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COMMERCIAL GEOGRAPHY

BY

MARION I. NEWBIGIN,
D.Sc. (LOND.), F.R.G.S.

Author of

*Modern Geography, Geographical Aspects of Balkan
Problems, Frequented Ways, etc.*

Editor of

Scottish Geographical Magazine

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Commercial Geography

CHAPTER I

SOME FIRST PRINCIPLES

COMMERCE, as we all know, means the interchange of commodities, and at first sight it may not be perfectly apparent what geography has to do with such interchange. But a moment's reflection will convince us that before it can take place there must be a difference in the productions of the regions which are trading with one another. If we could imagine a large area of the earth's surface perfectly uniform in relief, in climate, in soil, in the occupations of its inhabitants, in its relations to surrounding areas, then obviously within such a region all forms of trade would be impossible; for there could be nothing to serve as a basis of exchange. In other words, commerce depends ultimately

upon differences in the products of the various parts of the earth's surface, differences which find their explanation in geographical facts.

Let us take a very simple illustration. In the north of England the more or less barren Pennine upland separates from one another two lower areas in which fertile plains and river valleys occur. The upland is made of old, hard rocks, often limestones; over these the soil is, always thin, sometimes locally absent as in the limestone "deserts" of Ingleborough; surface water is often deficient in amount, owing to the presence of underground streams; the climate is relatively extreme. The net result of these geographical conditions is that the upland area is partly unutilised, partly pastoral, and yields also in certain localities minerals, notably lead, but not coal.

On the other hand the lowlands which bound the upland are sometimes rich in coal, sometimes have stretches of fertile soil, and are thus adapted in places for industry, elsewhere for agriculture. Throughout the extent of the central upland, both to the east and to the west, towns, villages and hamlets, which are virtually absent on the central hills, tend to occur at the margin, where

lowland meets upland. Some of these settlements have developed into large industrial towns, owing to the exploitation of the adjacent coalbeds; others are decaying agricultural villages. All were originally simple examples of the market town or village.

We may take as a type the little town of Appleby on the Eden. To this town on market days the inhabitants of the upland farms bring their produce, chiefly cheese, butter, eggs, poultry, with, at special times, the wool of their flocks and live stock. In the town they exchange these, virtually if not actually, for the flour, the fruit, the vegetables which result from the agriculture of the plain, the simple forms of implements which are locally produced, the more complicated industrial products of more distant regions, and now, though not in earlier days, for luxuries brought from afar. The town, which is the market, owes its origin to the junction of plain and upland; exchange is possible here, first because of the difference in the products of the two regions, and second because no unsurmountable transport difficulties intervene to prevent it.

Thus in this simple case the three elements which form the basis upon which commercial

geography is built are all present. We have first the difference in the products of two adjacent regions with which exchange originates; second, the physical possibility of communication between the two; third, the definite spot at which interchange takes place, that is the market. Commodities; transport; market, as involving the actual process of exchange—these are the three fundamental conceptions upon which commercial geography is based.

The commodities produced in the different parts of the earth's surface, the road by which these may be conveyed—these are relatively simple notions. Somewhat more complex is the third element, that actual process of exchange which we visualise as the market. The example chosen above has the disadvantage that the region forms part of a country which has been long civilised. If we trace the fortunes of the town of Appleby backward through the centuries, we find that the darkness deepens before we come to a period when exchange did not exist. Thus the illustration tells us little of the origin of the impulse which first led men to trade. By its very familiarity also it tends to obscure the fact that a certain

measure of civilisation is necessary before steady interchange can go on, and further that trade, once established, tends to develop civilisation. Let us, therefore, take another illustration which may help to make this point clearer.

The forest tribes of equatorial Africa, notably the Congo pygmies, exhibit a strong—and still largely unsatisfied—desire for salt and for iron and iron objects. Such products are obtainable in regions not far off, as the modern world counts space, and not separated from the forest area by any insuperable obstacle. But though the pygmies show keenness to satisfy their desire, within the limits set by their incapacity for sustained effort in any direction, they have not sufficient steadfastness of purpose to strive continuously to overcome the difficulties involved, as the navigators of fifteenth-century Europe strove ceaselessly to overcome the far greater difficulties which stood between them and the pepper and spices of the East.

