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PREFACE

THE development of the theory of natural regions is an indication of the rapid progress which the study of Geography has made in this country within recent years. The substitution of geographical for political units has not only imparted a new interest to the subject, but has given to it a new value. On the one hand, the gain to the student has been considerable. In the words of Professor Herbertson, to whom the whole theory owes so much, "not merely is time saved, but a more accurate knowledge of the world is gained, the memory is not burdened by such a plethora of place-names, the pupils can tell something of the shape of the lands, and of the circumstances of life in different parts of the Earth." On the other hand, the economist and the statesman may both benefit by a method which enables them to distinguish from one another regions in which the nature of the geographic control is essentially different.

Logically, no doubt, the theory of natural regions implies the treatment of the earth's surface quite independently of the political boundaries which may be traced upon it. But in Economic Geography, at least, there are certain reasons why such a course cannot be adopted. The economic development of a country is affected not only by the nature of the geographic control, but also by the political conditions which prevail. National boundaries cannot be ignored without, to some extent, losing sight of the interaction which takes place between man and his environment. In the following pages, therefore, I have endeavoured to divide the countries of the world into natural regions and to trace the influence of the geographical conditions of each upon the economic life of man within it. In some cases these regions are already well recognised; in others I have essayed a division, more or less tentative, of my own. But I have always been guided by what I conceive to be the necessity of taking all the geographical factors into consideration. The true natural region is a unit—physically, climatically, and biologically; and the ultimate task of the geographer is the recognition, classification, and examination of such units. On the other hand, the individual members of a group of units

are frequently so closely allied to one another by the dominating influence of one or more of the geographical factors, that in a general review of economic conditions they may be treated as together forming one natural region.

I have placed at the end of this book a list of the works to which I am mainly indebted. Mr. Chisholm's *Handbook of Commercial Geography* must be mentioned here. To it I am under a deep sense of obligation, as at every stage of my work it has been of the greatest assistance to me.

I have to express my thanks to the Oxford University Press for permission to reproduce their rainfall maps, which, I believe, will prove of value to students. Professor J. W. Gregory very kindly allowed me to make use of his map showing the geographical divisions of Australia.

Practically the whole of the book was read in proof by Dr. R. N. Rudmose Brown, of Sheffield University. My warmest thanks are due to him for much careful work and many valuable suggestions. In the compilation of statistics, in the correction of proofs, and in a number of other ways, great assistance has been given me by my wife.

J. McF.

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CHAPTER I

PHYSICAL CONDITIONS OF ECONOMIC ACTIVITY

ECONOMIC Geography may be defined as the study of the influence exerted upon the economic activities of man by his physical environment, and more especially by the form and structure of the surface of the land, the climatic conditions which prevail upon it, and the place relations in which its different regions stand to one another. These physical factors, it is true, do not determine absolutely the character of economic life, but they exercise a control over it which is more apparent, no doubt, in the earlier stages of human history, but which is no less real in advanced civilisations when man has learned to respond to his environment and to obtain from it an increased benefit.

In order to pursue a study of the character here indicated, it is necessary to have recourse to much information derived from other sciences. An appeal must be made to the geologist and geomorphologist for many facts regarding the structure and formation of the surface of the earth; from the metallurgist and the mining engineer must be obtained some knowledge of the value of minerals and fuels accessible to man; the general principles determining climate must be accepted from the meteorologist; while the botanist and the agricultural chemist must supply the necessary information regarding plant life. To the economic geographer belongs the task of correlating these different facts and estimating their influence upon human activity. In the first place he has to show, among other things, how the distribution of soil and minerals is affected by the physical structure of the earth; how climate varies with position and configuration; and how vegetation is determined by climatic and edaphic environment. Secondly, he has to consider the extent to which man in his economic aspect is controlled by these various factors, and

how far he is able to free himself from their control and consciously to adapt himself to his environment.

From what has been said it is obvious that some knowledge is necessary, not only of the actual configuration of the surface of the land, but of the rocks of which it is composed, and even of the morphological processes by which its present form has been determined. The minerals which the rocks contain, the soils into which they weather down, and the different types of land form which they constitute, each with its own potentialities for settlement and development, must all be taken into consideration.

Rocks may be classified as igneous, sedimentary, and metamorphic. Igneous rocks have been formed by the cooling and solidification of molten matter, and, while some may have formed part of the original surface of the earth, others belong to more recent times, as is testified by their occurrence among the sedimentary strata. The latter have been formed by the deposition or precipitation of matter derived from pre-existing rocks; they include conglomerates, sandstones, limestones, and shales. Metamorphic rocks are derived from igneous or sedimentary rocks, which, owing to great pressure, heat, or other causes, have entirely lost their original characteristics. Marble, for example, is limestone which has been metamorphosed by heat.

The oldest known rocks are called Archæan, a term which, although it is now being restricted to the earliest formations, has hitherto been applied to all of pre-Cambrian times. These rocks vary in structure, the oldest consisting of schists and granites, while the more recent are of metamorphosed and in places of unaltered sedimentary material. They weather slowly and frequently have but a scanty covering of soil. On the other hand, they sometimes contain great mineral wealth, as in North America, where the richest iron ores of the continent are found within the Archæan area. In some regions, also, and more especially where there are intrusive igneous rocks, valuable deposits of the precious metals occur.

