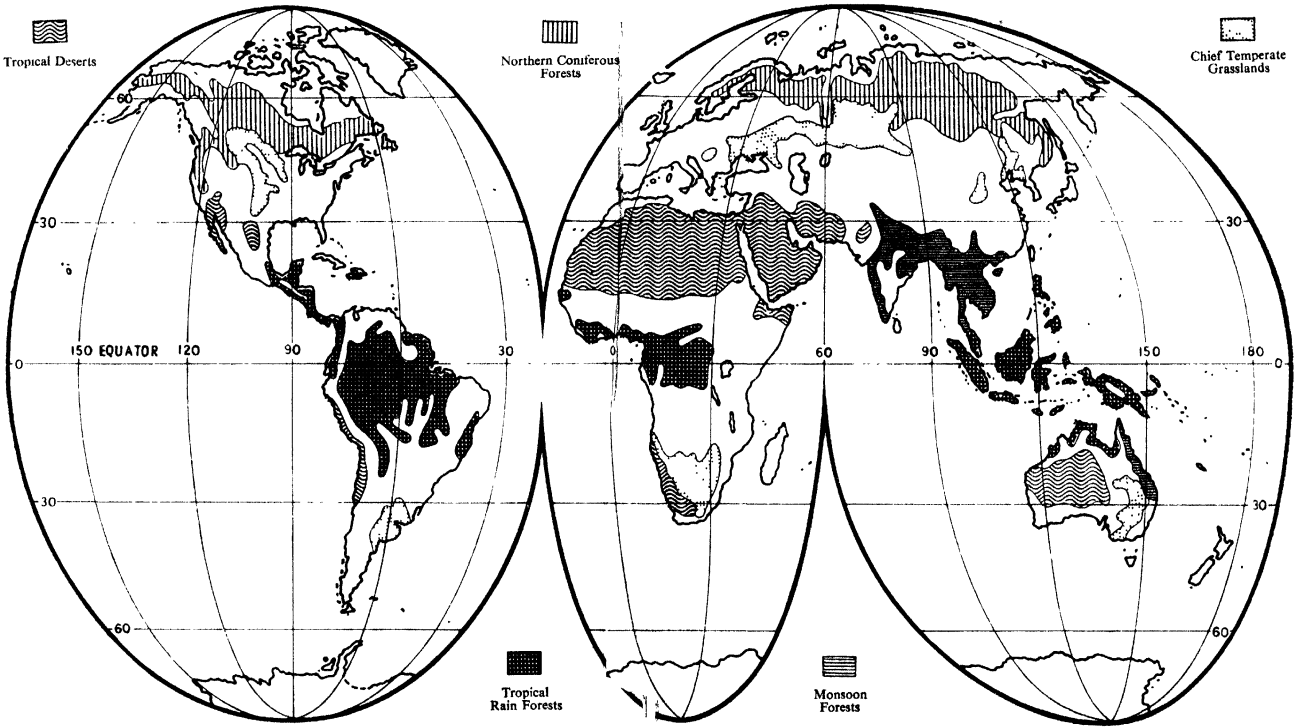
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GLOBAL GEOGRAPHY—BOOK ONE

# A FIRST LOOK AT THE WORLD

GLOBAL GEOGRAPHIES

GENERAL EDITOR – A. E. F. MOODIE, B.A., PH.D.

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BOOK ONE

# A FIRST LOOK AT THE WORLD

By

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LONDON

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# GLOBAL GEOGRAPHIES

Edited by A. E. F. Moodie, B.A., Ph.D.

Book I.—A FIRST LOOK AT THE WORLD
By A. E. F. Moodie, B.A., Ph.D.

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# PREFACE

Geography is the study of the world as the home of man. No one can ever hope to learn everything about the world and its peoples. Man has not yet travelled everywhere over its surface and only parts of it have been accurately surveyed and mapped: hence there are still many gaps in our geographical knowledge.

One thing is clear; no two parts of the earth's surface are exactly alike. Even in a small country such as England there are differences between one part and another, in relief, in soil, and in the weather; and these and other physical differences are largely responsible for differences in scenery, in the way in which the land is used by people living on it, and in the ways in which those people live their lives.

The study of all these differences is important. Some things can be done in some areas that cannot be done in others. Some countries possess many natural and rich resources and their people may become prosperous. Other countries are less well endowed and however skilled and hard working their people may be, they cannot become as prosperous. Mostly people try to fit themselves into that part of the earth's surface on which they live although some dislike their surroundings so much that they will move to another part of their homeland, or even to another country. Such changes are always taking place.

It is sometimes said that children grow up in a world which is different from that of their parents, but the physical world, of land and sea, of mountains and plains, of forests and deserts, of sunshine and rain, remains very much the same from one generation to another. Such changes as there may be, arise mainly from man's efforts to improve the surroundings in which he lives. The more we know of the geography of the world the better we can understand what is happening. At no other time have there been greater or so many rapid changes; indeed we are living in an age of world-wide changes.

This series of books has been planned and written to give the reader a picture of the geography of the world as it appears to be in the middle of this present century of change. The editor has been fortunate in his team of authors. Each of them is a teacher of geography and each has had much experience as an examiner in the subject. The considered intention has been to provide a

comprehensive, up-to-date survey of the world, graduated in language and amount of detail, to suit the needs of post-primary schools. Both editor and authors are well aware of the range of requirements imposed by syllabuses and the like; hence the individual volumes have been designed in such a way that they may be used separately where necessary.

A. E. F. M.

# CONTENTS


| | PART I | *Page* |
|---|---|---|
| Chapter 1 | LAND AND PEOPLE | 1 |
| 2 | TOWN AND COUNTRY | 9 |
| 3 | FOOD AND SHELTER | 16 |
| 4 | TYPES OF OCCUPATIONS | 22 |
| 5 | TYPES OF OCCUPATIONS (CONTINUED) | 32 |
| 6 | TYPES OF OCCUPATIONS (CONTINUED) | 37 |
| | PART II | |
| | INTRODUCTION | 44 |
| 7 | FARMING IN SOUTHERN ENGLAND | 46 |
| 8 | PRAIRIE FARMING | 54 |
| 9 | PEASANT FARMING IN CENTRAL EUROPE | 63 |
| 10 | ALPINE PEASANT FARMING | 75 |
| 11 | SHEEP-FARMING IN NEW ZEALAND | 84 |
| 12 | FARMING IN TROPICAL LANDS | 93 |
| 13 | PLANTATION AGRICULTURE IN TROPICAL LANDS | 100 |
| 14 | FARMING IN MONSOON LANDS | 109 |
| 15 | IRRIGATION FARMING | 118 |
| 16 | FOREST OCCUPATIONS | 129 |
| 17 | FISHING | 141 |
| 18 | COAL AND ITS MINING | 150 |
| 19 | IRON-ORE AND ITS MINING | 161 |
| 20 | PETROLEUM | 171 |
| 21 | MANUFACTURING INDUSTRIES | 180 |
| 22 | STEEL INDUSTRY | 186 |
| 23 | THE TEXTILE INDUSTRIES | 193 |
| 24 | THE DISTRIBUTIVE OCCUPATIONS | 199 |
| 25 | ONE WORLD | |
| | INDEX | |

# ILLUSTRATIONS AND MAPS

FRONT ENDPAPER – The World – Some natural vegetation regions.

| *Fig.* | | *Page* |
|---|---|---|
| 1 | The world – distribution of population density | 3 |
| 2 | Populations and areas of the six main parts of the world | 7 |
| 3 | Map of Godshill, Isle of Wight, and its surrounding district | 14 |
| 4 | Aerial view of Godshill, Isle of Wight | 51 |
| 5 | Aerial view of farms in the Spring Wheat Region of the U.S.A. | 57 |
| 6 | Peasant villages in South-east Germany | 66 |
| 7 | The village of Consdorf, Luxemburg | 68-69 |
| 8 | A cross-section of a Swiss Alpine Valley | 76 |
| 9 | Aerial view of a Swiss Alpine Valley (Celerina) | 79 |
| 10 | The Upper Engadin Valley in Switzerland | 81 |
| 11 | A sheep farm in South Island, New Zealand | 88 |
| 12 | Part of a rubber plantation in Malaya | 102 |
| 13 | Aerial view of a coffee plantation, Uganda | 105 |
| 14 | Farming in Kyushu, Japan | 112 |
| 15 | Ghardaia Oasis, Algeria | 121 |
| 16 | Aerial view of a modern oasis in the Eastern Sahara desert | 123 |
| 17 | Irrigation farming in Florida, U.S.A. | 126 |
| 18 | Northern coniferous forests in Canada | 131 |
| 19 | Yellowknife village, North-west Territories, Canada | 135 |
| 20 | What has happened to the forests of the U.S.A.? | 138 |
| 21 | The great fishing grounds of the world | 144 |
| 22 | The chief Coal-fields of the world | 154 |
| 23 | The chief iron-ore fields of the world | 164 |
| 24 | Noranda – a mining town in Quebec, Canada | 169 |
| 25 | The chief oilfields of the world | 174 |
| 26 | The chief manufacturing regions of the world | 182 |
| 27 | A general view of the iron and steel works at Consett, County Durham | 190–191 |
| 28 | Preston, Lancashire, England | 196 |
| 29 | (a) P. & O. liner *Chusan* | 201 |
| | (b) The oil tanker *Velutina* | 202 |
| | (c) Diesel-electric train in the U.S.A. | 204 |
| | (d) Barges on a British canal | 205 |
| 30 | (a) Post Office workers sorting letters and parcels | 207 |
| | (b) B.O.A.C. 'Comet' air liner | 208 |
| | (c) Cable ship H.M.T.S. *Monarch* | 209 |
| | (d) Burnham radio station | 209 |
| 31 | Distribution of Middle East oil | 211 |

BACK ENDPAPER – The world – Showing approximate location of some of the places shown in photographs in this book.

# PART I

## Chapter 1

## LAND AND PEOPLE

The earth's surface is the home of many millions of people, so many, in fact, that it is almost impossible to imagine their numbers and it is certainly impossible to count them all accurately. Many countries take censuses, usually every ten years, and they give a fairly good count of all their people. In the United Kingdom, for instance, censuses have been taken since 1801 during the first year of every decade (excluding 1941). In more than half of the world, however, it is not possible to count the people by censuses so that estimates have to be made and these cannot be accurate.

### WORLD POPULATION

The numbers given in this book have been collected by the United Nations Organization which is supplied with information by almost all countries in the world. Although they are not always exact, they give a useful picture of the world's population. According to the latest figures, there are 2,378 million people living on a land surface of about 53 million square miles. This fact in itself has very little meaning for most people but there are certain things about this world population which can be understood.

In the first place, this population is increasing rapidly and steadily. Between 1920 and 1949, it increased from 1,834 million to 2,378 million, that is, by 544 million in twenty-nine years. If

this rate of increase continues, the world's population will be doubled in less than a hundred years. This means that every year there are millions more mouths to be fed all over the world, and the rate of food production is not keeping pace with the increase in population. This is one of the world's greatest problems. Many scientists are exploring methods of producing more and more food but the prospects of balancing food production with increasing population do not seem very bright at present.

The second outstanding fact about all these people is that they are very unevenly spread over the earth's surface. To begin with, there are no people living permanently on the open seas nor on the ice and snow of the polar regions. This explains some of the blank spaces on the world population map (see Figure 1). Even on the land surfaces of the rest of the world, however, the population distribution is very uneven.

TABLE 1. WORLD POPULATION IN 1949

| *Land Areas* | *Population in millions* | *Area in millions sq. kms.* | *Density per sq. km.* |
|---|---|---|---|
| Africa .. .. .. | 198 | 30 | 7 |
| The Americas .. .. | 321 | 42 | 8 |
| Asia (excluding U.S.S.R.) .. | 1,254 | 27 | 47 |
| Europe (excluding U.S.S.R.) | 400 | 5 | 80 |
| Australasia .. .. .. | 12 | 9 | 1 |
| U.S.S.R. .. .. .. | 193 | 22 | 9 |
| World .. .. .. | 2,378 | 135 | 18 |

Table 1 shows that more than half of the world's people live in Asia, even if we exclude the Asiatic part of the Soviet Union. In spite of its small size, compared with the other continents, Europe (excluding the Soviet Union) contains almost one-sixth of all the world population. These two areas together contain two-thirds of mankind yet their combined area is less than one-quarter of the land surface.

Within the continents, the distribution of population is still very uneven. The steep slopes of mountains are generally unsuitable for farming and their higher parts are too cold and barren for

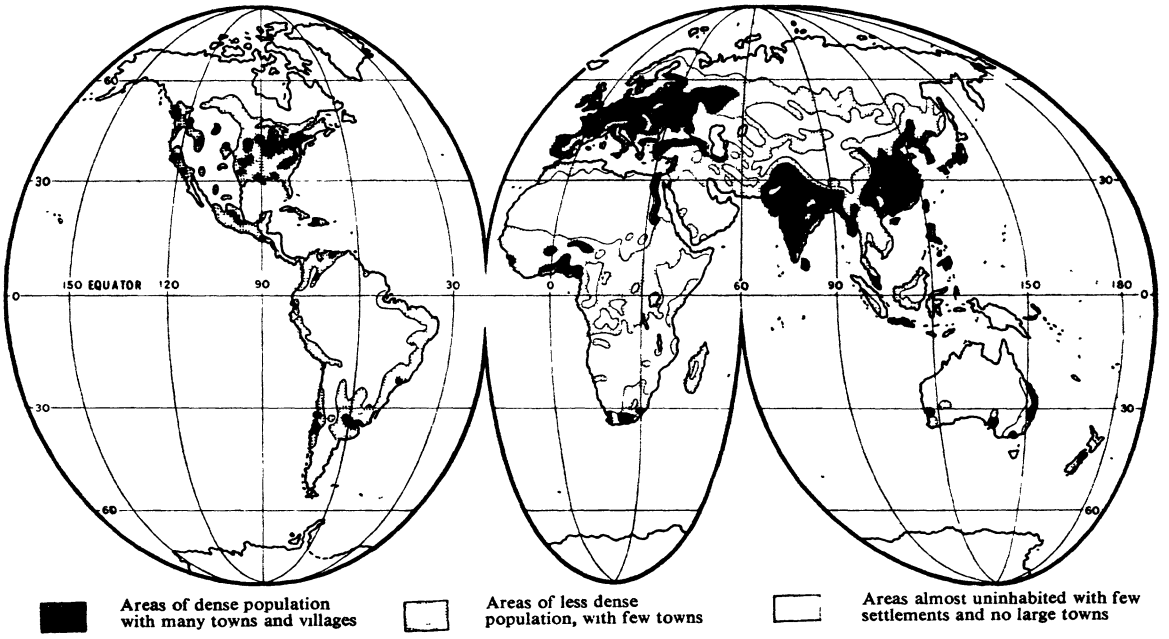



FIG.1 – *The World – Distribution of Population Density*
Like the End Maps and Fig. 2, this is an equal-area map which means that the lands and seas shown here are in proportion to their actual size. All the large areas of very dense population are in the Northern Hemisphere.

human occupation. Deserts are too dry for many useful plants to grow and therefore cannot support many people. Also, the northern parts of North America and Northern Eurasia are too cold to be suitable for dense populations, while the Equatorial Lands are still too heavily forested. The best areas for people to live on are the great plains, particularly where they are close to the oceans so that their inhabitants can take part easily in world trade. If such plains possess mineral wealth, especially coal and iron, they are suitable for industrial growth and so can provide work for many millions of people in addition to those who live by agriculture.

## THE THREE MAIN AREAS OF DENSE POPULATION

Figure 1 shows that there are three main areas where population density is very great.

1. WESTERN EUROPE. This is the home of great industries and very good agriculture. It is also the main centre of world trade.
2. SOUTHERN ASIA AND THE FAR EAST. Here people are more closely crowded together than in any area of the same size anywhere else in the world.
3. NORTH-EASTERN U.S.A. AND THE NEARBY PART OF CANADA. This is the most recently developed of the three main areas of dense population. Its people have followed the Western European way of life to a large extent. Many of their ancestors came across the Atlantic. Modern Americans have, however, worked out new methods in industry and in agriculture.

Even within these main areas of dense population, the people are still not evenly spread over the land. Population maps of small countries like England, or Belgium (which has the densest population in the world), show that there are still areas with quite small numbers of people in them. These areas are often quite close to great cities and make a striking contrast with them. In Southern and Eastern Asia, where most of the people work on the land, the very dense populations are found on the valley floors of the great rivers such as the Ganges, the Yangtze-kiang and the Hwang-ho.

In such areas every piece of land that can be used is devoted to crops of some kind and the numerous cities are marketing centres. At the same time, there are areas of much less dense population even in this region of Southern and Eastern Asia.

## POPULATION IN TEMPERATE LANDS

It will be noticed that two of the main areas of dense population are in the Temperate Lands of the Northern Hemisphere between latitudes 30° and 60°N. The remainder of the Temperate Lands, in both hemispheres, is much less densely populated. There are areas, such as the Northern Plains of Italy and the Ukraine of the U.S.S.R., where industries and agriculture together support large numbers of people, but there are other areas which are nearly 'empty' of people. This is notably true of the Temperate Lands of the Southern Hemisphere: the 'young' lands of South America, South Africa, Australia and New Zealand. Before this century began they were colonies of countries of Western Europe. They have few large manufacturing industries and their people are mainly concerned with producing raw materials. Changes are taking place in them rapidly but they have not yet reached the stage when they can support very dense populations on large areas.

Then there are the deserts and semi-deserts of the Temperate Lands and also the Temperate Forests where it is impossible for great numbers of people to live. There are scattered settlements in these areas but the physical conditions, especially the climates, are not favourable to dense populations. Irrigation may help to support many people, as in the valley of the Nile in Egypt with its 18 million inhabitants, or mining may give work to many thousands of town-dwellers as on the forested slopes of the Ural Mountains in the U.S.S.R. but, on the whole, much of the Temperate Lands is thinly populated.

## POPULATION IN THE TROPICAL LANDS

In few parts of the Tropical Lands is population density very great.

These areas usually have either too much or too little rainfall. In the Amazon Basin in South America, the Congo Basin of Central Africa and on some of the islands of the East Indies, the natural vegetation consists of very dense forests known as Equatorial Rain Forests. Great heat and heavy rainfall in these areas encourage the growth of closely-packed trees which do not permit dense populations. To south and north of the Equatorial Forests there are in some parts of the world great deserts such as the Sahara and Kalahari. Few people can live in these arid lands because of the lack of water. Deserts do not consist entirely of great stretches of sand, and water is sometimes obtainable from springs and wells, but not in sufficient quantities to support dense populations.

## CONCLUSION

From this first chapter, two main facts should be noticed.

1. The population of the earth is very unevenly distributed. This is because the resources of the world are also unevenly spread. Land suitable for different kinds of farming, minerals and other materials for industries, rivers for transport or irrigation, are the chief resources upon which mankind depends and they are unevenly distributed.

2. In spite of these uneven conditions, there is a kind of pattern in the distribution of the world's population. This pattern is shown in Figures 1 and 2. It is one of the most important facts in world geography because it represents the world-wide relations between man and the surroundings in which he lives. It is not an accident that some areas have dense populations while others are only thinly peopled. The great majority of people must live where they can find work and food, that is, where the land provides resources for them and their activities.

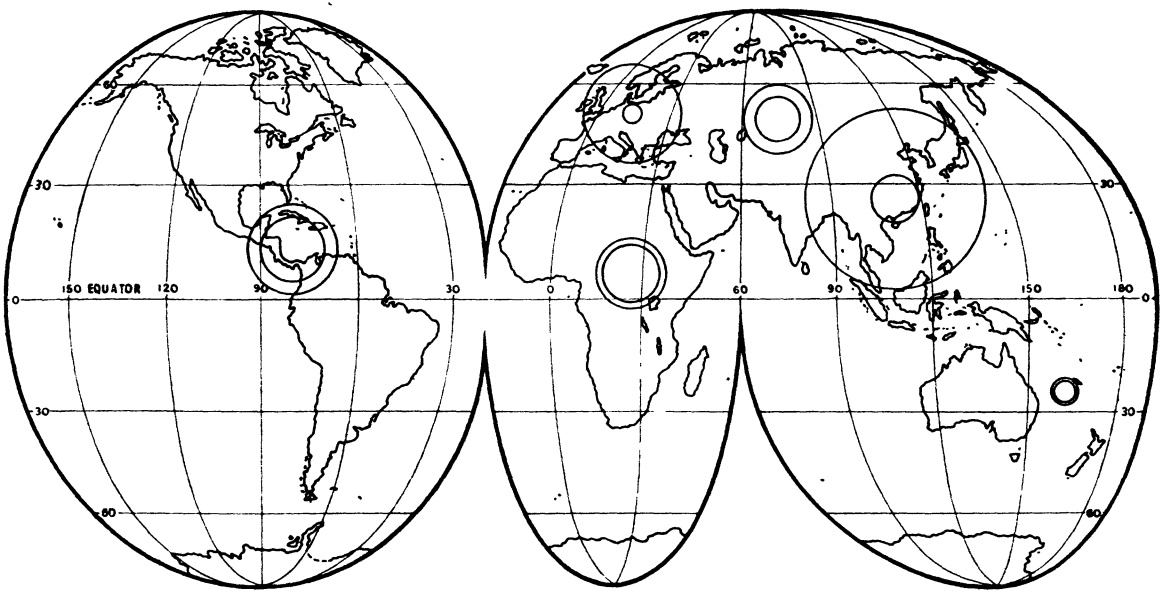



FIG.2 – *Populations and Areas of the Six Main Parts of the World*
The outer circles are in proportion to the total populations and the inner circles to the total areas except in Australasia where the outer circle represents the land area. The areas are the Americas, Europe (excluding the U.S.S.R.), the U.S.S.R., Asia (excluding the U.S.S.R.), Africa and Australasia (see Table 1, p. 2). Compare this map with Fig. 1 as this is another way of showing population density.

## EXERCISES

1. What do you understand by the term population density?
2. Metric units are used in Table 1. Convert the areas into millions of square miles and the numbers in the last column to density per square mile.
3. On a blank map of the world draw rectangles to show populations and areas given in the first two columns of Table 1. This is another method of showing the facts represented in Figure 2.
4.

| | *Area* (*thousands of sq. kms.*) | *Population* (*millions*) |
|---|---|---|
| Japan .. .. | 370 | 80 |
| Australia .. .. | 7,700 | 8 |
| England and Wales | 151 | 42 |

Calculate the density of population per square kilometre for each of these countries.

## Chapter 2

# TOWN AND COUNTRY

The people of the world are of many types and there are many ways of classifying them. Geographically, people may be divided into two main types – those who live in towns and those who live in the country. It is not suggested that the former are better or worse than the latter but their ways of life are different. Urban populations live in large closely-packed communities, while rural populations usually occupy smaller settlements containing fewer inhabitants.

Every country in the world shows this difference between town and country dwellers. Some, such as Britain, Belgium and Germany, have more urban than rural people while others, such as Bulgaria, Egypt and India, have a large proportion of their people living on the land. In every country, however, towns are increasing in size and number; there is ' a drift to the towns ' which is world-wide and is well worth studying. So important is this problem in Britain that 'New Towns' are being planned and built to accommodate the 'overspill' from the older towns.

### URBAN POPULATION

Why do people live in towns? Many answers have been given to this question but there is no doubt about the chief reason. It is that there are more opportunities for obtaining work of greater variety in the towns than anywhere else. The great majority of mankind must work for their living in some way. As the factories, offices, markets and shops are in towns, there is a greater variety of employment in them than in the country where the chief occupation can only be agriculture or possibly forestry. As towns grow,

more people are required for industry and commerce but there is not the same increase in demand for workers on the land. Indeed, as more machines are used on farms, the need for workers decreases. These factors explain the concentration of population in towns.

There have been towns since very early times. The Egyptians and Greeks built cities where the produce of the nearby country could be marketed, but the most famous town builders were the Romans. They introduced the idea of living in towns to Western Europe partly because they were accustomed to that way of life in Italy, but also because towns were necessary, in the lands they conquered, to act as headquarters of the Legions which controlled the life of the Provinces. In Britain, typical examples of Roman towns are York, Colchester and Chester which, unlike many similar Roman centres, have survived as towns, but do not equal in size many of the more modern urban settlements.

When the Roman Empire collapsed, nearly all the towns of Western Europe decreased in importance and it was not until the nineteenth century that the habit of living in very large groups began to develop rapidly. This was the result of the growth and spread of manufacturing industries which then took place. Once the factory system began to replace the older methods of making things in peoples' homes, then urban growth became inevitable. Industries provide work for large numbers of people in fairly small areas. Usually factories are built close together in 'industrial areas' because, before there were buses and electric trains, people had to live close to their work. This led to the growth of towns which seemed to spring up like mushrooms, especially on the coal-fields which became very important during the nineteenth century. Today, the populations of Britain, Western Germany, Belgium and the Netherlands and the north-eastern states of the U.S.A. are highly 'urbanized'.

As industries grow, more and more raw materials are required to keep their workers occupied and also more markets must be found for the sale of their manufactured goods. This means that trade, both national and international, must grow and increasing

numbers of people will find work in the collection and distribution of the many commodities. All towns and even villages share in this work, but for some purposes it is better to concentrate trade in certain places such as ports and route junctions. Once such a movement begins, it tends to grow rapidly so that towns become very large and important as trade centres and then they often set up factories to deal with some of the goods they handle. Good examples are to be found in great ports such as Liverpool, Bristol, New York and Hamburg.

In addition to industrial and commercial work, some towns have the task of acting as capital cities of their countries. Practically the entire land surface of the earth is now divided among nearly a hundred countries or States. Some are very large while the smallest are no larger than an English county. Each of them has a capital where the Government sits and conducts the affairs of its nation. The running of a modern State seems to require more and more people; civil servants, lawyers, bankers and, indeed, officials of every description. Most of them live and work in or near the capital city and help to swell its population. The largest towns in the world are those where this administrative work is combined with industrial and commercial occupations. London, Moscow, Paris and Berlin illustrate this clearly and the population of each of them runs into millions.

These are some of the reasons why people live in towns. There are many others of less importance. Many people find pleasure in 'Going to Town' to visit theatres, cinemas and the big shopping centres. A smaller number appreciates the advantages of being where there are libraries, museums and, in some towns, universities and larger schools.

There is also the question of how people live in towns. Before the beginning of this century, most towns were unhealthy places to live in, at least for the great majority of the town-dwellers. There was serious overcrowding, especially in the new industrial towns, the water supply was poor, good sanitation was very rare, the roads were bad and street lighting was found only in some of the main parts. It would be wrong to suggest that the towns of

the present day are perfect. They are still far from that happy condition but they are much more healthy as places to live in. They are better lighted, streets are wider, cleaner and better surfaced. It is true that the roads are probably more dangerous because of the greatly increased traffic but the people are able to travel more easily and it is no longer necessary to live next door to the place of employment.

Whatever the reasons may be, there can be no doubt that people in nearly all countries are drifting to the towns. This is true of the old as well as the new countries. It has been estimated that 85 per cent of the population of the United Kingdom are town-dwellers. What is more surprising is that in Australia, which is a fairly new country, more than half the total population lives in the six towns which are the capital cities of the states of that country. In the Soviet Union, it has been estimated that 23 million people moved from the country to the towns between the census years of 1926 and 1939. An American expert has written of the U.S.S.R. that 'Migration was clearly the main factor in the growth of cities'.

## RURAL POPULATION

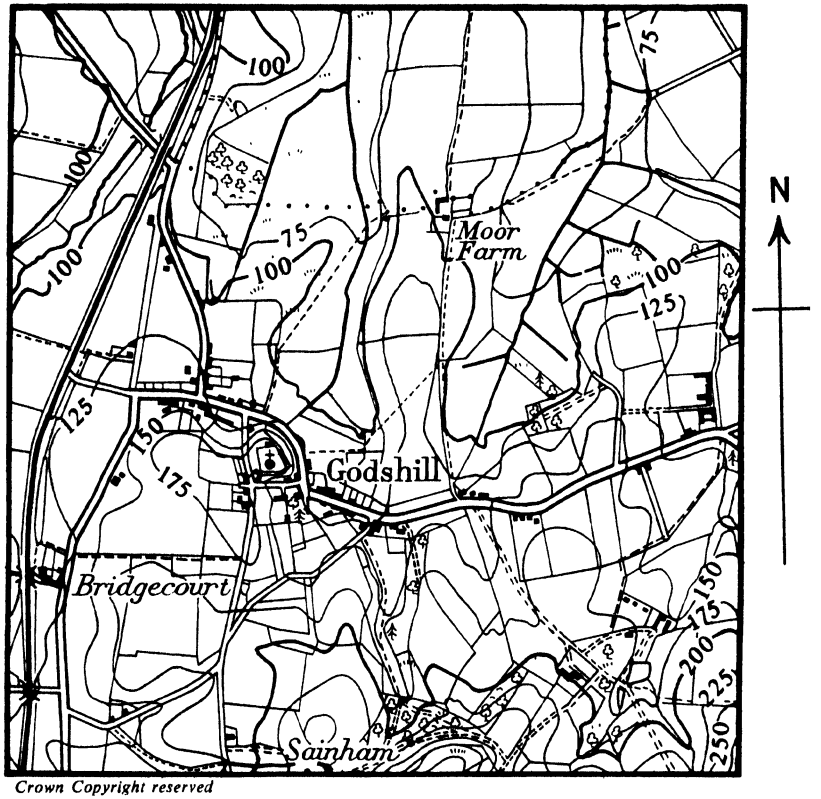
In every country, the rural population is less dense than that of the towns. Work on the land requires fewer people than the factories and business offices of urban areas. The chief use of the land is to provide food and raw materials in different ways according to the geographical conditions of any particular area. In later chapters, examples of the methods of land use will be studied but the main point to notice here is that, although agriculture gives employment to more people in the world than all the the other occupations put together, farm-workers are more widely distributed than urban workers.

The density of rural population varies from country to country, and from place to place, according to the kind of farming which is followed. Where the farming is intensive, the land is very carefully cultivated and therefore more people are needed. In such

areas, particularly in the irrigated parts of Egypt and India, the rural population is very dense. If the land is extensively farmed, the fields and farms are usually large, the amount of crops per acre is small and machines are often used to do much of the work. Fewer people are therefore required and the rural population is not very dense. This is the type of farming which is practised on the Prairies of North America and, indeed, in some parts of Britain.

Rural population lives in villages and hamlets. The former may vary in the numbers of their inhabitants from a few tens to several thousands. The houses in the village may be closely packed together or they may be scattered over a wide area. It is interesting to notice that in Britain, as well as in other English-speaking countries, the actual farm-houses often stand by themselves outside the villages. In most other countries it is common to find all the houses in the villages and usually close together. Figure 6 shows a number of villages in Germany and reveals a pattern which is fairly typical of many countries. Figure 3 shows a different kind of settlement. Most of the houses are packed in the village but some of the most important are scattered outside it. In Britain, it is common practice for the farmer to live on his land, whether he owns or rents it, and for his employees to live in the village. In most countries of the Old World from France to China, but excluding the Soviet Union, the land is farmed by peasants. These people work smallholdings which they usually own. There are many of them and there is no land to spare. They huddle together in their villages and go out to the fields to do their work. The farmlands surround the village and are divided into very small fields or strips. This is quite a different system from that followed in England and has many disadvantages including the waste of time in travelling from village to strip or from strip to strip.

As we shall see in later chapters, life is hard for the peasant and his family. He finds it difficult to produce enough food on his small farm and even more difficult to earn money. Even the richer peasants do not enjoy the comforts to which industrial workers have become accustomed, so that it is not surprising that




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FIG.3 – *Map of Godshill, Isle of Wight, and its surrounding district*
This map is drawn on a much larger scale than Figs. 1 and 2, and therefore shows much more detail. Compare this map with the photograph in Fig. 4, page 51.

many of them are attracted to the towns. In the past, millions of European peasants have migrated to the Americas where they have obtained more land or employment in industries. This outlet is now almost closed and very few Europeans may cross the Atlantic to find new homes and new jobs. The result is seen in the increasing drift to the towns in Europe and especially in Eastern Europe where new industries are being set up in the towns.

In spite of these difficulties, peasants, and indeed farmers everywhere, are very attached to their land. Farming is hard and skilful work but it is very satisfying and nobody doubts its importance at the present time. Many towns have grown to great size but the majority of the world's workers still farm the land in some way or other and produce the food and other raw materials which are necessary to themselves and to the urban population. They have a very important task especially as the world's population is steadily increasing. That is the reason why more attention is given to various kinds of farming in later chapters of this book. All the towns and all the industries and commerce of the world would be in serious trouble if the farmers ceased sending their produce to the markets. Some town dwellers are inclined to despise country people and their work, but they should remember that their own way of life would be impossible without the farmers and the things they produce.

## EXERCISES

1. When a town has a million or more inhabitants, it is described as a 'millionaire' city. From your atlas or another source find how many 'millionaire' cities there are in Europe (excluding the U.S.S.R.).
2. Find as many reasons as you can why people prefer to live in towns.
3. Make a list of the chief occupations of the inhabitants of the town in which you live or of the nearest big town.
4. Describe the advantages of living in the country.

## Chapter 3

# FOOD AND SHELTER

### FOOD AND SHELTER AS NECESSITIES

It has already been pointed out in Chapter 2 that, although they live different kinds of lives, town and country people depend on each other. This is true for most parts of the inhabited earth because all the millions of people who make up the world's population must have at least two things, food and shelter, the latter including clothing. The kinds of food and the types of shelter vary greatly but they must be available in some form. Otherwise human life is impossible. We could manage without luxuries and many other things although we should be much less comfortable. But all people have this much in common; they must eat and have shelter.

In order to provide these two essentials, the great majority of the world's people must do some form of work. They may be employed and receive wages for their work or they may grow their own food. There are very few people in the world who are completely self-supporting and even fewer who do not help to produce something. In many countries, the women and children are expected to assist in this production. Where mothers do not 'go out to work', they have the important task of looking after the home. This helps the work of the fathers and also ensures that the children are fed and sheltered.

Two important facts concerning occupations and production may be noted here. First, individual people can rarely manage their work entirely alone. They may be specialists or unskilled workers, factory 'hands' or farm labourers, but the full value of their work depends on the way in which they co-operate with each other. To take an extreme case, the trapper of the Northern Forests may live and work alone for weeks at a time but he would

gain little from his difficult occupation without the help of the fur-trader who buys his skins and sends them to distant markets.

Secondly, no country in the world can produce all the requirements of its people. The U.S.A. and the U.S.S.R. are the largest countries in the world, with far more resources than any other State, yet they find it necessary to import some goods from other parts of the earth's surface. On the other hand, remote Tibet with very few opportunities for human activities, manages to carry on a certain amount of foreign trade in spite of all its very great difficulties. Perhaps the best example of this dependence on other lands, is provided by Great Britain where it is just impossible to produce all the food and other raw materials which the people and industries require. Without imports, and the necessary exports to pay for them, all the people of Britain would suffer. That is why so many things are difficult to obtain in our own country today. Over half of our total food supplies must be imported and must be paid for.

## WAYS OF PROVIDING FOOD AND SHELTER

With the above points in mind, it is possible to examine the occupations by which people provide their essential needs of food and shelter. There are many of them and they vary from one country to another and even from district to district. Long ago, when life was simpler than it is now, there were fewer types of occupation and almost all the work was done by hand. Then a man could build his own shelter and grow his own food ; his wife could make the family's clothes and help him in the fields. That way of life has disappeared from Western Europe and from most of North America but it still exists in other parts of the world. In many areas in Africa, Asia and South America, the people still lead primitive lives. Their simple occupations are much more closely and more directly related to their physical surroundings than are those of the inhabitants of the more advanced countries. It is when we try to understand the occupations of these latter lands that we meet the difficulties of greater complications.

This point is worth remembering because all countries are making some progress towards what is called a higher standard of living. The speed of this progress varies very widely. Millions of Chinese and Indian people are very little better off than their ancestors were. In Western Europe and in North America, the standard of living is much higher than it was even one hundred years ago. Many people think that the growth of industries helps to improve the conditions of life of the inhabitants of a country. On the whole, this has been true of Great Britain and other industrial countries. The result is that practically all States are now trying to set up their own factories to produce their own manufactured goods. About a century ago, Britain was rightly described as the 'Workshop of the World' because its people supplied manufactured goods for sale wherever there were purchasers. Today, British manufacturers are finding it increasingly difficult to sell their goods because more and more countries either already have or are establishing their own industries. This process has been speeded by the two world wars during which the British people were so occupied with producing war materials that they were compelled to neglect their peace-time customers who, in turn, were forced either to make their own goods or to manage without them.

It is a mistake, however, to think that manufacturing industries alone will provide the food and shelter which people must have. A much better plan is to keep agriculture, industries and trade all working at full speed and at the same time. No country can afford to neglect any one of its chief occupations. During the nineteenth century, Britain became prosperous by increasing its manufacturing industries and selling its goods abroad. With the money so gained, abundant supplies of food were bought overseas quite cheaply. Those days of 'cheap food' have gone. The great food-producing lands now demand higher prices for their wheat, beef and dairy produce. They hope to improve the standards of living of their own people in this way but the results are very serious for those countries which must continue to import their products.

This is one of the main reasons why British farmers are being encouraged to produce more food.

Britain is not alone in facing this problem. As the world's population goes on increasing, the demands for food must also increase and there are no more large new areas to be turned into farmlands. This means that every country must do all that is possible to increase its output of foodstuffs as well as of other materials. It seems that no country will be content to remain purely agricultural; each wishes to have industries and foreign trade. If the living conditions of all people are to improve, then each country must develop all its resources to the maximum and then exchange its surpluses for those of other lands. This may not mean that there will be plenty of everything for everybody but it will help to avoid the famines and semi-starvation from which so many millions of people still suffer.

The British Government has made a good start in this direction by helping the economic development of the Colonies, and the Government of the U.S.A. is already spending billions of dollars every year in assisting the 'backward countries'. These are generous efforts but they cannot solve all the problems of the 2,378 million people of the world. The only way to do that is for all countries to realize that they depend on each other and that, therefore, they must 'pull together'. Standards of living cannot be raised quickly or easily; the problem is immense and the complete answer to it will be found only after years of hard work and serious effort. The whole matter is very difficult but we can begin to solve its problems by trying to understand them.

The big mistake that has often been made is to think of the countries of the world as being able to support their people independently of other lands. That may have been the case in the distant past, although it is worth recalling that even the ancient Egyptians and Greeks did trade with other peoples. Today, more than ever before, all countries are inter-dependent. This is also true of the individual people of each State. You may grow up to be a bus-driver, a postman, a clerk, a factory hand or even a millionaire but you will remain dependent on the efforts of your

fellow-countrymen. In other words, we are all members of a community and the world is made up of a large number of communities. Much of this book is concerned with descriptions of the occupations of these communities but we must avoid thinking of either the communities or of their members as separate and distinct from each other. Similarly, the different occupations which all these people follow are closely related to each other. They are united in two ways. First, they are the means by which people obtain their essential needs of food and shelter. Secondly, they are usually linked with the geographical conditions in which they are followed.

## THE ACTIVE POPULATION

In Chapter 1 a reference was made to the censuses and estimates by means of which the world's people are counted. When they receive their census forms, people are asked to supply certain information, including the occupations which they follow. The completed forms are carefully checked and, among other things, the people are divided into the 'active' and the 'inactive' population. The former includes all those, men and women, who work at some occupation or profession. The remainder, who do not, and who include housewives and children, are classified as 'inactive' people. This does not mean that they are useless members of the community. It is very difficult to separate the 'active' and 'inactive' people. Many housewives in Britain for example, are part-time workers. Also, in many agricultural countries, all the members of the family do some work on the land at certain times of the year. Such people are not classified as 'active' because they are not engaged in full-time work. In spite of such difficulties, it is very useful to know the numbers of active and inactive people, especially when comparing the numbers of people who follow the same occupation but in different countries. By means of these statistics, it is possible to find out approximately how many people are directly engaged in producing food or in other forms of work. Almost all countries now publish the numbers of their active population and the occupations which they follow.

## EXERCISES

1. Make a list of the foodstuffs which Britain must import from other countries.
2. What is meant by a 'backward' country?
3. Name the countries from which Britain receives the following raw materials: wool, cotton, petroleum and rubber.
4. Make a table with the headings *Country* *People* *Types of Dwellings.*
   Under each heading give as many examples as you can find.

## Chapter 4

# TYPES OF OCCUPATIONS

Human occupations can be said to fall into four main groups. Such a limited classification, however, has its difficulties because some occupations do not fit exactly into one group or another, but it is a useful step towards an understanding of the 'geography of work.' The four main groups are Primary Production, Manufacturing Industries, Distributive Trades and the Service Occupations.

### PRIMARY PRODUCTION

This group includes all the people who are engaged in producing things such as foodstuffs and other raw materials directly from the earth or from the sea. This is by far the largest group in numbers and, in many ways, it is the most important. Without them, there would be no food to eat or raw materials for the factories to manufacture. Of all people, they and their activities are most directly related to the surroundings in which they live.

The primary producers may be subdivided into four types according to whether they are engaged in agriculture, forestry, fishing or mining. They all have this much in common, that they do their work where Nature or the physical environment has provided the means to earn their livelihood.

### AGRICULTURE

More of the world's people are engaged in agriculture than in all the other occupations put together. This may be surprising to an English reader because less than 10 per cent of the 'active' population in the United Kingdom is engaged directly on the land.

Against this, it should be remembered that in some countries over 75 per cent of the workers are farmers of some kind. That is why agriculture comes first on this list of primary producers.

The success or failure of the farmer depends on the skill with which he adapts his work to the natural conditions of his land. He must find the right way of using his soil and his climate and, if he produces for a market rather than for his own needs, he must grow the right crops for his customers. The many different parts of the earth's surface are rarely suitable for the same type of land-use but there are certain kinds of farming which are common in many lands and which give us a broad scheme into which later detailed descriptions may be fitted.

## ARABLE FARMING

The word 'arable' comes from a Latin word which means to plough and therefore gives us a clue to the kind of farming which it describes. The kind of plough used varies widely from the modern tractor-drawn machine which may turn over as many as eight or ten furrows at a time to the simple instrument consisting of a branch of a tree, the point of which has been hardened by charring in a fire. This latter 'plough' may be drawn by an ox, a horse or even a man.

When man first discovered that he could plough the soil and grow crops, he made it possible to increase food production. He also found that the more crops he grew, the sooner his soil became exhausted. Soil fertility can be used up very quickly and one of the oldest, and still one of the most important, problems for farmers is to keep a balance between crops and soil fertility. Primitive peoples in tropical Africa and tropical America meet this problem by 'shifting cultivation'. They clear a patch of woodland by burning and then grow crops such as maize on the cleared land. After two or three years, they leave this cultivated patch to run wild and then clear a similar area somewhere else. Such a method of land use may be followed successfully where there is plenty of woodland and few people, but it is no longer possible in the great

arable farmlands. Something like it was practised in North America by the farmers of last century who steadily migrated westwards but it has ceased now because there is no more good new land to be had cheaply.

Today then, arable farmers are tied to the land they cultivate. Their chief task is to find the best way of producing crops and this varies according to the character of the soil they plough and the climate of their particular area. In general terms, there are two kinds of arable farming, intensive and extensive.

Intensive arable farming usually occurs where the amount of cultivable land is small in proportion to the number of people who live on it. Therefore the maximum use must be made of what land is available and so the amount of wheat, rice, maize, etc., which is grown on each acre of arable land is usually very high, i.e. there is a high yield per acre. Where high yields per acre are produced, the soil soon suffers unless it is carefully treated and provided with plant food in the form of manures, either natural or artificial. Much labour and skill must be used by farmers who practise this kind of farming. Many of the arable farms of Great Britain provide good examples of this skilful use of the soil although, at times, there has been serious neglect in British agriculture generally. Yields of 45 to 50 bushels per acre of wheat are by no means rare in East Anglia.

Intensive farming is practised on the arable lands of most of the 'old countries'. In Western and Central Europe, the Mediterranean countries, South-east Asia and the Far East, all the land that is at all suited to this method is cultivated intensively and often with great skill. The total area of such land is limited and so wasteful methods should be avoided.

Good examples of intensive cultivation are usually found on the outskirts of large towns where market gardening, or 'truck-farming' as it is called in America, is found. The demand for fresh vegetables, fruits and salads in these towns is met by the produce of the market gardens which is sent into the urban markets such as Covent Garden in London. So great is this demand that the market gardeners frequently gather two crops in a year.

Perhaps the best example of all intensive farming is to be found in the irrigated lands where more than two crops are sometimes produced in a year.

Extensive farming is more common in the 'new countries' where there is generally more land suitable for arable farming in proportion to the numbers of people who live on it. The early settlers who went to North America, Australia and New Zealand lived by employing farming methods similar to those to which they had been accustomed in their home countries. In time, they have passed beyond the stage of just providing food for themselves and their families, that is, of subsistence agriculture, to one where they are mainly concerned with producing crops for sale and export, either to other parts of their own countries or abroad. Until recently, good land was plentiful in these 'new countries' and the farmers preferred to produce large crops from big farms although the yield per acre was fairly small. Many Canadian Prairie farms, for example, still produce only 12 to 15 bushels of wheat per acre.