Once again, the pygmies up to, apparently, a very recent period, found in the forest all that they needed. Their hunting gave them animal food, the fruits, nuts, and roots of the forest supplied the necessary vegetable

matter. But they are now beginning to find that the bananas and sweet potatoes, grown by the agricultural tribes on the outskirts of the forest, are far more satisfying than the forest produce, and these agricultural tribes in their turn are eager for their surplus meat, and, under European influence, very eager for their ivory. Thus there exist the beginnings, the unsystematised beginnings, of a trade between the agriculturists and the pygmies, a trade which gives to each luxuries which have not as yet become necessities. Such a trade is not likely to reach great importance, for neither party can in the general case produce any considerable surplus for trade. The illustration may serve to show that the commercial geographer cannot limit himself to the three prime conceptions of commodities, transport and exchange in the limited sense. The extent to which different human groups are organised, their capacity for production, their powers of concentration, their social and industrial traditions, are all of great importance, and must come within his survey.

It is this fact which redeems the subject from pettiness, and makes it worthy of the attention of the student and the philosopher.

The cynic may say that it is an ignoble thought that the discovery of America, with all its myriad consequences to the human race, came about fundamentally through the desire of the European for cheap pepper. But a saner thinker would point out that it matters little what is the lure which leads man on in the first instance. Whatever the motives with which he began, in the end he discovered not only America but within himself the power—absent apparently in the ape, latent in the savage and the young child among civilised people—of carrying through a set purpose despite all difficulties in the way. Man has made trade, but trade has also helped to make him more truly man, and thus cannot be neglected by the student of humanity.

Again, if the significance of the last example has been clearly grasped, one main cause of the origin of trade will be obvious. It is clear that it tends to originate in luxuries, purchased by means of a local surplus of necessities. The pygmy could not live unless the forest supplied all his needs, and it must always be so with primitive peoples. To take another illustration—we read that the great king Solomon obtained from Hiram of

Tyre "cedar trees out of Lebanon," and also "great stones, costly stones, and hewed stones, to lay the foundations of the house," and he gave in return "twenty thousand measures of wheat, for food to his household, and twenty measures of pure oil." In other words, Solomon's greatness consisted in the fact that his people were able to produce a surplus of food stuffs after their own needs were satisfied, and with this surplus luxuries, on a previously unknown scale, could be bought from an adjacent region.

In such a fashion trade must always begin, but we should note that its effect, when well established, is to smooth out these very inequalities to which it owed its first origin. The negro on the borders of the African forest is largely, if not exclusively, vegetarian, and lives upon the products of his plantations. The pygmy lives upon the natural yield of the forest. When interchange begins the diet of the two tends to approximate. While Solomon lives, and his country prospers, gold is nothing accounted for, though there was none in his dominions, and those ships which brought "gold and silver, ivory, apes and peacocks," took back, we may be sure, such loads of wheat and pure oil, that they also

were as naught in the countries with which the great king traded.

The same thing happens, but to a much greater degree, in modern times. As commerce develops the material basis of life tends more and more to approximate in all the trading countries, and what were once luxuries speedily became necessities. Perhaps this may seem a gloomy thought, and raise visions of a world where life has everywhere lost relation to local conditions, where everyone wears similar cotton clothes, eats bread made of American wheat, and meat from the world's great savannas, uses similar machines, and lives in the same kind of house. But we have to remember that the process of smoothing out natural inequalities is never more than partial, local conditions continuing to exert their influence, and, especially, that civilised man is enormously affected by his social and literary traditions, which, though they originate as the result of a special environment, have yet great powers of survival under changed surroundings.

With these preliminary considerations in mind we may now proceed to discuss the exact meaning of the term commercial geography, and the best methods of studying

the subject. In the volume of this series entitled *Modern Geography*, it was stated that the aim of the general subject was to discuss the surface relief of the earth, and the influence which this relief has upon the distribution of other phenomena, especially upon the life of man. In other words scientific geography begins with the physical aspect of the surface of the earth, but keeps always in view the effect of the conditions described upon the life of man. That special branch of the general subject which we call commercial geography, on the other hand, begins with one aspect of man's activities, the economic one, and studies this in relation to local conditions and place relations. The general subject begins with the earth and leads upwards to man; the sub-division discusses the relation between man's commercial activities and earth form and structure.