The Palæozoic rocks are of sedimentary origin (though they have also been subject in numerous instances to metamorphic action), and contain great deposits of minerals of economic value. In the Cambrian rocks of North America gold is found, while in the lower Silurian strata of the same continent there are large

quantities of oil and natural gas, both of which are believed to be due to organic matter included in the rocks at the time of their deposition. Where the metamorphosed Devonian rock of Europe is in contact with intrusive igneous rocks, iron, tin, and copper are frequently found. The Carboniferous period saw the deposition of the great coal measures of the world. In the lower Carboniferous rocks of Scotland and of Russia, coal is found; but it is in the upper Carboniferous formations that the more important coalfields of Europe and eastern North America occur. Iron is also frequently present in the same formations. The Permian beds in many parts of the world contain large deposits of salt; the upper Permian, for example, contain the thickest layers of that mineral in Europe, Copper and coal are sometimes also found.

The Mesozoic or Secondary strata (Triassic, Jurassic, and Cretaceous) are less valuable on the whole with regard to the economic minerals which they contain, but more valuable in respect of the soils into which they weather. In the Triassic rocks, coal and salt are found in different parts of the world. The metamorphosed Jurassic rocks of California are gold-bearing, while the unaltered Jurassic formations, outside of North America, contain more coal than any other formation except the Carboniferous. In North America, on the other hand, the Cretaceous regions of the west are the most productive in coal, and contain large supplies of a lignitic character. Iron is found in the Jurassic oolites of England and Europe.

The Cainozoic era is divided into the Tertiary and Quaternary periods. During the first of these, important changes took place in the form of the land and the great mountain ranges of the globe were upraised. Volcanic outpourings on a large scale also occurred in different parts of the world at this time. The mineral wealth of the sedimentary rocks formed during the Tertiary period is not very great, but coal is found in those of Washington and Alaska, in parts of Europe, and in Japan. Oil occurs in similar formations in Europe and North America, and amber in North Germany. The Quaternary period is of most importance in relation to the influence upon soil of the ice-sheet which extended over considerable areas of Europe and North America. This will be discussed later.

The above account of the distribution of economic minerals in

rocks of different geological periods must not be considered as exhaustive, and numerous other instances will be referred to in the course of the present work. It is essential, however, that the student should from the beginning realise the importance of the geological factor in economic geography, and it is for this reason that these illustrations have been given.

The physical and chemical properties of the soil vary according to the composition of the rocks from which they are derived, and these variations affect its fertility and suitability for vegetation. On the whole, crystalline rocks such as gneiss do not provide a suitable environment for plant life. The soils derived from them are often thin, as they weather slowly, and they are usually wanting in lime and other constituents of fertility. Granites, also, though rich in phosphates, are often poor in lime, and do not, as a rule, form a fertile soil. On the other hand, some eruptive rocks are very productive, as they may contain both lime and phosphates, and are at the same time retentive of moisture. Basalt, for example, often weathers freely, and responds readily to good cultivation. Of the soils formed from sedimentary rocks those derived from limestone are generally fertile, as potash is in many cases present in addition to lime. That " a limestone country is a rich country " may be illustrated by reference to the blue-grass region of Kentucky; but in some districts, more especially in upland regions, the soil is very thin and cultivation is impossible. Sandstone soils vary greatly in character. Much depends upon the nature of the cementing material which holds the grains of sandstone together. If it happens to be lime, the soil may be fertile, but, if lime is absent and the cementing material is siliceous, the sandstone will disintegrate into a poor and infertile soil. On the Bunter Sandstone of Germany a forest vegetation alone is possible, while some of the richest soils of Great Britain are upon the Old Red Sandstone. The intermixture of the débris of different kinds of rock frequently leads to a soil of great fertility. Thus the alluvial soils deposited by rivers on their flood plains, and at their deltas, are often among the most productive. Many glacial soils are fertile for the same reason, though it must not be assumed that all are so. Much depends upon the source from which the rock waste comes, and the conditions under which it is deposited.

A knowledge of the morphological processes determining the

physical evolution of a region frequently throws much light upon its economic development. The folded mountain ranges of the world are generally higher than its dissected plateaus, their geological structure and river systems are different, and they exercise an influence peculiarly their own upon human progress. Plains of accumulation, again, are not the same as plains of denudation. In the one the strata are generally weak and unconsolidated, and minerals are usually, though not always, wanting; in the other the rocks are hard and consolidated, and great mineral wealth may exist. The plain of Western Siberia is an example of the first type, and that of Central Russia of the second. The value of rivers to man varies with the stage of development at which they have arrived. A river in early youth, descending from a mountain range, is generally useless for navigation, though it may be productive of much water-power. On the other hand, a river which has reached maturity, such as the Lower Mississippi, is navigable, but is without surplus energy. A transverse valley again tends to be narrow and to have steep sides, while a longitudinal valley is broad and suitable for settlement. Changes in the relative level of land and sea have had important economic results. When the land has sunk relatively to the sea, river mouths have often been drowned, and good harbours formed, as was the case along the coast of New England. Further south, along the Atlantic seaboard, the land has risen, and good harbours are few and far between. The processes which led to the formation of the continental shelf, upon which the British Isles stand, account for the fishing industry of these islands, and for the high tides which have played so important a part in the development of their ports.

Many other instances of the importance of a knowledge of morphological structure might be adduced, but these will suffice to show that in order to understand the present it is frequently necessary to appeal to the past.