Such an extensive system has been greatly helped by the use of machines and, for a long time, North America led the world in the making and use of agricultural machinery. This method has been adopted by the Soviet Union where the collective farm or *kolkhoz* has replaced the small peasant farms of earlier days. There is a very serious danger in this type of farming. Most of it is practised on land that used to be natural grasslands where there is insufficient rainfall for forests to grow. Most of this rain falls in heavy showers in the summer months and may wash away the top soil. This is called soil erosion. While there was a cover of natural grass on these lands, the roots protected the soil but ploughing destroys the grasses and exposes the soils especially where the cultivated plants are grown in rows. Many thousands, if not millions, of acres of good land have been ruined by soil erosion in this way and this process will continue unless preventive methods are used.

## PASTORAL FARMING

Arable farming is the greatest of all food-producing occupations

but not all the earth's surface is suitable for this type of use. If the temperatures are too low or the rainfall is insufficient, or if the slopes are too steep, arable crops cannot be grown but the land may produce pasture. This varies widely, from good grasses to the sage bush of Western U.S.A.; in parts of the Mediterranean Lands of Southern Europe, animals find a living by browsing on shrubs whereas in Northern Finland, reindeer can live on the mosses and lichens which grow in that desolate land. Most of the best pastures, the natural grasslands, have been turned into arable fields but wherever else grazing is possible, there animals are reared. This is called pastoral farming.

Again there are many types of this kind of farming. The pastoralists may be chiefly concerned with cattle, or sheep, or goats, or other animals. These may be reared for their coats (wool or hair), for their skins for leather, for their flesh, or for their milk (dairy-farming). In every case, the land has a certain carrying capacity. In semi-desert areas, a few sheep may require many acres of the poor grazing and even then the shepherds may have to move them frequently to new pastures (nomadism). By contrast, in Australia, New Zealand and parts of North America, the large sheep-runs and cattle-ranges are enclosed by fences. They may be several square miles in extent but the pastoralists are not nomads, they live in permanent houses or stations. In Denmark the farmers go even further and the milk-cows are actually tethered in the fields and only allowed to graze small patches each day. Whichever of these and many other methods is used, there is a danger of over-grazing. When this happens, the pasture is destroyed and the number of animals it can support, i.e. its carrying capacity, is reduced.

Pastoral farming has two advantages over arable farming. First, it can be followed where the cultivation of arable crops is impossible and secondly, it generally requires less labour than arable farming. It is therefore a valuable means of food production in marginal areas or in new lands where there are not enough workers to plough, sow and reap. Furthermore, where there are no good railway or road systems, animals can be driven to market,

'on the hoof' as Americans say. When we add that animals produce food which is rich in the necessary proteins, it can be seen that pastoral farming has an important part to play in world food production. It also provides a large proportion of the materials required for making clothing.

## MIXED FARMING

Farmers of all kinds know that it is wise to use land and not abuse it. Too many animals on a pasture, the same crop grown on a field year after year, ploughing land that should be left in grass, all these are abuses of the soil and lead to trouble for the farmer. His greatest task is to keep his land 'in good heart' whether it is for arable or pastoral farming. One of the best ways of doing this is by mixed farming wherever it is possible. This means crop-growing and animal-raising on the same farm. The owner can then have a greater variety of produce, different uses for his fields and manure on his land.

This method cannot be employed in semi-desert areas whether they are hot or cold, but it is being used increasingly in the great arable regions. At one time, most American and Canadian Prairie farmers specialized in one crop, very often wheat, but now they practise rotation of crops and get better results.

England is a good example of a country of mixed farming. Visitors from abroad often admire the skill with which English farmers use their land for mixed farming. It is unusual to find a purely specialist farm in this country. In some parts, certain crops are more important than others but by far the largest number of farms are mixed.

## PLANTATION AGRICULTURE

This is a special form of land-use which is restricted to tropical areas where primitive farming methods were generally employed before the coming of white men. When Europeans decided to use these tropical areas for agriculture, they found that the shifting

cultivation of the native inhabitants (milpa-farming as it is called in America) produced very little surplus. They have replaced this system in many tropical lands by plantation agriculture. Under this system, stretches of land are acquired by individuals or by companies, the forests are cleared and the local people are paid to work under overseers. Much money is needed to start such plantations and the owners may have to wait a number of years before they make any profits. There are other difficulties to be faced. Diseases and pests attack the workers and the crops; the climate is often difficult for employers and employees and many plantation owners have made mistakes through not knowing the right way to farm tropical land. Yet this special form of agriculture has increased the world's supply of foodstuffs and other materials and this has been achieved by using lands which contributed very little until a few years ago. Today, most of the world's rubber, coffee, tea, bananas, cane sugar, pepper and other spices are produced on tropical plantations.

## FORESTRY

Much of the earth's surface is still covered with forests. There are two main types, the Temperate Forests and the Tropical Forests. The former once occupied much larger areas than at present but the deciduous forests of the warmer, damper parts of the Temperate Lands have been largely cleared, as in Britain, where the land was suitable for agriculture. The Coniferous Temperate Forests such as those shown in Figure 19 still exist in Northern America and Northern Eurasia mainly because they grow in colder, drier lands where both the climate and the soils are unsuitable for farming or because they are too difficult to reach and so are not used for timber supplies.

The Tropical Forests are found in the hot lands near the Equator. The numbers and types of trees which they contain vary according to the rainfall of any particular area. Some of the Tropical Forests have been replaced by rubber or coffee plantations (see Figures 12 and 13). The remainder are not of great direct

value to mankind, partly because of the climate in which they grow but mainly because they consist of a mixture of many kinds of trees, some of which are not worth cutting. Only such trees as mahogany and teak are valuable and they are usually widely scattered.

By contrast, the Temperate Forests generally consist of large numbers of trees of the same kind which are valuable for many purposes. Where they can be reached, a great many trees are cut and must then be transported as logs or as sawn-timber to places where they can be treated for different uses. Every year the accessible Temperate Forests are decreasing in size. Once the trees are cut, the new growth provides poorer quality timber. As is the case with mining, therefore, tree cutting has generally been wasteful. Not only has much of the timber been wasted: when the forests are removed, soil erosion takes place quickly. This may not be important in the areas which were once forested but it may lead to destructive floods in other places.

In many countries, the peoples have at least realized how wasteful and dangerous timber-felling has been. They have frequently started re-afforestation schemes, partly to increase their timber supplies and partly to prevent soil erosion. The forests which once covered much of Western Europe and U.S.A. can never be replaced, if only because the land is required for food production, but those which remain are being treated more wisely.

## FISHING

From very early times, people have added to their food supply by fishing. The fact that we use such an expression as 'the harvest of the sea' suggests how important this occupation is. Whether they do their work on the sea, on rivers or on lakes, fishermen may be separated into two main groups, full-time and part-time. In each case their fishing activities are restricted to areas where the fish are sufficiently abundant. Large-scale fishing such as that followed on the continental shelves of Europe and North America gives

permanent employment to many men who are often away from home for weeks at a time.

On the other hand, there are very few parts of the world where some fishing is not possible, even though on a small scale, generally to add to the local supply of other foods. In countries such as Norway, where there is little land suitable for agriculture, many of the farmers are part-time fishermen. Similarly, river fishing provides a useful addition to the diet of the local people but is rarely sufficient to give permanent employment to more than a few fishermen except in special cases such as in British Columbia.

Just as over-cutting will destroy forests for ever, so over-fishing will exhaust the food supply of the seas. Most countries guard their fishing grounds carefully and make laws concerning the size and numbers of fish which may be taken. An interesting case is the whaling occupation in Antarctic waters where this 'fish' was in danger of disappearing. Now there are international agreements to stop over-whaling so that at least some of these mammals may be preserved for future use.

## MINING

The rocks of which the earth's crust is made contain many minerals all of which are useful to man in some way or other. The world would be a very different place if people had not discovered how to obtain and use coal, iron-ore, petroleum and many other minerals. Like the world's population, its minerals are very unevenly distributed but one thing is common to them all. They can only be mined where they exist and at depths where they can be reached. This means that mining can only be carried on where there are minerals. In other words, mining is a fixed occupation. Once the minerals are extracted, they cannot be replaced. This explains why new sources of minerals are always being sought. British and American oil companies, for example, are very interested in the oil resources of the Middle East and geologists are exploring many lands in the hope of finding uranium ores.

Unlike agriculture, mining is independent of present climatic conditions. The miner never digs for minerals for his own use.

The products of his work are sent to other industries, sometimes thousands of miles away. If the minerals are valuable, railways and roads are built to carry them; in some cases, even aeroplanes are used for this purpose.

The miners' work is finished when the minerals are all extracted from the ground. When this happens, a mining settlement becomes 'dead' unless new occupations can be found for its inhabitants. This happened frequently in Western U.S.A. in the last century when gold-mining 'towns' grew up very quickly and then as quickly died. Mining is only a temporary use of the land.

## CONCLUSION

Lumbering, fishing and mining are primary producing occupations in each of which great care is necessary to prevent the natural resources from being used rapidly and wastefully. In themselves, they do not provide employment for very great numbers of people and they can only be practised where the resources are found.

By contrast, agriculture is the greatest provider of employment in the world as a whole. Where the climate and soils are suitable and where the land has been carefully used, there is no end to the production of food. Probably the best agricultural land in the world is in Western Europe where crops have been grown for at least two thousand years and where modern scientific discoveries have been used to increase yields of crops. Few people realize that, before the Second World War, Europe produced more wheat than all the rest of the world together.

## EXERCISES

1. What are primary producers? Give examples from the district in which you live or from nearby districts.
2. What is the difference between intensive and extensive farming?
3. Why is the Forestry Commission in the United Kingdom planting trees in many parts of this country?
4. What are minerals? What minerals are produced in your district or in neighbouring districts? Remember that sand, gravel and lime are minerals.

## Chapter 5

# TYPES OF OCCUPATIONS (*continued*)

### MANUFACTURING INDUSTRIES

The word manufacture originally meant 'making by hand'. It has almost completely lost that meaning now although it is worth recalling that factories would not be of any use without the hands and brains of the people who work in them. In many industries, the workers are still called 'hands'.

From the very earliest times in human history, people have made things, usually in their homes. The things they 'manufactured' were generally for useful purposes; simple tools and weapons were cleverly made to help in food production and in defence. Very often, too, skill and care were used in making beautiful things which had little or no practical value but which gave their makers much pleasure. This 'domestic industry' is still practised in many parts of the world to meet the simple requirements of primitive peoples.

Soon it was discovered that hand-made things could be 'traded' for other things. Nobody knows when this exchange of goods first began but its growth was restricted by the small amount of transport which was available. In modern times, two developments have been outstanding in causing great changes in manufacturing industries, at least in the industrial countries. First, the discovery of the use of mechanical power made it possible to increase production, and secondly, the great expansion of trade in the world provided markets for the manufactured goods and brought more raw materials to the factories. The changes which have thus come about in manufacturing are vast and their influences are felt everywhere. They are often described as the Industrial Revolution. It is a mistake to think they began suddenly or that they have ended. There is not enough space in this book to describe all

these changes but certain geographical aspects are well worth studying.

## TYPES OF MANUFACTURING INDUSTRIES

There are many ways of classifying occupations in industry. For our purpose, a simple division into two types is useful in preparation for later studies. These two main types are fixed industries and mobile industries each of which must have supplies of raw materials, labour, mechanical power and, perhaps most important of all, markets in which to sell the goods they manufacture.

## FIXED INDUSTRIES

These include the branches of manufacturing which have been fixed or 'located' where they are because of factors which do not easily or quickly change. They are nearly always 'heavy' industries requiring large quantities of heavy, bulky raw materials. An obvious example is shipbuilding which must be located where water is available for launching all but the smallest ships. Other examples are the iron and steel industries, the textile, and the heavy chemical industries. Their owners spend very large amounts of capital on their machinery and are unwilling to move the plant unless forced to do so for very strong reasons.

## MOBILE INDUSTRIES

These are also known as 'light' industries because they consume smaller quantities of raw materials than do the heavy industries. Their products are generally sent directly to shops for sale without any further processing and their success depends on satisfying the customers' requirements. That is why the majority of such factories are built in or near towns where the large population acts as a market for their goods. It is a common feature of all large towns to find light industries by railways or at the side of main roads so that the finished goods can be sent easily and quickly to the shopping-centres.

The new factories in this branch of industry are pleasant to look at and provide greatly improved conditions of work for their employees. They are very different from the grim buildings, such as those shown in Figure 28, which were built in the nineteenth century. Frequently they are surrounded by gardens or lawns and the work inside them is much less unpleasant than it was in the older works.

The important thing about these light industries is that they must be in touch with their customers. Their owners and managers must be ready and willing to change their methods of production and the 'style' of their goods. They rely to a great extent on what business men call 'a quick turnover' and often branch factories are opened where a demand has grown up. These are all typical characteristics of 'mobile' industries.

Commonly they employ large numbers of women workers because the work is light and the wage rates are lower for women than for men. Partly for these reasons, the British Government has encouraged light industries in areas such as the South Wales Coalfield where previously there was little paid employment for women. It is not always necessary to build a new factory for a particular light industry. A shipyard can only build ships, and iron and steel can only be made in the right kind of works, but most factories which are used for light industries can be turned over, without a great deal of trouble or expense, to the making of other light goods. For example, many of the munitions factories and stores which were built during the Second World War are now occupied by light manufacturing industries.

## MANUFACTURING INDUSTRIES AND THE DISTRIBUTION OF POPULATION

There is another important difference between the fixed and mobile industries. The former are mainly concerned with turning raw materials into semi-finished goods which are then used in another occupation. For example, the iron and steel industry makes girders for buildings and plates for shipbuilding, the woollen

industry makes cloth for the tailoring trade, and so on. The light or mobile industries, on the other hand, are customers of the heavy industries and nearly always produce finished goods which may be sold directly to their own customers or be put on sale in shops.

Both types of industry, however, employ large numbers of people drawn together in relatively small areas. Wherever manufacturing industries are common, there the population is concentrated in towns. Side by side with the Industrial Revolution, therefore, there has gone on another change – the 'Drift to the Towns', as we have already seen in Chapter 2. Perhaps the most remarkable example of this link between the growth of towns and the development of industries is provided by the Soviet Union. Before the Bolshevik Revolution of 1917, that vast country was industrially backward and great efforts have since been made to increase both heavy and light industrial production. Between the censuses of 1926 and 1939, forty-nine Russian towns have increased in size threefold or more, so that each of them contained more than 50,000 people in 1939. Further, it has been estimated that in the same period of time, 23 million people moved from the country to the towns in the Soviet Union.

It is sometimes said that we live in an Age of Machines. This is certainly true of the industrialized countries where many labour-saving devices have been invented and put to use. In the result, there are thousands of 'gadgets' available if we have the money to buy them, and they certainly make our lives more comfortable. At the same time, many of these products of the manufacturing industries are luxuries and are by no means as essential as food and shelter.

During the last hundred years, Great Britain, Germany, France and the U.S.A. have become highly industrialized and great wealth has come from their activities. Many States, which have been largely agricultural, are now seeking to copy the industrial activities of the countries named above. Their people seem to think that by building factories and by manufacturing goods they can get rid of their troubles. The danger for them is that, if they

neglect their agricultural production and put all their capital into industries, they will soon be short of food for their factory workers. They will also find it very difficult to sell their manufactured goods both at home and abroad. The Governments of these countries appear to forget that the geographical conditions of their lands are not necessarily as suitable for industrial development as those of Western Europe and the Eastern U.S.A.

## EXERCISES

1. What are the differences between manufacturing industries and 'domestic' industries?
2. Why are manufacturing regions densely populated, mainly with town dwellers?
3. Make a list of the things which you use every day which have been manufactured in factories.
4. What is an industrial country?

## Chapter 6

# TYPES OF OCCUPATIONS (*continued*)

### THE DISTRIBUTIVE OCCUPATIONS AND THE SERVICES

A very large proportion of the goods which are produced in the occupations described in Chapters 4 and 5 are not 'consumed' by the people who make them. Even peasants whose chief work is to provide food for themselves and their families, usually have some surplus produce. All these surpluses enter into trade. They may travel short distances between producer and consumer or they may be carried thousands of miles before they reach their markets. Large numbers of people are required, therefore, to arrange and carry out this circulation of goods. Their occupations are known as the distributive trades. They are sometimes called 'middle men'. They are not directly concerned with production but without them goods could not be bought and sold easily and world trade would probably not be very important. When Napoleon said that the British people were 'a nation of shopkeepers', he admitted that, even in the early nineteenth century, Britain was already playing a very important part in world trade and he was probably jealous.

### THE DISTRIBUTIVE TRADES

It is impossible to separate the people of these occupations into clear-cut groups. There are bound to be overlaps in each section, but, for convenience, they may be considered under the following headings.

*Transport.* This group includes all the people who are engagec in the circulation of goods and people. They are important links between producers and consumers. Whether they work on land or sea or in the air, they are essential to our continued existence,

especially in the great trading countries. Great and rapid progress has been made in the transport industry. In 1752, goods and passengers moved slowly if at all. Industries were necessarily on a very small scale because large quantities of materials could not be moved and manufactured goods were few and very expensive because of the high cost of transport. The railways, the steamship and the internal-combustion engine have changed all that. In 1952, even after two great wars and the difficulties they have caused, transport is easier and quicker than ever before. Motor-roads are being built in the forests of the Equatorial Lands; rail-ways have opened up the great Temperate Grasslands; ships of all sorts sail the seas of the world and aeroplanes carry small but important goods to most parts of the world. All these activities depend on the transport workers, the drivers, the seamen and the pilots.

*Communications.* In a narrow sense, the people engaged in communications form a branch of transport. They are considered separately here because their main work is concerned with distributing information, whereas the transport workers are concerned with the movement of goods and passengers. In another sense, transport is often considered as a branch of communications. This means that the two types of occupation are closely related and, in practice, are inseparable. It is only for the convenience of study that they are considered separately here.

Communications are sometimes compared with the nerve system of the human body. This system carries 'messages' from the brain to all parts of the body and so makes it possible for us to see, to eat and to move. The great communication-systems of the world make it possible to send messages almost everywhere and usually very quickly. They are sometimes called 'telecommunications'. The first part of this name comes from a Greek word meaning 'far' so that the word itself brings to mind the great distances over which information can be sent, often in a few seconds.

Communications have always been important in human affairs. Primitive peoples in Africa and South America still use the 'bush telegraph' with the help of drums and word of mouth. The Red

Indians of North America were able to send messages over long distances by the smoke from fires: the news of the arrival of the Spanish Armada off the coast of South-west England was sent to London by a system of bonfires which were lighted on hill tops. The name Beacon Hill, which is fairly common in Southern England, reminds us of this means of communication. All these methods were not very reliable because they might lead to the transmission of inaccurate information. The value of modern communications rests on its speed and accuracy.

In addition to the telephone, telegraph, cables, wireless communications, air mail and surface mail, all of which are mainly concerned with sending information, there are other means which are used for spreading ideas of all kinds. They include the radio, television, and the cinema. They have all been developed in recent years and nobody can tell exactly what effects they have on human activities.

*Office Workers.* The distributive trades are not alone in employing many 'black-coated workers', as people doing indoor clerical work are called. Modern farmers have much 'office work' to do and all the industries, primary or manufacturing, employ clerks, secretaries and so on, to look after the business side of their work. Again, office workers, who do not produce anything directly, are necessary to the smooth working of the factory, mill or steamship company.

As their other nickname, 'white-collar workers' suggests, most office-workers are engaged in clean and not unpleasant jobs. They are to be found in large numbers in towns, especially where the distributive trades are centred.

While the distributive trades are busily engaged in circulating goods of all sorts, another section of the population in each country is occupied in what are called 'Services'. They do not produce any raw materials. With certain exceptions, they do not produce anything at all, yet their work is necessary if the affairs of each country, and indeed, the whole world, are to be run at all smoothly.

## THE SERVICES

In this group of occupations, the various branches are concerned with the day-to-day activities in which all the people of a country take part. Instead of producing food or other raw materials, or manufacturing goods, they render 'service' to their fellow human beings. As countries become more civilized, it seems as if more and more people become engaged in the Services. They may be divided into five sections.

*The Civil Service.* This body of men and women is responsible for the administration of their country. They are employed by the Government to see that its arrangements are carried out as efficiently as possible. They also are 'black-coated workers' and much depends on them. The British Civil Service has a reputation for honesty and reliability which is often envied by those of other countries. Civil servants are sometimes described as 'bureaucrats' suggesting that they control the activities of other people from their office desks, but it is only fair to point out that their task is to carry out the orders of the Government.

The majority of civil servants live and work in the capital cities where the Government offices are situated. It is interesting to notice, however, that most countries are now divided into 'regions' for Government purposes so that many of the civil servants now work in the regional headquarters. This process of distributing Government work instead of concentrating it in the capital, is sometimes called 'decentralization' and raises problems as to the best way of dividing a country.

Civil servants, properly so-called, are employed by the central or national Government but each country is also divided into another kind of area or district for local government. England, for example, is divided into *counties*, France into *départements* and the Soviet Union into *oblasti*. All these areas, and others as well, have their own governments or councils which look after local affairs. Their employees are responsible for road-making, street-lighting, sanitary arrangements and a whole host of other services.

*The Armed Forces.* In addition to making laws and seeing that they are obeyed, the national Government is also responsible for the defence of the land. Mankind has not yet learned to live at peace so that Governments must always be prepared for war. Such preparations are very expensive and take many young men and women from productive occupations. Practically everybody agrees that it would be a good thing if we could avoid the expense of Armed Forces but no country is prepared to take the risk of not being prepared.

*Water, Gas and Electricity Services.* The men who provide these services are very important members of the community in every country yet their work is often taken for granted. It is only when these services are 'cut off' that we appreciate how much our comfort and health depend on them, more especially when we live in towns. The 'domestic' supplies, which we use in our homes, are important enough but the consumption of water, gas and electricity is vastly greater in industries. The use of electricity, indeed, has brought about many changes in industrial methods. The current may be generated by using coal, petroleum or running water. In the first two cases it is called thermal electricity because the turbines are driven by steam which is raised by heat; in the third case, it is hydro-electricity. In all cases, the big advantage of electricity is that it can be transmitted cheaply and easily once the cables are provided. It is a particularly important source of mechanical power for the light industries.

*Domestic Service.* In all probability, very few readers of this book will consider entering this occupation yet it is one of the most important branches of work in all countries. It includes all those people who work in hotels, restaurants and cafés as well as in private homes. It is indeed a service occupation and should include the millions of mothers who receive no wages for their 'occupation'. While it is true that, in the past, domestic servants were treated as little more than slaves – they still are in some parts of the world – today their work is regarded as a valuable service in all advanced countries.

*Builders.* Only the primitive peoples build their own homes in

these days and even they are being 'modernized'. Many Eskimos in the Far North of Canada, for example, live in pre-fabricated, sectional wooden houses. Homes made of galvanized iron are also found in most unexpected places. Shelter is the second great need of all people, no matter where they may live, and as they become increasingly occupied with their own particular work, the task of making their homes is left to builders. The efforts of the building-trades are not restricted to houses; they include the making of shelters for industrial and other occupations. Builders, in this sense, include structural engineers, architects, plumbers, bricklayers and so on. Those who are engaged on the building of vast factories and power stations or on the building of rows of suburban houses, all belong to this group of occupations.

Some of the results of their work are pleasing to the eye, some of them are incredibly ugly. In the past, builders used local material, as they still do where transport is not available. Almost every English village once had its quarry for limestone, sandstone or granite, its claypit and brick or tile works, according to the kind of rocks in the district. With the expansion of population and the rapid growth of building in the nineteenth and twentieth centuries and with the coming of transport, it was found easier and cheaper to make bricks at a few favourable places and then send them by rail or by road to the building site. In more recent times, the use of concrete has led to a similar concentration of gravel pits and cement works. Modern means of transport have therefore made it possible to use the same kind of building material over very large areas, all too often resulting in streets of drab houses. In the nineteenth century, such dwellings were packed closely together and as near the factories as possible. The photograph in Figure 28 might have been taken in almost any of the old industrial towns they are all so alike, only differing in the goods they make in their factories.

## Conclusion

Looking back at these four major groups of occupations, we may see an important difference between the first two and the last two.

The primary producers and manufacturing industries are concerned with producing raw materials and goods. The people engaged in them are producers. The distributive trades and the services do not grow or make things and so they are sometimes called non-producers. This does not mean that the former are either more or less important than the latter. There is a common saying that "It takes all sorts to make a world". This is completely true of the world's occupations where each member of a trade or profession has his contribution to make to the well-being of everybody else.

## EXERCISES

1. Make a list of all the distributive occupations which are followed in your district.
2. Describe the means of transport which you and your family use most frequently.
3. Describe the various ways by which you could communicate with a friend or relation in Australia.
4. What are the chief building materials used in your district? If they are not produced locally, where do they come from and how are they transported?

# PART II

## INTRODUCTION

The first part of this book is concerned with large numbers of people and their work in various parts of the world. To make all the information it contains understandable, the occupations have been grouped together but, in practice, they are closely related to each other and frequently overlap. All the people in these occupations are earning their livings and, at the same time, they are helping others to do likewise.

A very important point to remember is that all these people live in one place or another. The earth's surface may be thought of as one great place, the home of over 2,000,000,000 people. Or it may be thought of as the total of millions of places which may be towns or villages, mountain valleys or plains, forests, grasslands or deserts. All these places are different from each other, and their inhabitants are also different, but they all have one feature in common; each of them gives opportunities for people to live and work. These opportunities also differ greatly: in some places the resources are great enough to support many people, while in others life is very difficult and the poor resources can only support few people. Whether the population of a place is dense, medium or sparse depends very largely on the opportunities it provides for human activities.

At the same time, the opportunities of a place only become important when its people accept them and use them. The grasslands of the North American Prairies and those of the Argentine Pampas were only used by small numbers of hunters until the European settlers arrived and showed that these plains could be used for farming. Or again, the valuable mineral deposits have lain in the earth's crust for many millions of years yet it is only

in modern times that they have been used on a large scale. When the world's human population was small in numbers, by far the greater part of its surface was in a natural condition and few changes took place. As the peoples have increased immensely in numbers and as their skill has grown, so changes have been brought about. At no time have these changes been more rapid than during the nineteenth and twentieth centuries. Nevertheless, there are limits to the things people can do in the places in which they live.

Every inhabited place has at least two elements, its physical environment and its people. The former consists of its rocks, land forms and soils, its climate and natural vegetation. The latter may be numerous or scanty, white, yellow, brown or black in colour, advanced or backward in their ways of life. In every case, the people must make efforts to use the opportunities the physical environment offers. The study of this struggle between Man and Nature, as it is often called, is the essence of geography but there can be no struggle of this kind without the two chief elements. Man brings about changes in his physical environment but his surroundings influence his life and work. In this way man becomes united with his environment.

These important relationships between physical environment and people vary widely in the many different parts of the world. Because some people live and work in a certain way in a certain environment, there is no guarantee that other people will act similarly in a similar environment. It is clearly impossible to study all these relations in one book because there are thousands of them. We must be content here with selected 'samples' from what are called the major natural regions of the world. The next fourteen chapters are devoted to describing samples of the primary producing occupations. They are followed by four chapters on manufacturing industries and other occupations. The reason why there are so many chapters on primary production in comparison with the number on manufacturing industries is because the majority of the world's peoples are engaged as primary producers.

## Chapter 7

# FARMING IN SOUTHERN ENGLAND

The use of rural land in Southern England varies mainly according to the kind of soil in any particular district. Near the large towns, especially London, much land may be under market gardening but elsewhere mixed farming is the general rule. Very few farmers specialize in any one crop. Where the soils are fertile and well-drained, they plough and plant the land rather than leave it as pasture for animals. On the other hand, if the soils are heavy, difficult to plough, and damp, then the farmers leave most of their fields in grass and rear animals on them.

No part of Southern England is very far from railways and good roads so that the farmers are not worried by difficult transport problems. They can send their produce to markets fairly easily and they therefore grow a variety of crops and often rear animals for various purposes as well. In this part of the world, there are no mountains and the climate is temperate; the forests which once covered this area have been cleared from all but the most infertile parts. The physical environment is decidedly favourable to farming and the mixed system has gradually developed over a period of about two thousand years. It 'fits into' the surroundings very neatly and, on the whole, efficiently.

### THE FARMS

The farmers of Southern England own or rent their farms which are of medium size, ranging from 50 to 200 acres although some are above and some below these limits. They employ workers, men or women, who are paid wages. One of the chief difficulties is to find enough labourers and that is one of the reasons why so many of the farmers use machines on their land. It has been claimed that agriculture in Southern England has become the most highly mechanized in the world.

Each farm is divided into fields which vary in size and shape. Generally the fields are separated by hedges in which occasional trees grow. This pattern of irregular fields and hedgerows gives much of its charm to the countryside. The farm-houses and outbuildings are usually set among the fields. Sometimes the farmer lives in a village or small town but this is not common. He prefers to live with his fields around him and they form a compact block of land.

## THE FARMING SYSTEM

The climate of Southern England rarely holds up farming activities for more than a week or two at a time. Rainy weather may delay ploughing or harvesting for some days or occasionally for some weeks, but farming here is an all-the-year-round occupation. Some parts of the year, such as harvest-time, are busier than others but there is always work to be done and the farmer has no really slack season.

The arable fields are in crops, with a three, four or five year rotation. Wheat-barley-roots is a common succession of crops. This system of rotation helps to maintain the soil fertility but the good yields on these fields make it necessary to put back into the soil plant food in the form of manures, natural or artificial.

The meadows for grazing by the animals are usually permanent pasture, that is, they are always used for growing grass which may be eaten by the cattle or cut for hay for winter feeding. The most important animals in Southern England are milk-cows which require careful feeding if their milk-yields are to be kept up.

In recent years a new method, called ley-farming, has been successfully tried. During the two world wars of this century, English farmers were compelled to plough much of their grassland in order to produce more wheat and potatoes. It was discovered that freshly ploughed meadows often grew very good crops for a year or two and then the yield decreased. This is explained by the fact that arable crops take more plant food out of the soil than grass does. Thus meadows are able to store up plant food

if they are not disturbed or over-grazed. Nowadays, farmers frequently sow grass in their arable fields and do not plough them again for several years. These fields are called 'leys'. They produce hay for animal fodder and also store up soil fertility until they are ready for ploughing again.

A typical farmer of Southern England, therefore, has three different ways of using his land; for arable crops, for meadows and for leys. He combines all three methods very skilfully and is not completely dependent on any one of them. He sells practically all his crops 'off the farm'. Unlike his peasant ancestors, he is much more concerned with growing produce for market than with merely producing food for his family.

## CHANGES IN FARMING IN SOUTHERN ENGLAND

Up to the end of the eighteenth century, English farmers grew nearly all the food which was eaten in this country. Only luxuries such as spices, wines and tea, were imported and they were very expensive. During the nineteenth century, the opening up of new lands and the growth of new means of transport meant that 'cheap food' could be imported ever more easily as long as there was money to pay for it. Furthermore, the rapidly growing industries and towns attracted labour to them and so there was a scarcity of labour on the farms. The farmers found themselves unable to compete with overseas suppliers of wheat and meat and allowed their arable fields to become meadows for cattle-raising. When the First World War came in 1914, many farmers were finding it difficult to make ends meet. During that war, many overseas sources of food were cut off and English farmers became temporarily prosperous. In the years between the two wars, many of England's farm lands were again neglected with the result that the Second World War made it necessary to plough large areas of grassland again. Today, nearly half our food is being produced in this country. With a population of over fifty million in the United Kingdom, it is impossible to grow all the food we require and the present output is only being maintained by intensive methods and with the help of many machines.

Another important change is to be found in the increased wages which English agricultural workers now receive. Only twenty years ago, a farm labourer received as little as thirty shillings a week. Now he may earn as much as £6 a week and more with overtime. Even so, there are too few workers on the land. Southern England, with its long traditions of good farming, is still suffering from the 'Drift to the Towns'.

What is perhaps the greatest change in English farming is more difficult to describe. Every farmer knows that much of his time is spent in 'filling in forms'. This is the result of attempts by the Government to make sure that the land of Britain shall be used to produce the maximum food supplies. The farmer's work is affected in two ways. First he must supply the Ministry of Agriculture with exact information as to the crops he grows each year. These returns include the kind of crops, the amount grown and the area used for each. They are necessary so that the Government may know how the land is being used. In this connection, we may notice the valuable work of the Land Utilisation Survey which was carried out privately before the Second World War. With the help of teachers and school children, every field in Britain was surveyed and its use recorded on maps which are now published as Land Utilisation Maps on the scale of one inch to one mile.

Secondly, the Government sometimes tries to control the agricultural methods. During the war, farmers were compelled to do many things, such as ploughing up grassland and growing more of certain essential foods. Since the end of this war, the Government has tried to persuade farmers to produce certain foodstuffs by paying subsidies on them. Even before the war, organizations such as the Milk Marketing Board were at work and also, agricultural experts, employed by the Government, were available to advise farmers on the best ways of using their lands. Sometimes these actions which take place in most countries are called 'state interference' in agriculture. To take an extreme case, the Government of the Soviet Union not only owns a large number of state farms (*Sovkhozy*) but gives orders to all its people engaged in agriculture. Whether this control is direct, as in the U.S.S.R., or

indirect, as in Britain, it means more 'paper work' for the farmer. In fact, modern agriculture is much more like a business than it used to be.

These are some of the changes which have affected farming in Southern England. They show that in Britain, the importance of agriculture is now recognized. No country in the world can afford to use its land wastefully especially as populations are rapidly increasing.

## A FARMING VILLAGE IN SOUTHERN ENGLAND

Figure 4 is an aerial photograph of the village of Godshill in the Isle of Wight. It illustrates many of the features of farming in Southern England which have been mentioned already in this chapter. No two villages are exactly alike but Godshill is fairly typical.

Round the church are clustered the older houses most of which are small cottages. Not all of them can be seen because some of them are hidden by the trees to the right of the church. They were built as the homes of the farm workers. In the past, farmers preferred to have their workers living on the farm itself but gradually villages grew up where the labourers could have their own houses. Each cottage has its own garden where vegetables and flowers are grown. These gardens are at the backs of the houses, the fronts of which are right on the main road. This shows that the houses are older than the road in its present form. Long ago it was probably a path which developed into a track and then became a gravelled road. Then the houses had front gardens but these have been sacrificed to make room for wider roads to cater for the greatly increased traffic of modern times.

Godshill is typical of English farming villages in that it grew up as a collection of the houses of farm employees who work in the fields which surround it. Most of the farmers live outside the village. In this case there is one large farm-house just to the left of the church but the others are away from the village. One can be seen beyond the church but the area photographed is too small to show the remainder.



*Aero Pictorial Ltd*

FIG.4 – *Aerial view of Godshill, Isle of Wight*
This shows a part of the area represented in Fig. 3, but the top of the photograph is north-west and not north as it is in Fig. 3. This is an oblique aerial photograph so the area in the background is foreshortened. Compare this with Fig. 3, page 14.

The field pattern shown here is characteristic of Southern England. None of the fields is very large and a careful study of the picture shows that they are of two kinds. Those immediately around the village are permanent pastures. Some of these are used for hay, as the hayricks suggest. Beyond this zone of meadows, lie the arable fields. As the photograph was taken in summer, it is a little difficult to see this difference between arable fields and meadows and it is certainly impossible to pick out the crops which are growing on the former. They are probably cereals (wheat, oats and barley) and, in some of the fields, roots for the winter feeding of cattle. Here then is an illustration of good mixed farming country.

The main road which passes through the village connects Newport and Shanklin. It is used by buses which take the villagers to Newport for their shopping and entertainment, and it is near enough to the farms for lorries to collect the milk daily from them. By the same road the harvested crops also reach their markets. Such a good road is clearly an advantage in many ways. The new houses, to the right of the church, suggest that Godshill is growing. These new houses of red brick with slates or tiles are a contrast with the thatched cottages of the old village. They are not occupied by farm-workers who are decreasing in number here as in most farming villages. The road has made it possible for people to work in the neighbouring towns and still live in Godshill. They may do this because they have relations or friends in the village and wish to live near them or because they may find the cost of living is lower here than in the towns.

Another characteristic feature of farming villages in Southern England, which stands out clearly in this photograph, is the number of trees. Some of them are fruit-trees in the gardens of the houses but the fine old elms and oaks around the church remind us that most of Southern England was once covered with deciduous forests. Our ancestors carved their fields out of those forests and gradually changed the appearance of the land but they always preserved some trees. These were useful to shelter the houses from strong winds and to give shade in summer. The trees shown in this photograph are not survivors of the original forests. They have been planted as the older trees have died and help to maintain the beauty of the countryside.

The village of Godshill is the result of the work of people over hundreds of years. It grew very slowly and there is an air of peacefulness about it. The church is similar to thousands of other places of worship found in Southern England, and the main road, now widened and with a good surface, still winds as the original footpath did. This is probably a danger to motorists and other road users, as the white line suggests, but its twists and bends are an inheritance from the past. In spite of the changes which

have taken place in the lives of the villagers and farmers, Godshill is not very different from what it was a hundred years ago.

## EXERCISES

1. Describe a farm which you have seen.
2. Count the number of buildings in Figures, 3 and 4 and explain why the numbers are not the same for each.
3. What is meant by rotation of crops?
4. With the help of Figures 3 and 4, write a description of Godshill village.

## Chapter 8

# PRAIRIE FARMING

A good atlas shows that there are large areas of plains in the interiors of all the continents. In the Northern Hemisphere their northern parts are still largely covered with forests and to the south they merge into deserts. These plains which lie between the forests and the deserts, were once covered with various types of grasses which were grazed by herds of wild animals. Because they lie in 'temperate' latitudes, they are called Temperate Grasslands and they provide a very different environment from that of Southern England which was once covered with Temperate Deciduous Forests.

The climates of the Temperate Grasslands have two outstanding features. First, either because they are so far from the sea or because they are shut off from the sea by mountains, they do not receive a great deal of rainfall. The amount decreases with distance from the oceans but it rarely exceeds 20 inches per year and is often less. Most of the rain falls in the summer months, i.e. during the hottest season of the year, and its value is therefore decreased by evaporation. Forests cannot grow under these conditions.

Secondly, the difference between summer and winter temperatures is much greater than it is in England. Average July temperatures may be 75° to 85° Fahrenheit while those of January may be well freezing point (32°) and sometimes fall below 0° Fahrenheit. Such rainfall and temperature conditions are part of 'Continental' climates and they are favourable to the growth of grasses which are able to survive the long cold winters by dropping their seeds in autumn ready for new growth during the following spring.

The surfaces of these great plains slope gently. There are no mountains on them. Although parts of the North American Plains are 3,000 feet high, they slope up to this height so gently that a

traveller does not realize how high they are. This gentle relief means that there are few natural obstacles to the winds which, in winter and summer, frequently blow with great force. The soils are usually dark in colour, ranging from brown to black. They are coloured by humus made of the decayed roots of grasses which have accumulated during some thousands of years. The Black Earth of the Southern Ukraine in the U.S.S.R. is one of the most famous soils of this type.

The Temperate Grasslands of North America are known as Prairies, those of Eurasia as Steppes and those of South America (Argentina) as Pampas. They are alike in many ways but they also have differences. Furthermore, there are also differences of considerable importance within each of these individual Grasslands, especially in the matter of amount of rainfall. In the drier parts, the chief land-use is animal-rearing but wherever there is sufficient rainfall for crop-growing arable farming is the rule.

The rainfall of even the dampest parts of these Grasslands is not very great – rarely is there as much as in Southern England. More important than the amount, is the fact that the rainfall is unreliable. There may be enough for the crops for three or four years running or even more but, sooner or later, comes a year or possibly more than one year in succession, when there is not enough rain for the crops to grow well. There is always this risk of drought in arable farming in the Temperate Grasslands and it explains why the yields per acre vary from year to year.

The Prairies and Pampas of the New World have only been 'broken in' since the early part of last century. When settlers from other parts of America and from Europe moved into the Grasslands of Canada and the U.S.A. they did not find an old land like Southern England. They called the covered wagons in which they travelled 'Prairie Schooners' because the empty land looked like a great sea. There were no roads, very few trees, no towns or villages. They found a virgin land with great opportunities for those who were prepared and willing to work hard, but they had to discover the right methods for using this new country. Very few of them were familiar with ~~such a~~ physical

environment and, in the early days, there were many failures. Those who succeeded in establishing farms on the Prairies prepared the way for one of the greatest achievements in history. In less than a hundred years, the Grasslands of North America became the world's greatest producer of cereals for commercial purposes. The story of this miracle of human effort is too long and complicated to be told here. There is only space to describe some of the present conditions in these vast arable lands.

Until these great rolling plains were settled by farmers, their natural vegetation was grass. Cereals (wheat, maize, oats, barley and rye) are members of the grass-family which have been improved by careful cultivation to give much greater quantities of seeds. The climatic conditions which suit grasses are therefore most likely to be favourable to cereal cultivation. This lesson was soon learned by the people who settled the Grasslands and today cereals are by far the most important crops in those parts which have sufficient rainfall. The kind of cereal grown depends very largely on the temperatures and rainfall of each area. Maize, for example, requires more heat and more summer rain than the others and is therefore grown in the damper, southern parts of the North American Grasslands. If the winters are very cold and long, then spring wheat, i.e. wheat which is sown in spring and grows quickly, is the favourite crop. Where the winters are mild enough to allow the young wheat to grow slowly through that season, then the seeds are sown in October or November. This type is called winter wheat.

## FARMING IN THE SPRING WHEAT REGION OF CANADA AND U.S.A.

The chief area of spring wheat growing in North America runs westwards from the Great Lakes until the rainfall becomes insufficient for the crop to grow. Northwards it spreads into Canada and southwards into the U.S.A. Because wheat is still the chief crop in this area, it is sometimes called a 'bread basket' and much of its production is sent overseas, especially to Europe.



*Fairchild Aerial Surveys, Inc*

FIG.5 – *Aerial view of farms in the Spring Wheat Region of the U.S.A.* Compare this view with that in Fig. 4. All the fields are used for arable crops; there are few meadows in this region. The grid-iron pattern of roads and field boundaries stands out well and makes a great contrast with the English countryside.

Figure 5 is an aerial view of part of Northern Iowa (U.S.A.) which is in the Spring Wheat Region. With its help, much of the geography of this part of the world can be learned. Other important points will be mentioned later in this chapter.

## THE FARMS

As in Southern England, the farm buildings are scattered among the fields. The farmers and their permanent employees live in the centrally placed buildings. There are few farming villages of the English type in this part of the world.

The size of the farms varies a good deal but not many of them are as large as those further west in the U.S.A. or further north in Canada. In this part of Iowa, the soils are fertile, the climate is well suited to wheat-farming with fairly heavy yields per acre. A farm of 200 to 400 acres can therefore support its owner and his workers quite comfortably.

The fields are not extremely large. They range from 15 to 20 acres in size and are no larger than many of the fields in East Anglia or on Salisbury Plain. What is very noticeable about them is their rectangular shape and the regular pattern they make. This grid-iron pattern is the result of the way in which the land was first divided. There were no forests to clear here and the land was either sold or given in lots, of 640 acres, half lots or quarter lots, all of which were marked on maps. In England, it will be remembered, the field pattern is the result of gradual growth, of carving farms out of the forests. In the Spring Wheat Region of Iowa, the land was shared out among the farmers in a few years.

When the fields were marked out on the ground and gradually became fenced, the roads, which came later, had to follow the field boundaries. This explains why the road net of the American Prairies still resembles the field pattern and makes a remarkable contrast with English roads which, as the late G. K. Chesterton once said, look as if they had been traced out by a drunken man.

The absence of hedges is another noticeable feature of this landscape. When the farmlands were first marked out, the limits of each farmer's fields were marked by boundary posts or stones. Many of the fields are still not fenced as there are few, if any, animals to be kept from straying. Trees are also absent except those immediately around the farm buildings where they have been planted. They are not 'natives' of these Grasslands. They have been grown here by the farmers to give shelter from the frequent strong winds and shade from the hot summer sun. Each clump of trees marks the presence of a group of farm buildings.

The headquarters of each farm consists of a compact block of buildings. The farm-house is usually made of wood with a corrugated iron roof. Either attached to it or near by are the quarters

of the farm hands. Generally the largest building is the barn where the tractors and other machines are kept. Such a barn can be seen on the farm in the bottom right-hand corner of Figure 5. Horses are seldom used now on these farms. They have been almost entirely replaced by machines.

All the farms are connected to each other, to the fields and to the nearest town, by roads. The main roads, such as the one in the foreground of Figure 5, are well-surfaced, usually with concrete, but the others are dirt-roads which become muddy in wet weather and soon wear into pot-holes. That is one reason why many American motor-cars do not have low chassis.

## THE FARM SYSTEM

The way the land is used in this Spring Wheat Region depends on three factors more than anything else: the growing season is short, wheat is the chief crop, and practically all of it is grown for sale outside the region. These main points are worth a brief examination.