As we have seen, the first effect of local conditions on commerce is that they lead to local differences in production. The influence of local relief, structure, and climate may be direct. Thus certain shallow seas are rich in food fishes, while deep seas are usually poor in these; mountain slopes up to a certain elevation are generally forest-

covered, while above this level there are no trees ; useful minerals tend to occur in certain special types of rocks, or under particular conditions of climate, as nitrate of soda in deserts. In other cases the influence of the natural conditions acts, not directly, but through man. For example, the potato plant arose in nature in response to a particular set of conditions of climate and relief, but owing to man's skill and ingenuity it can be grown with success in regions far removed, both in space and character, from those in which it occurred originally. Generally we shall find, with certain exceptions, of which minerals, marine products and the yield of forests are the most important, that the commodities upon which world trade depends are due rather to man's activities than directly to the natural conditions. Thus it is the effect of these conditions upon man's activities which is the most important point for us.

Once again, local conditions and place relations have very great influence upon the question of transport. Water carriage is cheaper than land carriage ; constant winds are, or have been, of much value in driving certain types of vessels ; moving water

affords a direct means of transport : such facts as these have exerted great influence upon industrial development, especially in the period before the great development of machinery. Their result is to make the distribution of land and water, the nature of the water surfaces, the relief of the land, supremely important in commercial geography.

The effect of relief and its consequences upon the actual process of exchange is far less obvious, but, on the other hand, the position of the market, as the point at which interchange takes place, is greatly affected by the physical conditions.

But if in this way the production of commodities, their transport, and the site of the market are all influenced by physical conditions, it would seem as if, to be logical, our study of commercial geography should begin with a general survey of the physical geography of the earth. Such a course is, however, never adopted in books on the subject, and that for reasons partly of convenience, and partly of method. In the first place we have to note that whole areas of the earth's surface are of no practical importance to the commercial geographer, even though their

theoretical interest may be very great. The vast ice-covered wastes near the Poles have for him only the negative interest that lines of transport tend to avoid them. The dark, chill ocean depths, with their strange inhabitants and their beds of ooze, only affect him because the cables which link together the commercial countries may have to be laid across their floor. The lofty mountain chains, which to the geographer proper present so many problems of profound interest, are for the economist but obstacles tending to interfere with commerce, obstacles to be overcome or avoided.

Further, for a very practical reason, political divisions count for more in commercial geography than physical ones. There is great similarity in relief, in climate, in productions, between parts of the plains of the United States and the adjacent plains of Canada. Thus the physical geographer would be tempted to classify the two together. But the economist knows that the illogically straight boundary-line on the political map means that statistics in regard to one part of the plains must be looked for in one set of publications, and in regard to the other section in a set published in a different town,

and arranged in a different fashion. Naturally therefore for him geographical logic has to yield place to practical convenience. Thus it is usual to find at least the greater part of books on commercial geography devoted to a consideration of the countries of the world, classified according to political divisions.

On the other hand, although the fact that only certain parts of the earth are of importance in commercial geography make it impossible to discuss its relief as a whole in books devoted to the subject, yet the circumstance that almost all man's activities are more or less affected by climate, makes it of great economic significance. Thus most commercial geographers, abandoning the dictates of strict logic, give in their books a longer or shorter treatment of climate, considered purely from the physical geographer's standpoint. The space available here renders all such excursions impossible; the particular one is the less necessary as the essential facts will be found in the late Prof. H. N. Dickson's companion volume on *Climate and Weather*.

Limits of space render it impossible to consider in detail here even the chief commercial countries of the world. What it is proposed to do is to study first of all some

typical commodities, in relation to the geographical conditions under which they are produced. Next we shall discuss the question of transport, that is the road along which the commodities are conveyed, and the methods by which the movement is effected. Finally, we shall take one or two representative communities to illustrate the conditions under which the production and exchange of commodities actually occur.

This arrangement necessitates in the first place some form of classification of commodities, for a mere dictionary list would avail us little. For our purpose the following simple arrangement may suffice :—

(1) Certain commodities owe their origin to causes wholly beyond man's control, and are independent of the ordinary process of growth and reproduction. To these the term minerals in the wide sense is applied. As thus used the word not only includes water and ice, as it does also for the geologist, but also what the geologist calls rocks, a term which, it will be remembered, includes clay and sand, as well as the rocks of ordinary speech. Such products cannot be renewed when once exhausted. In commercial geography, in the general case, the conditions

under which the minerals occur is of as much importance as the mere fact of their occurrence.