In this region the cold weather lasts from October to March. By the beginning of November the ground is usually frozen and may be covered with a thin coat of snow. Farming activities cease then. There are few, if any, animals to look after, the machines are stored away in the barn and there is little work to be done. In March or perhaps April, the spring comes, the ground thaws and the busy ploughing and sowing season begins. By July, the ears of the grain are swelling and the summer rainfall is very welcome unless it comes in the form of hailstorms which may flatten the crops. With good weather, the wheat is ready for harvest in August and a second period of great activity begins. This is the time of year when the photograph in Figure 5 was taken. The very short shadows of the trees show that the time is about noon. The workers have gone to the farms for their midday meal. The tractors, combine harvesters, and trucks can just be seen, parked outside the farm in the lower right-hand corner. Cutting of the wheat is in full-swing in several of the fields where what

seem to be lines of dots are sacks of wheat dropped at regular intervals by the harvesters. They will soon be collected by the truck drivers and taken to the farm buildings, ready to be sent away.

Other fields are waiting for their crops to be cut and handled in the same way. There is little rest for any of the farm-hands for a week or two. Indeed there is usually too much work for the permanent employees and the farmers are glad to have temporary helpers, if they can be found. Throughout the long, hot, sunny days, both machines and men are fully occupied until all the fields look like those light patches in the background of this photograph. They have been completely cleared of their crops.

In both the Canadian and U.S.A. sections of the Spring Wheat Region, the countryside resembles that shown in Figure 5. The great majority of the fields are in spring wheat which is very hard when it is ripe and very suitable for grinding into flour for bread-making. There is not a single meadow to be seen in this photograph of part of Iowa. How different this is from the mixed farming of Southern England! In a good year, each of these fields yields 15 to 20 bushels of wheat per acre so that the whole region produces a crop of many millions of bushels. But if a bad year comes, the results are very different. Much depends on the amount of rainfall in June and July. Fortunately for the farmers of Iowa, the rainfall there is more reliable than in some parts of the Spring Wheat Region and they are generally certain of reasonably good crops but, even so, this concentration on wheat has its dangers.

Wheat takes much of the plant food out of the soil, and as there are few animals on the farms, there is little natural manure. For a long time, the farmers thought that the soil's natural fertility would last but now they have found that they must use chemical fertilisers to keep up their yields. Again ploughing the field year after year encourages soil erosion, either by wind or by water. In the left-hand bottom corner of Figure 5 the beginnings of gullying may be seen. If the summer rain is very heavy, as it is during thunderstorms, such gullies may spread into many fields with the result that the soil is washed away and cannot be replaced.

Another danger is that if all the wheat-growing areas have good crops in any one year, the farmers find that the prices which they obtain for their wheat are low. They have discovered therefore that it is not a good thing to have all their land in this one crop. In recent years, they have been advised by their Governments to grow other crops so that if the wheat harvest is not good, they have other commodities to help them over bad times.

All the wheat crop in this region is sold 'off the farms'. It is taken in trucks to the nearest railway station where the grain merchants own large containers or silos. In these, the wheat is stored until it is taken by train to the nearest grain-marketing town where it is stored in even larger silos or elevators. Finally it is distributed either by rail or by ship to regions which are unable to grow enough wheat for their own requirements. The money the farmers receive for their crops depends largely on the price the merchants can obtain for it in distant lands. Without the railways and the ships, therefore, the wheat could not be sent to these markets so that all the hard work on the farms would be largely wasted without the help of the transport workers. That explains why railways have played such a large part in making wheat-farming possible on these Prairies.

One last point in this particular farming system should be mentioned. At the beginning of this century, the farms of the Spring Wheat Region produced low yields, there were few machines in use but even so the farmers became rich as a result of 'boom' years. In a word, the farming was extensive. Now that the world's population has become so large, the demand for cereals has increased greatly. The farmers of the Spring Wheat Region of North America are helping to meet this demand by making their methods of cultivation more intensive. They are using their land more carefully in order to produce heavier yields. They experiment with new types of wheat which supply more grain than the older kinds. There is little, if any, more space into which wheat-farming can spread on the North American Prairies. The only way to grow more wheat and therefore to produce more food, is to make each acre yield more. This is not easy, especially in countries like Canada

and the U.S.A. where, until recently, there seemed to be plenty of good land for expansion of farming.

## EXERCISES

1. With the help of your atlas, mark the chief areas of large plains on a blank map of the world.
2. Make a simple map of the area shown in Figure 5 to show the grid-iron pattern and the way in which the farms are scattered. Compare your map with Figure 3.
3. Why is the farming in the Spring Wheat Region so highly mechanized?
4. What happens to the wheat grown on the fields shown in Figure 5?

## Chapter 9

# PEASANT FARMING IN CENTRAL EUROPE

In this chapter, we return to Europe to study the farming methods which are employed in the central part of the continent. Here the use of the land is organized on quite different lines from those of Southern England and the North American Prairies.

Between the mountains of Northern and Southern Europe, there is a great belt of plains which runs eastwards from the shores of the Atlantic and continues into Asia. These plains lie in the track of the westerly winds which bring moisture from the ocean but the amount of rainfall decreases eastwards. Furthermore, the moderating effect of the great mass of water in the Atlantic Ocean decreases eastwards also. These changes in climate from west to east across the European Plains are gradual but they were shown clearly in the natural vegetation, that is, the vegetation which grew in this great region before man interfered with it. If it had been possible for a traveller to journey from the North Sea to the northern shores of the Caspian before the birth of Christ, he would have passed through first, deciduous forests (oak, elm, beech), then, mixed deciduous and coniferous forests, then grasslands on the Steppes of the Ukraine and finally deserts on the shores of the Caspian. That part of the plain which lies in Central Europe was originally covered by mixed Temperate Forests; the chief trees were beech, birch, firs and pines.

The physical environment in this area was not very favourable to agriculture at first. The winters are colder, with more frost and snow, and the summers are hotter than in Southern England. The rainfall is about the same as in East Anglia, approximately 20 to 25 inches per year. The great obstacle to farming in the early days was the forest and much of this remains today. The land could not be cultivated until clearings were made in the forest and many of the present farming villages are still in clearings.

For many centuries both the forests and the clearings of Central Europe were divided into large estates which were owned by aristocratic families who lived in large country-houses or manors. The agricultural workers lived in villages and cultivated the land for the owners who generally employed bailiffs or stewards to organize and direct the work of the 'serfs'. This feudal system of land ownership and use disappeared from England some centuries ago but parts of it persisted in Central Europe right down to the present century. The 'Junkers' of North Germany and the great land-owning families of Eastern Poland practised something like this system until the outbreak of the Second World War. That is one reason why many of the people of Central Europe migrated to the New World when they were able to do so.

In other parts of Central Europe, the farming people have won a long struggle with the owners of the large estates and most of them now own the land which they cultivate. They are known as peasants and the peasant system, as practised in Central Europe, is the subject of this chapter.

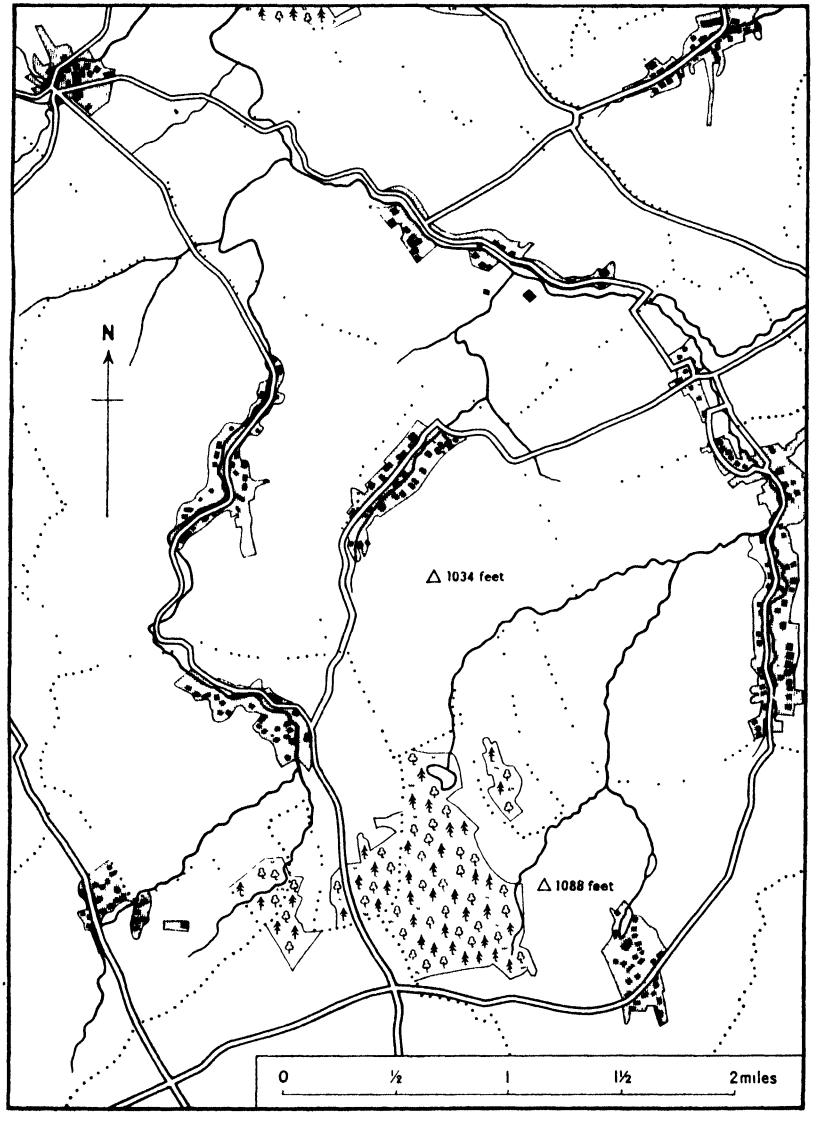
## THE PEASANT SYSTEM OF FARMING

There are no peasants in England and it is a little difficult for English readers to realize that by far the greatest part of the agricultural production of Europe (excluding the U.S.S.R.) is the result of peasant farming. As the crops of this continent are among the most important in the world, it is worth while studying this system. In this connection, it may be noted that Europe is still the most important wheat-producing continent in the world judged by the amount grown.

The essence of the system may be summed up briefly. The true peasant owns his land which is always very small in area. His holding is a family farm because it is worked by himself, his wife and children, and the main purpose of their work is to provide food for the family. As the holding is very small, the peasant must grow the greatest possible amount of food on it which means that the system is very intensive. No wages are paid to the

peasant workers and the only cash income of the family is that obtained by selling any surplus crops. These are never very large on any peasant farm. Although he usually rears some hens, geese and animals, the peasant rarely eats eggs or meat. They must be sold to obtain money for taxes and for buying essential goods which the holding cannot produce, such as needles, boots, and paraffin for lighting. The peasant way of life is therefore a very hard one, especially when judged by English or American standards. It is true that the peasants seldom starve, unless their crops fail, but they have a monotonous diet. Their wealth, such as it is, is the land they own and they are deeply attached to it. Perhaps their greatest problem is lack of money. They are rarely able to save, so that even if the holdings were suitable for mechanization they could not buy machines to work them. They are often described as mean and greedy where money is concerned. French peasants, for example, are said to hoard every *sou* they can get in 'le bas de laine' (the woollen stocking) which is hidden in a secret place. But when the total cash income each year is only the equivalent of a few English pounds, the peasant must be extremely careful with any coin or note which he may obtain.

As he cannot afford to pay for help on his holding, the peasant is anxious to have children, especially boys. Hence the populations of most peasant countries grow rapidly, resulting usually in over-population. When the father dies, his land is usually divided among his sons so that the holdings gradually become smaller. It is only with great difficulty that the peasant farmer can increase the size of his farm. He may become a factory worker in a nearby town, leaving his wife and children to run the holding, and so earn money to buy extra land if there is any for sale. That method was not at all easy before the First World War because most of the land belonged to estate owners who were unwilling to sell it. After each of the world wars, however, many of the large estates were broken up by the various Governments of Central Europe and the land was either given or sold to peasants. This change of ownership is called Agrarian Reform and has been organized on a very large scale in eastern Central Europe since 1945.




Villages with houses and gardens ..... Parish Boundaries

## PEASANT FARMING IN CENTRAL EUROPE

### PEASANT VILLAGES

Figure 6 shows a group of peasant villages in the southern part of the German section of the European Plains. The first thing to notice is that all the buildings are clustered together. There are no scattered farm buildings as in Southern England or in Iowa. Each group of buildings is surrounded by farmlands stretching to the boundary of the *Gemeinde* (parish) which is shown by dotted lines on the map.

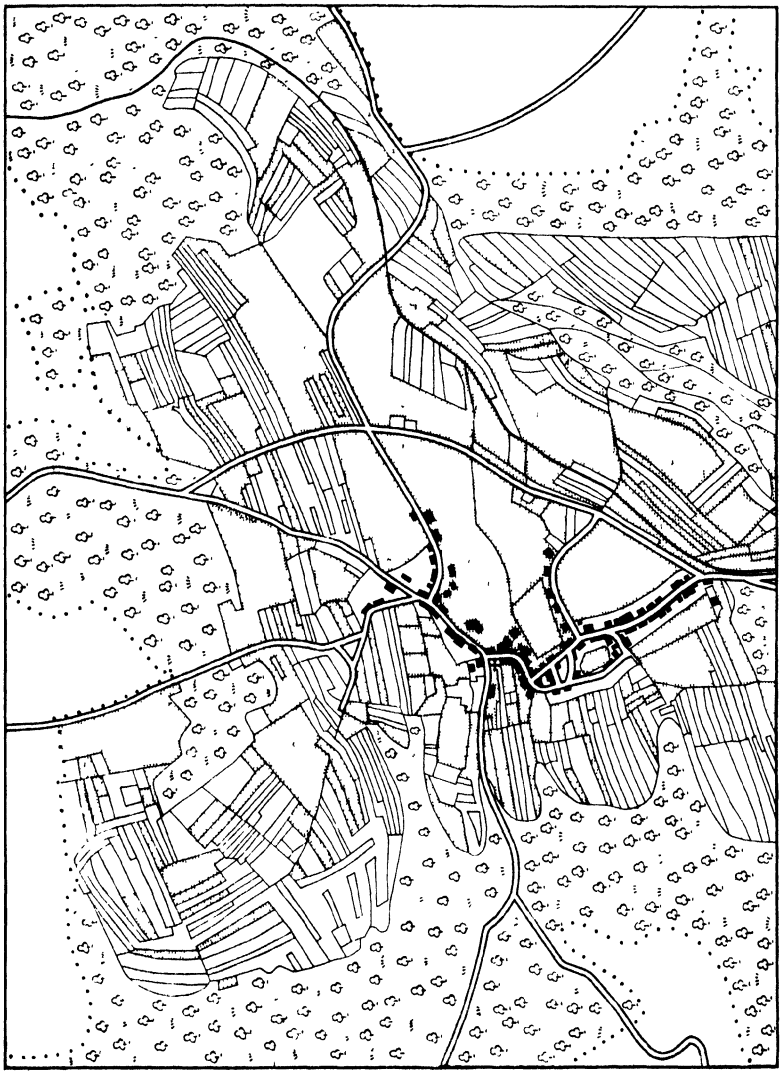
In this area, each village is on the floor of a valley. The land surface here is gently rolling and streams have carved many valleys, the sides of which are fairly steep. The valley floors are rather damp, too damp in fact for arable crops but moist enough for small patches of meadow where the small number of cattle kept by the villagers can graze occasionally. There is so little arable land between the streams that the peasants cannot afford to use it for buildings – they prefer to use the less valuable parts of the valley floors for these and there also they are able to obtain their water supplies from the streams.

Each black dot on this map represents a peasant's house, a small building built of wood and all on one floor. Attached to each house is a barn and a small stable for the horse and cow. Each day, the peasant goes out to his land to carry on his farming tasks which vary according to the season of the year. The scale of the map is, however, too small to show how the land is divided.

Each peasant farm has a small garden in which the owner grows vegetables and fruit for his family. In this respect he is like the English farm labourer.

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FIG.6 – *Peasant villages in South-east Germany*
'his map is on a smaller scale than Fig. 3, but it is still able to show much ıore detail than Figs. 1 and 2. All the farm buildings are concentrated ı the villages. The distribution of houses is very different from that in outhern England and in the Spring Wheat Region of U.S.A. The ɔaces between the villages, except the forests, are divided into small .rips for cultivation.



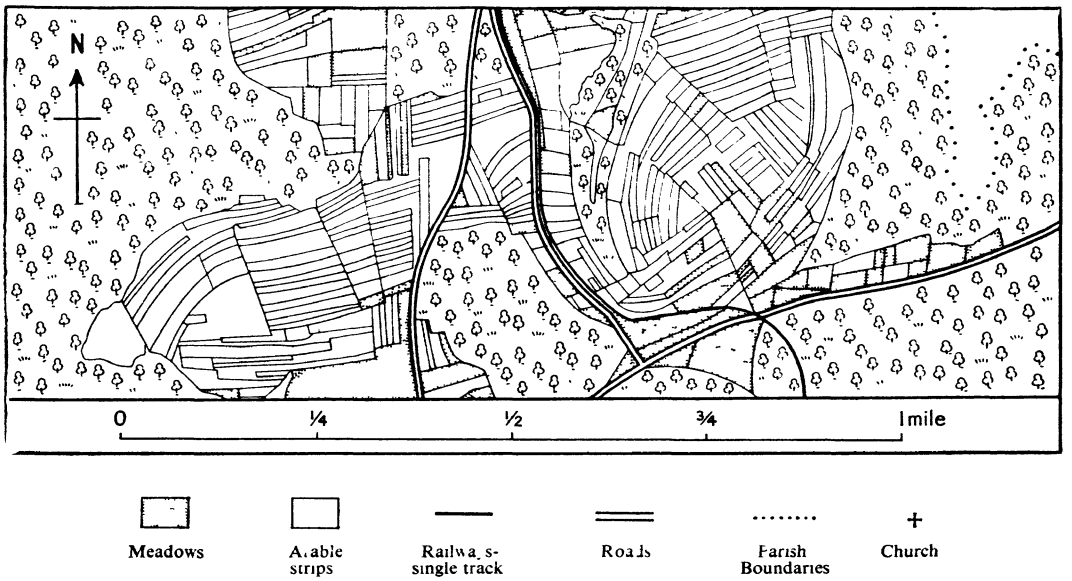



FIG.7 – *The Village of Consdorf, Luxemburg*
This is a typical peasant village in West Central Europe. Each division of land is a strip; those dotted are used for grass and other green fodder crops – all the others are ploughed fields or gardens. There are no farms of the English type; all the peasants live in the village, near the church. This is a good example of a forest clearing village.

Another thing to be noticed on this map is that some areas are marked as woodlands. They are remnants of the original forest cover of this region and usually they belong to the village people as a whole. They are very useful as a wood supply, for timber for the peasants' houses and for fuel during the winter. The peasants cannot afford to buy coal so their stoves are stoked with wood which they must cut during their spare time.

Figure 7 is a map on a larger scale showing a peasant village, Consdorf, in Luxemburg. A survey of it has been made and since it is similar in many ways to the German villages described above a map of it is included here to give details of the land-use.

Consdorf is obviously an example of a forest-clearing village with its buildings all closely clustered around the church. The most striking feature illustrated by this map is the way in which the farmlands are divided into narrow, short strips. These vary in size but the majority of them are not much larger than an English allotment. They are the fields of the peasants. They have no hedges or fences, not even along the roads. The peasant owner knows the limits of his fields by the boundary stones which are placed at each corner.

The strip system of arable farming is common to the peasant method of agriculture in many parts of Europe and gives the countryside the appearance of one of those old-fashioned patchwork quilts which our grandmothers used to put on their beds. Each peasant owns perhaps ten or twenty strips, more if he is rich, but they are not found next to each other. They are scattered in different parts of the parish. The origin of this system of land-ownership is not definitely known. The most likely reason for it is that, when the village lands were originally divided, the people obtained patches of land in different parts according to the fertility of the soil. By this means each peasant was supposed to have some good and some bad land. However the system began, it has been kept going by the fact that, when a peasant could buy land, his purchase would be a strip and he would buy it wherever he could in the parish.

There are more meadows in Consdorf than in any of the

German villages shown in Figure 6. They lie to the east and north of the village church and are not divided into strips. They are the property of the village and each peasant has grazing rights on them. Again they are not fenced so that the grazing animals must be watched, usually by children. Long ago, such a system was used in England and explains the origin of some of the lines in our nursery rhymes. For example

"Little Bo-Peep has lost her sheep
And can't tell where to find them"

dates from the time when girls had to mind sheep on the common grazing land of the village. It is not difficult for us to imagine what happened when:

"The sheep's in the meadow, the cow's in the corn."

Consdorf is a prosperous village largely because its soils are fertile. Yet when a survey of this village was made in 1932, not one peasant home had a wireless-set or piano. Most of them contained home-made furniture. Nearly all of them had electric-light because they are near a large industrial district, but the owners are very careful in their use of electricity as they must be with everything which costs money.

## THE LAND-USE SYSTEM

We have already seen that the aim of the peasant is mainly to produce food for his family and, if possible, a surplus for sale. The result is that every piece of land which can be ploughed and cropped is used for food production, chiefly for cereals. There is very little land left for animal-rearing and many of the peasants would be glad of an opportunity to plough and cultivate the common meadows. Arable farming gives a greater yield of food per acre than any other form of land-use and it is a general rule that, the more intensive the farming, the greater is the yield of crops. But, as we have seen in a previous chapter, the heavier the yields, the more plant food is taken out of the soil. One of the peasant's chief problems, therefore, is to maintain the fertility of his soil, and his system of land-use is designed to meet this problem.

Unlike the farmers of Southern England and Iowa, the peasant of Central Europe cannot afford to buy chemical fertilisers; nor has he enough land to rear many animals by grazing. He therefore puts his arable strips to two uses. On some he grows food for his family. On the rest, he produces clover or roots for his cattle which live for most of the year in stalls. He may have only one or two cows but they produce milk and calves for sale (veal is a favourite meat in Continental towns) and manure for the fields. Furthermore, the milk-cows are used for ploughing and for pulling the peasant's cart to and from his strips. Thus by living mainly on cereals (wheat or rye) in some form and by using his cattle to the maximum, he is able to make the most intensive use of his land.

In spite of the peasant's skill, however, the strip system has serious drawbacks. The owner must waste much of his time and energy going between strips and home, especially as his cattle-drawn transport is very slow. Also a part of the land is wasted by the large number of tracks which lead to the strips and usually separate them. It is also difficult to keep the crops 'clean' under such a system. One lazy peasant who does not keep even one of his fields free from weeds, may be responsible for scattering the seeds of his weeds over dozens of strips belonging to his neighbours. Unless all the peasants agree to use improved types of seeds, these will have little chance of surviving because of cross-pollination.

It would be an advantage if all the strips belonging to any one peasant could be arranged side by side or consolidated, as it is called. The French Government has tried to re-arrange the pattern of strips in this way but without great success, partly because the peasant is generally unwilling to change his methods.

## PEASANT LIFE IN CENTRAL EUROPE

Peasant farming in Central Europe is an all-the-year-round occupation largely because the winters are not too cold for at least some work to be done out of doors. The whole family shares in the work and, especially at seeding time and harvest, there is great activity although there is not the hustle of Iowa harvests.

The work is hard as there are few machines to lessen the physical labour. Most of the peasants own ploughs but the cutting of grain is still largely by sickle or scythe and the pulling of roots is done by hand. Throughout the year, outdoor work begins at dawn and ends at sunset. In winter there are the animals to be tended and wood to be cut and carried from the remnants of the forests. In spring, summer and autumn, the men and older boys work in the fields, ploughing, sowing, weeding and harvesting. There is little time left for leisure for any members of the family. The women and girls, in addition to doing the ordinary household duties of cooking and cleaning, help in the fields when required. At other times, they spin and weave cloth and make the family clothes. In many places the old style of dress is disappearing. In the past each village had its own distinctive designs worked in embroidery on the home-made clothes of men and women. It seems that the skill required for this kind of work is now largely forgotten.

Most of the peasants of Central Europe are members of a Church, generally the Roman Catholic Church. They seldom miss Mass on Sundays and the 'feast days' are their only holidays. Thus for them a holiday has its original meaning of 'holy day'. On these days the farmwork is left and after mid-day there is dancing and singing in some open space in the village.

The peasant way of life has gone on for a very long time in Eastern and Central Europe. It is undoubtedly a hard life and, judged by English standards, there is much poverty among these peoples. If there were more land available for arable farming and if the peasants could be persuaded to grow a greater variety of crops, the conditions of their lives could be made much more comfortable. Against all this, it should be remembered that these peasants have increased the productivity of the countries in which they live by fitting into their physical environments in the way which they think is best.

## EXERCISES

1. The farmland of Consdorf (Figure 7) is about 1½ square miles in area. Each dot on the map represents one peasant home. What is the average farm area owned by each peasant farmer? The correct answer will help you with exercise 2.
2. Why is the standard of living of the peasants of Central Europe lower than that of people in Great Britain?
3. What are the chief differences between the farming systems of Iowa (Figure 5) and of South-east Germany (Figure 6)?
4. A good method of fixing the location of a place on the earth's surface is to give its latitude and longitude. On your atlas maps fix the location of the following places:

| | |
|---|---|
| Consdorf (Figure 7) | Latitude 49°40′N. Longitude 6°10′E. |
| Villages in S.-E. Germany (Figure 6) | Latitude 51°10′N. Longitude 13°0′E. |
| Farms in Iowa (Figure 5) | Latitude 42°10′N. Longitude 92°40′W. |

## Chapter 10

# ALPINE PEASANT FARMING

The type of peasant farming described in Chapter 9 is found in many parts of the Old World where there are plains. These plains are not flat in the strict meaning of the word. They often contain hills as high as 1,000 feet and sometimes more, but cultivation is not greatly hindered by these heights. For instance, there are two spot heights marked on Figure 6 each of which is over 1,000 feet yet they are surrounded by arable fields. Further south in Europe, however, the altitude of the land is very much greater. In fact, there is a great belt or zone of high mountains which follows an irregular course from the Atlantic to the Black Sea. They are all alpine mountains although they are known as Alps only in South-east France, Switzerland, Austria and Rumania. Wherever these alpine mountains occur, they possess similar features. They are very high and rugged, their slopes are very steep and they are penetrated by valleys. The landscape is very different from that of the plains of Central Europe. Although it is very beautiful, it puts great difficulties in the way of its inhabitants if they have to depend entirely on agriculture.

Land which is suitable for arable purposes is very scarce in the alpine mountains. In the whole of Switzerland, for example, only 17 per cent of the surface is used as farmland and much of this is meadow. One quarter (25 per cent) of Switzerland's land grows nothing at all. Again, in the Province of Tyrol in Austria, only 4 per cent of the surface is used for arable farming. These figures suggest that the Alps are not a very important agricultural region yet nearly one half of the 'active' population of Austria works on the land, either in agriculture or in forestry, and agriculture is the second largest occupation in Switzerland. In both of these alpine countries, the workers on the land are mainly peasants who

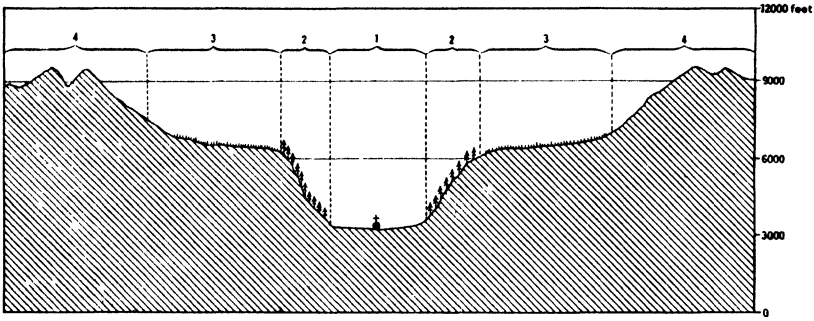



FIG.8 – *A cross-section of a Swiss Alpine Valley*
The distance between the summits is about five miles. Sections like this are useful to show how land is used for different purposes.

have worked out a special system of land-use which is well suited to their physical environment.

## LAND USE IN A SWISS ALPINE VALLEY

Figure 8 shows the main features which are typical of all alpine valleys. Their floors are fairly smooth but the sides are very steep. This is because, in the long distant past, great masses of ice called glaciers moved down these valleys, lowering their floors and steepening their sides. The climate is much milder now than it was during the Ice Age but the highest Alps still carry glaciers which are the remnants of once greater masses of ice. Moving ice and rivers have carved out the present landscape in these high mountains and have given rise to four distinct kinds of surface, each of which is illustrated in Figure 8.

First there are the mountain tops on which nothing grows. They have no direct value at all to the farmers. They are so high that snow and ice remain on them all the year round and the temperatures are always too low for plants to grow.

Secondly, and below the summits, there are patches of smoother land, clearly shown in the photograph of Celerina (Figure 9).

These patches are covered with snow for six to eight months each year but in summer, when the snow has melted and disappeared, they are covered with short grasses and flowering plants. They are called 'alps' by the local people and from them the mountains have taken their name.

Thirdly, and below the alps, are the very steep valley sides. They too are snow-covered for half the year but they are forested with conifers which can stand the winter cold. These slopes are far too steep for any kind of arable farming but there is often some grazing in more open patches of the forest.

Finally there is the valley floor, fairly smooth but also snow-covered for several months of the year. The valley floor in this photograph happens to be wider than most because two rivers meet just below Celerina.

Each of these zones, except the highest, has its own special value and the peasants make skilful use of each and combine these uses in their system of farming as is suggested in Figure 8.

The most important area is the valley floor. In its lower part it is carefully cultivated in strips which are rather similar to those described in Chapter 9. If the climate is suitable, cereals are again the main crops but there are also many meadows for hay. The growing season is very short here and all the field activities must be completed between May and the end of September. In the upper parts of the valley floor the climate is always too cold for arable crops and the land can be used only for hay as is shown in Figure 10. The chief agricultural difficulty is that there is not sufficient arable land on the valley floor to produce enough food for the peasants. They must therefore make some use of two of the other zones.

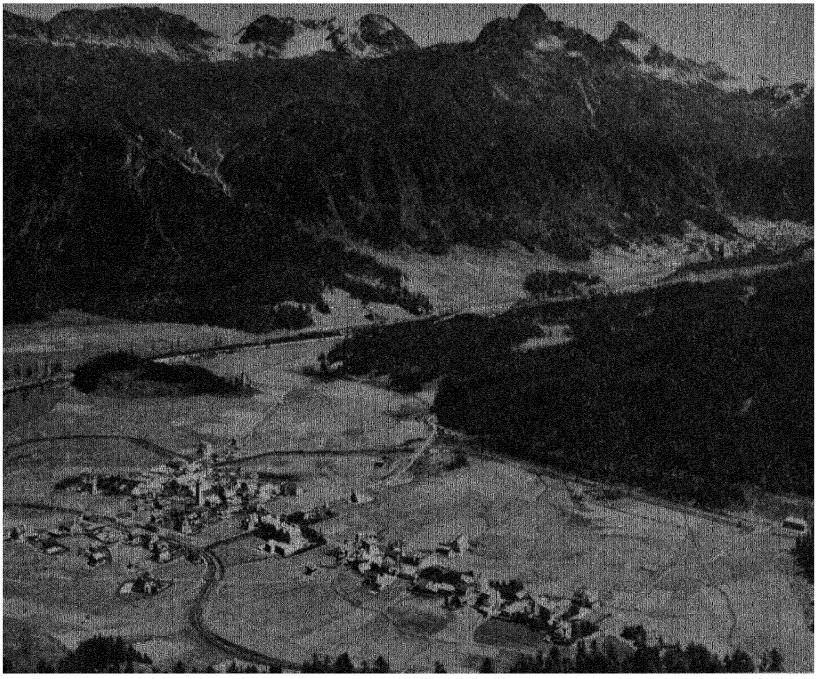
The steep valley sides are useful for timber and fuel production and there are occasional patches of grazing land among the trees. The zone of alps provides grassy slopes at some thousands of feet above the village. These alps are not divided into fields but the rights to graze animals on them as well as to cut the grass for haymaking belong to the villagers as a whole. When the snow disappears from them in May or June, the animals are driven up the slopes

from the village where they have spent the cold winter in stalls. The villagers who guard the animals drive them along steep paths until they reach the alps where they remain until the snows of September and October force them to return to their winter quarters. During the summer months the animals feed on the alpine pastures. The peasants make cheese and butter from their milk and cut grass wherever possible. The latter is stored in wooden barns until it can be transported to the valley floor for use as winter fodder. While they are on the alps, the peasants live in wooden huts (chalets). These temporary summer homes contain very few comforts and the people live rough lives during their stay there.

This system of land-use is called 'transhumance'. By means of it, the peasants are able to produce extra food for themselves and to store hay for the winter feeding of their animals. They are also able to use the valley floors more intensively because there is no great necessity to find summer grazing places there. Not all the village people go up to the alps; the majority remain on the valley floor to grow the maximum quantities of crops on the restricted area.

Transhumance is practised in most alpine lands, and not only in those of Europe, but the system varies according to the local physical conditions. It is highly organized in Switzerland and Austria. Generally a few villagers go up with the animals to the alpine meadows and they share the profits made from the sale of cheese and butter with the owners of the cattle and sheep.

Alpine peasants thus make the best use of their difficult physical environment. Life is not easy for them. They cannot stop their work when the winter snows come, mainly because the animals must still be tended carefully in their stalls. Hay must also be brought down from the barns on the alps and fuel must be cut in the forests. The winter days are short and the long, dark evenings are spent in indoor occupations. The women and girls still spin wool and weave cloth for the family clothes. The men often make small wooden articles such as toys and simple musical instruments which they sell in nearby towns. Like the peasants of Central



Paul Popper

FIG.9 – *Aerial view of a Swiss Alpine Valley (Celerina)*
The photograph shows part of the Engadin in Switzerland and brings out the contrast between the flat valley floor and the steep forested valley sides. There are still ice and snow on the highest parts although the month is August. The smoother areas between the summits and the forested slopes are alps.

Europe they are glad of any opportunity to earn extra money with which they can purchase the things they cannot themselves produce.

## CHANGES IN ALPINE PEASANT FARMING IN SWITZERLAND

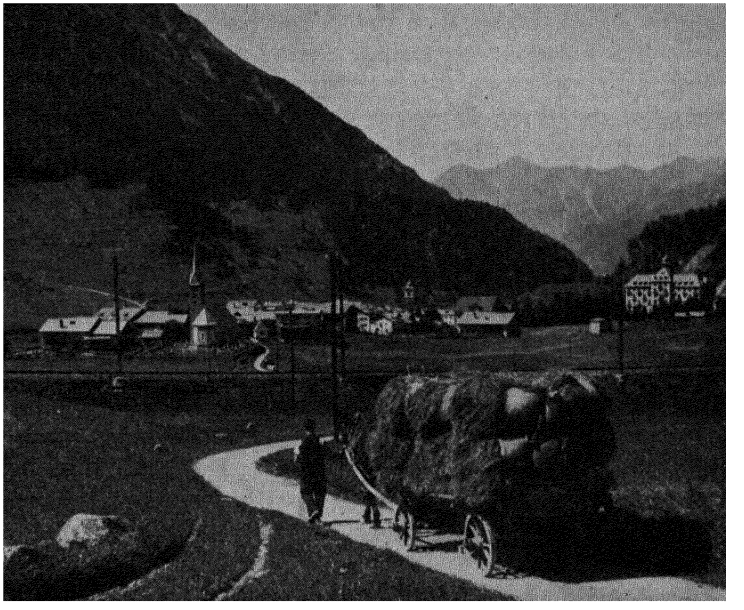
The peasants of the Swiss Alps are now more prosperous than they were in the past and certainly they are better off than the peasants described in Chapter 9. This is because, with the help of their Government, they have developed ways of using their land which have affected their peasant farming in many ways.

In the first place, the beautiful mountain scenery of Switzerland is very attractive both in summer and winter to people of other lands: but very few visitors could come until transport was developed and hotels built. The Swiss have been very successful in providing these two necessities for tourists. Figure 9 illustrates some of the things they have done. The mountains shown in this photograph are the Bernina Alps and the valley is part of the Engadin which is drained by the upper part of the River Inn in South-east Switzerland. The valley coming in from the top right-hand corner contains the small town of Pontresina but, more important than this, it gives an easy way to the Bernina Pass which leads into Italy. Both valleys in this picture now contain railways and good roads which make it possible for tourists to reach places such as Celerina, Pontresina and St. Moritz, the last named lying off the photograph to the left.

Study of Celerina village shows that many of the buildings are much too large to be peasant houses. They are the hotels which have been built here; clean, comfortable hotels, well-heated when visitors arrive for the winter sports. Even the small village shown in Figure 10, which is much higher up the valley than Pontresina, has its railway and hotels.

Many thousands of tourists visit the Engadin in winter for the sports and in the summer for climbing or perhaps just to see the wonderful scenery. This affects the peasants because all these visitors require food and accommodation. The peasants therefore find good markets for their milk, butter, cheese and grain and many of them obtain work also as guides, as hotel workers, as car-drivers and so on. Instead of being concerned only with subsistence farming, that is, providing food for their families, they now grow crops for sale and can also earn money in various other ways. These changes give added importance to the valley floor and one result is seen in the decline of transhumance. The younger members of the peasant families prefer to find work in the ways just mentioned rather than spend several months on the 'alps' looking after animals and cutting hay.

Another great change has come about during this century by



*Paul Popper*

FIG. 10 – *The Upper Engadin Valley in Switzerland*
The valley in this photograph is a part of the one shown in Fig. 9, but at a much higher level. There is no arable farming on the valley floor here because it is too high and the winter lasts five months, but there is a hotel for tourists and a railway.

the making of hydro-electricity. The many rivers of Switzerland and Austria are fed by abundant rainfall, and by melted snows in the warmer months. Their slopes are generally steep and they flow swiftly. For centuries they have been used to turn water-wheels for grinding corn and cutting up logs of wood, but today some of the valleys are dammed to make great reservoirs. From these, the water rushes down through steel pipes to turn the turbines in large hydro-electric power stations whence the current is carried by a grid of cables supported by pylons. Very few parts of Switzerland are now very far from electricity supplies. The

railways have been electrified, the street-lighting of towns and villages is by electricity and the people use the current in their homes. But the most important change is seen in the peasant-farming.

Many of the peasants now have electrically-driven threshing-machines in their barns. They do not yet use electric ploughs or grass-cutters but they do have electric light in their homes. Also the use of electricity makes the hotels brighter and more cheerful and so helps to attract more visitors. This means better and more reliable markets for the peasants.

These changes, among others, have brought prosperity to the alpine peasants of Switzerland. Many of the old farming methods are still practised. The old and the new exist side by side. In some valleys it is possible to see wheat being threshed, with flails on the floor of a barn, while in a neighbouring farm a modern machine driven by electricity is being used for the same purpose. The peasants still have much hard work to do and it would be a serious mistake to think that their lives are 'soft'. Nevertheless, no other alpine peasants in the world have made such a success of their land-use as have those of the Swiss Alps. They are far better off than the peasants of the plains, in Europe or elsewhere.

## SWISS FARMERS AND THE OUTSIDE WORLD

There are many alpine mountains in the world which are like those of Switzerland. The Himalayas of Asia, the Andes of South America, have at least as magnificent scenery and as many valleys in which farming is carried on. The question arises then as to why the Swiss peasants have been able to make their lives so much more prosperous than those of farmers in similar areas. The answer to this question lies mainly in the fact that the Swiss Alps are in Europe and have densely populated plains to the north and the south of them. On these plains, great industries and cities have grown up and many of the inhabitants can afford to spend holidays in Switzerland. In doing so, they have greatly helped the Swiss peasants in their system of land-use. But the farmers could

not have benefited from this situation just by their own individual actions. The Alps have been made accessible by Nature because of the numerous great valleys which penetrate them and also provide routeways from north to south and from east to west. For centuries these valleys have been followed by roads but it was not until the coming of the railways that people could reach the Alps in comfort and with ease. These railways have been built and run by the Swiss Government which has done everything in its power to encourage visitors especially from foreign countries.

This may be expressed in geographical language in this way. The physical environment of the Swiss Alps is suitable for a special type of peasant farming, it is extremely attractive to tourists and provides routeways by which visitors may travel from nearby densely populated areas without great difficulty. But all these resources have only been used, on their present scale, for less than a hundred years. Surely this is an excellent example of how a part of the earth's surface provides opportunities for its inhabitants. The Swiss have seized these opportunities successfully, but without the presence of the densely populated plains, especially in North-west Europe, they could not have built up their tourist industry and their farmers would have been little better off than the peasants of the Himalayas or Andes. Here, again then, is an example of the ways in which human activities in one country have become dependent on what people do in other lands.

## EXERCISES

1. Write a description of the village of Celerina (Figure 9).
2. Compare Celerina and the village shown in Figure 10.
3. Describe the methods of transport which are suggested in Figures 9 and 10.
4. What differences are there between the farm-houses in Swiss alpine valleys and those in Southern England?

## Chapter 11

# SHEEP-FARMING IN NEW ZEALAND

England, Iowa, Central Europe and the Swiss Alps are all in the Temperate Lands of the Northern Hemisphere. The earth's surface is so arranged that there is far more land to the north of the Equator than there is to the south of it. Your atlas will probably contain maps of the Arctic and Antarctic Regions and will show you that the former consists of a sea which is surrounded by great land-masses whereas the latter is an ice-covered land-mass which is surrounded by great oceans. This difference between the Northern and Southern Hemispheres is one of the outstanding features of global geography. The Northern is, in fact, often called the Land Hemisphere while the area to the south of the Equator is called the Water Hemisphere. As people do not live permanently on the seas, the Northern Hemisphere contains by far the greater number of inhabitants. That is why the maps in Figures 22, 23, 25 and 26 are drawn in a special way. They draw attention to the great importance of the Land Hemisphere.

The Temperate Lands lie approximately between 30° and 60° latitude in each of the two hemispheres. A world map shows that the total area of land between these latitudes in the Southern Hemisphere is only a small part of the land surface of the globe. Furthermore, even today the Southern Temperate Lands can be reached easily only by sea or by air. They were discovered and and settled long after the people of Europe and Asia had built up civilizations. They are, therefore, new lands and the majority of their people are still primary producers. The most recently discovered of them all is Australasia (Australia, New Zealand and their adjacent islands). This island continent is literally on the other side of the world from Europe. Because of this fact and also because of the great distances between Australasia and Europe, it is not

surprising that the systems of land-use which are used in the 'Antipodes' are different from those to be found in Europe.

In spite of their newness, the best land in Australia and New Zealand is already under arable farming as it is in the Old World. Best land is that which has a favourable climate for arable purposes with fertile soils and slopes which are not too steep for ploughing. Unfortunately such areas are not unlimited. If there were more of them, the problem of feeding the world's population would not be as great as it is. As there is little hope of extending these arable areas, man has discovered ways of using the poorer areas although their production is not as high as that of the best lands. A good example of the way in which some of these poorer lands are used is to be found in the sheep-farming lands of New Zealand.

## ANIMAL-REARING

In very early times, man tamed wild animals and has continued to rear them for three main reasons, for food, for materials for clothing, and for work as 'beasts of burden'. There are few parts of the world where animals are not of some value to man, but in most instances animal-rearing is one of two main types. The first and most widespread is where animals are part only of the farming system. On the mixed farms of Southern England or on the peasant farms of Central Europe, animal-rearing of this type plays an important part. The numbers of animals are not usually very large on any one farm but they help the farmer to avoid being dependent on one crop. The second type is found where farmers make animal-rearing their main occupation. They usually have no arable land. They may rear cattle or sheep; their herds or flocks may be large of small. They are pastoralists and their animals live by grazing. This type of animal-rearing or pastoralism, as it is called, forms the subject of the rest of this chapter but two further points require explanation before we go any further.

On the pastoral areas of the Temperate Lands, animals may be reared for meat or for clothing materials or sometimes for both. Whatever the purpose may be, the numbers and quality of

the animals depend on the carrying capacity of the land. If the climate of an area is fairly damp and the grasses are rich, then more animals per acre can be reared than in places which are very dry and have only a poor cover of coarse vegetation. Since the best land is taken for arable purposes, which is the most profitable type of land-use, the pastoral areas are nearly always of poorer quality and therefore require more space to support a given number of animals than would the land which is now ploughed.

The most important animals reared in the Temperate Lands are cattle and sheep. The former require richer pastures if they are to produce good meat or milk. The latter are able to live on much poorer pasture, that is, on land of a lower carrying capacity. If the grazing is very poor, the sheep will produce poor mutton but their wool may be of good quality. In general, cattle are reared on the better pastures and sheep on the poorer. In fact, sheep are the most useful of all domestic animals in the sense that they can be reared on land which is almost useless for any other farming purpose.

Both Australia and New Zealand are among the leading sheep-rearing countries in the world. Australia has the largest sheep population but suffers greatly from the unreliable character of its rainfall. The following report appeared in *The Times* of December 28, 1951. "It is officially estimated by the Department of Agriculture that a million lambs have died this year in the areas of Western Queensland affected by the drought." In New Zealand, there is little danger of such droughts but there are other factors there which affect the types and distribution of sheep.

## THE SHEEP-FARMING SYSTEM IN NEW ZEALAND

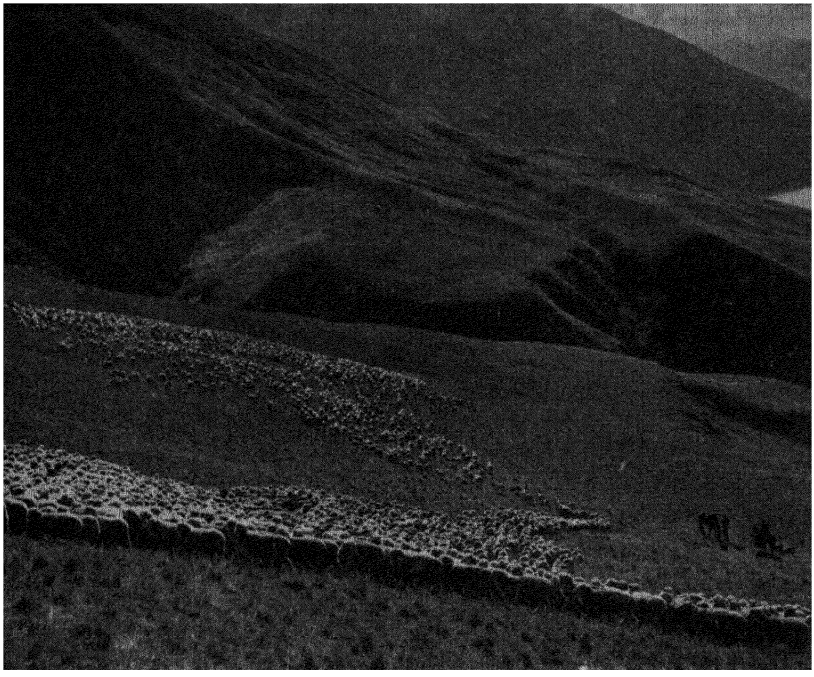
Like the British Isles, New Zealand consists of two large islands and a number of smaller ones. The most important part of the country for sheep-rearing is South Island, much of which is mountainous. On the central part of its eastern side are the well-known Canterbury Plains which were the original home of sheep-rearing in New Zealand as is suggested by the name 'Canterbury

Lamb' which was its chief product at one time. These plains have a mild climate, not unlike that of Southern England, and an undulating surface. Their soils are fertile and it was not long before farmers discovered that they could be used in more profitable ways than by sheep-rearing alone. Now much of the land in this part has become arable or is in dairy farms which produce the milk from which much of New Zealand's cheese and butter are made. In other words, the farming of the Canterbury Plains and other non-mountainous areas, has become much more intensive.

Gradually sheep-rearing is being pushed out of the lower parts into the mountains where the slopes are too steep, and where less fertile soils are unsuitable for arable or dairy-farming. The same thing has happened in Britain in the past but there is a difference in New Zealand: the hilly and mountainous country of South Island is divided into large 'runs', often of several thousands of acres, on which the sheep are grazed. Each run may carry flocks of thousands of sheep which are tended by mounted shepherds who are assisted by dogs.

Figure 11 shows a part of such a sheep-run near Wanaka in South Island, New Zealand. A corner of Lake Wanaka can be seen near the top right-hand corner of the photograph and this will help you to locate the district on a map of New Zealand in your atlas. The landscape is rugged and quite unsuited to arable farming. Even the grazing is not very good as the tufted grass in the foreground of the picture shows. Its carrying capacity is not very great so that the sheep require large areas for grazing. That is why the run is not divided into fields and there are no hedges to be seen in this photograph. Occasional wire fences are erected to control the movements of the animals – in this case, the flock is passing through a gap in a wire fence just to the left of the shepherds. The chief task of the shepherds is to move the flocks from one part of the run to another to avoid over-grazing. Theirs is a lonely life without regular hours of work. Their home is at the sheep-station which is several miles away.

The flock seen in this picture consists of dual-purpose sheep – they have been bred to supply both wool and meat. At least



*High Commissioner, New Zealand*

FIG.11 – *A sheep farm in South Island, New Zealand*
The land shown here is too high and rugged for arable farming. The pasture is not very good and the large flock of sheep must have plenty of space for grazing. No buildings are to be seen and the shepherds must have horses to reach their home at the sheep 'station.' This is marginal land and is only suitable for sheep rearing.

twice a year, they will be driven to the dipping pens where they are 'dipped' in water containing chemicals which kill the insects which infect their fleeces. In late spring or early summer they are brought to the shearing sheds where skilled men remove the fleeces with the help of electrically-driven clippers. The wool is then packed into bales and sent to Christchurch or Dunedin where it is sold to buyers who purchase the wool for export, mainly to Europe and North America.

The nearest railway station to Wanaka is at Cromwell which is over 50 miles away. The wool is taken there by motor lorry and

then transferred to railway wagons for the next stage of its journey. It is then in its 'greasy' state and much cleaning is necessary before it can be spun into yarn for making cloth.

In New Zealand, the production of mutton and lamb is more important than that of wool. The sheep in Figure 11 have just been dipped and even in this small photograph they seem to be in good condition. When they are ready for slaughter, they will either be driven or carried in lorries to the nearest abattoir. This is probably at Cromwell, the terminus of the railway from Dunedin, and is equipped with modern machinery. When the sheep and lambs are killed they are skinned, cut up and put into cold storage. Later the carcases are put into refrigerator-vans on the railway and taken to the port where they are again removed to cold-storage sheds until a ship is ready for them. This vessel is equipped for the meat trade with special refrigeration space so that the meat can make its long journey to market in a good condition.

Such a system of land-use does not require very many workers. A large run of several thousands of acres will employ perhaps ten or a dozen shepherds who are assisted at shearing time by temporary helpers. Sheep-rearing areas of this type are therefore sparsely populated but the people are producers of important primary goods, both meat and wool.

## SHEEP-FARMING AND THE OUTSIDE WORLD

The total population of New Zealand is just under two million. If all these people lived entirely on mutton and lamb, they would find it impossible to eat the total production of their country. In fact, the great majority of the meat and the wool is exported, mainly to West European countries, especially Britain. But Western Europe is about 12,000 miles from New Zealand and the journey by sea takes many weeks, varying according to the speed and route of the ships. This long journey does not affect the wool which will come to no harm for many months, but meat will deteriorate quickly on such a journey, which is largely through tropical latitudes, unless special precautions are taken to preserve it.

Refrigeration has made it possible for New Zealand mutton and lamb to reach Europe in excellent condition. But for the invention and development of this system, meat could not be sent in fresh condition from the southern Temperate Grasslands to its markets. This is true for Australia and Argentina as well as for New Zealand. Their pastoralists would be unable to send their produce to the densely populated countries of Western Europe. The Second World War showed the importance of this connection between the primary producers and their customers. For a number of reasons, the refrigeration ships were unable to bring meat from the Southern Hemisphere in sufficient quantities to meet the demands, particularly of the English people. The result was seen in the severe rationing of meat which was necessary during that war and the years which followed it.

Here is yet another example of the many ways in which the inhabitants of different parts of the earth's surface, and their occupations, are connected. As far as New Zealand mutton and lamb are concerned, the connection spreads half-way round the world. At least some of the sheep shown in Figure 11 have been eaten in English homes. In other words, the opportunities provided by Nature in the Wanaka district of New Zealand have been used by the people there to provide food for other people who live 12,000 miles away. This has been made possible by refrigeration which simply means storing the meat at low temperatures. Fortunately for New Zealand sheep-farmers, mutton does not suffer from being frozen, that is, it keeps well if the temperature of the storage space is below 32°F. When the carcases are in the cold rooms, they are frozen as hard as boards and remain so for a time after they have been removed. Beef provides a more difficult problem. When it is frozen, beef is apt to lose its fresh appearance and does not attract the customer in the butcher's shop in normal times. But 'chilled' beef, that is, beef which has been stored in temperatures just above 32°F. but low enough for it not to deteriorate, looks, and is, as good as meat from cattle which have just been slaughtered.

Refrigeration space in ships was first used, early in this century, to bring meat to Britain from New Zealand. Now that space is

shared between meat, butter and cheese. This is an interesting development. Earlier in this chapter, it was stated that the eastern coastal plains of South Island have changed from sheep-farming to mixed, including dairy-farming. Much of the dairy-produce is prepared for export to Britain but this development would have been impossible before the days of refrigeration. It is worth while trying to follow the changes which have taken place in New Zealand. Not much more than 50 years ago, sheep were reared there for wool (as in Australia); the coming of refrigeration led to a change in production from wool, to wool and mutton. Then the agriculture of the plains became more intensified so that much of the sheep-farming was pushed out into the less favourable areas and was often replaced by cattle-rearing on the plains. The butter and cheese could be exported because of refrigeration.

In quite a short time, therefore, New Zealand has ceased to be a country of primary producers only. Butter- and cheese-making in New Zealand is a manufacturing industry and it is likely that similar industries will continue to grow there. It cannot yet be called an industrial country but more manufacturing processes are being carried on there than previously. Many countries have passed through similar changes. In Roman times, Britain was a primary producer; indeed one of the chief attractions of Britain for the Romans was its grain and minerals. Now the majority of our primary products must be imported. Such examples illustrate the changes which are certainly going on all over the world. The remarkable thing about New Zealand is the speed at which the change has come about.

One last point may be noted here. New Zealand sheep-farmers have shown great skill in the ways in which they have fitted into their physical environment. One of their successes has been improvement in sheep-breeding. Most of the flocks consist of first-class animals. This has been brought about by importing high quality rams and ewes, particularly from Britain, for breeding purposes. This means that the quality of both the meat and the wool is high and so they are able to earn good prices in the world markets.

## EXERCISES

1. Make a list of the products which animals provide.
2. What do you understand by carrying capacity of land? Why does it vary in different places?
3. How does refrigeration help in supplying the world's food?
4. Write a description of the scene shown in Figure 11.

## Chapter 12

# FARMING IN TROPICAL LANDS

Everywhere in the Temperate Lands, people, and especially farmers, have to contend with climatic conditions. The systems of land-use are greatly affected by rainfall and temperatures. In passing, it may be noted that the name 'Temperate', meaning mild and equable, is a true description of only some parts of the so-called Temperate Lands. In the interiors of continents in these latitudes the climate is anything but mild and equable. The explanation of this misuse of an adjective lies in the fact that the ancient Greeks, who first suggested that the earth might be divided into Frigid, Temperate and Torrid Zones, happened to live in one of the mildest parts of the Northern Temperate Lands and probably knew little of the climatic conditions in the continental interiors of their own zone.

In the Temperate Lands, the particular combination of rainfall and temperature in any area is very important to the farmers. Temperatures are less important in the Tropical Lands because the temperature range is small, that is, there is much less difference between the highest and lowest temperatures. There is almost always enough heat, usually with some to spare, for the growing of tropical plants. The decisive climatic element in these lands is rainfall, with soils and slopes next in importance. If we take the Tropical Lands as those parts of the earth's surface between 30° North and 30° South, then their outstanding climatic feature is that some parts have extremely heavy rainfall while other parts have practically none at all. This explains why some parts of the Tropics or Inter-Tropical Lands, as they are sometimes called, are clothed with extremely dense forests while other parts are deserts with little or no plant life on them. The natural vegetation and the land-use systems are therefore clear reflections of the amount of rain which falls.

Most of the Equatorial Belt has very heavy rainfall. Not only is the rainfall in these Equatorial Lands heavy, it is very regular throughout the year, usually falling during thunderstorms in the afternoons. Where there has been no interference by man, dense forest is characteristic of these areas. It is called Equatorial Rain Forest, a name which reminds us of where it occurs and why. The three main areas of such forest are in the Amazon Basin (South America), the Congo Basin (Central Africa) and the East Indies. They are shown on the Front Endpaper Map.

On the northern and southern sides of these forest lands, the rainfall is still fairly heavy but it falls mainly during the season when the sun is vertically overhead. The plants which grow wild in these areas must be able to survive during some months of dry weather. There is no winter or summer in the European sense, only a dry and a wet season with little difference in temperature throughout the year. If the sun is vertically overhead twice during the year, there may be two wet and two dry seasons but the total amount of rainfall decreases with distance north and south of the Equator. The forests gradually become less dense, the trees are more scattered, there are more open spaces. There are more opportunities for human activities, especially in agriculture, in these Savana Lands.

Further to the north and south, as the Tropics of Cancer and Capricorn are approached, the rainfall decreases almost to nothing. The Savanas give way to semi-deserts and finally the almost plantless deserts occur.

These changes in rainfall do not occur regularly everywhere in the Tropical Lands. There are always exceptions to general rules. For example, in South-east Asia there are no Savana Lands to the north of the Rain Forests of the East Indies because the arrangement of the land and the sea there gives rise to another set of climatic conditions. Or again, there is no great desert like the Sahara on the northern side of the Amazon Basin Forests for the simple reason that the North Atlantic Ocean is there. Nevertheless, the broad pattern of the distribution of types and amounts of rainfall is shown in the natural vegetation map. If the surface

of the earth were flat and if the continents were regular in shape, there might be a regular arrangement of these lands of varying rainfall and varying vegetation.

If we now compare the natural vegetation and population maps of the world (Front Endpaper Map and Figure 1), an important fact should be noticed. All the Inter-Tropical Lands, with two exceptions, are not densely populated. The two exceptions are found in Asia (India, China and South-east Asia) and Egypt. It has already been suggested that most of these Asian Lands have special climatic conditions. They have what is known as a Monsoon Climate which helps to make the river valleys and plains of this Monsoon Asia the most densely peopled areas on earth. Egypt is a special case also among the Inter-Tropical Lands but, apart from these two cases, there are no large areas of dense population.

Equatorial Rain Forests and Tropical Deserts do not provide many opportunities for human activities. They are not favourable physical environments, at least not for large concentrations of people. Their climatic conditions have been discussed in some detail in this chapter because their climates mark them off from the rest of the world. They also have mountains and plains, steep slopes and undulating surfaces.

Excluding Monsoon Asia and Egypt, the Inter-Tropical Lands are still largely inhabited by primitive peoples more especially in their remote parts. Certain developments have taken place in some areas and these will be described in Chapters 13 and 14. The rest of this chapter is concerned with those native peoples whose lives have not yet been greatly affected by modern changes.

## SUBSISTENCE FARMING IN TROPICAL LANDS

The great Tropical Deserts (Sahara, Arabian, Kalahari, Atacama and Australian Deserts) can be occupied only where water is obtainable from springs or wells. The true Equatorial Rain Forest is also almost uninhabitable by people and certainly does not allow agriculture to be developed. This is especially true of

such forests when they are found on lowlands, such as much of the Amazon Basin, because the abundant rainfall cannot be drained away properly and the forest floor is always swampy. The Savana Lands, between the forests and the desert, are the most favourable Tropical Lands for human life. Where the trees are scattered, the surface can be used for some kind of agriculture and even if the trees are fairly close, they can be cleared by burning because there is always at least one dry season in these areas.

On most of the Savana Lands, the native peoples have their own special systems of land-use. The details vary from one part to another, but the general method is similar practically everywhere is such lands. It is a system of subsistence farming which means that its purpose is to provide enough food and clothing for the family, the tribe or the village to subsist, that is, to keep alive. There is rarely any surplus produce for sale and very little money is used. The lives of the people are very simple; they need very few material things and most of what they want, they make themselves.

The system is usually a mixed one, including some animal-rearing and some cultivation. It might be described as a primitive peasant system except for one thing. In these Savana Lands, the areas are so large and the population is so sparse that there is no shortage of land for cultivation. A Savana farmer does not own a farm or even rent it. The whole village or a group of farmers share and cultivate a patch of land for a few years. They may have to burn the trees and bushes at first. Then the land is broken up with hoes or mattocks, or perhaps it would be better to say that the earth is loosened, and then the seeds of maize or other cereals are sown. They are left to grow until the harvest is ready when the crop is reaped and gathered by hand. The threshing is done with primitive flails and the women then pound the grain in wooden tubs to make flour.

After a few years, the cultivators find that the soil in their patch of Savana is giving very poor yields, not enough to make the cultivation worth while. This is one of the great problems of rainy Tropical Lands. There are very few areas of fertile soils

anywhere among them. The reason is that the heavy rains wash the plant foods out of the soils. This process is called 'leaching' and where it happens on a large scale, the soils cannot be fertile. Also, where the surface slopes at all steeply, much of the soil itself is washed downhill and a kind of soil erosion takes place. To meet this soil infertility, the Savana cultivators simply move to another patch of land and repeat the processes described above. As the land is not owned by any one person, the cultivators may choose any suitable and convenient patch. This method of land-use is called 'shifting cultivation' and is characteristic of the Savana Lands of Africa and Central America. It is a kind of nomadic existence for the people and explains why their villages are not permanent.

Practically all the work is done by hand but this is no great hardship to the people because, unlike the Alpine peasants of Switzerland, they have plenty of time. There is no cold, or even cool, winter season in the Savana Lands. There is enough heat for crops to grow all the year round. If the farmer can get his seeds sown before or during the rains, they will grow rapidly and look after themselves. He does not even bother to hoe between the rows of plants and is probably wise not to do this because too much cleaning of the surface soon helps soil erosion either by water or by wind.

When white men first met these Savana people, they often described them as lazy and 'good for nothing' and said that their shifting cultivation system was very wasteful. To a West European accustomed to the intensive land-use and permanent farms and villages of his own land, this criticism may seem correct but it is possible that the Savana farmer has worked out a system which is suitable to his particular physical environment.

## RECENT CHANGES IN THE TROPICAL LANDS

In their original state, tropical farmers knew nothing of the outside world and certainly had no trade connections with it. In some areas there were local barter arrangements. For example, the

pigmy hunters of Equatorial Africa still exchange goods for food and fruit with the Savana people. But there was no trade because the native peoples had such little surplus. With the coming of white men, as traders and missionaries, new ideas have spread in many of these tropical areas. Since the beginning of this century, new methods of farming have been developed by tropical peoples with the help of European advisers. One outstanding example is to be found in Southern Nigeria where native farmers now grow cacao on their own farms which have now become permanent. They have abandoned the old subsistence farming in favour of one by which they produce crops for sale. Another example is provided by Malaya in South-east Asia where a good proportion of the rubber production consists of that grown on native holdings.

Changes like this, together with that of plantation agriculture which is described in Chapter 13, are results of efforts to provide more food and raw materials from these Tropical Lands. By far the largest areas of Tropical Savanas are in the continent of Africa and it has been suggested that these large territories could be made to contribute a great deal to the easing of the world's food supply problem. Africa has even been called the 'Continent of Tomorrow' partly for this reason. It is unfortunate that certain experiments in food production in Africa in recent years were not more wisely planned because the great difficulty is that few white people have experience in farming the Savana Lands. The world demand for food is so great that it seems likely that more experiments will be tried in these areas.

Some of the Savanas are called Tropical Grasslands and they were originally very rich in wild game of various kinds. Many of their human inhabitants have long practised animal-rearing so that it seems that pastoralism might be increased. If this were possible, it would mean a welcome addition to the world's meat supplies. But there are two serious difficulties. First, the carrying capacity of the Tropical Grasslands is very low partly because they occur where there is at least one long dry season. The wild animals could survive in the past because their grazing grounds were unrestricted. They could wander in search of pasture but

large scale domestic animal-rearing would mean some enclosure of land.

Secondly, there are numerous insect pests on these Grasslands. They are particularly dangerous, in various ways, to cattle. There is only space here to mention the dreaded tsetse fly which infects cattle and indeed human beings with the germ which leads to 'sleeping sickness' or 'the sickness' as the native peoples call it. European scientists and their African assistants are working hard to discover methods of overcoming these pests but they have not achieved full success yet. Perhaps they will be able to rid the Tropical Grasslands of their insect enemies and thus prepare the way for the growth of large-scale animal-rearing.

## EXERCISES

1. Why are there few areas of very dense population in the Tropical Lands?
2. Write a short account of shifting cultivation in the Tropical Lands.
3. Why is it correct to say that rainfall is more important than temperature in the Tropical Lands?
4. What are the chief difficulties of farmers in Tropical Lands?

## Chapter 13

# PLANTATION AGRICULTURE IN TROPICAL LANDS

Earlier* there has been a brief account of some of the changes which have taken place in the use of land in the Inter-Tropical Lands. One change, not described previously, is probably the most important of them all. It is the growth of plantation agriculture and it is worth a chapter to itself.

The word plantation has several meanings but in this particular case it is used to describe a method of land-use followed in Tropical Lands and which is completely different from the shifting cultivation which the native people still practise. It is a method which has been worked out by European peoples who have gone out to Tropical Lands and have discovered that they must fit into the physical environment as the natives had to do, but in a different way.

Plantation agriculture is land-use on a large scale and most of it is concerned with the production of tree crops for sale. Much of the world's natural rubber, coffee and palm-oil is now produced on plantations in the Tropical Lands. The system of production is much more efficient than shifting agriculture and is taking its share in the world struggle for increased supplies of food and other raw materials.

### THE PLANTATION SYSTEM

This way of using tropical land is less than 100 years old, indeed the great majority of plantations have only been developed during this century. It has certain features which are found wherever it is practised.

First, a large amount of capital is necessary before a plantation can be started. Money is required to buy land and to clear it, to

* See pp. 97-98.

build the planter's home, to buy equipment, to pay the labourers' wages and for dozens of other things. A man must be rich to start a plantation. In many cases, they are owned by companies. For these reasons, plantation agriculture is sometimes called 'capitalist farming' and therefore makes a complete contrast with the native land-use or subsistence-farming.

Secondly, as tree products are the main produce of tropical plantations, the planter must wait for several years before he can gather any harvest. Therefore money is more than ever necessary if all the plantation work is to be carried on until the crops are ready for gathering.

Thirdly, such a system of farming must be carefully planned. To begin with, it is still a new way of using land. The peasant farmers of Europe inherited their land and their methods from their ancestors in most cases but the planter in Tropical Lands is working out a new technique. That explains why many plantation-owning companies employ scientists in their efforts to find the best ways of using their lands.

Fourthly, almost all the plantation is used for growing one crop which may be, for example, rubber, coffee or bananas. It is not common to find mixed crops on plantations. Such 'monoculture', as it is called, is necessary because the owners must have equipment for treating the crop before it is sent to market.

Finally, and perhaps most important of all, is the fact that the workers on the plantations are paid wages. This applies to the Europeans who are overseers and direct the planting and harvesting, as well as to the coloured people who do the manual work. This is something new in Tropical Lands where for many centuries the people have cultivated the village lands without thinking of wages. Many of them are still unwilling to work permanently on the plantations. The planters are finding it worth while to allow their employees to cultivate their own small farms where they grow food for themselves.

These five features are found in most plantations. They show that plantation agriculture is different from all other kinds of land-use. The planters have to face many difficulties but they have



*Dunlop*

FIG. 12 – *Part of a rubber plantation in Malaya*
This photograph shows mature rubber trees which have been tapped for latex. The planter's clothes suggest the high temperatures of this part of the world.

been successful in turning both Tropical Forests and Savanas into useful, productive land. Their methods vary according to the crops they produce. There is only enough space in this chapter to give two examples. They are taken from different parts of the world.

## A RUBBER PLANTATION

Figure 12 is a photograph of a part of one of the great rubber plantations owned by the Dunlop Rubber Company in Malaya. At one time, the district in which this plantation is situated was covered

with Tropical Rain Forest with trees of many kinds growing closely together. After clearing, the young rubber trees were planted and have now reached a stage where they are tapped to obtain the sap which is collected as latex. The trees are well spaced and are kept free from undergrowth. The white overseer, seen in the photograph, is responsible for the upkeep of the plantation and also for seeing that the trees are not tapped too frequently.

When the latex is collected, it is taken to the plantation headquarters where it is treated by heat, and chemicals are added to it. The result is that it becomes solid and is rolled into sheets of crepe which are then ready to be packed and exported.

The photograph in Figure 12 shows only a corner of the great rubber estate. It was chosen because it illustrates the way in which the trees are tapped and because it includes a white planter. The whole plantation is very much larger than this small part. Other parts have younger trees which are not yet ready for tapping while in yet other parts, the native workers are busy at their collecting and carrying of latex to the headquarters. The activities of all the employees are carefully arranged to collect the maximum amount of rubber.

Somewhere near the centre of the estate is the plantation headquarters. This consists of accommodation for the white overseers and for some of the native workers, sheds for the treatment of the latex and storehouses for the crepe. Each headquarters is a considerable distance from its neighbour. The planters do not live in villages or towns. They live and work on the estates and often find the life rather monotonous. Roads and railways are necessary for transporting the rubber to the ports as practically all of it goes overseas to Europe or North America.

Much of the world's natural rubber comes from plantations like this one and most of them are in Malaya and Sumatra. Many of them were damaged by the Japanese during the Second World War and, although the planters have succeeded in restoring the rate of production, they are still confronted with many difficulties.

There is a very large demand for rubber in the world today, a demand which has increased greatly with the invention of the

pneumatic tyre for use on lorries, cars and bicycles. The greatest markets for rubber are in North America and Europe where climatic conditions make the cultivation of rubber-producing trees impossible. When these markets were cut off from natural rubber-supplies by war, scientists developed methods of making artificial or synthetic rubber. This created a type of problem which many primary producers have to consider. If the natural commodity, such as rubber, is expensive to produce or is liable to be cut off, then the consumers of that material often try to produce it more cheaply and in their own countries. If they succeed, the rubber planters lose their markets and, in time, their work. This explains why rubber manufacturers, who often own the plantations, try to find new uses for rubber and also advertise their products widely.

Rubber-growing and manufacture provides yet another example of the dependence of one part of the world on other parts. More rubber is used for the making of tyres for vehicles than for any other purpose. But for the automobile industry of North America and Europe, the rubber plantations of Malaya and Sumatra would never have been developed.

## A COFFEE PLANTATION

Coffee is another plantation crop of the Tropical Lands but whereas rubber trees grow well on lowlands and hill slopes, the coffee tree thrives best on uplands where the soil is well drained. It requires a heavy rainfall for much of the year and high temperatures. The valuable part of the tree is the berry crop so that a dry spell is an advantage during the picking season. These conditions are found in some of the Tropical Savanas and there the coffee tree flourishes.

Coffee as a beverage has been known for many centuries. In the past, the berries were collected from trees growing wild on the Savanas, just as rubber was collected from wild trees in the Equatorial Rain Forests. Since the beginning of this century, practically all the world's coffee has been produced on plantations, and as coffee is now the chief non-alcoholic beverage in the world, this change in method of production is important.



*Aerofilms*

FIG. 13 – *Aerial view of a coffee plantation, Uganda*
The various stages in making a coffee plantation are illustrated in this photograph very clearly. (See Chapter 13, pp. 105-107). The district is much hillier than it looks here because aerial photographs seem to 'flatten' the countryside.

The greatest coffee-producing country is Brazil, but the photograph of a coffee plantation shown in Figure 13 was taken in Uganda in Central Africa. There are several reasons for this choice. They will help to explain some important features of plantation agriculture.

The camera was pointed to the north when this photograph was taken, so we can use compass directions when describing this plantation. In the first place, then, this is a fairly young plantation so that it shows the various stages of making such an estate. Careful study of the picture will show four stages as follows:

1. To the north of the planted area, are two patches of the original natural vegetation, that is, Savana, with its tall grass and occasional clumps of trees.

2. The light grey area which lies between the two patches of Savana and stretches to the north-east, is land which has been cleared recently and is now ready for planting.

3. Most of the north-eastern quarter of the plantation is occupied by young trees some of which have not yet been thinned.

4. The rest of the area, to the west and south-west but excluding the headquarters, is covered with regular rows of mature trees, that is, the trees which are producing berries.

A well-organized plantation, such as this one, employs a kind of rotation system. By growing trees at different stages on different parts of the estate, the owner is sure of having part of his land in full production. As the older trees become less profitable, the younger ones will reach the berry-bearing stage.

Just to the right of the centre of the photograph is the plantation headquarters where the owner and his European assistants live in wooden bungalows sheltered and shaded by a clump of trees. To the south-east of the residence are the drying platforms. The freshly picked berries are brought here by the native labourers, spread out on the platforms and dried. Then they are cleaned and sorted and put into bags which are stored in the large building to the north of the residence. The tracks running among the rows of trees and converging on the headquarters assist the workers in their task of collecting the berries and attending to the trees. The road leading from the residence north-eastwards connects with another road which leads to the nearest town. Here the dried and sorted coffee beans will be sent on their way to an overseas market.

The second reason for choosing this Uganda plantation as an example is that it illustrates the best natural conditions for growing coffee. Your atlas will show you that Uganda is part of a great plateau in Central Africa. This plantation is on that plateau at about 3,000 feet. The surface is irregular with quite steep slopes. These do not stand out well in this picture because aerial photographs seem to 'flatten' slopes. In fact, the headquarters of this plantation stands on a hill with slopes leading in all directions from it.

Remembering that the top of the photograph is the north, and noticing the shortness of the shadows of the coffee trees, we can deduce that this district is in a tropical latitude and that therefore the temperatures must be high enough for coffee-growing. The slopes of the surface mean that the land is well drained during the rainy season. What the picture cannot show is that the soils are made from volcanic rocks. These, when they are fertile, are the best for coffee trees. The combination of suitable temperatures, rainfall and soils, makes this a very good area for coffee plantations which produce very good quality beans. The chief difficulties are that Uganda is an inland country and its mountainous character makes rail and road building expensive. Very little of the total amount of coffee is consumed locally; most is exported and so transport costs are high.

Finally, as the chief area for coffee production is in Brazil, why has a plantation in Uganda been chosen as an illustration? There are two reasons for this. First, Uganda is very near and similar to Ethiopia where coffee trees were first cultivated. Secondly, coffee-growing on plantations in Uganda, as well as in neighbouring Kenya and Tanganyika, is a recent development. For a long time the planters of south-eastern Brazil had such large surpluses of coffee that they preferred to destroy much of it in order to keep up the prices they could obtain for the remainder. These high prices made it profitable to grow coffee in other lands where the conditions were suitable. Furthermore, Uganda is a part of the British Commonwealth and Empire and much care, thought and money have been devoted to the development of these lands. This shows that, although successful coffee plantations are possible only where the physical environment is favourable, other factors may decide just where the coffee is to be grown within the Savana Lands.

## OTHER PLANTATION CROPS IN TROPICAL LANDS

Rubber and coffee are the two outstanding plantation crops but there are others such as oil palms, bananas, cane-sugar, coconuts

and spices. They are all grown in the Inter-Tropical Lands and each provides commodities which enter into world trade. Like rubber and coffee, they were first collected from the natural vegetation and have now reached the stage where they are grown on large estates. By means of these plantation products, the Tropical Lands are playing an increasingly important part in the supply of food and raw materials for the world's population.

## EXERCISES

1. What are the chief differences between Tropical plantations and peasant farms in Central Europe?
2. Describe the method of tapping rubber trees.
3. Make a simple map of the area shown in Figure 13 to show the stages in the growth of a coffee plantation.
4. On a blank map of the world, mark the routes by which coffee and rubber are sent to Britain.

## Chapter 14

# FARMING IN MONSOON LANDS

### THE MONSOON LANDS

The chief countries of Southern and South-east Asia are India, Pakistan, Burma, Siam, Indo-China, and Malaya, while the Far East is made up of China and Japan. Although there are many differences between these countries and the ways of life of their peoples, there is one feature which they all have in common. They all experience monsoon climates, hence the name of the whole group.

The word monsoon means a seasonal wind and has been given to the type of climates found in these parts of Asia because the most important climatic factor is the seasonal winds. In winter, the winds blow from the land to the sea. They are outblowing winds. They may be very cold, as in North China, but they are nearly always dry winds. In summer, the winds blow from the sea to the land. They are the rain-bringing winds. This change in wind-direction gives the characteristic seasonal weather to Monsoon Asia. The people of these lands call the summer months 'The Rains' and their land-use system depends on this all important climatic factor of summer rain.

Monsoon Asia, like all other large areas of the world, includes many different kinds of surface. Here are the highest and broadest alpine mountains, the Himalayas. There are also important plains which either take the form of valley floors of great rivers such as the Ganges, the Yangtze-kiang and Hwang-ho (Yellow River), or are coastal plains. The natural vegetation of these mountains and plains was originally forest but this has long been cleared from the lower slopes of the former and from most of the latter. In China, particularly, the cleared plains have been the homeland of people from very early times. Long before the Romans reached

Britain, the Chinese were using their land very skilfully and had developed a high level of civilization. This early start, combined with a steady increase in numbers, means that the lowlands of Monsoon Asia are among the most densely populated parts of the earth's surface. By far the great majority of these people work on the land and their methods of farming have changed very little. In parts of China, Burma and India, the landscape is practically the same as it was two or three thousand years ago.

Nowhere in the world is the problem of food production more urgent than in the Monsoon Lands of Asia. Put in simple words, this whole region has too little land to support all its people. It is still common, unfortunately, for famines to occur and cause the deaths of thousands of people in a single year. What is worse than famines, however, is the fact that most of the people have never enough to eat.

## THE LAND-USE SYSTEM IN MONSOON ASIA

Although different crops are grown in different parts of these Monsoon Lands, there are certain common features of the land-use system everywhere.

First, farming is everywhere intensive, that is, the maximum use is made of every piece of land. There is little or no land to spare for grazing animals as every patch which can be ploughed is put under arable crops. One of the greatest agricultural achievements in the world is the way the people of Monsoon Asia have pushed cultivation up hill by means of terracing – but more of this later.

Secondly, with certain exceptions, farming in Monsoon Asia is carried on by peasants; land-use is a peasant system with small-holdings and strip-cultivation and no mechanization. It has often been said of the Chinese Plains that roads are scarce because the land cannot be spared for their building. It is certainly true that the rivers of China have been the chief highways for centuries and that the commonest vehicle is still the wheelbarrow, with one wheel, which requires only a narrow track. It is probably true that,

taking China as a whole, more goods are carried on poles slung across peasants' shoulders than by vehicles.

Thirdly, with the exceptions of North China and Japan, the Monsoon Lands are inter-tropical with no cold season. Agriculture can go on the whole year round if there is sufficient moisture. The temperatures in a Monsoon 'winter' are rarely low enough to halt farming. This is an advantage denied to European peasants. It is of great value to Asian peasants because they can often produce two crops a year and sometimes more, especially where irrigation systems are used.

Fourthly, like his European counterpart, the peasant of Monsoon Asia is a village dweller. With such a shortage of land, there can be no shifting cultivation here. The villages are permanent and the houses are crowded as closely together as possible to avoid waste of land. They are frequently built on a patch of infertile soil to leave the more fertile areas for cultivation.

Finally, monsoon agriculture is mainly subsistence farming, the chief task of the peasant being to provide food for himself and his family. His holding is so small that he has little surplus for sale. The saying that "A Chinaman lives on a handful of rice a day" is not strictly true, except during severe famines perhaps, but the diet of the majority of Asian peasants is very monotonous and very poor. It is surprising that they are able to do their work with such inadequate food.

## FARMING IN KYUSHU (SOUTHERN JAPAN)

### THE PHYSICAL ENVIRONMENT

Japan is probably the most over-populated country in the world. It consists of a group of islands with much of their surface occupied by forested mountains which have practically no agricultural value. Its total area is not much larger than that of the British Isles but its population is 82 million, that is, nearly 30 million more than that of the British Isles. At the same time, there are larger areas of farmland in Great Britain than in Japan and the people of the



*Paul Popper*

FIG.14 – *Farming in Kyushu, Japan*
Every piece of land that can be used is in some kind of crops. The Japanese population is so dense that they cannot afford to waste any land. The steep slopes of the mountains in the background are forested and provide charcoal and timber.

latter have no overseas possessions. It is not surprising, therefore, that the problem of feeding the Japanese people is a vast one.

Only the southern part of Japan lies in the Monsoon Lands and even this is outside the Tropics. There are therefore few opportunities of producing more than one crop a year so that it is more than ever necessary to obtain the maximum yield from the land which can be cultivated.

The photograph in Figure 14 shows a typical landscape in South Japan. The mountains in the background are of no use for arable farming. They supply timber which is made into charcoal

which the peasants use for cooking and for heating their homes in the cool winters. The mountains also supply water to the rivers from which it is taken for irrigation.

The valley floor which occupies the left-hand half of the photograph is narrow and provides only a limited area for arable farming. The steep slopes of the low hills to the right are very carefully terraced so that they also can be used for crops.

The opportunities provided by such a physical environment can be used to support a reasonable standard of living for a fairly dense population; but the trouble in Monsoon Japan is that the population is altogether too dense for the available resources.

## CROP-GROWING ON THE VALLEY FLOOR

The valley floor shown in this photograph is flat and covered with alluvium, that is, material washed down from the hills and mountains and spread out by the rivers and streams. Such alluvial flats are likely to be marshy and, in England, would probably be left as water-meadows for cattle-grazing. In Japan they are used for intensive arable farming mainly for the production of rice which is 'the staff of life' to the Japanese as wheat is to West Europeans.

Successful rice-growing depends on three things: abundant water, high summer temperatures, and fertile soil. All three are available here but the peasants must contribute in the production. Rice grows in standing water. The monsoon rains in Japan are not heavy enough to keep the paddy fields under water for the several months required for the cultivation of the rice. Therefore, the water in streams which drain the slopes of the hills is directed into canals, one of which can be seen near the middle of Figure 14. At regular intervals along the banks of this canal there are sluice gates which are opened at certain intervals to allow the water to run into ditches which lead it out on to the fields. The fields are thus regularly flooded and the water is prevented from running away by the low banks which surround them.

The young rice seedlings are planted in the water-covered soil, usually in spring, and grow there until the ears are filled. Then

the field banks are broken and the water drains away if it has not already evaporated. Soon the crop is ready for reaping by sickle. Following that process, the grain is carried to the peasants' homes where it is stored for later use. The fields are then prepared for the next year's crop by ploughing and manuring.

Rice cultivation is limited to the areas where water can be brought to the fields. This does not include the whole valley floor. Nearer to the village, the land is divided into strips where the peasants cultivate crops which do not require as much water as rice does. Maize, millet, perhaps some wheat, and vegetables are grown on this drier land and help to increase food production.

## LAND USE ON THE HILL SLOPES

The slopes on the right-hand side of Figure 14 are the foothills of mountains similar to those in the background of the picture. They show how steep slopes are used in this country of insufficient farmland. Almost every square inch is cultivated by means of terracing and the crop is tea, a bush crop. Each small 'field' is kept in place by a terrace or wall of stones; otherwise the heavy summer rain would wash away the soil.

The tea bush is a perennial plant and is well suited to this particular section of the Japanese physical environment. It is one of the few important plants which are grown for their leaves. The frequent pickings of these means that the bush requires plenty of moisture during the picking season. This is supplied by the monsoon summer-rains, and the combination of summer heat and rain gives the right conditions for the rapid growth of leaves fit for picking. This is important because the best tea is provided by the young tender leaves.

Tea, like coffee, but unlike rice, does not grow well in waterlogged soil. That is why tea gardens are almost always on well drained slopes, as in this photograph.

In Japan, tea is grown for home consumption – very little is exported. It is cultivated therefore by peasants who usually own a few terraced 'gardens'. India and Ceylon are the great tea-

exporting countries and there the gardens are much larger. In fact most of them are plantations.

In the Kyushu valley, shown in Figure 14, a peasant family is busily engaged on one of their periodic pickings. Some indication of the heat of the summer in South Japan is given by the head-protection which the people are wearing. Without this heat, the rice would not ripen and the tea bushes would not produce their crops of leaves. Three of the workers in this picture are women and their deft fingers are especially valuable in selecting and picking the right leaves. In most of the Monsoon Lands, women and children, as well as the men, take a full share in the land-use system.

As this is a peasant holding, the tea will be taken to the village where it will be dried in the sun to make 'green tea', the aromatic type which the Japanese and Chinese people prefer. On the large tea estates of India and Ceylon where tea is grown for export, mainly to Britain, the leaves are dried artificially in large chambers which are heated by charcoal. They are then packed in lead-lined chests for dispatch overseas. Tea is the chief drink of the Monsoon Lands, particularly in Japan and China, where it is taken without sugar and milk. The liquid which passes for tea in most English homes would be unrecognizable by the ordinary man in China or Japan. It is an interesting fact that Britain is one of the very few countries outside the Monsoon Lands where tea is a favourite beverage. This is undoubtedly the result of a long British connection with the Far East, but the French and Dutch have an equally long connection, yet tea-drinking is not so popular among them.

## A KYUSHU VILLAGE

The village shown in Figure 14 is typical of the many thousands of agricultural settlements in South Japan. It is very compact; the houses are crowded together as closely as possible. They are strung along a road and each of them consists of one storey. The roofs are made of wood or corrugated iron as are most of the walls. Inside the houses, rooms are separated still by paper and wood

partitions. The whole house is very lightly constructed partly for cheapness but also because this valley is in a region where earthquakes occur. The Japanese have found that the safest buildings during earthquakes are either these very light houses or very solidly built ferro-concrete blocks of flats.

There is no indication of any factories or offices in this valley so that the people must depend on agriculture for their living. It is not possible to count the houses here but they must add up to a large number and each shelters a family of several people. The area of farmland to support this large village is small and there are many similar settlements in this Kyushu valley. That is simply another way of saying that the population is very dense.

Every day the peasants go out from the village to work in the paddy fields or on the tea terraces and then return at night. They travel on foot. The distances are not great because the 'parish' is small but they are great enough when loads of rice or tea have to be carried home.

There is not a sign of any machinery being used. Human labour is extremely plentiful in the Monsoon Lands, especially in Japan. Furthermore, machines would be of very little help in the tea gardens or in the rice fields. Not even the cleverest scientist has yet invented a machine that will select the right tea-leaves to pick or the right rice seedling to plant in the flooded paddy fields. Practically all the work is done by hand. Strictly speaking, the valley floor is not 'arable' land as few of the peasants own ploughs. The fields are cultivated with spades and hoes and so are the tea gardens.

Like the peasant farming of Central Europe, this is subsistence farming but at a lower level because the population density is much higher here. If these Asian people had more land fit for cultivation, they could produce greater quantities of food but, as in the rest of the world, all the best land is already in use and there is no room for expansion.

## EXERCISES

1. On a blank map of Asia shade the countries named in the first paragraph of this chapter. Name your map Monsoon Asia. Compare it with the area of Monsoon Forest shown in the Front Endpaper Map.
2. Compare the hill-slopes and the valley floor shown in Figure 14.
3. Describe the work of the tea-pickers shown in Figure 14.
4. Why do the Japanese export very little tea or rice?

## Chapter 15

# IRRIGATION FARMING

Plants and their products are the ultimate source of food for people and for animals, and they also provide many of the raw materials for manufacturing-industries and other human occupations. The cultivated crops have all been developed from natural plants, and farmers all over the world are still trying to improve their stocks in order to obtain higher yields from them. Both cultivated and natural vegetation can only flourish in suitable physical conditions. These vary for different types of plants but always three things are necessary: water, heat, and soil. The farmlands of the world are limited because the combination of water, heat and soil is not everywhere suitable for plants which produce food. A large proportion of the earth's land surface, for example, has sufficient heat and soil for plants but suffers from insufficient water.

All the water which is found on land comes from the oceans and in time it returns to them. This process is called the water cycle and without it there could be no life on the land. From the surfaces of the oceans and seas, water is evaporated by the sun's heat and is changed into invisible water vapour. When this vapour condenses, it forms droplets which together make clouds which are blown to the land by the winds. When the droplets grow together, they form drops which fall to the ground as rain. If the air temperatures are near or below freezing point (32° Fahrenheit), the precipitation falls as snow, sleet or hail. Rain and snow, when the latter has melted, sink into the ground and make it possible for plants to use the plant foods which are stored in the soil. They absorb this food through their roots and then give off the moisture through their leaves and branches. Only a small portion of the

ground-water is used in this way. The remainder sinks away and reaches streams and rivers which finally carry it back to the oceans.

In those parts of the world where the winds blow regularly from land to sea, that is, offshore, the water cycle cannot develop and such areas receive little or no rainfall. They are the Tropical or Trade Wind Deserts. Again, in areas which are either very far from the oceans or are shut off by high mountains, the winds are unable to bring large quantities of moisture from the oceans. These are the arid lands of the interiors of the continents.

The deserts and semi-deserts, where there is sufficient heat and soil for plants but not enough water, are among the most thinly populated parts of the world. If some scientist could invent a method of 'making rain' reliably and cheaply, much of their surface could be turned into good farming land and the world's food problem could be solved, at least, in part. But this has not yet been possible, so mankind must still rely on the small quantities of water which are available in some parts of the deserts. The water occurs in the form of rivers, or as ground-water which can often be reached by springs, wells or pumps. When this water is used and carried to the plants by some means, the system of land-use is called irrigation farming.

There are many ways of irrigating farmland. The most famous are those of the river basins of India, China and Egypt where the water is led by canals and ditches to the crops. The rivers which provide water in this way are of great value. They bring their water from lands outside the deserts, where rainfall is heavy. Some arid lands, however, have no such life-giving rivers. If their scanty populations wish to grow crops they must obtain ground-water by some means. As it can only be obtained in small quantities, the land-use can only be practised in small patches where the water can be reached. These small areas are oases and the method of farming is oasis irrigation.

Not all the irrigated lands are rainless. Figure 14 shows how extra water is provided for rice cultivation in a land which has heavy summer rain. Some regions, such as the Mediterranean Lands of Southern Europe and North Africa, receive rain only

in winter. Their summers are hot and dry but their food production is increased by irrigation at that season. There are, therefore, two main types of irrigation, perennial and seasonal. The former supplies water to the crops throughout the year; the latter is necessary only during the dry season, whether it is winter or summer. Irrigation, then, is practised not only in the deserts of the world. It is necessary if any crops at all are to be grown in these dry lands but in other irrigated areas, the system is used to increase food production by adding to the water brought by the seasonal rains.