(2) Other products are due to the ordinary process of growth and reproduction, uncontrolled by man. Here are included forest products, fishery products, furs of wild animals, and so on. It has been found by experience that natural processes of reproduction are incapable of keeping pace with man's destructiveness, so that such "natural" commodities are always tending to diminish in amount, and to be replaced in the markets of the world by those due to man's activities. Thus the primeval forest yields place to woodland; wild rubber is replaced by plantation rubber; fur-bearing animals are bred in captivity.

(3) More important than either of the above are the animal and vegetable products due to natural processes of reproduction, controlled and aided by man. Thus a very large proportion of the commodities which enter into world trade are due to the industries of agriculture and stock-rearing.

(4) Finally raw material formed in any one of the three foregoing ways may be utilised by man to produce manufactured articles,

whose value lies in the skill and ingenuity with which they are constructed, or their cheapness as compared with natural products, as in such cases as artificial silk or synthetic dyes.

We shall begin our general survey of the commodities of commerce by a consideration of some of the products of agriculture and stock-rearing, for this will enable us to study the more striking effects of the control exercised on man's activities by climate and relief. Before doing this one further word may be added on products in their relation to trade. We have said that trade always tends to begin with articles which are luxuries to the recipient. Not till much later do we reach the stage where trade is carried on in necessities. But we should perhaps add that it is one of man's peculiarities that almost no human group is totally without luxuries.

Fundamentally it may be said that man's prime needs are food, shelter, generally clothing in some form, fuel, tools and implements or weapons. But on the other hand we have to remember that not at every moment of his existence does he want all of these; there are moments when none is essential. It is a paradox, but not without its importance that his demand for luxuries

is at times more clamant than that for necessities. The striving after the satisfaction which luxuries bring has, we may repeat, initiated trade, and has also initiated and maintained civilisation.

But we must be careful not to exaggerate. Trade, from one point of view, originates in certain distinctively human attributes, and tends to increase as human groups become more stable and more complex. On the other hand it is obvious that we cannot measure civilisation by volume of trade. It could hardly be maintained that, on the whole, Chicago, a great trading town, is more civilised than was ancient Athens. Trade tends to develop with civilisation, but its volume depends not directly upon the degree of civilisation but upon human capacity to increase production, and to overcome the difficulties of transport. The enormous development of commerce which the world has seen in the last hundred years has been due first to increased production, partly owing to the tapping of the resources of hitherto almost unutilised lands, and partly owing to improved methods, especially the elaboration of machinery and the use of the energy of steam or of electric power to drive it. It has also

been due, perhaps to an even greater degree, to the vast improvement in modes of transport, without which increased production would tend merely to glut the local market. It is to these two subjects that we must devote most space here, and we may close this chapter by repeating that while the impulse which starts trade is the desire for luxuries, it can only be maintained where a local surplus can be continuously produced, and as continuously conveyed to regions having need of it.

CHAPTER II

EXAMPLES OF AGRICULTURAL PRODUCTS

(1) THE CEREALS

It was pointed out in the previous chapter that the cultivation of plants is one great source of the commodities which are the object of world trade. Now, fundamentally, the fact that agriculture usually leaves a surplus for trade after the needs of the producer are satisfied is due to the power which the green plant possesses of building up living matter, if supplied with air, sunshine, water and certain mineral salts. (See Prof. T. B. Farmer's *Plant Life* in this Library.) As is well-known, the plant is a chemical laboratory in which, by means of the energy of sunlight, simple and cheap substances, of some of which the supply is unlimited, are built up into complex and more costly ones. This is true alike of the cultivated and the wild plant, but the former is placed under specially favourable conditions

by man, is artificially protected in the struggle for existence, and in consequence shows the organism's power of growth and reproduction in a more highly developed degree than the wild product.