## OASIS IRRIGATION

In the Tropical Deserts, there is no winter or summer in the sense we use these terms in Europe. There are larger differences in temperature between day and night than there are between January and July. The outstanding feature of these regions is their almost complete lack of rainfall. They may have occasional thunderstorms but the water soon evaporates or disappears completely into the ground. In certain parts, this ground-water accumulates and the oasis farmer's problem is to reach this water and bring it to the surface so that it can be distributed to the crops.

Figure 15 is a photograph of Ghardaia, an oasis in the northern part of the Sahara Desert in Africa. This village and its cultivated land are surrounded by vast stretches of desert which is almost entirely plantless and is therefore useless to man for agricultural purposes. It is not everywhere covered with sand nor is it all flat. In fact, the desert surface is irregular, rising in parts to hills and even mountains. In some places it is strewn with boulders while in others it may consist of bare rock which has been cleared of soil by the strong winds which frequently blow in the Sahara.

In this particular oasis, the settlement has been built on a hill where the stone houses are closely packed together and the streets are very narrow. Wood is seldom used in house construction here because it is very rare in this arid land. But there is an abundance of good building stone which, when built into thick



*Paul Popper*

FIG.15 – *Ghardaia Oasis, Algeria*
The people of this small town could not live in the desert without the precious water which is obtained from the well shown here. The donkeys which pull up the 'buckets' are off the photograph to the left. The trees are date palms.

walls with very small window-spaces, keeps out much of the heat of the daytime. Unlike the houses of more humid lands, these of Ghardaia have almost flat roofs where the inhabitants often sleep during the hottest weather.

The most important single feature in the oasis is the well which is shown in the foreground of this photograph. The stone windlass above the well supports two pulleys over which run ropes to which are fastened two leather 'buckets'. Each rope is attached to the harness of a donkey which walks along a path to the left of the well-head and, in so doing, pulls the filled bucket from the water level in the well. When the bucket reaches the surface, the water is tipped into a stone 'basin' from which it runs along the channels to the cultivated fields which are not shown in the photograph.

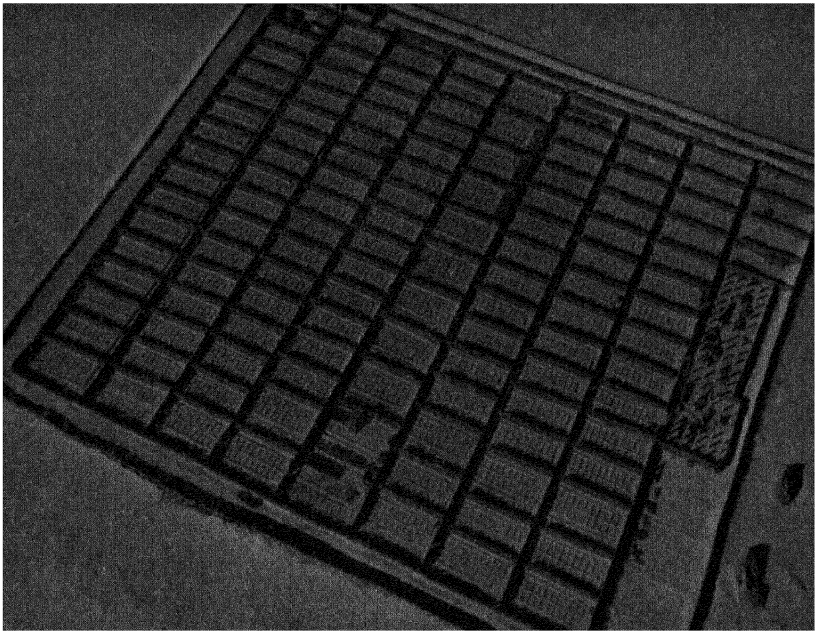
There are several of these wells in Ghardaia Oasis and the donkeys keep the supply of water flowing to the crops. The little

Algerian boy spends most of his days attending to his two donkeys thus making sure that the water-supply is maintained. His parents cultivate a small patch of arable land on which they grow wheat, maize, barley and vegetables. Farmland in the oasis is limited by the amount of water which can be obtained. It is therefore necessary to cultivate it very intensively.

Scattered among the village lands and grown in groups near the irrigation channels are the typical date-palms. They provide a very valuable source of food to the oasis dwellers. These trees are able to live under desert conditions because they have very long roots which enable them to reach the ground-water unless it is very far indeed from the surface. Their fruits are dried in the sun after they are picked and will keep for many months. On the northern edge of the Sahara, in Tunisia, some large oases specialize in date production so that the owners have a surplus which is exported. In the particular place, shown in the photograph, there are too few date-palms to provide a surplus for export. The oasis cultivators here are subsistence farmers.

Ghardaia is a very old oasis and contains a large village or rather a small town. Since Algeria became a part of France much work has been done to improve the irrigation farming of the oases especially where they lie on or near the roads which the French engineers have built. Ghardaia is on such a road which crosses the Sahara from Algiers to French West Africa. The road is used by lorries and cars. This modern transport has helped Ghardaia to develop more quickly than it otherwise would have done.

By contrast with this example of an oasis with very old methods of water-raising and distribution, Figure 16 shows one of the most up-to-date methods of oasis cultivation. It is an aerial view of an experimental development in Libya in the eastern Sahara. The surface of this Libyan Desert is much smoother than the Erg near Ghardaia and is covered with sand. Here again the only source of water is that in the ground and the water must be raised. In this case, a motor-driven pump works in one of the buildings to be seen in the top left-hand corner of this rectangular 'farm' next to the owner's house. The water is pumped to the hundred



*Paul Popp*

FIG.16 – *Aerial view of a modern oasis in the Eastern Sahara desert*
This photograph shows what can be done with money, time and labour in the desert. Such methods of cultivating the desert are so expensive that there are very few oases of this kind. Also the ground water is so limited that there is not enough for many such oases.

and nineteen 'beds', they are too small to be called fields, where vegetables are the chief crops.

This photograph illustrates two interesting facts about oasis agriculture. In the sandy deserts, one of the great problems is drifting sand. The very existence of this holding has been made possible by piling up great walls of sand which are held together by plaited palm leaves. There are other wind-breaks round each bed but there is an unceasing struggle against the blown sand. As it is, four beds in the bottom right-hand corner have been completely submerged by sand.

The other point is the newness of this oasis farm which is in marked contrast with the age of Ghardaia. Such a method of

land-use, especially when it is practised right out in the desert, requires much capital. The land costs very little, if anything at all, but the machinery for pumping water, the pipes for distributing it, and the labour for maintaining the protections against the sand, all these cost far more money than the poor cultivators of ordinary oases could afford. Such a 'capitalist' system of cultivating the desert cannot be used to a great extent, partly because of its cost but also because there is not enough ground-water to supply large numbers of these experiments.

Before leaving oasis agriculture, it is worth noting that the cultivated land of Egypt, with its 18 million people, is really one great oasis. In this case, the water is obtained from the Nile which overflows its banks regularly each year and provides rich fertilizing mud for the fields. That is why the farmlands of Egypt are often described as 'The Gift of the Nile'.

## LARGE-SCALE PERENNIAL IRRIGATION FARMING

Oasis irrigation goes on all the year round but it supports groups of people in only small areas in the hot deserts. On the other hand, where rivers bring down great quantities of water from rainy regions to the desert, large areas have been irrigated and made productive. We have already mentioned the case of the Nile and Egypt. Similar examples are those of the Indus, the Ganges and the Tigris-Euphrates all of which provide the 'life-blood' of large irrigated areas and support millions of peasants. Such systems are possible only on gently sloping plains where the water can be distributed by a complicated network of channels and ditches. The valley floors of the rivers mentioned above are highly favourable for this. Their inhabitants have practised irrigation for many centuries but it is only in modern times that the irrigated land has been extended by engineering works. The rivers are now controlled by great dams which hold back the water in large reservoirs, and the main canals are frequently lined with concrete to prevent seepage.

Such systems are known as perennial irrigation because water is distributed throughout the year. They are very expensive to

build and to maintain. The money is provided by water taxes which the peasants pay, but to do this, they must grow some of the crops for sale. In order to grow their own food as well as cash crops, their farming must be extremely intensive. One big advantage is that it is often possible to grow two or even more crops each year. The land is divided into smallholdings on which no machinery is used. The standard of living is very low. None of the irrigated land can be spared for grazing so that animal products such as milk and meat are rarely eaten by the peasants. Nevertheless, the irrigated lands of India, Pakistan, China and Egypt carry extremely dense populations. In fact, irrigation farming of this type supports populations as dense as those of the industrial areas of Europe and North America.

Although perennial irrigation was first practised in Asia and Africa, it has been developed in the U.S.A. during this century. The majority of the American irrigated lands are in the semi-arid areas of the 'West'. The water-supply comes from the heavy rainfall and snowfall of the high mountains and is brought down to the plains by the rivers which have frequently cut deep gorges or canyons. American engineers have shown great skill in damming these rivers, creating great reservoirs of water for irrigation purposes. Before the water reaches the semi-arid plains, however, it is sometimes passed through turbines where it generates hydro-electricity.

## SEASONAL IRRIGATION

Many of the Sub-tropical Lands which lie between the Tropical and Temperate Regions have seasonal rainfall either in winter or in summer. Their inhabitants could survive without irrigation; indeed, they have done so in the past. They find it an advantage, however, to increase their output of food and other materials by watering their land during the dry season.

Figure 17 illustrates an irrigation scheme in Florida. This part of the U.S.A. has a warm climate with quite considerable rainfall during the summer months. The winters are warm enough



*Ewing Galloway, N Y.*

FIG.17 – *Irrigation farming in Florida, U.S.A.*
This illustrates a modern method of irrigating crops. The water is piped from a reservoir to the fountain shown on the left-hand side. The farmer must see that the irrigation ditches are kept clear so that the water can reach the roots of the crops (celery in this case).

but too dry for the growing of crops. With its high standard of living, the U.S.A. provides excellent markets, especially in the industrial towns of the north-east, for the products of 'truck-farming', or market gardening. If these crops can be grown 'out of season', they can be sold for higher prices than the ordinary crops. The farmers of Florida have succeeded in growing out-of-season crops by irrigating their fields in winter.

In the photograph (Figure 17), long rows of celery are being grown during the Floridan winter. The water-supply is piped to the fields and rises in small fountains like the one in the bottom left-hand corner here. One important part of the farm-worker's

task is to keep the irrigation ditches clear so that the water can reach the roots of the plants. In a few weeks, the celery will be ready for pulling and sending off to market. For this purpose, the good motor road seen in the background will be very useful. Along it the celery is transported to the nearest railway station where it will be loaded on to a fast goods train for delivery in perhaps New York or Washington.

There is one big difference between the irrigation systems of North America and those of Asia and Africa. In the latter, the work is carried on by peasants and they are mainly concerned with subsistence farming. In the former, the irrigated land is almost always used for cash-crop farming. Figure 17 illustrates this last point very well. Next to his field of celery, the farmer has a small field in which alfalfa (lucerne) is growing. This plant is a member of the clover family and is a very good food for cattle. Its roots penetrate several feet into the ground and, provided the temperatures and water-supply are sufficient, it can be cut five or six times a year. An acre of irrigated alfalfa can therefore produce far more fodder than an English meadow or even more than an equal-sized area of cultivated clover in England. But the Floridan farmer is not usually a cattle-rearer. The great majority of the lucerne grown by irrigation methods is sold to farmers in other parts of the country, and so is a cash crop.

To the left of the alfalfa field in Figure 17 is a small orchard of young fruit-trees. These are grape-fruit trees which thrive in the Floridan climate when they have water brought to them by irrigation. Not every farmer in this part of the U.S.A. grows the three crops shown here, but this view is sufficient to illustrate the variety of crops which can be grown and they are all for sale, mainly in distant markets.

A few words on the irrigation systems of the Mediterranean Lands must be added. The areas around this great inland sea are usually mountainous leaving no space for great plains. The best farmlands are therefore found in river valleys or on small coastal plains and nearly all of them suffer from summer droughts. Seasonal irrigation is practised here especially for the growing of

oranges, lemons and the vine but there are no large areas of artificially watered lands such as those of India and Egypt. The Mediterranean countries provide a good example of the effects of the relief of the land on irrigation farming. The result is seen in the large number of fairly small patches of farmland which, being carefully irrigated, are much more productive than they otherwise would be.

## CONCLUSION

Irrigation agriculture is one of the best illustrations of the ways in which man fits his activities into his physical environment. Because of the expense and labour involved in the careful distribution of water, this type of farming is always intensive. Its crops are a valuable addition to the world's food supply and some countries are extending their irrigated lands in order to increase their food production. India, China and Egypt have probably reached the limit in using their water-supplies but the Soviet Union and the Danubian countries of Europe are working on schemes which will add large areas to their irrigated farmlands. Even in England, with its damp climate, some market-gardening areas are trying overhead irrigation. By this system, water is sprayed from a series of pipes on to fields of young vegetables and salad crops in order to 'bring them on' quickly for market.

## EXERCISES

1. What does irrigation mean? Describe some of the ways of irrigating land.
2. Why do the houses in Figure 15 have (a) flat roofs, (b) thick stone walls, (c) very small windows?
3. What are the chief differences between the oases shown in Figures 15 and 16?
4. Why is irrigation agriculture always very intensive?

## Chapter 16

# FOREST OCCUPATIONS

There are more than twenty types of forest and together they cover a very large part of the land surface of the earth. The types of forest vary greatly. Climate is the chief reason for the differences between them and for the different kinds of trees which make up any particular kind of forest. Whether the trees are evergreen or deciduous, hardwood or softwood, depends on the climate, more than anything else, of the area in which they grow. In a small country such as England, the kind of trees may depend on the soils, but in the world as a whole, the chief physical factor affecting forests and their distribution is climate.

There is not enough space in this book to describe all the different kinds of forests. Some of them have been mentioned in earlier chapters. The two main types are those of the Tropical and Temperate Lands. The Tropical Forests are less important to man for the following reasons: they grow in the hot parts of the world, in regions where the rainfall is heavy either all the year round or during one of the seasons. Such climatic conditions are not very favourable to human work. Secondly, many of the Tropical Forests are very dense; in fact, they are almost impenetrable. Thirdly, they contain a variety of trees, and it is unusual to find many of the same kind of tree growing closely together. This adds to the difficulty of finding and cutting those trees which are useful. These reasons explain why comparatively little lumbering is done in the Tropical Forests. As was explained in Chapter 13, it has only been in recent years that parts of these forests have been cleared for plantation agriculture.

The Temperate Forests have been, and still are, the most useful to mankind. So much so, that vast areas of land which were once covered by such forests have been cleared and the cutting of trees

is still going on rapidly. We need only concern ourselves here with the Temperate Forests of the Northern Hemisphere. There are only small areas of this type to the south of the Equator because there is only a small amount of land there with the right climatic conditions.

## THE TEMPERATE FORESTS

These forests are of three main types.

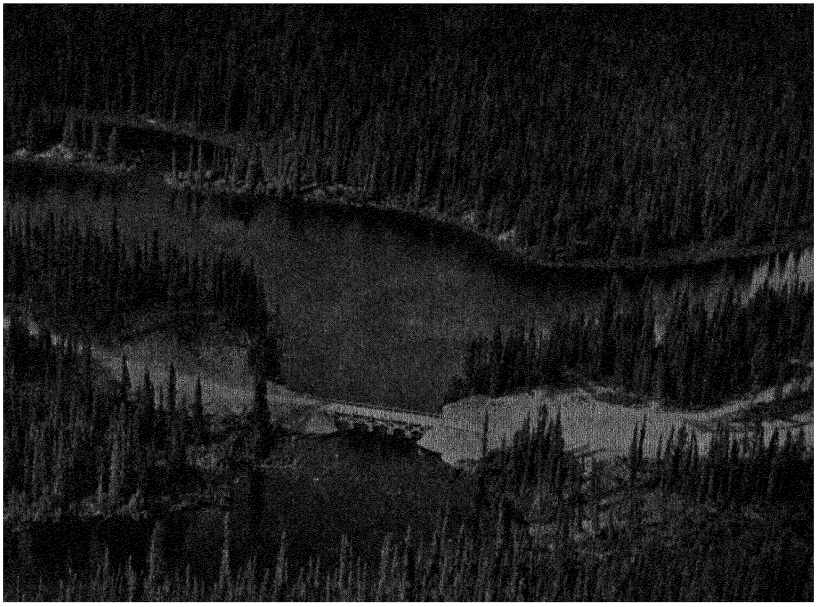
1. In the damp, warm parts of the Temperate Lands, *Deciduous Forests* were once the natural vegetation. The plains and uplands of these areas were clothed with oak, beech and elm which provided hardwoods for building and other purposes. Most of the surface of the British Isles, France, Belgium, parts of Germany and the eastern half of the U.S.A. were so forested in Roman times but the great majority of the trees have now been felled

2. In the colder, drier parts of the Temperate Lands, the deciduous trees could not survive the long winters with their frost and snow. Here, the conifers, with their needle-shaped leaves, are the dominant trees and often cover very large areas. An important fact about them is that they grow in what the forester calls 'pure stands', that is, in large groups of one kind of tree such as fir, pine or spruce. Figure 18 shows a pure stand of spruce trees and is typical of these *Temperate Coniferous Forests.*

3. Between the zones of Deciduous and Coniferous Forests are found the *Mixed Temperate Forests* which consist of some of each of the two other types. The three belts gradually merge into each other but it is interesting to notice that the chief deciduous tree of the Mixed Temperate Forests is the birch, which is a very hardy tree, able to grow where climatic conditions are not suitable for the oak and beech.

## THE TEMPERATE CONIFEROUS FORESTS

These forests occur in two great zones or belts across the northern parts of North America and Eurasia (see Front Endpaper Map).



*Canadian National Film Board*

FIG.18 – *Northern coniferous forests in Canada*
This shows a pure stand of spruce trees and some of the many irregularly shaped lakes of these northern lands. The road is part of the Alaskan Highway which was built during the Second World War to connect U.S.A. and Alaska.

In North America they reach as far south as Lake Superior but the Eurasian zone is further to the north. In the Old World, it is only in mountainous areas that the Temperate conifers are found south of Latitude 60°N. This is because the westerly winds bring the warming influence of the Atlantic Ocean to the land mass of Eurasia and so make possible the growth of deciduous trees much further northwards than in Canada where the great mountain masses of British Columbia keep out the influence of the Pacific Ocean.

Throughout both zones, temperatures are low during the whole year and fall below freezing-point for at least four of the twelve months. Rainfall is lower here than it is in the Deciduous Forest areas but very little of it is lost by evaporation because the tempera-

tures are never very high. This type of climate is called sub-polar and it is most unfavourable to the growth of food plants, both natural and cultivated. In fact, the hardy conifers are the only plants which can grow well in such a climatic environment because they are especially adapted to it.

In an earlier chapter* a reference was made to the water cycle and to the fact that plants take in their food in water which is absorbed through their roots. The water is then given off through the leaves. This latter process is called transpiration, and in warm, damp climates, the leaves of trees are large so that they may give off water easily. Where there is a shortage of water, plants have many ways of reducing transpiration. The needle-shaped, tough-skinned, glossy leaves of the conifers are very suitable for keeping down the rate of transpiration thus enabling the trees to make the best use of the water which is available in the forests in which they grow.

Much of the precipitation of the Northern Coniferous Forests falls as snow which often remains on the ground for several months. If the trees were broad-leaved, the weight of the snow would damage the branches; but most of the conifers have down-sloping branches which, together with the narrow leaves, prevent accumulation of snow on them and so avoid damage.

The trees grow quickly as compared with those of the Deciduous Temperate and Evergreen Tropical Forests. Their wood is therefore softer and is generally less valuable for building purposes. On the other hand, this 'softness' is a great advantage when the wood is used for other purposes which will be mentioned later.

The Northern Coniferous Forests contain the largest reserves of timber in the world. It has been estimated that there are two thousand million acres of such forests in the Soviet Union alone. The great problem in using these resources is that of inaccessibility. Not only are they very far away from the densely populated areas where the timber is needed, but it is also very difficult and expensive to build roads and railways to transport the wood even when it is cut. That explains why only the southern fringes of these forests

*See p. 118.

are being used in spite of the great demand for softwoods. Further to the north, the forests are still largely virgin and are unlikely to be cleared for many years. Up to the present time, the fur-bearing animals which they shelter are their chief value to man.

In the northern parts of these forests, the climate becomes steadily colder. The trees become smaller and more scattered, and therefore less valuable, until the forests merge into the desolate tundra where human life is very difficult indeed. Here the ground is permanently frozen. Only the top-soil thaws during the short summer and then becomes swampy, thus providing breeding-grounds for large numbers of mosquitoes.

From this description of the Northern Coniferous Forests, it will be seen that they can never become densely populated. The climate is unfavourable to human activities. Agriculture is only possible in a few special areas. Furthermore, all the areas now occupied by these coniferous trees were once covered by a great ice-sheet during the Ice Age. One of the results of this is that the surface is badly drained and has innumerable lakes, of all shapes and sizes, and many marshy areas. The latter, 'muskeg' as they are called in Canada, make transport very difficult except in winter when they are frozen. There are, therefore, no great towns in these forests. They are among the most thinly populated lands on the earth's surface. Such settlements, as there are, are small and far apart; the lumbering camps are temporary settlements which are abandoned when the timber has been cut.

## OCCUPATIONS IN THE TEMPERATE CONIFEROUS FORESTS

There are two ways in which the inhabitants of these forests are occupied, lumbering and animal-trapping with its associated trading. The former is limited to the southern parts of these lands while the latter is much more widespread even extending to the tundra.

### LUMBERING

The coniferous softwoods provide valuable wood for sawn-timber, pit-props and wood-pulp and there is a large and ever

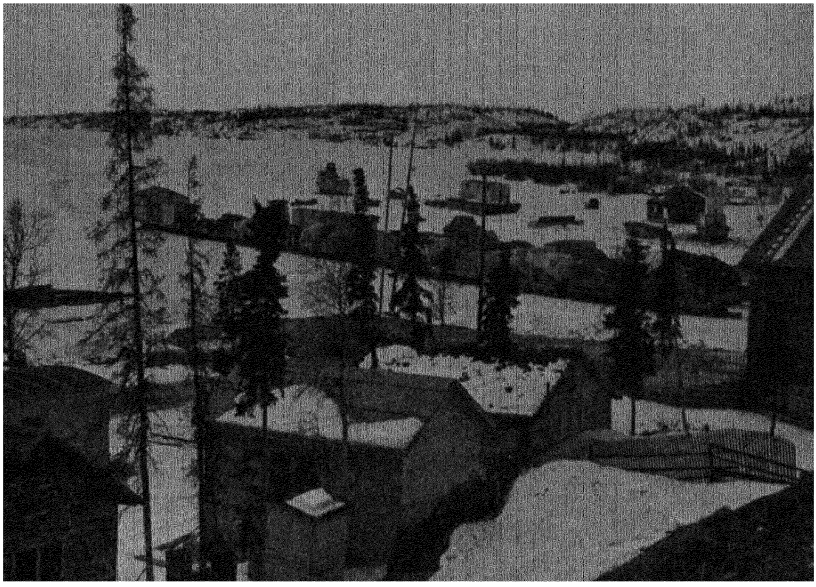
increasing demand for each of these products. The lumberjacks work in gangs and use machines wherever possible. Most of the trees are cut by power-driven band-saws and the majority of the felling is done in autumn and winter. The trimmed logs are transported, when the winter snows have fallen, with the help of tractors which drag the logs either to the nearest railway or to rivers. When they reach the rivers they are piled until the spring thaw sets in. Then they are floated, singly or in rafts, to the great mills. Here they are sorted, according to size and quality. The biggest and best logs are sawn into planks and the smaller, less valuable, wood is turned into wood-pulp.

The large works where sawing or pulping is carried on are situated at convenient points both for collecting the logs and for distributing the timber products. In Newfoundland and Sweden, they are on or near the coasts, while the great mills of Quebec and British Columbia are on the banks of rivers. If these rivers are swift-flowing, they are often used for generating hydro-electricity which drives the mill machinery.

Lumbering and the processing of its products requires much capital to pay the workers and for the machinery which they use. Today, most of this occupation is organized on a large scale by wealthy companies. In Newfoundland, for example, one large company owns many thousands of acres of forest, several pulp-mills and also large paper-making mills in England. This is another illustration of the ways in which different countries are dependent upon each other. British and American newspapers, magazines and books are printed on paper which is made from wood-pulp produced in Canada, including Newfoundland. The paper on which these words are printed may very well contain some of the pulp which originated in the coniferous forests of some part of Canada.

## FUR-TRAPPING

The animals which live in the Temperate Coniferous Forests are able to survive the long cold winters with the help of their warm fur coverings. These are in the best condition during the winter



Canadian National Film Board

FIG.19 – *Yellowknife village, North-west Territories, Canada*
Yellowknife is a settlement of lumbermen and trappers in the Northern Coniferous Forests. It is on the shore of Great Slave Lake which is frozen in winter. The tractor train in the centre of the photograph crosses the frozen lake twice a week to bring in supplies and to take out furs. Life in such a village, with its trading 'post', is more comfortable now than it was a few years ago.

months which are the main trapping season. The pelts are valuable if they can be brought to the cities and towns of America and Europe, and their transport is not as difficult as that of timber because they are light. The men who do the trapping are not able to take the results of their work to these markets as they are too far away from their homes. Fur-trading companies buy the pelts either with money or other goods, and then arrange their sale in such places as New York, Paris and London.

In Canada, for example, fur-trapping and trading have been greatly assisted by the Hudson's Bay Company which maintains small settlements such as the one shown in Figure 19 which is on the northern shore of Great Slave Lake in North Western Territories. During the short summer, the lake and its rivers are used

for transport by boats but the ice and snows of winter interrupt this method of movement. At this time of the year, 'trains' drawn by diesel tractors replace the boats and canoes. The line of sledges shown in the centre of this photograph has just crossed the frozen surface of Great Slave Lake. With its powerful 'cat' (tractor), this train has travelled 200 miles in less than a week. It is the recognized method of transport from December to May or June. From July to October the lake and rivers are open, but from September to December the muskeg does not freeze solidly enough to bear the weight of such heavy trains.

The regular weekly arrival of the sledge-train brings food, clothing, tobacco and other goods to the settlement. These goods will be sold to the trappers at the 'post', the wooden building on the right of the photograph. The 'factor' who is in charge of the post, buys the furs from the trappers and sends them away as a return cargo on the train. Some weeks or perhaps months later, they will reach the big towns where they will be manufactured into fur coats and similar articles for sale in the shops.

The trapper's life is a hard one but has been made much more comfortable in recent years. This particular settlement consists of a number of wooden huts in which the trappers live. There is plenty of timber for building and heating and even electric light is available as the trading post has a small oil-driven generating set. Regular supplies of food are brought in and the stations are in touch with the outside world by radio.

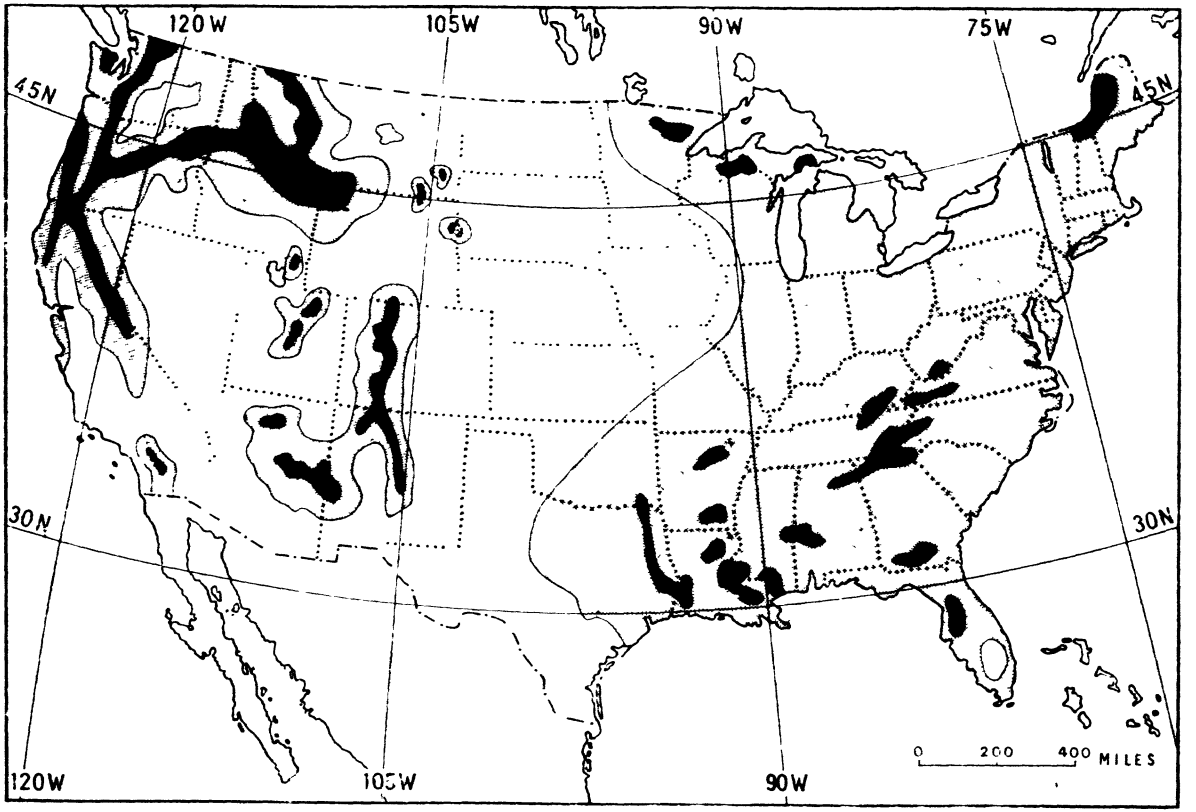
By means of this co-operation between the trappers and the traders, the pelts of sable, mink, muskrat, beaver, fox and weasel are brought to the fur shops of America and Europe. But this is not the only result of these human activities. In their search for furs, the trappers have explored the forests and have made known areas which otherwise would have remained unknown. Their work has made possible the inclusion of much of North America in the Dominion of Canada. They were also the pioneers in spreading Russian control into the northern forests of Eurasia and particularly into the 'taiga' of Siberia.

It is also worth remembering that the rocks which underline the Northern Coniferous Forests are frequently rich in valuable minerals. But for the work of the trappers, these lands and their minerals would not have been explored. To take only one example, the vast area which is known as the Laurentian Shield and which lies between Hudson Bay, the St. Lawrence River and the Great Lakes in Canada now produces large amounts of minerals, including gold, copper and nickel. The mines shown in Figure 24 alone support a population of 13,000 people and produce 6,000 tons of minerals a day. Such developments were made possible by the explorations of trappers. A hundred years ago, there was not a single miner on the Laurentian Shield. It may well be that present-day trappers, who are often prospectors in their spare time, will discover further mineral deposits for future use.

## RE-AFFORESTATION

Few of the world's natural resources have been used as wastefully as the timber of its forests. This statement is particularly true of the Temperate Deciduous Forests which have almost disappeared. Figure 20 shows that one half of the U.S.A. was forested in the seventeenth century, but that today less than one-tenth remains tree-covered. An even greater proportion of Europe has been cleared of its deciduous trees. The main reason for this destruction of forests in the early days was the need to make the land suitable for agriculture, but during the nineteenth and twentieth centuries the demand for timber increased so greatly that lumbering companies cut down the trees wherever they could be found in sufficient quantities. The result of all this destruction is that there is very nearly a timber famine today.

When we consider also, the difficulties in obtaining timber from the Northern Coniferous Forests and from the Tropical Forests, it is easy to understand why the prices of timber and of timber products have increased greatly. To take one example only, the price of newsprint rose from £10 a ton in 1939 to £60 a ton in 1952. This material is made from wood-pulp, a timber


120W
105W
90W
75W
45N
30N
0 200 400 MILES

product, and is widely used for newspapers and books. The increase in its price has caused an increase in the cost of publishing reading matter. This book you are reading could probably have been sold for half its present price before the beginning of the Second World War.

This world shortage of cheap timber and its products has forced the governments of many countries to take action in this matter. Some of them have passed laws for the control of the amount of timber which may be cut each year; others insist that where forests are cleared, new trees shall be planted, while yet others have decided to plant trees in areas which are suitable for them but which are not good enough for agricultural use. These efforts and plans to build up timber supplies in new forests are called re-afforestation. In Great Britain, there is a Forestry Commission which is responsible for many thousands of acres of new woodlands and is planning even larger areas.

Unfortunately for the users of timber, and that includes practically everybody, re-afforestation is a slow process because trees grow slowly. Even the spruce and larch trees take from 30 to 50 years before they are fit to cut, while hardwoods, such as the oak, may take centuries before they are fully grown. Because of the increasing demands for crops from agricultural lands, it is unlikely that the areas which were once covered with Deciduous Temperate Forests will ever again produce much timber. The people of the world will rely more and more on the Coniferous Temperate Forests but, as the lumberjacks penetrate further northwards, the costs of the timber will probably increase unless the southern fringes are re-afforested.

FIG.20 – *What has happened to the forests of the U.S.A.?*
All the areas shown in black and in dots were covered with virgin forests in 1620. Only the areas marked in black remained forested in 1940. In just over three centuries, the whole of the dotted areas has been cleared.

## EXERCISES

1. Find out and write down all you can about evergreen, deciduous and coniferous trees.
2. Explain why the forested areas of the world are not densely populated. The Front Endpaper Map and Figure 1 will help you.
3. Why was the Alaskan Highway (Figure 18) so difficult and expensive to build.
4. What cargoes are carried by the tractor-train shown in Figure 19?

## Chapter 17

# FISHING

The land masses of the earth's surface are by far the most important sources of food and raw materials but the water areas also make a valuable contribution. From very early times, people have caught fish in rivers and lakes and on the coasts of the seas. Even before man learned how to grow crops, he added fish to the food he obtained by hunting and trapping animals in the forests and on the grasslands. This primitive type of 'food collecting' still exists in many parts of the world but, in certain areas, fishing has been organized on a large scale and with modern boats capable of travelling thousands of miles. The earlier type is not unlike subsistence farming because the fishermen were, and some of them still are, concerned with providing food only for themselves and their families whereas large-scale fishing is rightly called an industry.

Just as plants can grow properly only where the right physical conditions of temperature, water, soil and slope are found, so different kinds of fish require the right kind of physical conditions in the water in which they live. To begin with, all the fish which man has come to regard as edible are the products of shallow waters, shallow, that is, as compared with the deep oceans. There are peculiar kinds of creatures living in the ocean depths but they are beyond the range of the fishermen's nets. Secondly, like all forms of life, fish must eat. In some cases, their food consists of very small organisms, generally invisible to the naked eye, which are called 'plankton'. Some parts of the world's seas contain great supplies of this fish food but it is rarely found in water which is more than 100 fathoms (600 feet) deep because it requires light which can only penetrate to about this depth. Where there is plankton, there the fish come to feed and that is why the shallow seas are the best fishing grounds. Thirdly, the temperature and

the amount of salt in the water affect the kind of fish which can live in any particular part of the sea, largely because these two factors determine the kind of plankton which is available. The greatest numbers of fish are found in the waters of the Northern Temperate Region where these suitable physical conditions occur most frequently.

## SUBSISTENCE FISHING

All "the waters of the earth" contain some fish of some kind and wherever people live near these waters, they practise fishing. In the Arctic winter, the Eskimo uses a hole in the ice to make a catch and the native inhabitants of Tropical Africa make baskets of reeds and canes to trap the fish of their rivers and lakes. In all such cases, fish are used to provide food for the fisherman's family and form a useful addition to their diet.

In those parts of the Temperate Regions where either agriculture or industry is not sufficiently developed to provide food and work for the people who live near the seas, the rivers or the lakes, they invariably take to fishing to eke out the food they obtain in other ways. Norway provides a good example of this type of fishing. Because of the ruggedness of their land and their short cool summers, agriculture cannot support all the coastal people. Many of them combine farming and fishing, as do the inhabitants of the coastal parts of Scotland, Ireland and North-western France.

This type of fishing is always a part-time occupation. The catches are never very large and most of the homes of the fishermen are too far from markets for the fish to be sent to them and sold. A variety of methods is used, from nets to lines and hooks, but the fisherman is satisfied when he has caught enough for his family's requirements, either for eating immediately or for curing.

If it were possible to count the total amount of fish caught by subsistence fishermen, it would probably turn out to be less than that obtained by other methods. Yet there can be no doubt about its importance, particularly to the people concerned. The valuable foodstuffs which English people like to obtain from meat

the inhabitants of many parts of the world obtain from fish; they rarely eat animal flesh, either because they cannot afford it or because it is not available. To them fish is especially valuable and not only for its direct food value. The coastal peoples of China, Japan and the East Indies, for example, also use fish to flavour the rice which is their chief food. In this way they make their diet less monotonous than it would otherwise be.

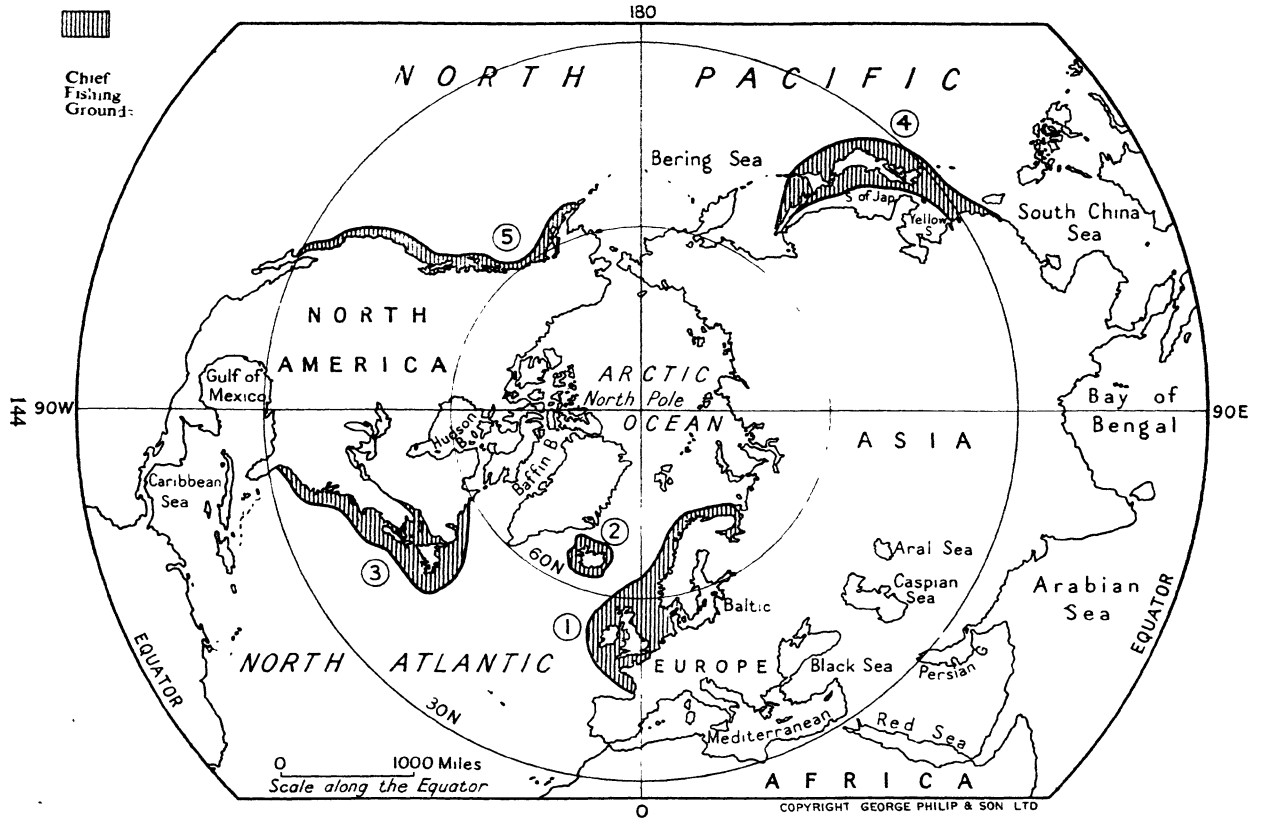
## COMMERCIAL FISHING

Wherever fishing is organized on a large scale so that the catches are brought to land and sold in markets, it is known as commercial fishing. It provides full-time employment for considerable numbers of men who generally receive wages as well as a share of the money obtained for the catch. It also requires large amounts of capital because expensive boats and machinery are needed. Such fishing is often carried on far from the men's homes – they may be at sea for several weeks at a time.

The three chief areas of commercial sea-fishing are off the coasts of Eastern North America, North-west Europe and Eastern Asia. Relief maps in your atlas show that the seas which wash these coastlands are often less than 100 fathoms in depth. They lie on Continental Shelves which are the submerged parts of the continents but which are covered by waters which are not too deep for fish. The highest parts of these shelves stand up above the water as islands such as Newfoundland, Britain and Japan.

## THE NORTH-WEST EUROPEAN FISHING INDUSTRY

The Continental Shelf of North-west Europe provides excellent fishing grounds which have been used for many centuries. The waters of this area contain abundant plankton and there are numerous places where the sea is less than 100 fathoms in depth. These 'banks', such as the Dogger Bank, are used by the fish as breeding-grounds and therefore attract the attention of the fishermen.


Chief Fishing Grounds
180
NORTH PACIFIC
Bering Sea
S. of Japan
Yellow S.
South China Sea
NORTH AMERICA
ARCTIC OCEAN
North Pole
Gulf of Mexico
Hudson B.
Baffin B.
ASIA
Bay of Bengal
144
90W
90E
Caribbean Sea
60N
Aral Sea
Caspian Sea
Arabian Sea
Baltic
EQUATOR
NORTH ATLANTIC
EUROPE
Black Sea
Persian G.
30N
Mediterranean
Red Sea
0 1000 Miles
Scale along the Equator
AFRICA
0
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All the countries which border these continental seas of North-west Europe take a share in the fishing industry, but Britain leads, both according to the weight of fish caught and the number of vessels employed. The occupation is a very old one but several important changes have come about in the last hundred years. First, the vessels used in the industry are now driven by engines so that they are no longer dependent upon the winds and can travel greater distances in much less time than the sailing-boats could. This is important because the fish are rarely found in exactly the same places so that the captains of the fishing-boats must be able to 'hunt' for them. This is much easier with steam or oil-driven vessels. Furthermore, modern boats are able to return to harbour and market their fish quickly. This also is very important because the first catches to be put on sale usually fetch the best prices.

Secondly, the system of packing the freshly caught fish in boxes with crushed ice keeps the catch in good condition for several days. This means that the fishermen can stay at sea until they have caught a large quantity of fish and still deliver it to market in a fresh condition. Thirdly, and perhaps most important of all, is the concentration of the fishing industry at a smaller number of ports. In the old days of sail, most of the coastal villages and towns of the North Sea and English Channel had some fishing-boats which brought their catches home for sale in local markets. With the growth of railways and of fast road traffic, it is more convenient to bring the catch to a port which is well equipped with transport facilities which, in their turn, can carry the fish to larger and more distant markets. In this way, Grimsby, Yarmouth

FIG.21 – *The great fishing grounds of the world*
This map, like Figs. 22, 23, 25 and 26, shows the Northern Hemisphere in a special way. In the five shaded areas on this map, fishing is organized commercially. In the seas named in small print, off the coasts of the continents and in rivers and lakes, subsistence fishing is important.

1 – N.W. European fishing grounds
2 – Iceland fishing grounds
3 – N.E. North American fishing grounds
4 – Japanese fishing grounds
5 – North American West coast fishing grounds

and Hull have grown into very large and important fishing ports. They are near to the chief fishing grounds and their good inland communications ensure that the fish can be sent to inland markets, such as Birmingham and London, very quickly.

The North-west European fishermen employ many methods of fishing, but trawling, seining and drifting are the most important. In the first method, a net is drawn through the water. This trawl net is used for catching demersal fish (those, such as cod and flat-fish, which feed near the sea bottom). Drift nets are held close to the water-surface by buoys and are used for catching pelagic fish (those, such as herring, mackerel, pilchards and sprats, which feed near the surface). This kind of net is not drawn through the water except by the slow drift of the boat. This explains the name 'drifter' as applied to vessels engaged in this branch of fishing.

## THE WESTERN ATLANTIC FISHERIES

The chief fishing grounds of the West Atlantic are found off the mouth of the St. Lawrence River where an extensive continental shelf occurs. Here also, two great ocean currents, the warm Gulf Stream and the cold Labrador Current, meet. The mixing of these warm and cold waters brings an abundance of fish food, and the large banks, especially the Grand Banks off Newfoundland, are valuable fishing grounds for cod, haddock, herring and mackerel.

Like the fishing-grounds of North-western Europe and also like those off the coasts of Iceland, the Western Atlantic areas are visited by fishermen from many countries. American, Canadian, British, French and Portuguese vessels are to be seen regularly fishing in these waters. Because of the great distances from European markets, the boats remain at sea for many weeks at a time and are fitted with refrigerating machinery for keeping the fish in a fresh condition. Until recently, the coastal areas of Newfoundland were used for curing the fish in the open air. It was then salted and brought to market as 'salt-fish'. With the coming of refrigeration, this branch of the industry has declined.

## THE JAPANESE FISHING INDUSTRY

The Japanese Islands are the unsubmerged parts of the continental shelf of Eastern Asia. As in the Newfoundland area, cold and warm ocean currents meet here, and combined with the shallowness of the sea, give rise to rich fishing grounds. The Japanese fishing industry is larger than that of any other single country. Before the Second World War it was responsible for about one quarter of all the fish and fish products in the world. This was partly explained by the great density of Japan's population together with the shortage of other resources so that the Japanese people turned to the sea for food which they could not produce on their land.

## BRITISH COLUMBIA'S SALMON FISHING INDUSTRY

Fishing is practised along the whole of the west coast of North America from the Aleutian Islands to the Peninsula of California, the salmon-fishing of British Columbia being particularly interesting because it is quite different from the occupations of the areas we have already described.

The coast of British Columbia is deeply indented by a very large number of fiords into which flow the swift rivers and streams which drain the mountains behind them. In these streams the salmon are hatched, but before they reach full size, they migrate to the open seas. After about three years there, they return to the rivers to spawn. Nobody has yet explained exactly why the salmon do this but it is well known that they do so in large numbers and are easily caught in their journey upstream. Nets are stretched across the rivers and the great catches of salmon are cleaned, cut into pieces and packed into tins by machines in the canneries which line the banks of some of the rivers.

This canned salmon is sent to many parts of the world including Eastern Canada, Eastern U.S.A. and Western Europe. It has the great advantage of being preserved in airtight tins so that it remains in a fit condition for eating for many months. Recent

experiments in freezing the freshly caught fish have been successful but the costs of transport to distant markets are higher than for the canned salmon. The canning industry is organized on such a large scale and so much of the work is now done by machinery, that in ordinary times, the fish can be sold cheaply. Unfortunately the present financial situation means that West European countries are able to buy British Columbian salmon only in small quantities.

## THE WHALING INDUSTRY

Although whales are mammals and not fish in the strict sense, they live in the sea and provide valuable resources so it is convenient to deal with the whaling industry here. Until the end of the nineteenth century, whales lived in many of the world's oceans and seas but they have been either killed or driven away from many areas. Today, the chief whaling-areas are in the distant Antarctic.

Earlier in this chapter attention was drawn to the changes in the North-west European fishing industry but these are not nearly so striking as those brought about in whaling. In the past the men engaged in this occupation led very dangerous lives. They used sailing ships and small boats and their catch was never very large. Today, large steam-driven 'factory ships' are employed. Each of these ships carries a number of motor-driven small boats which are equipped with the latest devices for killing the whales. The carcases are kept afloat until they are hauled into the factory-ship by means of a slipway at its stern. Then they are cut up by machinery, the oil is extracted, and with the various other products, is stored away. Such a factory ship may be away from home for a year at a time and only return to harbour when its load is complete. England, Norway, Japan and America are the chief countries engaged in this occupation, and all are far from the Antarctic, so that the distances travelled by whaling ships are very great.

Modern methods of whaling and fishing have led to a vast increase in the production of 'harvests of the sea'. In spite of the fact that fish breed very quickly, there is a serious danger of decreased output unless laws are made to prevent 'over-fishing'.

## FISH PRODUCTS AND BY-PRODUCTS

It would be a mistake to think that the fish which is eaten by human beings is the only product of the seas. Off the eastern shores of U.S.A., for example, the most important catch by weight is of menhadin, a fish which is rarely eaten by people but is used for oil. This oil, however, is a direct product of the sea, not a by-product as the menhadin are caught solely for their oil. There is very little wastage in the modern fishing industry anywhere: the list of by-products includes oil, both for human consumption and for making soap and paints, meal for animals and poultry, and fertilisers for improving land.

## EXERCISES

1. Why are the great fishing grounds marked as 1 to 4 on Figure 21 found in those four places? Figure 1 will help in this exercise.
2. What is subsistence fishing?
3. Give some examples of the changes which have come about in commercial fishing during the twentieth century.
4. Write a description of the fish-canning industry of British Columbia.

## Chapter 18

# COAL AND ITS MINING

### EXTRACTIVE INDUSTRIES

In Chapters 7–17 we have been studying some of the ways in which people use the resources of the earth's land surface and of its seas. All these occupations are concerned with primary production either of foodstuffs or other materials which are used in manufacturing industries. There is also another group of occupations which are concerned with extracting mineral wealth from the earth. The people who belong to this group are also primary producers and the minerals which they provide are of great importance because all other industries depend on them, either for making power to drive machines or for metals which are necessary for the making of machines and hundreds of other things as well.

The earth's crust is very rich in minerals and man has used them since very early times. It is worth remembering that the earliest period of human history is called the Old Stone Age and it was followed in turn by the New Stone Age and the Bronze Age. Stone is mineral and bronze is a metal made from minerals. They were so important to man that the early ages were named after them. As civilization has grown and spread over the earth's surface, minerals have become even more important until today it is almost impossible to imagine how we should manage without them.

The full list of minerals is a very long one and the uses to which they are put are even more numerous. Some are mined and used in small amounts; others are required in large quantities and give employment to many miners. The methods employed by the miners vary greatly also but there are two features common to all these extractive industries. Once the minerals are taken out of the earth they can never be replaced. If they are used carelessly and

wastefully, they soon become exhausted, and if fresh supplies cannot be found, then the industries which depend upon them cannot continue their work. Secondly, mining can be carried on only where the minerals occur. The extractive industries are therefore *tied* industries. When the minerals are brought to the surface, they may be transported long distances to where they are required but the actual mining must stay where the minerals can be reached.

The occurrence of minerals depends on the nature of the rocks in the earth's crust. Many rocks do not contain any useful minerals, at least, not in workable form; others are rich in mineral wealth but must be treated in some way before the metal can be obtained. More than all the space in the whole of this book would be necessary to describe all the minerals and the ways in which they are extracted. We must be content with descriptions of those minerals which are most important for industries, namely coal, iron-ore, and petroleum.

## COAL-MINING

### IMPORTANCE OF COAL

The two nicknames 'Black Diamonds' and 'King Coal' that are sometimes given to this very valuable mineral, convey some idea of its importance in the modern world. Coal is the chief fuel in use today although there are other fuels and sources of heat for making power. Even in the U.S.A. which is the world's largest producer and consumer of petroleum, coal still leads the way as a fuel. Most of the countries which have built up industries have done so with the help of coal and certainly much of Britain's wealth and importance depends on the use of this mineral.

There are two main uses to which coal is put. First there is its domestic use, for heating and cooking in homes and other buildings. This use is very old. As early as 1257, it is reported that Queen Eleanor was driven away from Nottingham by fumes from coal-fires, and 'seacoal' which was sent from Newcastle to London was given that name at about the same time. It is probable that

coal was used as a fuel even before the thirteenth century and its consumption has gone on increasing ever since that time. It must be admitted that the burning of coal in open grates is a wasteful method, largely because most of the heat goes up the chimney. Also the smoke from millions of chimneys pollutes the atmosphere, spoils buildings and helps to cause fogs. The manufacture of gas and electricity at large gas-works and power-stations is a much more economical way of using coal as a fuel. So also is the system known as central heating.

The second use of coal, or rather group of uses, is for industrial purposes. With the exception of a few cases in Scotland and Wales, practically all the machinery of British industry depends on coal as its source of power. The fuel is burned in furnaces under boilers to make steam to drive engines. This steam-power may be used directly to work machines or it may be turned into electricity for the same purpose. Whichever way it is used, it is the life-blood of industry in most countries and it depends very largely on the supply of coal. In the metal making and some other industries, however, coal is also used to provide heat for processing metals (see Chapter 22 for this use in the Iron and Steel Industry) and other materials.

Enough has been said here to illustrate the importance of coal in general but its value is particularly great in Britain which was the first country to use it for industrial purposes. There are still large reserves of coal in the British coal-fields but the coal-mining industry is faced with two major problems. In the first place, the most easily reached coal has already been mined. This will be understood when it is realized that we have been using coal in industries for about 200 years, that is, longer than any other country, and the miners naturally dug the most accessible coal first. Now, with every year that passes, deeper seams must be worked and that means more expensive mining. In the second place, it is becoming more and more difficult to persuade young men to become miners. There are many reasons for this difficulty, including the hardships and dangers of the work and the attraction of more pleasant jobs, but the fact remains that there are not enough men trained to hew

the coal which is needed. Many improvements have been made in the conditions of the mining industry. Much of the work is now done by machines and the miners' wages have been increased but the labour situation is so serious that the Government has brought in men from other countries to be trained as miners.

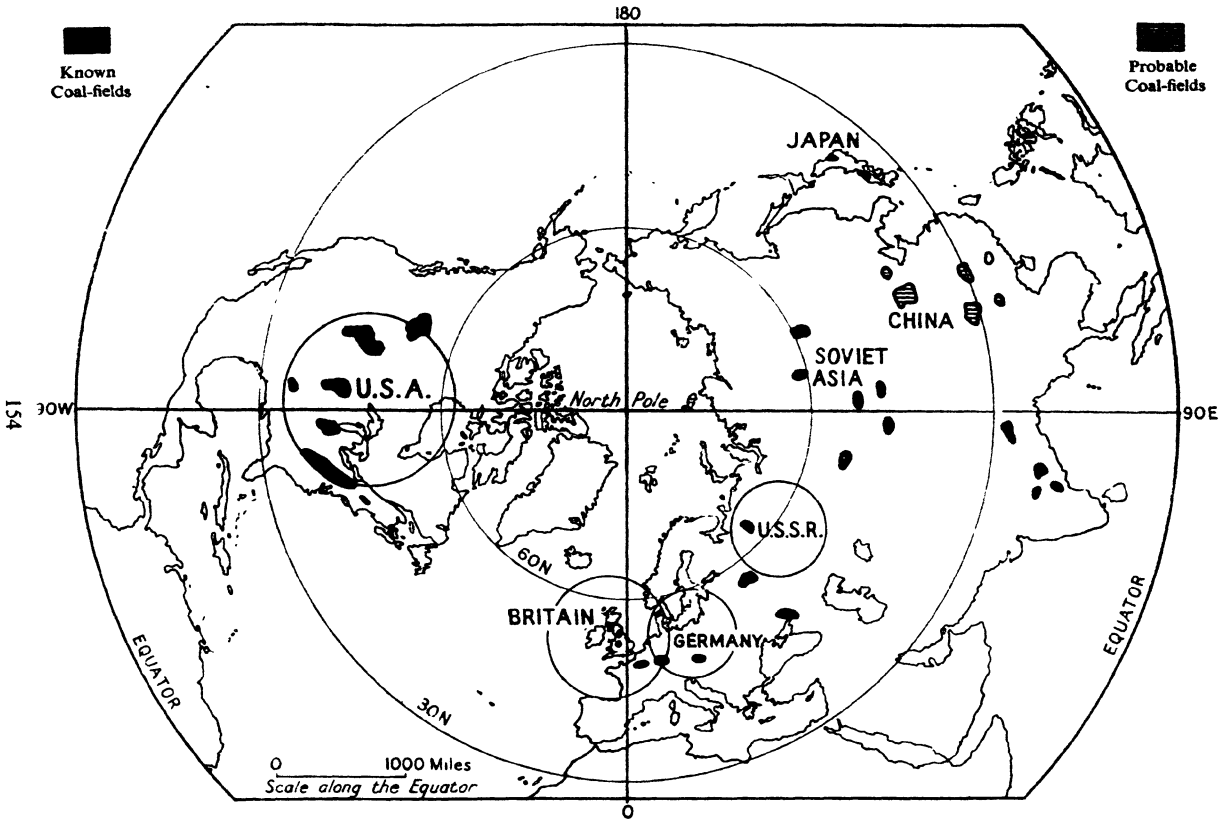
## WORLD DISTRIBUTION OF COAL AND ITS MINING

Figure 22 shows that nearly all the world's coal-fields and coal production are found in the Northern Hemisphere. There are several small fields in the Southern Hemisphere, in Australia, New Zealand, South Africa, Argentina and Chile, but their combined production is not as great as that of Great Britain.

A warning is perhaps necessary here. The amount of coal mined is not necessarily proportional to the area of the field. Some fields, as in the Western U.S.A., are very large but their production is small and of poor quality coal. Again, China probably has very large deposits of coal but little is yet mined because the country has few industries. Also the amount and quality of the coal are not yet known. Figure 22 cannot show the exact areas of the coal-fields because the scale of the map is too small; many of the smaller coal-fields have been omitted.

However, Figure 22 does give a general picture of the distribution of coal-fields and their production of coal. It illustrates the fact that four countries stand well above all the others and particularly it emphasizes the importance of the U.S.A. which produces each year as much as Germany and Great Britain together. The U.S.A., Great Britain, Germany and the U.S.S.R. are the giants of the coal-mining industry just as they are the leading industrial countries. There is clearly a close relationship between coal production and industrialization.

Coal is a bulky, heavy commodity and its transport adds much to the price which the consumer pays for it. This cost may be reduced if the transport is by sea and that fact enabled Britain to be the world's chief exporter of coal before the Second World War. Because Britain is a small island, none of her coal-fields is


Known Coal-fields
Probable Coal-fields
180
90W
90E
0
JAPAN
CHINA
SOVIET ASIA
U.S.A.
North Pole
U.S.S.R.
60N
BRITAIN
GERMANY
30N
EQUATOR
EQUATOR
0 1000 Miles
Scale along the Equator

very far from the sea. In some cases, as in Eastern Scotland and in Cumberland, the coal is actually mined under the sea. Unfortunately this valuable export trade has almost ceased because she needs so much coal at home to maintain her industries. So serious has the position been in recent years that it was necessary for a time to import coal from the U.S.A.

When coal was the chief fuel used by ships, Britain exported it to many parts of the world. Most of it was bunker-coal which was stored at ports where ships could re-fuel with it. Much of that trade also has disappeared since the navies and merchant fleets have changed to oil fuel.

Now that Britain's coal export trade has almost stopped, there is not much movement of coal on the world's oceans, yet there is still a great deal of transport of this mineral on land and by coastal steamship. The north-east coast of England, and South Wales, regularly send coal to other parts of Britain by sea, and millions of tons of coal are shipped on the Great Lakes of North America. Perhaps the most interesting movement however is that in the Soviet Union where coal is sent on the Trans-Siberian Railway from the Kuznetsk Basin in Soviet Asia to the new industrial districts in the Ural Mountains. This journey is over 1,000 miles and the wagons which convey coal from Kuznetsk take back iron-ore and other minerals for the works of the 'Kuzbas'.

## THE GEOGRAPHICAL CONDITIONS OF COAL-MINING

Coal is made of the compressed remains of plants which grew under tropical or semi-tropical climatic conditions many millions

FIG.22 – *The chief coal-fields of the world*
In addition to the known and probable coal-fields, this map shows, by the size of circles, the annual production of coal in the four chief countries. By far the greatest production of coal is in the Northern Hemisphere, especially between latitudes 30° and 60° North. The circle representing the production of Germany does not include the coal of the Saar Coal-field.

of years ago. The rich vegetation of those times gradually decayed and accumulated at certain parts of the earth's surface. In time it became buried under thick layers of mud which, in turn, became compressed into beds of shale or similar rock. Thus the coal is now found in seams of varying thickness ranging from a few inches to several feet. Originally the seams were more or less horizontal but most of them have bent or warped. If they have been very highly compressed, the resulting coal is known as anthracite which burns without a great deal of flame; where there has been less pressure, the coal is bituminous and gives off gas when it is burned. This second kind is the chief type of coal, both for industrial and domestic use. Sometimes, when the gas is taken away, the remaining coke is very strong and is suitable for use in blast-furnaces (see Chapter 19). This coking coal, as it is called, is one of the most valuable kinds of fuel.

The chief problem of the miner is to reach the coal which is usually buried deeply under other rocks. Originally, the mineral was dug only where it reached the surface but both the quality and the quantity of this outcrop-coal are not good enough for most modern requirements. The greatest amount of coal is therefore deep-mined. Vertical shafts are sunk to the seams and then horizontal galleries are driven along them. Sometimes these tunnels are several miles long and have many branches to left and right of the main gallery. When the coal is cut, by hand or by machines, it is carried on underground railways to the bottom of the shaft where the trucks are brought to the surface in lifts. Here is the pit-head with its characteristic winding gear consisting of a large wheel over which runs the strong steel wire which pulls up and lets down the cage.

Even when the coal reaches the pit-head it is not ready for sale. It usually contains stones and other 'dirt' most of which is removed in the washing plant where strong jets of water are forced over screens on which the coal moves along. Finally it is 'hand picked' to remove any rubbish which may have remained after the washing process. The fuel is then ready to be loaded into trucks for its journey to the consumer.

The first shafts were quite shallow and the miners used ladders. As the easily accessible coal was worked out, shafts became steadily deeper until some of them are now as much as 3,000 feet deep. Such shafts are expensive to sink so that as few as possible of them are built. This means increasing the length of the galleries and, consequently, entails longer underground journeys for the mineral and the miners.

It has already been mentioned that the seams vary greatly in thickness. In parts of the Eastern U.S.A., there are seams of 10 feet and more in thickness and they are almost horizontal. With the help of machines, miners can win more coal more easily in such seams than they can in other countries where the layers of coal are thinner and less continuous. This explains why the U.S. miner's output averages 6·4 tons of coal a day whereas a daily average output for British miners is only 1·25 tons.

If the coal is near the surface, say within 10 or 15 feet, and is covered with loose 'overburden', it is sometimes worked by the opencast method. Powerful bulldozers clear the overburden until the coal is exposed. Then large cranes or mechanical shovels scoop up the coal and load it into motor lorries. This type of coal is never found in very thick seams so it is quickly exhausted. After it has been extracted, the overburden can be replaced, with its topsoil, and in the course of a few years, the land can be used again for agriculture. In some parts of the Midlands of England land has been treated in this way and is now growing grass for cattle. Opencast mining is only a temporary measure. It is an expensive way of obtaining fuel into which Britain was forced by her shortage of deep-mined coal in recent years.

Most of the coal-fields of the world were thinly populated in the days before the Industrial Revolution. The rocks in which coal seams occur do not give very fertile soils, and the coal-fields are often in hilly country which was not therefore very suitable for agriculture. When the demand for coal increased rapidly during the nineteenth century, many shafts were sunk wherever the coal could be reached. Labour had to be brought to the mines and groups of houses were built near the pit-heads. The characteristic

coal-mining settlement was the 'mining village' which might contain several thousands of inhabitants all of them dependent on the work and earnings of the miners. There are still many of these mining villages in England and Scotland, but where other industries grew up near the pits, the villages have developed into large towns. Some of the mining villages are 'dead' now because the coal has been used up and, although the men find work elsewhere, they frequently continue to live in the villages.

The winning of coal demands much labour, which is often dangerous and always unpleasant, and a great deal of capital to pay for the machinery and other requirements. A new system is being tried in the hope of overcoming some of these difficulties. It is called 'gasification' and is quite simple in theory. The seam of coal is ignited and the gas piped to the surface where it is stored in gas-holders until it is required for heating or for raising steam in boilers. In practice, gasification has several disadvantages. It is difficult to reach and burn the coal underground and even then, many of the by-products of the coal are lost. Also, if the gas is to be distributed, large quantities of pipes are needed and the gas must be pumped through them. Nevertheless, the system is reported as being very successfully worked in the great Donbas coal-field of Russia and experiments are being made with it in England.

## THE MINERS' WORK

The key men in the coal-mining industry are those who work at the coal face, that is, the part of the seam that is exposed in a gallery. Here they work in teams, each member having his own particular job. Some of the team are cutters, either using picks or machines, some are loaders who load the underground railway trucks or 'tubs'. As these men gradually cut back the coal face, other workers must make sure that the roof does not collapse. They support this rock 'ceiling' with pit-props of wood or steel. The men at the face always cut some useless materials from the rocks which lie above and below the coal seam. Other workers must clear this waste and put it away in disused workings.

Every coal-mine also employs men whose job is to organize the work of the miners and to see that the underground work is as safe as possible. They decide the direction of the cutting, see that the proper tests for gas are made and check the supporting of the gallery roofs.

Once the coal is cut and loaded, it is transported along the galleries to the bottom of the shaft. This is the work of less skilled men but it is still a necessary job. The trains of 'tubs' are usually drawn by electric locomotives now and the pit ponies are no longer as common as they used to be.

All the working spaces underground are lighted by electricity. Most miners still wear their safety helmets in which electric lights are fitted to help them with their work. One of their chief problems is the presence of large quantities of coal-dust. This settles on everything, including the miners' bodies, and may be very dangerous because it gives rise to 'damp', that is, gas which may lead to explosions. In most mines, it is found necessary to sprinkle powder made from finely ground rock to reduce the risk of explosions but this does not prevent the dust from reaching the lungs of the mine workers.

The miners work in shifts. Although they usually live near the pit-head, they have a long underground journey if they are face-workers. When a shift is completed (it usually lasts six hours) they return to the pit-head where, if the pit is properly equipped, there are baths for their use before they go home. There have been several improvements in the conditions of work in the last thirty or forty years but coal-mining still remains one of the most dangerous jobs, as newspaper reports of mine disasters show. Nevertheless, miners are among the most important industrial workers. Some people would say that they are the most important people in Britain since so much depends on the coal they produce.

## LIGNITE AND PEAT

A note may be added here on two other kinds of solid fuel. Lignite, or 'brown coal' as it is sometimes called, is the remains

of vegetation which has not been sufficiently compressed to form coal. It is much younger geologically than coal and is usually found at or near the surface. Its value is much less than that of coal because it has less heating power and needs special furnaces for burning. It is used in great quantities in Germany and in the Soviet Union where it is used to raise steam for large electricity power-stations.

Peat is found in many marshy areas and represents the first stage in the process of coal-forming. It has been used as fuel in many parts of the world and for a very long time. Only in this twentieth century have methods been discovered for burning peat in furnaces for industrial purposes. As the fuel is at the surface, it is excavated by mechanical shovels and, after drying, is taken to the furnaces. Its heating value is even less than that of lignite and it would not be used but for the shortage of coal or other fuels. It has been reported that large quantities of peat are being used in the central parts of European Russia which are not only far from coal-fields but also lack railway transport.

## EXERCISES

1. Explain why coal is one of the most important minerals in the world.
2. Why has Britain's export trade in coal almost ceased?
3. Why is coal-mining a dangerous occupation?
4. China probably has very rich and very large quantities of coal. Why have they not yet been worked on a large scale?

## Chapter 19

# IRON-ORE AND ITS MINING

Iron-ore is the mineral from which the metal, iron, is made. It is the most widespread mineral used for industrial purposes and there are very few parts of the world where iron-ore, in some form, is not found. Yet it is extracted only in a fairly small number of iron-ore fields most of which are again in the Northern Hemisphere. As iron and the steel made from it are the most widely used metals, the question arises as to why iron-ore mining is concentrated in this way. There are two main answers to this question.

In the first place, the value of iron-ore depends very largely on the amount of metallic iron it contains. This is called its 'iron-content' and varies greatly according to the type of ore. In some cases there may be as much as 70 per cent iron in the ore and this is well worth extracting. Usually, if the iron-content is less than 10 to 15 per cent, the ore is not worth working. This explains why many of the iron-ore deposits in the world are not worked.

In the second place, iron-ore is a heavy bulky mineral which is expensive to transport over large distances. In this respect iron-ore is like coal, although it is less valuable, and its price per ton to the consumer depends very largely on the cost of transport from the ore-field to the blast-furnace where it is turned into iron. Where transport is possible by water, the costs are reduced but rail and road transport add greatly to the price which the consumer must pay for the ore. Therefore, if iron-ore deposits are far from the places where they can be used, they are not likely to be worked unless special ways of handling and transporting them are found.

It follows from these arguments that the most useful iron-ores would be those that are found in the same areas as coking coal because coke is needed in the blast-furnaces which produce the iron. This was actually the case in Great Britain

for a long time during the Industrial Revolution. In parts of Scotland and Northern England coal and iron-ore were found very close together. Indeed, in some places the two minerals were extracted from the same pits, but unfortunately, those particular iron-ores have been used up and Britain must now obtain ore from other parts of the country or from abroad.

A careful study of Figures 22 and 23 shows that coal and iron-ore deposits are not usually close to each other. This is an important point and would be more easily understood if the maps in Figures 22 and 23 were drawn on a larger scale. Also it should be remembered that not all the coal-fields shown in Figure 22 produce coking coal. In fact, almost all the iron-ore produced in the world must be transported over considerable distances unless the coking coal, or perhaps coke, is brought to furnaces on the iron-ore fields. This is one of the reasons why the prices of iron and steel have been steadily increasing for many years.

## THE USE OF IRON-ORE

It is sometimes said that we live in the Iron Age but a more accurate description of our times would be the Iron and Steel Age for the two metals are closely linked together. Their production depends very largely on the types of iron-ore which are available.

Iron-ore is a common rock which has little or no value in itself. It must be treated in a special way before the iron can be extracted from it. This process is called smelting and is done in great machines called blast-furnaces. These are really great containers into which iron-ore, coke, and broken limestone are put in layers. The coke burns, with the help of a forced draught, and raises a very high temperature in the furnace. After several hours, the iron separates itself from the other materials in the ore and becomes a white-hot liquid which is tapped near the bottom of the furnace. It then runs into moulds of sand where it cools and forms 'pigs'. The resulting metal is called pig-iron and the material left in the bottom of the furnace is called slag. This

used to be piled in great slag-heaps which were of no value, but now, in some cases, valuable by-products, such as basic slag for fertilising fields, are made from this material.

Each blast-furnace holds several hundreds of tons of materials and a large iron-works may have twenty or more of them arranged in batteries. This means that enormous quantities of ore, coke and limestone are needed each day. To keep up the supply much labour and much transport are required so that iron-making works are usually found in one of three types of places.

1. On the iron-ore field, in which case coke must be brought from coal-fields.

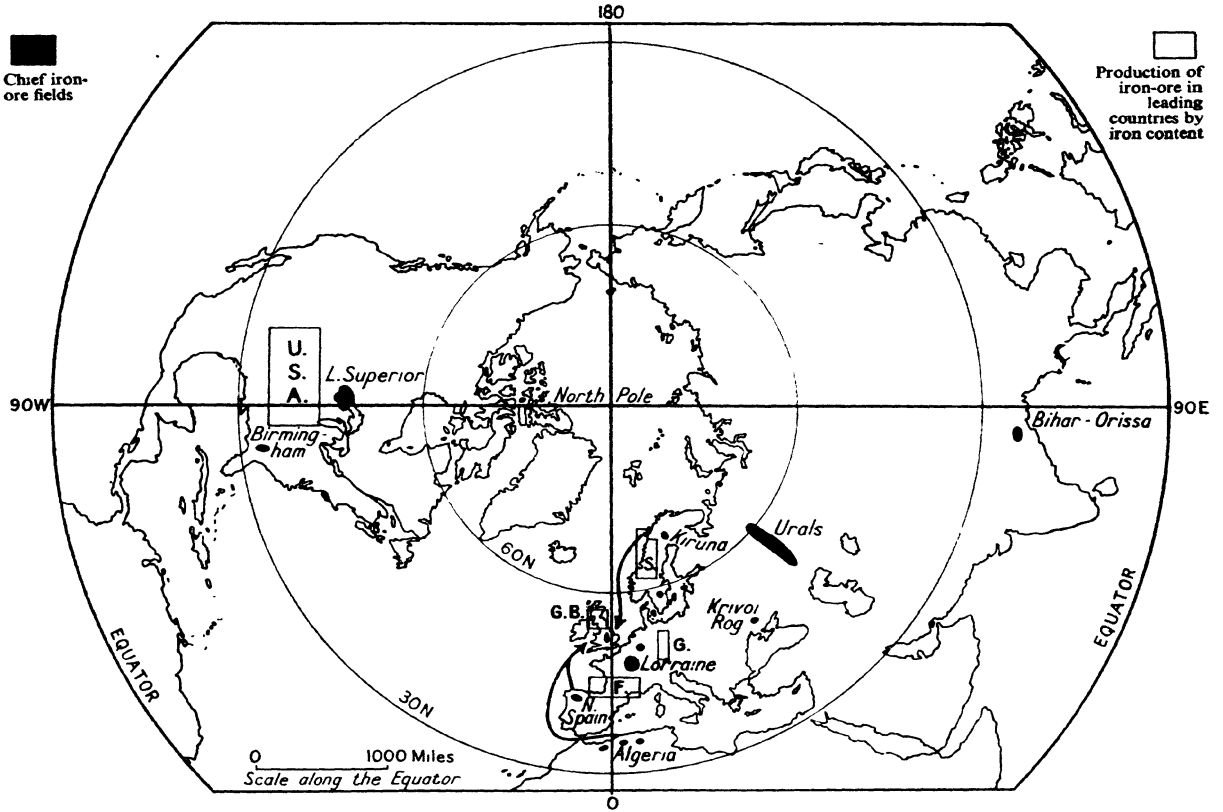
2. On the coal-field when ore must be brought from the iron-ore field.

3. Between the two kinds of fields where the two raw materials may be conveniently assembled.

There are many examples of each of these three kinds of iron-works which we will meet again later. We must be content here to point out that wherever large quantities of heavy materials have to be used in an industry, transport is an especially important factor in the industrial development.

When the pig-iron is obtained from the blast-furnaces, it is not yet fit for use largely because it still contains impurities which must be removed. Before the invention of the steel-making process, these impurities were partly removed by hammering the iron. This was done by large hammers which were usually driven by water-wheels which were rotated by streams. Where there was not enough water in the streams, dams were built to hold water in 'hammer ponds'. Although they are no longer used for this purpose, they are still to be seen in some parts of England where iron was once made by this process. The resulting metal was called wrought iron but little of this is used now because steel is much stronger and less brittle.

Sometimes the pig-iron is re-heated and poured into moulds again to make cast iron. The disadvantage of this metal is that it is very brittle and will not stand blows. It is useful for large


Chief iron-ore fields
Production of iron-ore in leading countries by iron content
180
90W
90E
0
U.
S.
A.
L. Superior
North Pole
Birmingham
Bihar - Orissa
Kiruna
Urals
60N
G.B.
Krivoi Rog
G.
Lorraine
F.
N. Spain
Algeria
30N
EQUATOR
EQUATOR
0 1000 Miles
Scale along the Equator

pipes and other purposes but it also is being largely replaced by steel.

The great majority of the pig-iron goes to steel works where it is treated in converters. The processes of steel-making are described in Chapter 22 but two more important points should be mentioned here. First, it is clearly a great advantage for the steel works to be close to the places where the iron is made to save transport costs of the heavy pig-iron. Secondly, there are many kinds of steel and the quality of each of them depends on the types of pig-iron which are used. That is why much time, labour and money are still being devoted to methods of obtaining the correct pig-iron for making each particular kind of steel.

## WORLD DISTRIBUTION OF IRON-ORE AND ITS MINING

From what has already been said in this chapter, it is clear that iron-ore is a very important primary commodity and that it is widely distributed in the earth's crust. There are certainly sufficient reserves of the mineral to meet the world's requirements for centuries to come, yet the great majority of iron-ore is extracted only in a fairly small number of important places and all of these are in the Northern Hemisphere. Europe and the U.S.A. are easily the leading areas of ore extraction, partly because they have available ore fields but mainly because they have many industries which require the steel which is made from the pig-iron. There are vast reserves of iron-ore in the other continents but these have not yet been greatly developed. One reason is that these areas are not yet highly industrialized and another is that the cost of transporting iron-ore to Europe or North America would be very high.

FIG.23 – *The chief iron-ore fields of the world.*
The blocks represent the production of iron-ore according to its iron-content. The amount of iron-ore production in U.S.S.R. is not available. The Northern Hemisphere produces the great majority of the world's iron-ore. G.B. = Great Britain. G. = Germany. F. = France. S. = Sweden.

Only high-grade ores, that is those with a high iron-content, and which can be easily worked, are sent overseas. British supplies of iron-ore illustrate this point clearly. In this country, we have few resources of high-grade ores although there is a large quantity of low-grade ore in Eastern England. As a result, British iron and steel makers use much ore imported from other countries, namely, Northern Sweden, Northern Spain and Algeria which have large supplies of good ores which they are unable to use fully in their own industries. Most of these deposits are not very far from the sea (see Figure 23) so that, after a short railway journey, they can be carried by sea which is cheaper than land transport.

Apart from these examples, there is not very much world trade in iron-ore but two cases of long distance transport of this mineral may be mentioned although they do not form part of international trade. In the U.S.A., the largest deposits of iron-ore are situated near the western and southern shores of Lake Superior but the great iron and steel works of U.S.A. are in Pennsylvania and at the southern end of Lake Michigan near Chicago. Fortunately, the Great Lakes provide an easy line of communication for most of the distance of over 1,000 miles from the mines to the works. The chief cargo carried by ships on the Great Lakes is therefore iron-ore. The U.S.S.R. provides another interesting example which has already been mentioned in Chapter 18. In this case the ore is carried by rail and it is doubtful if the cost of this transport could be met in a country where everything was not controlled by the Government.

## IRON-ORE MINING

The mining methods employed by the men who extract iron-ore from the earth depend almost entirely on the ways in which the ores occur. In the case of the richer ores, it is usually necessary to employ deep-mining methods but most of the low-grade ores occur near the surface so that they can be obtained by open-cast mining. This is fortunate because these ores with their low iron-content, usually between 20 and 25 per cent of iron, must be mined

cheaply otherwise their cost would be much too high for the consumers to pay. As such low-grade ores are the most important source of iron in Britain, some attention is given here to the methods by which they are extracted.

Lincolnshire and Northamptonshire are the two most important English counties for the supply of these 'bedded' ores. The ores are known by this name because they occur in layers or beds at a few feet below the surface of the ground which, in these and neighbouring counties, was once good agricultural land. Once it is decided to extract the ores, the first task is to remove the overburden of material, including the soil, which is valueless to the iron-ore men. It is piled in great heaps by bulldozers and tractor-drawn machines. When the ore beds are exposed, large steam- or motor-driven mechanical shovels scoop it up and load it on to railway wagons. As the quarry becomes deeper large cranes with steel scoops at the end of steel wires, dig out the ore and pull it to a higher level. Some of these drag-line scoops can excavate up to 30 tons at a time, that is, enough to load two or three railway trucks. With the help of these powerful machines the ore is rapidly removed and sent off to the blast-furnaces. When all the ore is extracted from one area the machines move to a similar area near by and the processes are repeated. Then the old working is filled in with waste material and overburden, the soil is returned to the top of the filled-in working, and in a few years, may again be used for agriculture.

By these methods, all the iron-ore can be removed from a district in a few years. No permanent equipment such as the shafts and winding gear of coal-mines is required and the machinery for the extraction of ore migrates from one part to another of the iron-ore field until all the useful mineral is obtained.

Somewhat similar methods are used in the large ore-field of Lorraine in France and that near Lake Superior in U.S.A. In the former area, there are deeper beds of ore as well as those near the surface so that deep-mining is necessary in addition to the open-cast method. Fortunately for the miners who work at depths of as much as several hundred feet, there is no 'damp' in

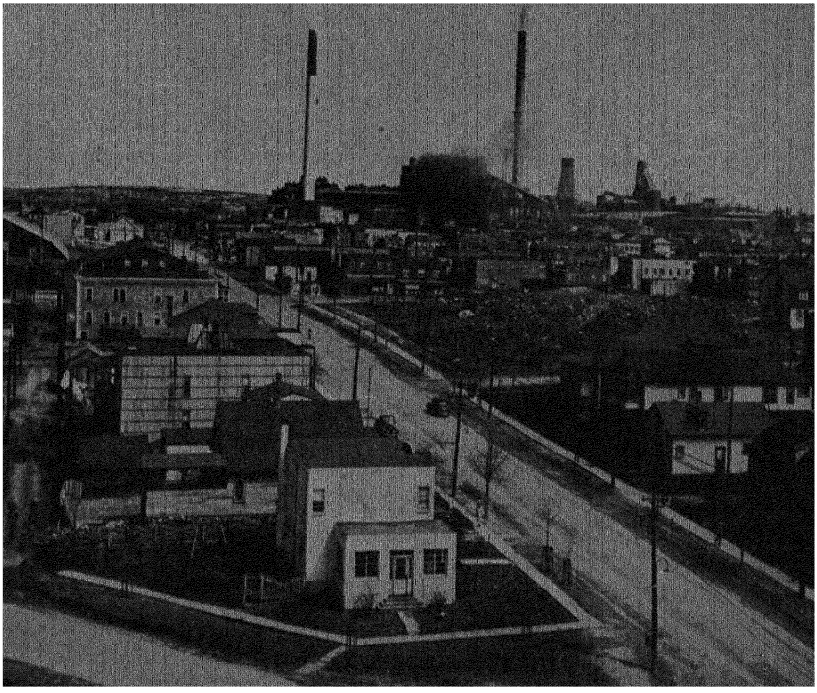
iron-ore mines and consequently far less danger than in coal-mines. In the Lake Superior district of U.S.A., the extraction of high-grade ores has been so highly mechanized that over 50,000,000 tons were dug out each year during the twenty years before the Second World War. So great has been the American demand for steel since that war that production of iron-ore has nearly reached a hundred million tons a year in this district. This is a very rapid rate of growth in production and it has been estimated that the supply of high-grade ore in this area will last for only another twenty years. Yet none of this ore is smelted where it is found. It all travels in specially built ships on the Great Lakes to the great steel works of Pennsylvania and Illinois.

## IRON-ORE MINING AND POPULATION DISTRIBUTION

Because modern iron-ore mining is so highly mechanized, great numbers of workers are not required in this extractive industry. Therefore, unless other industries are set up on the iron-ore fields there are no large cities on them. When visiting the open-cast quarries of Northamptonshire or Lincolnshire one is impressed by the small numbers of men who are actually engaged in the ore extraction. All this means that such an occupation cannot directly support a large population although the mineral production helps to provide work for many people elsewhere. Therefore the iron-ore fields are not much more densely populated than they were when they were used for agriculture.

Furthermore, it would be unwise to set up great towns in such areas because of the rapid exhaustion of the ores. Once the ores are removed, the employment of the people is gone and the miners must move to other areas. In other words, this kind of extraction is not only a 'tied' occupation but also a shifting one. It can last only as long as there are minerals left to extract.

What has been said here about iron-ore mining is equally true of some other minerals. Figure 24 is a photograph of Noranda in the north-west part of the Province of Quebec in Canada. This town lies on the desolate Laurentian Shield. The open space



Canadian National Film Board

FIG.24 – *Noranda – A mining town in Quebec, Canada*
Mining is a modern development on the Laurentian Shield of Canada. All the inhabitants of this town depend on mining and smelting gold and copper ores. The town is surrounded by the barren country of the Laurentian Shield which has no value for agriculture.

approximately in the centre of the picture is not a rubbish dump. It is a remnant of what all this district was like fifty years ago. Near the top left-hand corner, is a good example of what the open country just outside the town is like and there are few parts of the world which are less attractive than this part of the Laurentian Shield. In fact, Noranda is almost like an oasis in a desert of bare rock and swamps and it is less than fifty years old.

The reason for the rapid growth of a town in this unattractive land is that the rocks which lie under it contain ores which yield copper and gold. The two great chimney-stacks carry smoke and fumes into the air from the furnaces and smelter which treat

6,000 tons of ore a day. Noranda is a 'boom town'. When its ores are exhausted, it is almost certain that there will be no other employment for its inhabitants and Noranda will probably become as 'dead' as many gold-mining settlements have become in California and Australia.

Mineral extraction cannot provide a permanent basis for population unless other industries are established in the mining-villages and towns. That is why the general rule is that the ores are taken away from the mines to places situated in more favourable districts. It is unusual to find manufacturing industries moving to ore-fields unless the reserves of ore are large enough to last for a long time.

Man is constantly seeking new supplies of mineral ores of all kinds. Even aeroplanes are being used nowadays in the search. They take photographs from the air which sometimes give clues as to the occurrence of ores. We may therefore expect mining to spread into many new areas and the deposits of ores which are discovered will add to the wealth of the world. But it is very unlikely that any new discoveries of minerals will lead to important changes in the population map.

## EXERCISES

1. Why does Great Britain have to import large amounts of iron-ore?
2. What are the meanings of the following terms: iron-ore, pig-iron, iron-content, wrought iron?
3. What is open-cast mining?
4. Why are large towns not found on iron-ore fields unless there are other major occupations present?

## Chapter 20

# PETROLEUM

The story of petroleum is a fascinating one, not only because of the speed with which the mineral has come into importance but also because of the valuable part it plays in our lives today. Yet the first oil well was drilled less than 100 years ago – in 1859. Petroleum had been used for many centuries before that date but only where it seeped out of rocks and could be gathered without drilling holes in the ground. The extraction of petroleum is a good example of the skill which modern man possesses and employs in his use of the earth's natural resources. It also illustrates the fact that a great industry never develops as the result of one single cause. If the internal-combustion engine had not been invented there would have been no great demand for petroleum and all the skill shown in the various ways of drilling wells would not have been required. It was because the rapid growth of the use of internal-combustion engines in aeroplanes, cars, lorries, motor bicycles, as well as in railway engines and in some ships, created a vast market for petroleum and its products that oilfields have been developed in many parts of the world. This demand is still increasing and explains why the search for more and more petroleum is still going on.

## MINERAL OIL

Unlike the great majority of minerals, petroleum is a liquid in its natural state. It is by no means the only oil used in industry and domestically, and in order to avoid confusion it is often called 'mineral oil'. There are various theories about its origin but there is no doubt about the importance of the arrangement of the rocks of the earth's crust in its occurrence. In its natural state, petroleum

exists as vast numbers of tiny drops which occupy small spaces between the grains of certain rocks. It cannot therefore be mined by processes like those described in Chapters 18 and 19. But it often happens that beds or layers of oil-bearing rock have been bent or folded so that the oil accumulates under pressure. It accumulates especially where a layer of a different kind of rock prevents the oil from spreading. If the oil-bearing layer can be reached by a pipe, the liquid mineral often flows to the surface.

Being a liquid, petroleum is much easier to transport than the mineral ores. It will flow through pipes, it can be stored easily in large tanks and it can be carried easily in tankers, both on the sea and on railways and roads. This is an important point because petroleum is not always found where it is used. It must be carried to its consumers as we have seen is the case with iron-ore. The cost of this transport is one of the decisive factors in the price which the consumer must pay for petroleum and much progress has been made in reducing this cost. The consumption of petroleum has therefore increased enormously. The U.S.A. is both the largest producer and the largest consumer of mineral oil. Its annual production has increased from a few barrels in 1859 (a barrel of oil contains 42 pounds) to 63 million barrels in 1900 and 2,000 million barrels in 1948. Since the end of the Second World War, the value of oil production in U.S.A. has exceeded that of coal or cotton or wheat in that country.

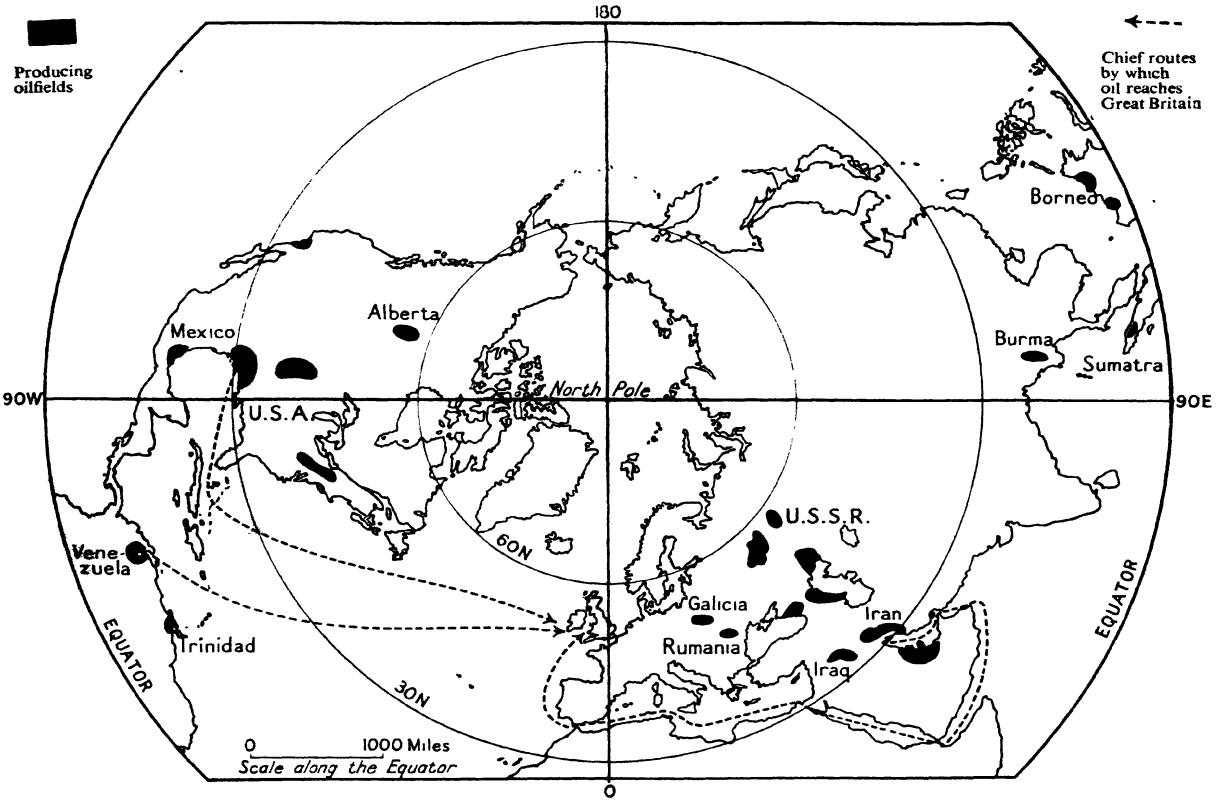
## OIL WELL DRILLI' G

The presence of oil in the rocks of often indicated by small quantities of the surface. The early prospectors f such clues but now that geologi arrangement of the rocks, they ar to occur. Once they have decided is to bore a trial hole. This proce a job requiring great skill and care. steel is erected over the selected spo

apparatus which is a flexible steel cable. This cable carries the drill which is made of especially tough steel sometimes studded with industrial diamonds. It is rotated by a motor and gradually bites its way through the rocks. As the hole, a few inches in diameter, is bored, it is lined with steel pipes as the 'core' of drilled rock is steadily removed. If the geologists have been right, the drill will eventually reach the oil-bearing rock and the oil will flow to the surface. If the oil is under great pressure, it may come up very suddenly and cause a 'gusher'. This may lead to a serious wastage of oil and even dangerous fires so that the drillers must watch their apparatus very carefully and be ready to seal the well if necessary. Once oil has been 'proved' in a district, more derricks are quickly erected until the oilfield is studded with scores or even hundreds of them.