While this is true, however, we have to remember that it is only under certain special conditions that cultivated plants flourish to such an extent as to yield a large surplus when the demands of the cultivator and his household have been satisfied, and it is only when they do this that an extensive trade in agricultural produce can arise. Further, we have to realise that over considerable parts of the globe, including among them the most important agricultural areas, the climatic conditions suitable for plant growth and reproduction only exist during a part of the year. Thus in many climates the summer plenty has to be stored to meet the dearth of winter. In consequence the yield of the land must keep the cultivator not only during the working period, but also during the time when little work is possible; only after this has been done can he have a surplus for export. As his most productive crops may not be directly capable of storage, or may fail to meet all his demands, the question of the

possibility of exchange very greatly affects his capacity for great seasonal over-production. In point of fact the entrance of agricultural produce into the world market on the present gigantic scale is a phenomenon of recent development, and is directly dependent upon recent improvements in means of communication and methods of preservation.

The older type of agriculture was that which tended to produce all that was necessary for the sustenance of the farmer and his household throughout the year, and left relatively small amounts of surplus products available for trade. The newer type tends to specialise on crops for which the local conditions are particularly favourable, and to dispose of practically the whole yield, which thus forms what is called a money crop. Thus what we may describe as industrialised agriculture tends to be enormously productive, but can only be carried on when access to a market is easy. It is therefore far from universal at the present day, even in the civilised parts of the world. At the same time its development has had a very marked reflex effect on various parts of the civilised world, which, owing to unfavourable con-

ditions of surface, soil or climate, or the difficulty of access to markets, are unable to apply industrial methods. The cultivators in such regions, when they occur in crowded parts of the western world, as we shall see, are almost everywhere constrained either to give up tillage, or to take advantage of peculiar local conditions, of a tradition of skill and care, or of some other special circumstance to produce relatively small amounts of costly commodities, demanding much skilled labour, in contrast to the great bulk of cheaper ones produced by the regions where industrial agriculture reigns.

Thus we reach the conception of two main kinds of agriculture yielding products which enter into trade in the civilised—or perhaps we should say the commercialised—world, which means for the economic geographer the parts of the world in which transport is cheap and well-organised. These two kinds are (1) Industrial agriculture, which with the help of animals and machinery produces vast amounts of cheap and bulky commodities, and (2) Intensive agriculture, which needs trained cultivators and yields much smaller amounts of costly products. The wheat of the inland plains of Canada and the United

States; the wine, olive oil, fruits, and silk (as resulting from the growth of the mulberry) of the Mediterranean area, are typical products in the two cases.

It is not of course intended to maintain that the old self-sufficing type of agriculture has ceased to exist, even within the confines of the civilised world in its narrowest sense. There are groups and communities here and there still producing as few money crops as, for example, the farmer in Scotland did a hundred or more years ago. But the point is that such individuals or groups scarcely concern the commercial geographer at all, for their surplus is at best so insignificant that it does not count in the trade of the world.

If we extend our survey beyond the confines of the civilised world, we find that where means of transport are absent or very poor the cultivator tends again to be almost entirely self-supporting, and to have no considerable surplus for exchange, so that we may pass him by. Where, however, lines of communication are present, even in relatively un-specialised form, and the conditions are favourable to plant growth, then another form of agriculture tends to arise. This is (3) the Plantation System, in which com-

mercial products are grown on the large scale with the aid of cheap labour under skilled supervision. Since the cold parts of the earth's surface are usually unsuited for agriculture, and the temperate regions are generally devoted to the kinds already mentioned, there is a tendency for the plantation system to be limited to warm or tropical regions, though there is often an intermediate tract within which the methods of industrial agriculture and of the plantation system seem almost equally applicable, a fact well illustrated in the Southern United States. As a rule the plantation system tends to produce luxuries and minor articles of food, such as tea (in some cases), coffee, cocoa, bananas, and so forth, or the raw materials for manufacture, *e.g.* cotton, and rubber, all on the large scale. It is thus contrasted both with Industrial Agriculture, which in itself and owing to its association with domesticated animals tends to produce bulky and cheap food products, such as cereals and meat, and with intensive agriculture which, though it generally produces luxuries, yields those which demand care and skill, and cannot therefore be produced in large amount. Tea is rather an interesting example of a

product which has to a considerable extent been taken over by the plantation system from the Japanese and Chinese, who originally carried it on intensively.