In the early days of the petroleum industry, there was much 'wild cat' boring, that is, the sinking of many trial bores. Once it was known that an oilfield existed, there was great competition to obtain the petroleum. As there is no way of telling which way the oil extends underground except by boring, there was a rush to buy land near the first bore. Sometimes this led to serious trouble; but nowadays, large oil companies usually obtain concessions to search for oil in large areas and the rivalries of the early days are less common.

The discovery of oil is only the first stage in its production and use. It is followed by the erection of large storage tanks where the thick treacl petroleum is pumped until it is time to send it for the next p esses which take place in a refinery. In its natural state, mi oil is only fit to be used as fuel oil, which is the kind tha in the furnaces of ships and of some factories, for raising he great majority of the natural oil is, however, treat jority o ries where it is broken down into petrol, paraffin and is by n roducts. The machinery used in refineries is exper l in orde ery complicated. The petroleum products must ... are vari ularly to ensure their fitness for the various uses about the imp / are put. Therefore each refinery must hav... crust in its o ch station and most of the great oil


Producing oilfields
Chief routes by which oil reaches Great Britain
180
90W
90E
0
North Pole
60N
30N
EQUATOR
EQUATOR
Mexico
Alberta
U.S.A
Venezuela
Trinidad
U.S.S.R.
Galicia
Rumania
Iraq
Iran
Borneo
Burma
Sumatra
0 1000 Miles
Scale along the Equator

companies have special research stations in addition. The Anglo-Iranian Company, for example, operates ten very large refineries and opened another in 1952. It also has a very large research station at Sunbury-on-Thames, just outside London.

Generally the whole business of petroleum production and refining is carried on by very large companies which have vast reserves of capital. They are often international concerns, owning concessions for drilling in various oilfields, fleets of ocean-going tankers, refineries and distributing agencies. Although their head offices may be in one country, they may have interests in many parts of the world. To mention the Anglo-Iranian Company again – it owns refineries in Britain, France, Germany, Italy, Austria and Belgium. Until 1951, it also owned the largest refining plant in the world, at Abadan in Iran. Such widespread interests and enormous amounts of capital justify the name given to the petroleum industry – 'A Giant in Modern Industry'.

## THE DISTRIBUTION OF OILFIELDS IN THE WORLD

Figure 25 shows the distribution of all the major oilfields in the world but it must be remembered that these are 'proved' fields which are already in production. It is probable that there are other resources which have not yet been discovered, although most of North America and Europe have been fairly thoroughly prospected.

Two facts stand out clearly from a study of Figure 25. First, all the important producing fields of the world lie between the Equator and 60° North. Secondly, Europe which is one of the greatest consumers of petroleum and its products is very poorly supplied with oilfields. If we exclude the Soviet Union from Europe, there are only two fields of any size left, one in Galicia

FIG.25 – *The chief oilfields of the world*
The areas shown in black are oilfields, but oil is produced only at certain places on them, that is, where wells have been bored. The Northern Hemisphere produces the great majority of the world's oil.

and one in Rumania and these are under Russian control. A vast amount of money has been spent on prospecting for oil in Europe, including the British Isles, but the results have been disappointing. This means that, as the U.S.S.R. is unwilling to export oil to Europe, this continent is dependent on overseas supplies of this valuable liquid. The routes followed by imported oil to Great Britain, for example, which has a very small home production of oil, are shown on Figure 25.

In contrast with Europe, North America is well supplied with oil deposits. The U.S.A., in particular, is the home of the modern petroleum industry and has produced more than 60 per cent of the world's mineral oil for many years. At the same time, the U.S.A. is the largest consumer of oil. So large is this consumption that the American oil companies now find it necessary to import oil from Venezuela and the Middle East. Important new discoveries have been made in Canada which may make that country independent of the U.S.A. for oil supplies. The largest proved deposits are in Alberta which is far away from the densely peopled areas of Canada but this difficulty will probably be overcome by the use of pipelines.

In Asia, including the whole of the U.S.S.R., the known oilfields are situated in or near the edges of the continent. Reports have been made of recent discoveries in Central Asia but no details have been given of them. The three chief areas of proved oilfields are as follows:—

1. In Russia between the Black and Caspian Seas and the Ural Mountains. These fields are rich enough to make the Soviet Union probably second to the U.S.A. in world production. Before the Second World War, when figures of production were published annually, the U.S.S.R. was undoubtedly second to U.S.A. and there was a surplus for export. Since the outbreak of that war, no figures have been published for Russian production and the U.S.S.R. has certainly ceased to export oil. This is because she needs all the oil she can produce for her own use.

2. In the Middle East part of Asia, the main fields are near the Persian Gulf – in Iran, Iraq and in the shorelands on the south-

western side of the Gulf (see Figure 31). These fields are especially interesting for three reasons. The people in the countries in which they occur are too poor to pay for the expensive extraction and refining of the oil. They are also too poor to act as markets for the oil when it is produced. Thirdly, these fields lie on or near the great air- and sea-routes between Western Europe, India and the Far East so that their refined and crude oils are particularly valuable both in time of war and peace.

Because of the poverty of these Middle East countries, their oil deposits have been worked, under concession, by British and American companies and the trouble in Persia (Iran) in 1951 was partly the result of the dissatisfaction of the Persian Government with their share of the profits made from the sale of petroleum which was extracted from the rocks in their country.

3. The remaining oilfields of Asia are found in South-east Asia, in Burma, Borneo and Sumatra. Their production is not very great but the oil is extremely useful as it is found near the great routeways of that part of the world.

## WORLD TRADE IN PETROLEUM

There is much more world movement of oil than there is of coal or iron-ore. This is largely because many of the industrial countries of Europe have little or no oil in their own territories. It is true that synthetic oil can be manufactured from coal and other materials but it is more expensive than natural oil and, in any case, the coal is required for other purposes.

The chief lines of movement of oil are, therefore, from the oilfields to Europe. This does not include the trade inside North America which is mainly by pipelines. The most important world routes are by sea with certain land links by pipelines to bring the oil to the ports. The main route is from the Middle East to Europe via the Suez Canal and the Mediterranean Sea. This route is shortened by the pipelines which cross the Middle East to ports on the shores of the Eastern Mediterranean (see Figure 31). The second most important route is from the Caribbean Sea and

the Gulf of Mexico across the Atlantic to Europe. These and less important sea routes are followed by ships especially built for carrying petroleum. The most modern of these (see Figure 29(b) ) are very big ships of up to 40,000 tons deadweight. Except for engine rooms and crews' quarters at the stern, these tankers are really great oil containers and are not suitable for carrying any other cargoes. Like the tanks often seen on our roads and railways, they must make the return voyage empty and this adds to the costs of transport of the oil.

So great is the demand for petroleum, especially in Europe, that it is very necessary to keep all this world trade in progress. During the Second World War, Britain's dependence on overseas supplies was made evident by the severe rationing which was imposed by the Government.

## USES OF PETROLEUM

A complete list of the uses to which petroleum and its products are put would take up a great deal of space. We can only deal with the two main uses here. They are as oil fuel and as petrol.

Oil fuel is the crude or, sometimes, the semi-refined petroleum which is used for heating purposes. It is burned in specially equipped furnaces where liquid oil is forced through fine jets under a boiler and burns with a fierce heat. Its use has many advantages over coal for this purpose. It is cleaner, more easily handled and more easily controlled. Most modern ships are oil-fired and in many buildings oil fuel is used for central heating. This latter use is very common in the U.S.A. where central heating of houses is more frequently employed than in Great Britain. In the case of ships, oil has the great advantage of being pumped quickly into the storage tanks and does not require a large number of stokers in the boiler rooms. In the old days, 'coaling' a ship might take three or four days with a great deal of unpleasant dust. Now, less than twenty-four hours of pumping are enough to supply the *Queen Elizabeth* for a journey across the Atlantic.

Petrol is used for a greater number of purposes than oil fuel but this consumption is almost entirely in internal-combustion engines. The millions of cars and aeroplanes in the world today, except jet-propelled aircraft, use petrol in some form. Unfortunately, the internal-combustion engine is not a very efficient machine because a large proportion of the petrol is wasted in exhaust gases. This is unfortunate because the world's petroleum resources are being used at a very rapid rate and, like all minerals, they cannot be replaced. That is why jet and turbo-jet engines, besides giving higher speeds, are very valuable. They use less highly refined products of petroleum and, when they are improved, are likely to be more efficient than piston-engines.

## EXERCISES

1. Why is there much more world trade in petroleum than in coal?
2. Explain why the petroleum industry needs great sums of money?
3. Make a list of the uses of petroleum and its products.
4. What is meant by each of the following terms: pipeline, refinery, tanker?

## Chapter 21

# MANUFACTURING INDUSTRIES

Nearly two-thirds of this book are devoted to descriptions of the ways in which raw materials are produced in various parts of the world. Careful study of Chapters 7 to 20 shows how different countries produce primary commodities such as foodstuffs or minerals which may be used where they are produced or exported to other parts of the world. Very few of these materials are consumed in the form in which they are produced; that is why they are called raw materials. They must be treated in some way or other before they are ready for use. Most of the processes used are carried on in factories and are known as manufacturing industries.

### MASS PRODUCTION

The growth of industries has been very rapid and is still in progress. Factory-made goods are in great demand in the advanced countries and are becoming increasingly important in those lands in which, not many years ago, the inhabitants had to rely on what they could make themselves. This enormous increase in the consumption of manufactured goods has been made possible by the growth of mass production methods in modern factories. Under this system, large numbers of goods are made by machines at a rapid rate. They are standardized, that is, they are exactly alike, and the aim of the manufacturer is to produce as many goods as possible at the lowest price and in the shortest time.

When this system of mass production was first introduced the workers thought that they would lose their jobs and there was much trouble in the industrial areas. Today the system is generally accepted and modern factories are being built in almost all

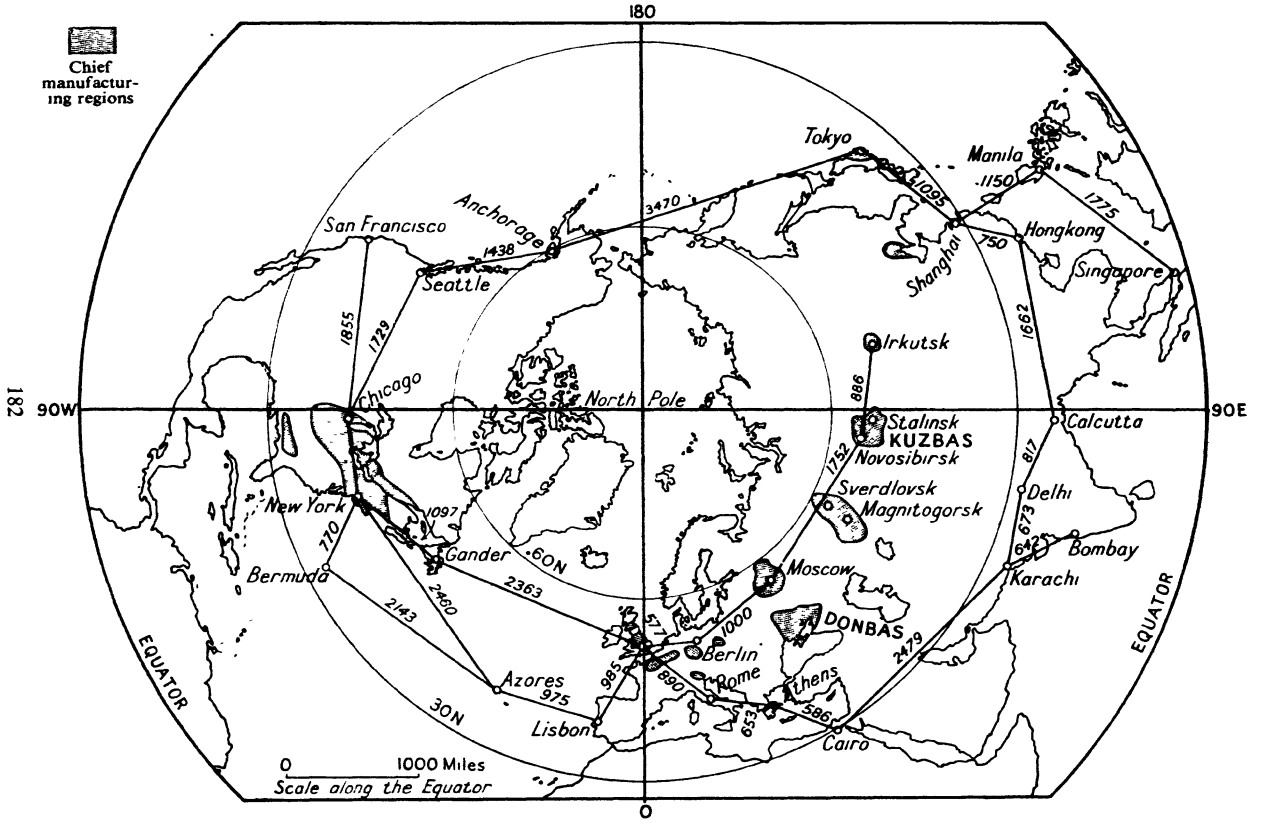
countries and there is an ever-increasing demand for the raw materials to feed the machines.

The last point raises a very interesting and serious problem. No country in the world produces all the raw materials which its industries require. This is true of the very wealthy U.S.A. but it is even truer of West European countries and particularly of Great Britain. To meet the demands of the factories, raw materials must be imported and the only way to pay for them is by exporting other goods. Britain led the world, during the nineteenth century, in the development of manufacturing industries, and for a long time, was able to export manufactured goods on a very large scale. The result was that Britain could import food and other raw materials and her industrial system was able to support a rapidly growing population. For several reasons, Britain is no longer able to import cheaply and it is becoming more and more difficult for her to find markets for her exports. Yet there are 50 million people in the United Kingdom who cannot produce enough food for themselves on their own land nor can they produce all the raw materials to keep their factories in full production. There is no better illustration of the ways in which countries depend on each other than that of the present position of the people living in the British Isles.

## LOCATION OF MANUFACTURING INDUSTRIES

We have already seen (in Chapters 18, 19 and 20) that the extractive industries are 'tied' to places where the minerals occur. Similarly, agriculture can only be developed where the land and the climate are suitable to the particular crops which are grown. Manufacturing industries are not tied in these ways but they are unlikely to be successful unless the following five things are available:—

1. *Transport facilities.* Perhaps the most essential factor is the reliable and easy assembly of raw materials. This is especially important for heavy industries such as engineering, steel-making and shipbuilding but it is also essential for the light industries.


180
0
90W
90E
182
Chief manufacturing regions
Tokyo
Manila
1150
1095
1775
Hongkong
150
Singapore
Shanghai
Anchorage
3470
San Francisco
1438
Seattle
1855
1729
Chicago
Irkutsk
886
1662
North Pole
Stalinsk
KUZBAS
Novosibirsk
1732
Calcutta
817
Sverdlovsk
Magnitogorsk
Delhi
New York
1097
770
Gander
60N
673
642
Bombay
Karachi
Bermuda
2460
2363
2143
Moscow
1000
577
DONBAS
2479
Berlin
985
880
Rome
Athens
586
653
Azores
975
30N
Lisbon
Cairo
EQUATOR
EQUATOR
0
1000 Miles
Scale along the Equator

Unless there is a steady flow of materials to the factories, there are 'bottle-necks' leading to delays and loss of production. This explains why modern transport is so important to manufacturing industry and why so many factories are situated near railways, roads or waterways.

2. *Power supply.* Because industries are highly mechanized, great quantities of power are required. This power is obtained from heat, either directly by burning fuel in furnaces to raise steam, or indirectly by using the heat to make electricity. In the early days of manufacturing industry, factories had their own steam-engines and, to save transport costs, many of the factories were built on or near coal-fields as coal was the chief fuel. Present day transport and electricity transmission systems make it possible for many industries to grow up away from the coal-fields.

3. *Labour supply.* Although much of the work in factories is done by machines, many people are still required, in fact, manufacturing industries are one of the chief employers of labour. Hence industrialists either build their factories where there is a supply of labour or they arrange for houses to be built near their factories so that the workers may have somewhere to live. For these reasons, most manufacturing industries are associated with towns and they have been the largest single factor in the development of these towns.

4. *Capital.* The payment for materials, machines, buildings and of wages, all on a large scale, means that great quantities of capital are necessary for the development of modern industries. The capital is usually provided by big companies or, in some countries, by the Government.

5. *Markets.* Lastly, but by no means the least important, there must be markets for the manufactured goods. In this sense,

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FIG.26 – *The chief manufacturing regions of the world*
This map should be compared with Figs. 22 and 23. The straight lines represent the chief air routes with distances between airports in miles. There are no large manufacturing regions in the Southern Hemisphere.

markets mean somewhere to sell the products of the factories, either at home or in foreign countries. This is a very complicated side of industry partly because markets frequently change. A manufacturer may lose his market in one country and look for another elsewhere. He may specialize in goods for the 'home' market or he may switch to commodities for 'overseas' markets. In any case he must study his customers' requirements and be ready to change the style of his goods whatever they may be. For all these purposes, he employs expert salesmen who are continually on the watch for new markets as well as for changes in the needs of customers.

All of these five factors must be present if manufacturing industries are to be successful. Without them manufacturers are unable to produce and sell goods cheaply and efficiently. When they are available in an area, industries grow quickly and then attract other industries which take a share in the conditions which have been described. Manufacturing industries, therefore, tend to concentrate in industrial regions which usually have dense populations and big towns. The largest and most important of such regions are shown on Figure 26 and it is not surprising to find all of them in the Northern Hemisphere where the conditions described above are most favourable to their growth.

The U.S.A., Britain, the U.S.S.R., Germany and Japan are the leading manufacturing countries in the world. Germany and Japan have been seriously disturbed by the Second World War and have lost their foreign markets for the time being. There is little doubt, however, that they will recover their pre-war position before very long. Britain is in a serious position for reasons indicated earlier in this chapter but the U.S.A. and the U.S.S.R. are making tremendous industrial progress. Each of these two countries possesses all the facilities necessary for large-scale manufacturing and are taking full advantage of them. These countries are indeed the industrial giants of the present day.

The following table gives an indication of the importance of manufacturing industries in four of the five leading countries. Similar figures are not available for the U.S.S.R.

TABLE 2. WORKERS IN MANUFACTURING INDUSTRIES IN FOUR LEADING COUNTRIES

| | *Total Active Population (millions)* | *Workers in Manufacturing Industries (millions)* |
|---|---|---|
| U.S.A. (1940) | 52·8 | 12·3 |
| United Kingdom (1931) | 21·0 | 8·4 |
| W. Germany (1946) | 19·2 | 7·4 |
| Japan (1940) | 33·9 | 5·7 |

No other countries have such large numbers of people engaged in manufacturing industry. These four and the U.S.S.R. are undoubtedly the great manufacturing countries of the world.

### VARIETY OF MANUFACTURED GOODS

When studying the geography of industry, as it is sometimes called, one is often bewildered by the great variety of goods which are manufactured. Industrial regions may be famous for a certain class of goods but they each make other industrial products as well. In fact, it is not wise to concentrate on one class in case there should be a slump in that kind of commodity. Nowadays, the general practice is to develop as wide a range of industries as possible. For this reason, the governments of various countries are encouraging the establishment of new industries in areas where previously there was only one type of manufacturing.

There would be very little value in giving a list of the many industrial products here. It is sufficient to point out that there are two main classes of manufacturing industry, those concerned with heavy and those concerned with light goods. One example of each is studied in Chapters 22 and 23.

## EXERCISES

1. What is meant by mass production?
2. Why are all the great manufacturing regions in the Northern Hemisphere?
3. Explain the different meanings of the term 'market'.
4. Describe the various kinds of power which are used in manufacturing industries.

## Chapter 22

# THE STEEL INDUSTRY

Steel-making has been selected as one of our examples of manufacturing industry for three reasons.

First, steel is the most important metal in the world: it is almost impossible to imagine a world without it, so many and varied are its uses. Yet the first successful method of making this metal cheaply was introduced by a British inventor, Henry Bessemer, in 1856, that is, only about one hundred years ago.

Secondly, steel-making is a good example of a heavy industry because it requires very large quantities of heavy raw materials and most of its products are heavy also.

Thirdly, steel-making is a basic industry, that is, it provides much of the materials for many other occupations. All manufacturing industry, for example, uses machinery which is largely made of steel and many of the things made by this machinery are themselves partly or wholly of steel. Furthermore, steel is being increasingly used in agriculture as this occupation becomes more and more mechanized.

For these three reasons alone, a brief study of steel-making is worth while but it is particularly interesting to British people because Britain can justly claim to be the home of the steel industry.

As we have already seen (Chapter 19), steel is made from pig-iron which is produced in blast-furnaces. The great advantages of steel over iron lie in its greater strength and in its being much less brittle. Over the last hundred years, many experiments have been made to improve the quality of steel so that today there are hundreds of types to suit an equally large number of purposes. Perhaps the most interesting development has been the introduction of alloy steels. These are made by adding to ordinary steel, when it is being manufactured, small quantities of other material such as

chromium, nickel, molybdenum, tungsten or manganese. The alloy steels are exceptionally tough and hard and are especially suitable for purposes where hard wear takes place. Their most important use is in making the cutting tools which are the key parts of many machines. In Britain, Sheffield has specialized in making these alloy steels and produces five-sevenths of the total British production.

## IRON INTO STEEL

Pig-iron is brittle because it contains impurities which must be removed by heat treatment before it can be made into steel. Also to make steel, the amount of carbon in iron must be reduced from one part in thirty to one in five hundred. In order to do this, very high temperatures are necessary. In the open-hearth process, for example, which produces nine-tenths of British steel, the temperatures in the furnaces must be about 1650°C. This means that the furnaces must be made of special materials to make them heat resistant.

In the open-hearth process, this high temperature is obtained by pumping pre-heated air and coal-gas into the furnace, which is loaded with a mixture of pig-iron, scrap-iron or steel, and coke. In another process, the Bessemer process, where large pear-shaped vessels called 'converters' are used, the iron is heated and then a blast of hot air is pumped through the hot iron and the impurities are blown away.

These are the two main methods of making steel and they both require great skill on the part of the workers. These men must know the correct temperatures, the right times for the processes and the right amounts of materials for charging their furnaces. When the furnaces or converters are ready for tapping, the metal is white hot and in a liquid state and is run into moulds to make ingots. These are carried by cranes to the rolling-mills where they are rolled into sheets or bars according to the customers' requirements.

Open-hearth furnaces may hold between 60 and 350 tons of materials at each charge and the Bessemer converter holds between 10 and 25 tons for each 'blow'. Great quantities of coal are used for heating the furnaces. Thus, the steel industry uses vast quantities of heavy raw materials and one of the important features of the industry is the assembling of these materials.

## A MODERN STEEL WORKS

Coal and iron are the basic materials needed in all steel-works. The ideal situation for such works would therefore be one where coal and iron-ore are mined together but there are no longer any places where this can be done. The result is that one of the two materials must be transported to the other or the two must be carried to a convenient meeting place. There are several examples in the world of all three kinds of movement of these materials.

It has been noted already that great quantities of heat are used in the treatment of iron-ore, pig-iron and steel. If the processes in the making of all three can be carried on side by side much fuel can be saved. The hot pig-iron can be moved to the converters, the hot steel can go directly to the rolling-mills. In these ways much re-heating can be avoided. Figure 27 is a photograph of the iron and steel works at Consett in the Derwent valley of north-west Durham. Iron-ore mining and smelting on a small scale in this district dates back to Roman times, but the local supplies of ore have long been exhausted so that Consett is now entirely dependent on imported ore most of which comes from Sweden and Spain. The great advantage of Consett is that there are good supplies of coking coal in the district. It therefore provides an example of ore being brought to coal in the making of iron and steel.

The imported ore is carried by rail from wharves on the River Tyne to the blast furnaces (right centre of the picture). When it has been made into pig-iron, it is transported, while still hot, to the steel furnaces on the left of the photograph where it is converted into ingots. These, in their turn, are taken to the rolling-mills in the centre of the picture. Here the steel is rolled into

plates and bars of various shapes and sizes. By having all these processes close together, fuel is saved and also hot gases can be used for several purposes. Finally the finished steel is stored in stockyards until it is sent away by rail to the consumers who use it for a great variety of purposes.

During the working hours the plant is covered by a pall of smoke and steam, evidence of the importance of heat in steel-making. Consett has been completely modernized and electricity is now widely used in the works. Immediately behind the blast furnaces is the power-station with its two chimneys and cooling towers. Close inspection of the photograph also reveals some of the many railways along which the heavy iron and steel are carried from one department to another. A further interesting feature is the number of large pipes, two of which can be seen in the bottom right-hand corner. The pipe on the extreme right carries gas from the coke ovens (not shown in this picture) to the blast furnaces. Others carry gas to the steel mills, or water from the furnaces to the cooling towers.

## STEEL AND OTHER INDUSTRIES

At Consett, iron and steel are made in large works which are on a coal-field. The number of houses in the background of the picture (Figure 27) suggests that many workers are employed in the various processes of the industry. The Consett Iron and Steel Works now employ 6,000 workers all of whom must live as near as possible to the plant. It is typical of the iron and steel industry that it encourages the growth of dense populations, Even in the Consett district, which has no other major occupations, steel-making now supports 39,000 people whereas, when the works were first opened in 1840, the village of Consett had only 200 people. When other industries, using large quantities of steel, develop near steel works, then very large concentrations of people are found. Perhaps the best example in the world is that of the Ruhr Region in Western Germany where several millions of people gain their living from steel-making and allied industries.

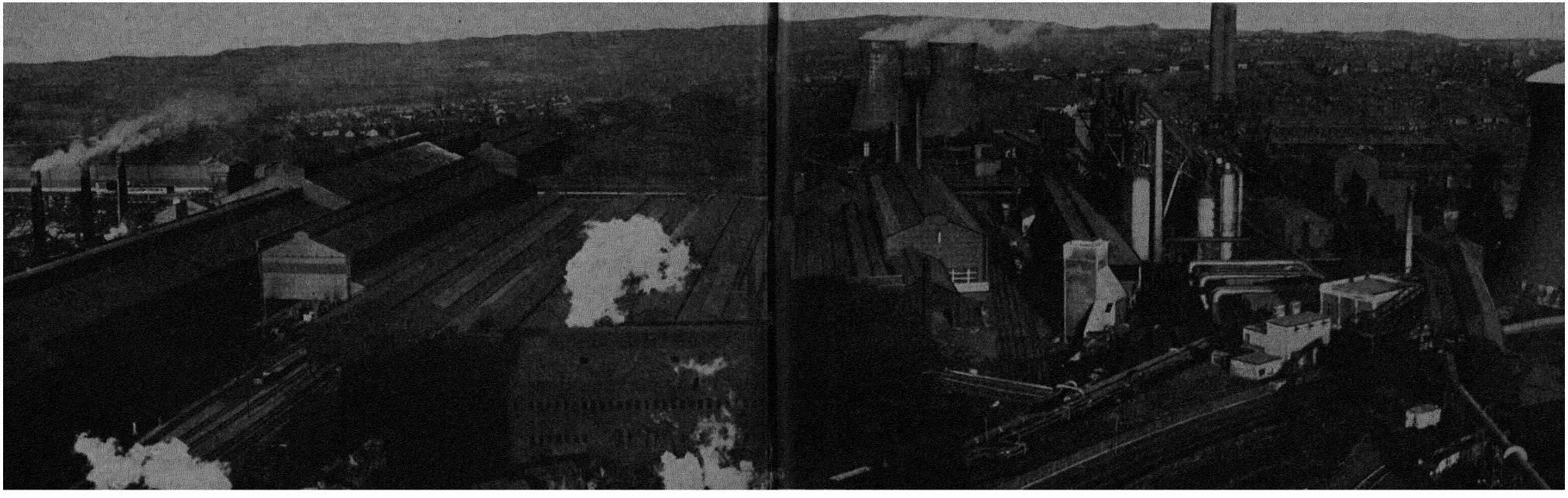


FIG 27 A general view of the iron and steel works at Consett, County Durham. *Iron and Coal in the Region*
Behind the nearby houses may be seen the rather bare countryside of the northeastern uplands, used mainly for grazing sheep and beef cattle

The customers of steel-makers are other industries Consett sends all its steel to other parts of Britain where it is manufactured into goods of many kinds The Ruhr Region uses much of its steel locally but also sends its products to other areas for manufacture. There is scarcely a single human occupation which is not affected by the use of steel in some way and this is particularly true of the manufacturing countries The following table shows how the steel production of the U S A and the United Kingdom was distributed in 1949 The chief industrial consumers of the metal are grouped together but they include almost every industry in each of these two great manufacturing countries.

TABLE 3 PERCENTAGE DISTRIBUTION OF STEEL BY INDUSTRY IN 1949

| | *U.S.A.* % | *United Kingdom* % |
|---|---|---|
| Motors, Cycles, Aircraft | 27 | 10 |
| Mechanical and Electrical Engineering | 17 | 27 |
| Oil and Gas | 11 | 3 |
| Building and Constructional Engineering | 13 | 12 |
| Railways and Rolling-Stock | 9 | 8 |
| Ship-building and Marine Engineering | 2 | 9 |
| Other Industries | 21 | 31 |
| | 100 | 100 |

The demand for steel is increasing everywhere especially as more and more industries are being established. Fortunately there is plenty of iron-ore and coal in the world for steel-making but the difficulty is that the necessary works are expensive to build and they must be located in the right places. The U.S A., the U S.S R., France and Britain have already built new iron and steel works since the end of the Second World War and their older factories are working to full capacity. Yet the demand for steel is not being fully met. In some countries, the Governments have had to decide

how their steel production shall be shared out as fairly as possible. For the first time in its history, in 1952, Britain had to import large quantities of steel from the U.S.A. Just how important steel is may be illustrated by the fact that the British iron and steel-industry proposes to spend £240 millions on new development and that the new works at Margam in South Wales have cost £60 millions.

### WORLD PRODUCTION OF STEEL

The great majority of the world's steel is made in the Northern Hemisphere where three areas are of outstanding importance. They are the U.S.A., Europe (excluding U.S.S.R.) and the Soviet Union. Their 1950 production was 88, 61, and 27 million tons respectively. In Europe, the chief steel-making countries are the United Kingdom, Germany, France and Belgium-Luxemburg, in that order of importance.

The annual production of steel varies from year to year for a number of reasons, but there has been a great increase during recent years. The U.S.A. has trebled its output since 1938 and the British iron and steel industry broke all its previous records in 1950 with a production of 16·6 million tons. These increases are a clue to the growth of industries because so many of them rely on steel. That is why steel has been described as the most important metal in the world.

## EXERCISES

1. Why is steel-making called (a) a heavy industry (b) a basic industry?
2. Make a list of the uses of steel which you see every day.
3. Make a simple map of the area shown in Figure 27 to illustrate the arrangement of blast-furnaces, converters, rolling-mills.
4. Name six towns which are famous for their steel industries.

## Chapter 23

# THE TEXTILE INDUSTRIES

In Part I of this book (see Chapter 3) it was stated that all the world's population must have food and shelter, including clothing. In other chapters, there were descriptions of many of the different ways in which food was produced. In this chapter are discussed some of the ways in which clothing materials are made and that means studying the textile industries which are mainly concerned with turning raw cotton, wool and silk into materials for clothes.

No human occupation has passed through greater changes than the textile industries. Before people were civilized, they wore the skins of animals. They then gradually learned how to spin yarn and how to weave the yarn into cloth. For many centuries, these occupations were followed in peoples' homes where the women spun and wove and made the family's clothes. In some parts of the world they still do this, but the great majority of textiles are now made in factories. The change was brought about by two discoveries which occurred at about the same time and which are interlinked. In the eighteenth century men invented ways of improving spinning-machines and weaving-looms. At the same time, they discovered new ways of obtaining power to drive their machines. At first, they used streams and rivers to turn water-wheels but in the second half of the eighteenth century they found out how to use coal to raise steam to drive engines. New textile machinery driven by steam-engines made spinning and weaving much more rapid and led to large increases in the production of cloth of all kinds. This resulted in a vast increase in output and an increased demand for raw materials. Soon the factory system replaced the older handicraft methods in many countries and the textile industry, as we know it today, came into existence. It has become one of the chief occupations of the manufacturing

countries, and since the beginning of the twentieth century many of the backward regions of the world have set up their own textile factories.

## GEOGRAPHICAL FEATURES OF THE COTTON AND WOOLLEN INDUSTRIES

1. *Raw Materials.* Most of the cotton and woollen factories are not found in the areas where the majority of their raw materials are produced. Britain, for example, is one of the leading textile manufacturing countries in the world yet it imports all its raw cotton and most of its raw wool. Similarly, Japan and the countries of Western Europe depend on other lands for their cotton and wool. The U.S.A. which is the largest grower of cotton, imports wool from Australia and New Zealand. Hence the textile industries are very dependent on world trade, both for supplies of materials and for export markets.

2. *Power.* Cotton and wool pass through many processes before they are made into cloth, and at each stage they are treated by machines all of which are power-driven. The power may be obtained from steam-engines or it may be used in the form of electricity made in hydro-electric power-stations. In the British and European textile mills, it is usual for each factory to have its own power-plant. This is illustrated in Figure 28 by the number of chimney stacks shown there. As such large amounts of power are required in the textile industries, it is an advantage for them to be situated on or near a coal-field.

3. *Labour.* The spinning and weaving-machines are very complicated but the tasks of the workers are not as heavy as those in mining or steel-making. Many of the jobs in the mills are done by women whose nimble fingers seem more suitable for this work than those of men. Because there are so many machines and processes, large numbers of people are required and many of them are skilled workers.

4. *Water.* In addition to spinning and weaving, the textile industries include the processes of washing, bleaching and dyeing.

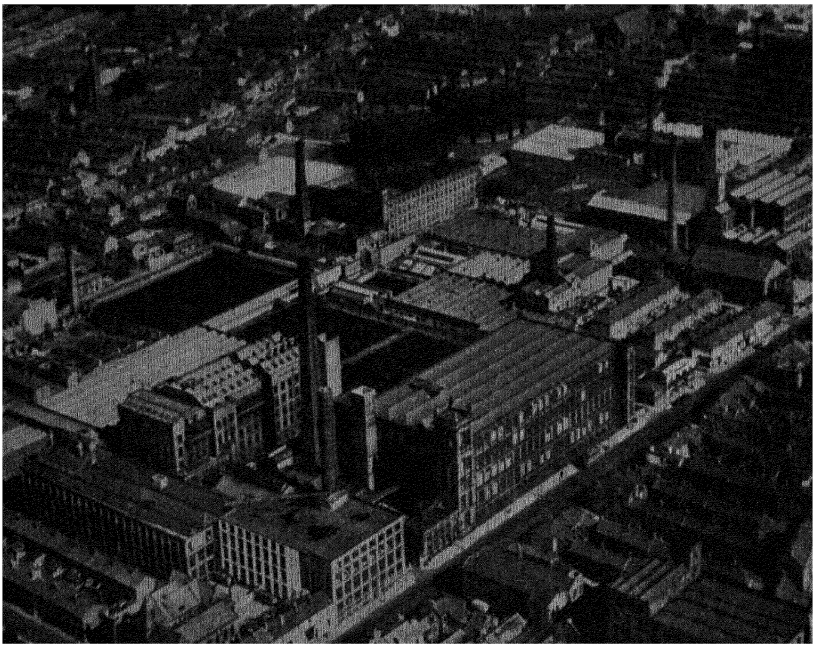
These require large quantities of water. Many of the early mills were therefore situated on the banks of rivers so that the running water could turn water-wheels and also provide the water for the processes just mentioned. At the present time, most of the rivers in textile regions are polluted so the water cannot be used and large reservoirs have had to be built from which clean water is piped to the mills.

5. *Specialization.* In both the cotton and woollen trades, the various processes are usually done in separate factories. One company may specialize in spinning, another in weaving and another in dyeing. To save transport costs, it is an advantage for the different kinds of factories to be close to each other. Furthermore, the finished materials are generally sold by merchants who buy the cloth from the makers. When both the manufacturers and the merchants carry on their businesses in one place, employment is provided for many people. Hence large concentrations of people have grown up in the textile towns and the mills are surrounded by the closely-packed houses of the workers. Hence urban life is a feature of all the textile regions of the world.

## AN ENGLISH COTTON TOWN

Figure 28 is an aerial view of part of the town of Preston in Lancashire, the county which was the home of the cotton industry. Preston is not one of the largest cotton towns but the photograph has been chosen because it well illustrates many of the features of the industry. The large group of mills in the foreground of the picture is mainly concerned with weaving cotton-yarn. Each factory has its own chimney-stack and the group is supplied with water from the small reservoir shown, and this, in its turn, receives water from a more distant but much larger store. So closely clustered around the mills are the workers' houses that they have no room for gardens. It must be admitted that such cotton towns are not very beautiful places.

The photograph was taken during a holiday period. The chimneys are not smoking and there is very little traffic to be



*Aero Pictorial Ltd.*

FIG.28 – *Preston, Lancashire, England.*
This part of Preston is entirely concerned with cotton-weaving. The photograph shows how the workers' houses were built near the factories. The houses in the bottom right-hand corner have no space for gardens. On a working day, all the chimney stacks would be belching smoke.

seen. During working time, the mills would be extremely active and a steady flow of lorries would be seen on the main road because they are the chief form of transport used for carrying the yarn to the weaving-sheds and the cloth to the warehouses of the merchants. Cotton is not the only industry of Preston but it is the chief employer of labour there. When there is a slump in the cotton trade, Preston, like the other cotton towns of Lancashire, suffers.

## RECENT CHANGES IN THE TEXTILE INDUSTRIES

Two major changes have taken place in the textile industries since the beginning of the twentieth century.

1. Until the last years of the nineteenth century, Western Europe was the only part of the world which had very large textile industries and Britain was the foremost country. Indeed, Britain, France and Germany were the chief suppliers of cotton goods and woollen goods. Since the beginning of the twentieth century, the U.S.A. has greatly expanded its textile production and Japan and India have developed completely new factories. The case of Japan is particularly interesting because the people of that country have found ways of manufacturing cotton goods very cheaply and have captured markets which were once supplied by Lancashire. The export trade of this English textile region therefore suffered very severely.

2. There have also been big changes in the materials used and made in the textile industries. Cotton has replaced linen for many purposes; but the most important has been the replacement of natural silk by rayon (artificial silk). Natural silk is too expensive for most people to buy but rayon can be produced much more cheaply. The processes used in the rayon industry are quite different from those of other textile trades. Cotton, linen and wool are made of fibres which are either plant or animal products and the best qualities are made from the longest fibres. Rayon, however, is made from cellulose, which is manufactured by pressing a liquid mixture of wood-pulp and chemicals through tiny nozzles to form filaments which are much longer than any plant or animal fibres. The dried filaments are woven into cloth which is as good as natural silk and has advantages over both cotton and wool.

Scientists are continually looking for new materials for use in the textile industry especially as the costs of raw cotton and raw wool have risen greatly. One interesting example is the use of ground-nuts from which fibres are made that look exactly like

those of wool. It may be that, within our life time, people will be dressed in clothes that are made entirely of synthetic fibres. At the present time, however, cotton and wool are still the chief textile materials and very large quantities of each are produced and used. In 1950, for example, nearly 6 million tons of cotton were grown, over a half of it in the U.S.A. In the same year, nearly one million tons of raw wool were produced.

## EXERCISES

1. Make a list of clothing materials worn by people in different parts of the world.
2. Why are large quantities of water required in the textile industries?
3. Which of the manufacturing regions marked on Figure 26 are famous for their textile industries?
4. Make a simple map of the area shown in Figure 28 to show factories, workers' houses, reservoir and main roads.

## Chapter 24

# THE DISTRIBUTIVE OCCUPATIONS

Many examples are given in this book of the ways in which people depend on each other for the necessities of life. We all depend on the work of our own countrymen as well as on the activities of people in foreign lands. Yet the goods of primary producers and of manufacturers could not reach the consumers if it were not for the people who are engaged in the distributive occupations. They distribute things of all kinds in many ways, only a few examples of which are given in this chapter.

The distributive occupations include three main types of workers. In the first group there are the transport workers who move goods and passengers from one place to another. The second group includes all the men and women who work the communications systems without which the movement of goods cannot be carried on, and thirdly, there are all those people, managers, secretaries, clerks, who work in offices and who organize the transport systems. There are many different jobs to be done by each of these groups of people. The whole business of distribution is very complex. It is important to remember, however, that every time we send a letter, every time we make a journey, every time we eat and drink, we are using the efforts of people who are called distributive workers. This is especially true of the populations of the industrial countries but there are very few people in the world who do not depend, in some way or other, on the results of distribution.

## TRANSPORT WORKERS

Every day, many millions of tons of goods and a very large number of passengers are carried by various kinds of transport. They may travel short distances or they may be crossing the world's

oceans or continents; some of them move slowly, others at very high speeds. The growth of this modern transport is indeed remarkable. Some idea of its importance is given by the facts that, on the roads of the United Kingdom alone, there are 4,500,000 vehicles of which 900,000 are for goods traffic and that 1,750,000 men are employed in operating them. Yet this is only one branch of British transport; it does not include movement by railways or by water.

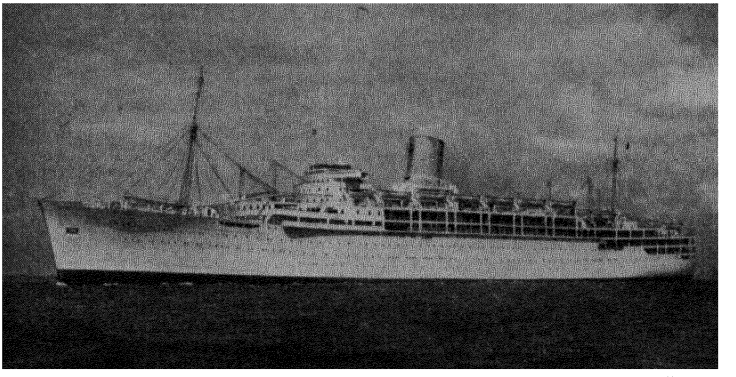
The transport of things and people in the world is somewhat like the circulation of blood in the human body but on a much greater scale. If our blood does not flow freely and reach all parts of our bodies, we are not able to move and act properly. Similarly, the activities of the world's population depend very largely on the free flow of trade. That explains why the transport workers are important people in every country and also why new methods of transport are being developed. The expression 'world circulation' is often used to describe all these varied and essential movements which fall into three groups – sea, land and air transport.

1. *Sea Transport.* This is the most important branch of world transport because it carries more goods than the other methods. The seas and oceans link most of the great producing areas of the earth's surface without any very serious barriers. Once a ship leaves port, its captain is free to steer it on the most direct route to his destination. The ship may be delayed by storms but most modern vessels are so well built and are fitted with so many aids to navigation that they usually arrive safely and on time. More important still, transport by water is the cheapest way of moving goods. Less power is required to move a given weight on water than on land or in the air. The cost of building modern ships is very great, but they do not, on the other hand, need expensive roads or rails. It is true that they must have ports for loading and unloading but once they are on the 'High Seas', they are able to carry great loads easily and cheaply.

Until fairly recent times, the oceans were barriers to transport but now they have become widely used. The great increase in ocean transport has made it possible to circulate many kinds of

things easily and safely. Raw materials for British industries, for example, as well as food for her people, are carried in ships from many parts of the world while her manufactured goods are exported as return cargoes.

One of the most interesting developments in sea trade is that it is so varied that many shipowners have built special vessels for certain cargoes. There are the famous liners, such as the *Queen Mary* and *Queen Elizabeth*, which follow definite 'lines' across the North Atlantic. They are specially built for speed and comfort because they carry passengers, mails and small quantities of expensive goods. Far more numerous are the cargo liners. They are smaller in size but have comfortable quarters for passengers and large holds for cargoes. They also follow certain 'lines', travelling regularly between certain ports. Figure 29(a) shows one of the most recently built ships of this type. She is the P. & O. cargo-liner *Chusan* of 24,000 tons which 'runs' between Britain and the Far East. Then there are the 'tramps' which are specially built



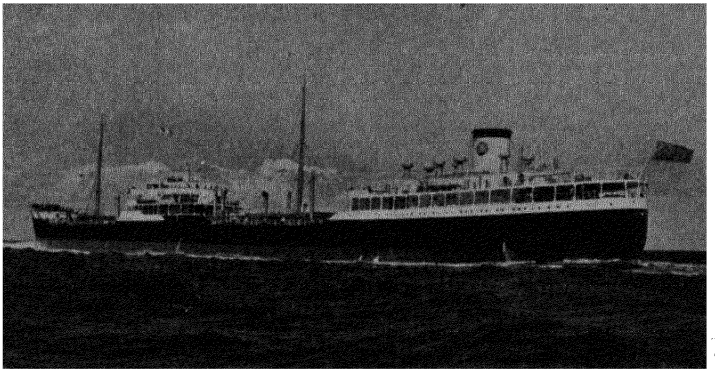
*P. & O.*

FIG.29(a) – *P. & O. liner 'Chusan'*
This is a modern cargo liner which runs between the United Kingdom and the Far East. The derricks are used for loading and unloading cargo.

for cargo transport and do not follow regular 'lines'. They go wherever cargoes are available and may be away from home for several months or even years at a time.

Perhaps the most interesting of all the modern ships are the oil tankers which are built to carry one cargo only, petroleum. They are different from other ships in appearance because their engines and crews' quarters are at the stern and all the rest of the vessel is taken up with large tanks. Figure 29(b) shows one of the latest giant tankers. She was built for the Shell-Mex Company for the oil-trade between Britain and the Middle East. She is able to carry 26,000 tons of crude oil on each trip and from each of her cargoes enough petrol can be made to drive many hundreds of cars and lorries.

Since the fifteenth century, when the Portuguese Prince Henry the Navigator explored sea routes along the west coast of Africa and Columbus discovered America, ocean navigation has developed greatly. When steel ships driven by steam-engines came into



*Shell*

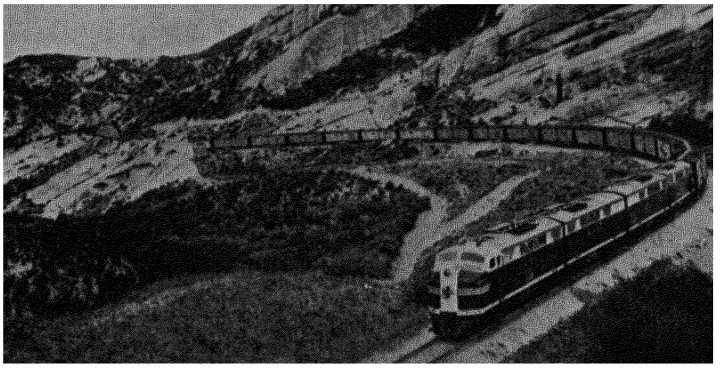
FIG.29(b) – *The oil tanker 'Velutina'*
This modern vessel was built to carry oil from the Persian Gulf to Britain. More than two-thirds of such a ship is taken up by oil tanks. Compare this photograph with Fig. 29(a).

use during the nineteenth century, the progress in navigation became even more rapid than previously. Throughout these five centuries, Britain has played an important part in sea transport. The British Merchant Navy is the largest in the world and British shipyards build more ships than any other country. In 1951, 40 per cent of the world's new ships were being built in British yards, particularly on Clydeside and Tyneside. Many of these are sold to foreign countries and so help in our overseas trade.

2. *Land Transport.* Under this heading we include rail and road transport and also movements by water on canals and rivers. All this traffic must follow fixed lines. Railways and roads are expensive to build and keep in good order while rivers and canals must be dredged and embanked if they are to keep their value for inland navigation. That is one of the big differences between sea and land transport. Only the rich countries can afford a good network of land routes. In some of the backward countries, many of the people live far from railways and roads and find difficulty in travelling and in sending their goods to market.

People in Britain are so accustomed to living near railways and good roads that they do not always realize that these land routes have grown very rapidly. It is only just over a hundred years since railways were first built; well-surfaced roads, suitable for motor traffic, are a product of this century.

As with sea transport so with land transport, there are many different types of vehicles and vessels used and, again, it is interesting to notice how the special needs of certain goods and passengers are being met. Railways are the chief means of transporting goods on land although road transport by lorry is growing rapidly. The steam-locomotive is the most important 'engine' on the railways of most countries, but electrically-driven trains are important in those lands which have hydro-electric power and also in the large cities where many passengers travel daily to work over considerable distances. A recent development on the railways is that of the diesel-electric locomotive. Several of these are already at work on British Railways and Figure 29(c) shows four of these powerful engines drawing a freight train through difficult country in the



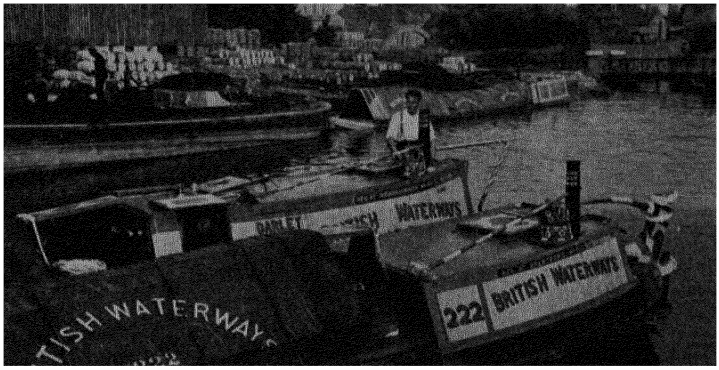
*Paul Popper*

FIG.29(c) – *Diesel-electric train in the U.S.A.*
The powerful diesel-electric locomotives pull this heavy goods train across the mountains of the Western U.S.A. The train runs regularly from Los Angeles to Chicago with fresh fruit and vegetables.

U.S.A. They are very powerful and have the great advantage of not requiring 'third rail' or overhead conductors as do ordinary electric engines. In fact, they make their own electricity with their diesel engines.

The use of railways and of vehicles driven by internal-combustion engines on roads has brought about great changes in the distribution of goods and passengers on land, yet as far as world trade is concerned, railways, roads and rivers are only 'feeders' for the ships which cross the oceans.

If you have ever watched a horse pulling a barge on a canal or a small tug towing a string of barges on a river, you will have probably realized the great advantage of inland water transport. Because there is so little friction between vessels and water, little power is required to move them. This is one of the reasons why rivers have been highways since the time when men first learned how to make rafts and how to build simple boats. In modern times, the larger rivers of the world are very important trade routes. The Rhine, the Volga, and the rivers of China carry great amounts




*Docks & Inland Waterways Executive*

FIG.29(d) – *Barges on a British canal*
Canal traffic is slow but very useful for heavy cargoes such as coal, timber, bricks and cement, which do not perish. British barges must be narrow to pass through the locks on our canals. On the River Rhine, barges are large enough to carry over 1,000 tons of cargo each.

of traffic. Duisburg-Ruhrort, a German port on the Rhine, handled about 40 million tons of goods a year before the Second World War and was the largest river port in the world. The Thames is also an important artery of traffic for sea-going ships and barges. The disadvantage of river and canal transport is that it is slow when compared with that of railways and roads but this is not very important for heavy goods such as coal, oil, timber and iron-ore which do not perish easily. Provided they are moved regularly, the speed of their transport does not matter greatly.

3. *Air Transport.* This is the newest and fastest form of transport although it is not yet able to carry very great loads. Like sea transport, aeroplanes do not require rails or roads. They must use airports for loading and re-fuelling but, once they are in the air, they follow the most direct route to their destination. Their value depends very largely on their speed so they are mainly used for passengers, mails and valuable small cargoes. It seems as if a new age in air travel was opened in 1952 with the introduction of the

B.O.A.C. 'Comet' air liner with its four gas-turbine jet engines. (See Figure 30(b). Its makers claim that "The journey from England to the Middle East now occupies an evening; one may dine between the Alps and the Greek Archipelago". This kind of travel will not become available to large numbers of people nor will it carry loads as large as those of ships and railways for a very long time. Yet it is important for urgent journeys for business men and other people who must travel quickly.

Mechanized transport carries the great majority of the world's traffic. In some countries, however, animals and even human beings are still used as 'beasts of burden' but everywhere machines of some sort are becoming more and more important. All these means of transport require the services of the transport workers – drivers, sailors, pilots, navigators, lightermen and a host of other people. Their jobs may be described as 'keeping things moving' regularly and smoothly, quickly or slowly, so that the world's circulation may continue. In most cases, this movement follows regular lines which are called trade routes. These are the arteries of world transport. They are too numerous to be shown on one map but your atlas will show you the chief trade routes for most countries.

## COMMUNICATIONS

Strictly speaking, communications are a part of the transport systems and methods which have just been described but it is convenient to deal with them separately. Railways, roads, ships and aeroplanes are means of communication, it is true, but in this section we are concerned with the distribution of information and ideas.

*Telecommunications.* This name really means communications over long distances but it is also used to describe the distribution of information over short distances. The chief types are postal services, the telephone, telegraphy, wireless-telegraphy, and radar.

The 'penny post' was first introduced by the British Government in 1840 as a result of the work of Sir Rowland Hill. This date



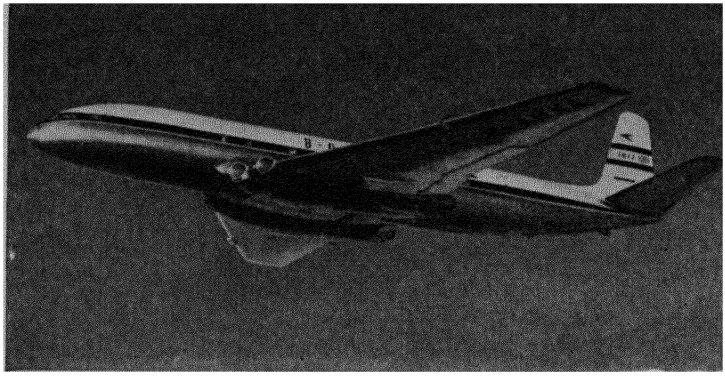
*By courtesy of the Postmaster-General*

FIG.30(a) – *Post Office workers sorting letters and parcels*
This photograph shows a corner of the Sorting Office at Mount Pleasant, London. As the mail comes in from different parts of London, it is sorted and put into canvas bags which are sent by road and rail to many destinations. The men shown here are some of the 'Workers behind the Scenes'. (See p. 212.)

marks the beginning of the development of the modern telecommunication systems of the world. They have advanced so widely that today it is possible to send messages quickly to very many parts of the world. Not only are we able to communicate with friends but orders for the circulation of goods may be 'flashed' rapidly so enabling the world's trade to be continued smoothly.

All countries possess telecommunication systems but they vary widely. The U.S.A., for example, has over 40 million telephones but India, with twice as many people, has only 130,000. Again, the U.S.A. has more than 105 million radio and over 15 million television receivers but there are twenty countries with less than 100,000 radio sets in each. Figures such as these illustrate the uneven distribution of telecommunications and show the need for further development in the poorer lands.

Figure 30(a) shows the method of sorting letters and parcels in the English postal system. When the mail bags are filled they



*De Havilland*

FIG.30(b) – *B.O.A.C. 'Comet' air liner*
This jet air liner flies at nearly 500 miles per hour at heights of about 40,000 feet. Passengers are carried swiftly and in comfort.

are distributed to their destinations by road, rail or air. Many of the mails for foreign countries are now sent by air and the 'Comet' air-liner shown in Figure 30(b) began carrying such mails at nearly 500 miles per hour in 1952.

One of the first ways of speeding up communications was by the use of the electric-telegraph which carries messages along wires. These wires may be seen by the side of railways and main roads but, in order to carry telegraph-messages overseas, the cables which contain the telegraph-wires must be laid on the sea-floor. Special ships such as the one shown in Figure 30(c) are used for laying and repairing cables. The strange shape of the cable ship, at the bows, is explained by the presence of cable-laying equipment in that position. Cabled messages are sent in code and must be collected and distributed from cable offices.

Wireless telegraphy and the telephone have the great advantage that their users may speak directly to their friends and other people. This is a great saving of time because it enables information to be sent to many parts of the world in a few seconds. All these means of communication are essential to world commerce but the



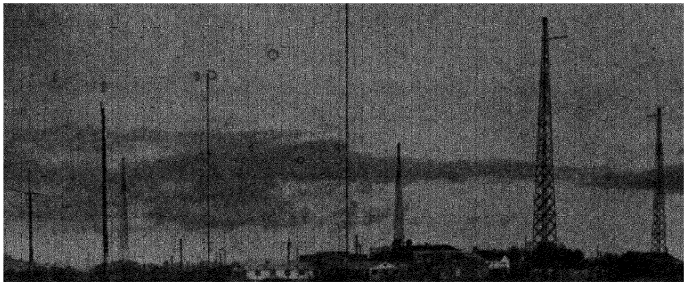
*By courtesy of the Postmaster-General*

FIG.30(c) – *Cable ship H.M.T.S. 'Monarch'*
Such ships as this are necessary for laying and repairing electric telegraph cables which lie on the sea floor. In this photograph, the 'Monarch' is anchored off the coast of Denmark while her crew are repairing a cable.

most wonderful invention for helping communications is radar. By this system, ships can be navigated into harbour in thick fog or in complete darkness.

*The Radio and Cinema.* The world's communication systems are not only concerned with sending facts, but also with distributing ideas and giving entertainment. In this connection, wireless programmes, including television, and cinematograph films are used. The spreading of ideas by these methods is sometimes called 'propaganda' and it is not necessarily a bad thing. In Central Africa an experiment is being tried to teach the native peoples how to read and write with the help of simple wireless sets.

FIG.30(d) – *Burnham radio station*
This is a Post Office Radio Station for sending wireless messages overseas. It is one of several stations owned by the British Post Office for this purpose. It does not broadcast B.B.C. programmes.



*By courtesy of the Postmaster-General*

In parts of Australia, farmers live so far from towns, railways and roads, that their only contact with other people is by 'pedal' wireless sets, i.e. sets operated by electricity generated by a small motor driven by pedals. In our own country, wireless programmes are often very informative and the broadcasts to schools are generally considered to be valuable. It is impossible to say exactly what effect the use of these means of communication is having on the world's peoples. Opinions vary greatly but there can be no doubt that they have come to stay and are increasing rapidly. Never before have there been such opportunities for distributing and receiving both useful and entertaining knowledge.

## AN EXAMPLE OF THE RAPID GROWTH OF COMMUNICATIONS

The Middle East is the area between the Mediterranean Sea and the Indian Ocean. It has been a routeway for many centuries but, until recently, goods were carried by animals between the the two seas where they were transferred to ships. When petroleum was discovered in Persia (Iran), Iraq and the Arabian Peninsula, it became necessary to use new means of transport and communications. Figure 31 illustrates some of the features of the present transport system in the Middle East.

The first stage was the sending of Persian oil from Abadan to Europe in tankers via the Red Sea, the Suez Canal and the Mediterranean. Later, pipelines were built to carry Iraq oil from Kirkuk to Haditha from which two lines were built, one to Haifa and one to Tripoli. In 1952, a further pipeline joined Haditha and Banias. Since 1945, new oilfields have been opened in Kuwait, Bahrein and Qatar and some of them have been connected to Haifa and Sidon by pipeline. Thus Middle East oil is carried westwards either through pipes or by tanker.

The laying of pipelines is very expensive. Much American and British steel was used in their construction and hundreds of powerful lorries were employed in transporting the pipes and workmen across the Arabian Desert. Once this network of lines of transport was complete, it was still necessary to have pumping stations

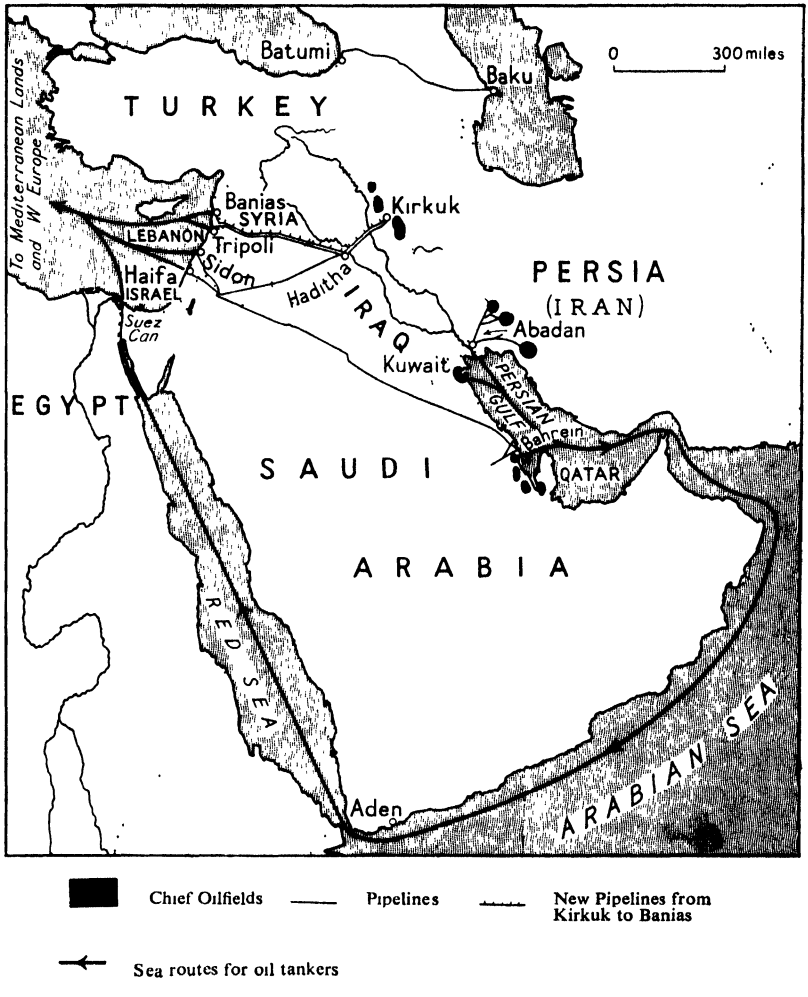



FIG.31 – *Distribution of Middle East oil*

This map illustrates a geographical method of showing how modern communications are organized. The new pipeline from Kirkuk to Banias, opened in 1952, cost £43 million, is 30 inches in diameter, 556 miles long, and is able to carry 14 million tons of oil a year.

along the pipelines to keep the oil flowing freely, and the oilfields, the refineries and the offices of the oil companies had to be kept in touch with each other. Aeroplanes are used to carry officials and employees, wireless telegraphy carries orders for the loading and distribution of oil, and telephones connect the oilfields, the pumping stations and the refineries. All this complicated system has grown in the last thirty years and has brought about great changes in the Middle East.

## THE WORKERS BEHIND THE SCENES

Like many other of the geographical features described in this book, transport and communication systems are themselves unevenly developed over the earth's surface yet at least some of the means of transport are familiar to most people. The aeroplanes, ships, trains, pipelines and the like attract more attention than the things they carry and also more attention than the people who work 'behind the scenes' so that circulation may go on.

In addition to the people who design the means of distribution, there are the millions of workers who build them. They work in shipyards and factories in many countries. But there are also the very large numbers of people who are employed in offices. They include the executives, as they are called, who plan the movement of traffic, and the clerks, secretaries and messengers who do less important but still necessary work. Then there are the workers in ports, railway stations and goods yards, garages and warehouses. There is no way of telling the exact numbers of these people but there must be many millions of them in the world as a whole. Without their work, the circulation of goods, passengers and information would be impossible. They are not producers but they enable the results of the work of producers to reach the consumers. The important point to try to understand is that human activities all over the world are becoming more and more closely connected with each other. The links between them are the distributive workers, together with the means of transport and communication which they maintain.

## EXERCISES

1. Why is transport by water cheaper than that by air or by land?
2. Make a table headed Sea Transport and Land Transport. Under each heading put the names of the kinds of vessels or vehicles used in each case.
3. Find out how to send the following: (a) an air mail letter to Canada (b) a telephone message to U.S.A. (c) an S.O.S. message by the B.B.C. (d) a parcel to a foreign country.
4. What are the advantages and disadvantages of air transport?

## Chapter 25

# ONE WORLD

We began this book with some facts about the 2,378 million inhabitants of the earth and then went on to study some of the occupations by which they try to satisfy their needs. We have seen how these people use the resources of the areas in which they live and how they have learned to communicate and trade with each other. Perhaps the most striking fact in all this geographical knowledge is the way in which people, occupations and wealth are unevenly distributed over the earth's surface. No two parts of the world are exactly alike. Similarly, the customs and habits of people are widely different from place to place. Clothes, languages, religions change from country to country. The people themselves are different in appearance. They may have white, yellow, black or brown skins; their hair may be smooth or crinkly. But, in spite of all these differences, the world's peoples belong to one great human society, linked together by transport and communications. They live in one great world which, as far as we know, is quite different from all the other stars and planets which make up the universe.

This world in which we live is indeed a remarkable place but even more remarkable is the rapid development of our knowledge of it. A hundred years ago, most people knew very little about places outside their own village or town. Now, in the middle of the twentieth century, every newspaper and many wireless broadcasts provide us with information about our own country as well as far-off lands. When Queen Victoria came to the throne of England there were many journeys of discovery and exploration still to be made in many parts of the world. Today there are few unknown lands. The great deserts, the great forests, even the Arctic and the Antarctic, have given up many of their secrets. This does not mean that our geographical knowledge is complete but we do know enough to see the world as a whole.

## ONE WORLD

### GEOGRAPHICAL REGIONS

Like most other things, the world is made up of parts and, once we have realized that the world is one, the best way to study it is to learn the geography of its parts. The largest inhabited parts of the earth's surface are the continents. Europe, Asia and Africa together form the Old World or the 'World Island' as it has been called. The Americas (North, Central and South) make up the New World while Australasia includes Australia, New Zealand and many other smaller islands. There is no clear division between Europe and Asia so that, in Volume 3 of this series of books, the whole of the U.S.S.R. is included with Asia. On the other hand, the lands which border the southern and eastern coasts of the Mediterranean Sea are so closely linked with Europe that they are described in Volume 5 which covers Europe. In the Southern Hemisphere, Australasia, South America and most of Africa have many geographical features in common so they are considered together in one book. This arrangement of the contents of these books suggests that the division of the world into continents is not a satisfactory basis for the study of geography although they are often considered as separate parts of the world.

Geographers find it much more convenient to divide the world into a number of different parts which they call regions. These may be small or large. There are regions of mountains and of plains, vegetation regions and many others. Each of them has its own special characteristics which make it different from all other regions but each is a part of the world and all fit together to make up the whole. The study of such regions is called regional geography and much of the contents of the books which you will read after this one is concerned with it.

### THE STATES OF THE WORLD

The world is also divided in another way. There are nearly a hundred countries or States which have gradually grown up and now include all the habitable surface of the earth. They are called

political regions because they are different from each other in the ways they are governed. Some of them are monarchies, ruled by a king and his parliament, others are republics with presidents and parliaments. Many of them are independent in the sense that their governments manage their own affairs. There are also dependent territories which are ruled, partly or entirely, by governments in other lands. A new kind of independent State is to be found in the Dominions of the Commonwealth. India has become a republic, and Pakistan and Ceylon have become Dominions since 1945, for example, and probably other parts of the British Empire will obtain similar independence in the future. This is interesting because it seems that people everywhere wish to be independent and to manage their affairs in their own way.

Our atlases contain political maps which show how the world is divided into States. The countries are usually marked in different colours so that we can see how many States there are and that they vary greatly in size and position. The largest are the U.S.S.R. and the U.S.A. Although some of them, such as the United Kingdom, Holland and Belgium are small, they are nevertheless important in world affairs. Europe, excluding the U.S.S.R., is divided into more States that any other continent, whereas the whole of Australia forms one Dominion of the Commonwealth.

Each independent State, large or small, rich or poor, kingdom or republic, has its own government whose main duty is to guard the interests of its people. This very difficult task is called administration and the people who are engaged in it belong to the administrative services. There are many branches of these services in all States. They are headed by ministries with headquarters in the capital city. Examples are the Ministries of War, Health, Labour, Transport and Inland Revenue (for Taxation). They employ many civil servants, either at their headquarters or elsewhere.

Furthermore, all States have what is called local government. They are divided into administrative areas such as the counties, boroughs, urban districts, rural districts and parishes of England. Each of these areas has its own council which looks after local

affairs. By means of central and local government, national and local matters are linked together and many of our activities are controlled by them. In some States, the officials of the government have wide powers, in others they are less important – but the numbers of people engaged in administration are increasing in all countries.

So far we have discussed the internal affairs of States, that is, those which are concerned only with the activities of the people who live in the country itself. All States, however, have connections with other countries. These are called international relations and they are attended to by the Foreign Office or Ministry of Foreign Affairs. These relations are extremely important even when the world is at peace but in times of war they have an even greater value. We have already seen that people in different parts of the world depend on each other for many things but these goods cannot be easily exchanged when international relations are not friendly. One of the greatest needs in the modern world is that all States should be 'good neighbours'. This is the best way to help the trade which keeps circulation going. Unfortunately, it is not easy for all countries to be good friends. All too often they are afraid of each other and have large armed forces in case war should break out. In the hope of getting rid of fear in the world men have set up international bodies to keep the peace and to prevent war. Their first great effort in this direction was the League of Nations which has now been replaced by the United Nations Organization (U.N.O.)

It would be a serious mistake to expect U.N.O. to settle all the world's problems in a short time. Nevertheless, it shows that we are learning the geographical lesson that the world is one in which we all have to live together. Some people think that there should be a kind of world government which would organize and look after international matters. A beginning has been made towards such a government, but if it is ever to be completed, a long period of time will probably be necessary before it is successfully established.

# INDEX


Abadan, 175, 210
Administrative services, 216
Africa, 2, 3 (fig.), 6, 7 (fig.), 17, 94, 98, 105, 106
Agrarian reform, 65
Agriculture, 12, 13, 15, 22–3, 31, 75: see also Plantation agriculture
Air transport, 38, 205–6, 208, 211
Alfalfa, 127
Algeria, 121, 122, 166
Alpine valley, 76–8
'Alps', 77, 78
Alps, The, 75, *et seq.*
Amazon Basin, 6, 94, 96
Americas, 2, 3 (fig.), 7 (fig.), 14
Animal-rearing, 55, 85, 86, 96, 98, 99: see also Sheep-farming, Cattle and cattle-raising
Antarctic region, 30, 84, 148
Anthracite, 156
Arable farming, 23–5, 47, 48, 51, 55, 67, 70, 71, 113, 117: see also Wheat farming
Arctic region, 84
Argentina, 55, 90
Asia, 2 3 (fig.), 4, 5, 7 (fig.), 17, 95, 176
Australasia, 2, 3 (fig.), 7 (fig.), 84, 215
Australia, 5, 12, 25, 26, 84, 85, 86, 90, 194, 210, 216
Austria, 75, 78, 81
Bahrein, 210, 211 (fig.)
Bananas, 101, 107
Banias, 210, 211 (fig.)
Basic slag, 163
Beef, 90
Belgium, 4, 10, 216
Belgium-Luxemburg, 192
Bessemer process of steel-making, 187, 188
Bituminous coal, 156
Black earth, 55
Blast-furnaces, 161, 162, 163, 188
Borneo, 177
Brazil, 105, 107
Britain: see Great Britain
British Columbia, 30, 134, 147–8
Builders, 41–2
Building materials, 42
Burma, 109, 110, 177
Butter, 78, 87, 91: see also Dairy-farming
Cable-ships and cables, 39, 208, 209
Cacao, 98
Canada, 4, 42, 55, *et seq.*, 134, 135, 136, 168, 176
Canal transport 203 204, 205
Cane-sugar, 107
Canterbury Plains, 86
Capital, 100, 143, 183
Capital cities, 11, 40, 216
Cargo liners, 201
Cattle, 26, 47, 48, 67, 72, 78. 85, 86, 91, 127: see also Dairy farming
Celerina, 76, 77, 79 (fig.), 80
Celery, 126–7
Censuses, 1, 20
Central Europe, 63–73
Ceylon, 114, 115, 216
Cheese, 78, 87, 91: see also Dairy-farming
Chemical industry, 33
China, 95, 109, 110, 111, 115, 119, 125, 128, 143, 153
Cinema, 39, 209
Civil service, 40, 216
Climate, Alps, 77; Continental, 54; Central Europe, 63; Desert, 120; Florida, 125–6; Monsoon lands, 95, 109, 114; Savana lands, 97; Sub-polar, 132; Temperate grasslands, 54; Tropical lands, 93, 94; Tundra, 133
Clydeside, 203
Coal and coal-mining, 150–60, 162, 188
Coconuts, 107
Coffee, 28, 100, 101; Plantation, 104–7
Coking coal, 156, 161
'Comet', 206, 208
Communications, 38–9, 199, *et seq.*, 206–12
Congo Basin, 6, 94
Coniferous forests: see Forests
Consdorf, 68, 69 (fig.), 70–1
Consett, 188, 189, 190
Continental climate, 54
Continental shelves, 29, 143, 146

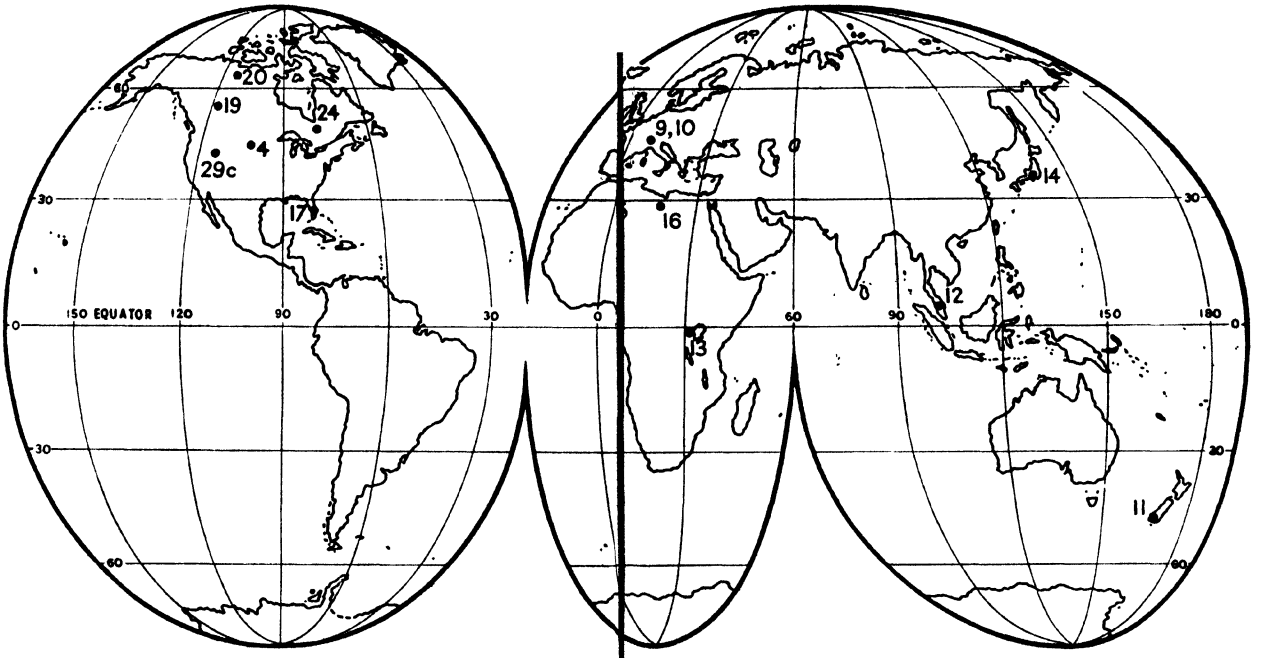
Copper, 137, 169
Cotton, 193, 194, 195–6, 197, 198
Dairy-farming, 26, 87, 91
Date-palms, 122
Deciduous forests: see Forests
Denmark, 26
Density of population: see Population
Deserts, 5, 6, 93, 94, 95, 119, 120–4
Distributive trades, 37–43, 199–212
Dogger Bank 143
Domestic industry 32
Domestic service, 41
Donbas coal-field, 158
Drifting (fishing), 146
Duisborg-Ruhrort, 205
East Anglia, 24
East Indies, 6, 94, 143
Egypt, 5, 13, 95, 119, 124, 125, 128
Electricity, 41, 81–2, 152, 194: see also Hydro-electricity
Engadin, 79, 80, 81 (fig.)
England, 27, 46–53, 158: see also Great Britain
Equatorial rain forest, 6 94, 95, 103: see also Forests, Tropical
Eskimos, 42
Europe, 2, 3 (fig.), 7 (fig.), 14, 26, 63–73, 143, 165, 175, 177, 192
Extensive farming, 13, 25, 61
Extractive industries, 150
Factories, 10, 34, 180, 193, 194: see also Manufacturing industries
Factory ships, 149
Far East, 4, 24, 109
Farming: see Agriculture, Arable farming, Extensive farming, Intensive farming, Ley farming, Mixed farming, Pastoral farming, Peasant farming
Farms, Types of, 46, 57, 58, 64, 67
Fields, Types of, 47, 51, 57 (fig.), 58, 70
Finland, 26
Fishing, 29–30, 141–9; Commercial, 143–9; Subsistence, 142–3
Fixed industries, 33
Florida, 125–7
Food, 16–20
Food production, 2, 23, 26, 31, 98, 110, 114, 128
Forestry, 28–9, 75, 129–39
Forests, Mixed temperate, 130; Temperate, 28, 29, 63, 129–30, *et seq.*; Temperate coniferous, 28, 130, *et seq.*; Temperate deciduous, 52, 130, 131, 137; Tropical 28–9, 103, 129: see also Equatorial rain forest
France, 35, 122, 142, 191, 192, 197
Fur-trapping, 133, 134–7
Ganges, 4, 109, 124
Gasification, 158
Germany, 10, 13, 35, 64, 67, 153, 160, 184, 185, 189, 192, 197
Ghardaia, 120, 121 (fig.), 122
Glaciers, 76
Goats, 26
Godshill, 14 (fig.), 50–3
Gold, 137, 169
Grand Banks, 146
Grapefruit, 127
Grasslands, 25, 44, 54, *et seq.*, 90; Tropical, see Savana
Great Britain, 1, 10, 12, 17, 18, 19, 22, 24, 35, 37, 48–9, 89, 91, 111, 115, 143, 145, 148, 151, 152, 153, 155, 162, 166, 176, 178, 181, 184, 185, 186, 190–1, 192, 194, 197, 200, 203, 216
Great Lakes, 155, 166, 168
Great Slave Lake, 135, 136
Grimsby, 145
Gulf Stream, 146
Hardwoods, 130
Heavy industry, 33, 34, 35, 181, 186
Himalayas, 109
Hudson's Bay Company, 135
Hull, 146
Hwang-ho, 4, 109
Hydro-electricity, 41, 81, 125, 134, 194, 203
Illinois, 168
India, 13, 95, 109, 110, 114, 115, 119, 125, 128, 207, 216
Indo-China, 109
Indus, 124
Industrial Revolution, 32, 35, 162
Intensive farming, 12, 24–5, 61, 71, 110, 125, 128
Internal-combustion engine, 38, 171, 179 204
Iowa, 57–60
Iran: see Persia
Iraq, 176, 210
Ireland, 142
Iron and iron-ore, 161–70: see also Steel and steel industry
Iron, content, 161; mining, 166–8
Iron and steel industry, 33, 34: see also Steel industry
Iron and steel works, location of, 316
Irrigation, 5, 113; farming, 116–28
Italy, 5
Japan, 109, 111–16, 143, 147, 148, 184, 185, 194, 197
Kalahari desert, 6

Kenya, 107
Kirkuk, 210, 211 (fig.)
*Kolkhoz*, 25
Kuwait, 210, 211 (fig.)
Kuzbas, 155
Kyushu, 111–16
Labour, for textile industry, 194; supply, 183
Labrador current, 146
Lake Superior, 167, 168
Lamb, 89, 90
Lancashire, 195, 196, 197
Land hemisphere, 84
Land transport, 203–5
Land Utilisation Survey, 49
Latex, 103
Laurentian Shield, 137, 168, 169
Ley farming, 47–8
Libya, 122
Light industries, 33–4, 35, 41, 181
Lignite, 159–60
Lincolnshire, 167, 168
Linen, 197
Liners, 201
Lorraine, 167
Lucerne: see Alfalfa
Lumbering, 68–71
Luxemburg, 68–71
Maize, 56, 114
Malaya, 98, 102, 103, 104, 109
Manufacturing industries, 32–6, 43, 45 180–5
Margam, 192
Market-gardening, 24, 46, 126
Markets, 10, 183–4
Mass production, 180–1
Meat production, 86, 87, 89, 90
Mediterranean lands, 24, 26, 119, 127–8
Middle East, 30, 176, 177, 210, 211, 212
Millet, 114
Mineral oil, 171–2, 173
Minerals, 30, 150, 151, 170
Miners, Coal-, work of, 158–9
Mining, 5, 30–1, 137
Mining, Coal, 150–60; Iron, 161–70
Mining villages, 158
Mixed farming, 27, 46, 85
Mixed temperate forests: see Forests
Mobile industries: see Light industries
Monoculture, 101
Monsoon climate, 95, 109, 114; lands, 109–16
Muskeg, 133, 136
Mutton, 89, 90, 91
Netherlands, 10, 216
Newfoundland, 134, 143, 146
New Zealand, 5, 25, 26, 84–91, 194
Nickel, 137
Nigeria, 98
Nile, 124
Nile valley, 5
Nomadism, 26, 97
Noranda, 168–70
North America, 13, 17, 18, 24, 25, 26, 54, 55, 56, 131, 176, 177: see also Canada, U.S.A.
Northamptonshire, 167, 168
North Western Territories, 135
Norway, 30, 142, 148
Oasis irrigation, 119, 120–4
Oil, from fish, 149
Oil: see Petroleum, Mineral oil
Oilfields, 173, 174 (fig.)
Oil fuel, 155, 173, 178
Oil palms, 107
Opencast coal-mining, 157; iron-mining, 166, 167
Open-hearth process of steel-making, 187, 188
Pakistan, 109, 125, 216
Palm-oil, 100
Pampas, 55
Pastoral farming, 25–7
Pastoralism, 85, *et seq.*
Peasant farmers, 64–73, 110, 111; Alpine, 75–83
Peasant villages, 66 (fig.), 67–71
Peat, 160
Pennsylvania, 166, 168
Persia (Iran), 175, 176, 177, 210
Petrol, 178, 179
Petroleum, 30, 171–9, 202, 210–12
Pig-iron, 162, 163, 187, 188
Pipelines, 210, 221
Plains, 4, 54, 63, 109
Plankton, 141, 142, 143
Plantation agriculture, 27–8, 100–8
Poland, 64
Population, 1–7, 34–5; Density of, 2–6, 168, 189; Active and inactive, 20; Japan, 111, 116; Rural, 9, 12–15; Tundra, 133; World, 1–2, 44, 95
Ports, 11
Postal services, 206, 207–8, 238
Power and power supply, 32, 152, 183, 193, 194
Prairies and prairie farming, 13, 25, 27, 54–62
Preston, 195–6
Primary production, 22, 43, 45, 150
Qatar, 210, 211 (fig.)
Quebec, 134

Radar, 206, 209
Radio, 39, 207, 209, 210
Railways, 38, 61, 83, 145, 203, 204
Rainfall, Central Europe, 63; Monsoon lands, 109; Temperate grasslands, 54, 55; Tropical lands, 93, 94
Rain Forest: see Equatorial rain forest
Raw materials, 22, 118, 180, 181, 194
Rayon, 197
Re-afforestation, 29, 137, 139
Refineries, Oil, 173, 211
Refrigeration, 89, 90, 91, 146
Regions, 215–16
Rice production, 113–14
River transport, 203, 204, 205
Road transport, 200, 203
Roads, 52, 58, 59, 122, 203
Romans, 10, 91
Rotation of crops, 47
Rubber, 28, 98, 100, 101, 102–4; Plantation, 102 (fig.), 102–4; Artificial, 104
Ruhr, 189, 190
Rural population, 9, 12–15
Sahara desert, 6, 94, 120, 122, 126
Salmon-fishing, 147–8
Salt-fish, 146
Savana lands, 94, 96–9, 104, 105, 106, 107
Scotland, 142, 158
Sea transport, 200–3
Services, 39–42, 43
Sheep-farming, 26, 85–91
Sheep-runs, 87
Sheffield, 187
Shelter, 16–20, 42, 193
Shifting cultivation, 23, 27–8, 96–7, 100
Ships, 38, 61, 200–3
Siam, 109
Silk, 193, 197
Softwoods, 132, 133
Soil erosion, 25, 29, 60, 97
Soil fertility, 23, 60, 71, 97
Soils, 55, 107, 118
South Africa, 5
South America, 5, 6, 17, 55, 94
South-east Asia, 24, 95, 98, 109
South Wales, 34, 192
Soviet Union: see U.S.S.R.
*Sovkhozy*, 49
Spain, 166, 188
Spices, 108
Spring wheat region, 56–60
Standards of living, 18–19
States, 11, 215–17
Steel, 162, 163, 165; Alloys, 186–7; Distribution by industry, 190–1; Industry, 186–92
Steppes, 55
Strip system, 13, 70, 71, 72, 110, 114
Subsistence farming, 25, 80, 95, 96, 98, 111, 116, 122, 127; Fishing, 142–3
Sumatra, 103, 104, 177
Sweden, 134, 166, 188
Switzerland, 75–83
Tanganyika, 107
Tankers, 172, 178, 202
Tea, 114–15
Telecommunications, 206–8
Telegraphy, 39, 206, 208
Telephones, 39, 206, 207, 208, 212
Television, 39, 207
Temperate forests: see Forests
Temperate lands, 5, 84, 85, 93, 130, 142; Grasslands, see Grasslands
Temperature, grasslands, 54; Tropical lands, 93
Terracing, 110, 113, 114
Textile industry, 33, 34–5, 193–8
Tigris-Euphrates, 124
Timber, 29, 77, 112, 132, 133, 134, 137–9: see also Forestry
Tourist industry, 80, 82, 83
Towns, 9–10, 11–12, 14, 33, 35, 39, 168, 183, 184, 195
Trade, 10–11, 16–17, 18, 19, 37, 166, 177, 194, 200
Tramp steamers, 201
Transhumance, 78, 80
Transport and transport workers, 37–8 61, 145, 161, 163, 166, 172, 181, 183, 199–206, 214
Trans-Siberian Railway, 155
Trappers, 135, 136: see also Fur-trapping
Trawling, 146
Tropical deserts: see Deserts
Tropical forests: see Forests
Tropical grasslands: see Savana lands
Tropical lands, 5–6, 93–108
Truck farming: see Market-gardening
Tsetse fly, 99
Tundra, 133
Tunisia, 122
Tyneside, 203
Tyrol, 75
Uganda, 105, 106, 107
Ukraine, 5, 55
United Kingdom: see Great Britain
United Nations Organization, 217
Ural mountains, 5
Urban population, 9–12

U.S.A., 4, 10, 17, 19, 26, 31, 35, 36, 55, *et seq.*, 125, 126, 148, 151, 153, 155, 157, 165, 166, 167, 172, 176, 178, 181, 184, 185, 190–1, 192, 194, 197, 204, 207, 216
U.S.S.R., 2, 3 (fig.), 5, 7 (fig.), 12, 17, 25, 35, 49, 55, 128, 132, 153, 155, 158, 160, 166, 176, 184, 185, 191, 192, 216
Vegetation, 95; Central Europe, 63; Tropical lands, 93
Venezuela, 176
Villages, 13; Forest-clearing, 66 (fig.), 67, 68–9 (fig.). 70; In Japan, 115–16; Mining, 158; Southern England, 50–3
Wanaka, 87, 88, 90
Water cycle, 118–19
Water hemisphere, 84
Water services, 41
Western Europe, 4, 5, 17, 18, 24, 31, 36
Whaling, 30, 148
Wheat 24, 25, 56, 64, 114; Farming, 56–61
Winter wheat, 6
Wireless-telegraphy, 39, 206. 208–10
Women workers, 34, 194
Wood-pulp, 133, 134, 137, 197
Wool and woollen industry, 34–5, 87, 88, 89, 91, 193, 194, 197, 198
World population, 1–2, 44, 95
Yangtze-kiang, 4, 109
Yarmouth, 145
Yellowknife, 135

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*The World, showing approximate location of some of the places shown in photographs in this book* – As the scale of this map is very small, the places in England cannot be shown clearly, but they may be easily found in your atlas map. The small dots are *not* in proportion to the areas of the places which they represent. The numbers are those of the photographs in this book.