The more important of the products of agriculture which enter into commerce are produced in one or other of the three ways which we have illustrated, and there are many curious instances, in addition to that just mentioned, of a commercial product passing from one class to another. Thus the issue of the conflict between cane sugar, produced in warm or hot climates by cheap, coloured labour, and beet sugar, produced in temperate ones by highly industrialised methods, is still uncertain, and has been rendered more so by the effects of the war. The issue in this case is complicated by the fact that machinery and modern scientific methods are being utilised for the production of sugar-cane in parts of the tropics. There is of course no reason to think that cheap labour will be permanently preferred in tropical regions to the use of machinery, and there is much to lead us to believe that the causes which have raised the price of labour in the temperate regions will also act, if more slowly, in tropical regions. At the same time the

simple classification given may aid us in considering briefly some of the commercial products of agriculture in their relation to modes of land utilisation.

If we sum up the essence of the foregoing paragraphs we may say that it is characteristic of the plant that it can convert substances useless to man into those of value to him. But in a state of nature the plant is subjected to a variety of checks which diminish its power of growth and reproduction. The object of agriculture is to minimise these checks in the case of certain special plants, and thus to increase the productive power of these. The result is that agriculture always tends to produce a surplus after the claims of the labour devoted to it have been satisfied. But before it can yield a surplus sufficiently extensive to maintain world trade the working capacity of the average individual must be greatly increased. This may be effected by the use of the strength of animals and the specialised human ingenuity expressed in machinery; this occurs in the case of industrialised agriculture. In this case the surplus represents the difference between the cost of breeding and feeding the animals and their capacity for work, or between the cost of

constructing and running the machinery and the amount of power which it produces.

Again, in certain localities the application of labour specially skilled in taking advantage of local conditions may produce commodities whose price remains high because of the limited distribution on the earth's surface of the favouring conditions, and of the particular tradition of skill; in this case the produce has a monopoly value. Finally, cheap labour can be so directed as to yield a large surplus which represents the difference between the demands of the skilled supervisor and those of his coolies, who take the place of the domestic animals and the machinery in the first case. The distribution of the first two types depends upon geographical causes which are likely to be more or less permanent. That of the third depends upon a human element which is capable of modification, and will probably undergo modification in the near future. Historically, the coolie making incisions in the bark of rubber plants, or hand-picking the leaves of the tea plant, is strictly comparable to the eighteenth-century European farm labourer laboriously cutting corn with a sickle, or the Hebrew of patriarchal Palestine threshing it

with flails ; all are examples of undeveloped methods.

Space does not permit us to consider here the methods and results of the different kinds of agriculture in any detail, but a consideration of a few representative products in each case will enable us to set forth the main outlines of the subject. In the case of industrial agriculture the cereals form so important a part of the total yield, and enter so largely into world commerce, both in themselves and in their products, that no excuse is needed for concentrating upon them. Among the temperate cereals wheat, especially, is grown on a gigantic scale, and to it we shall devote most of the remainder of this chapter, leaving the following one for a consideration of some of the products of intensive agriculture and of the plantation system.

Wheat is so important a product of industrial agriculture, that the question of the zone within which it may be grown is of significance as helping to define the area within which this type of agriculture may be practised. The geographical factors affecting its distribution are climate, soil, relief, and relation to lines of communication, natural

or artificial. The last factor exerts its influence in the general case over limited areas, determining, for instance which parts of an area otherwise suitable cannot be utilised for wheat-growing under existing conditions. As wheat is almost always collected by rail, the extension of railway lines in the wheat belt, or the construction of new lines, almost always leads to an increase in wheat acreage. Thus for our immediate purpose in this chapter this factor is a subsidiary one.

The general question of the climate suited for wheat is discussed in Prof. Dickson's *Climate and Weather*, but, from the standpoint of commercial geography, a considerable number of minor points have to be taken into account, of which perhaps the most interesting are that wheat on the large scale is not now grown in the climates best suited to the plant, and that while the acreage under wheat is often decreasing in the more suitable climates, great efforts are being made to extend it in regions much less suitable climatically. (This of course means that under existing conditions climate, within certain broad limits, is less important than other factors. The important factors are

indeed suitable soil and relief, and, especially, the existence of large areas of unutilised and cheap virgin land.

This does not imply that climate is ceasing to exert its influence. But it does mean that within certain ill-defined limits climatic disadvantages can be overcome, either by special methods of cultivation, or by the breeding of varieties of wheat differing considerably in their climatic requirements from those hitherto grown. Within recent years great attention has been given to this latter subject, with the result that the climatic zone of wheat has been greatly extended.

Let us note in a few words the chief climatic requirements of wheat as an economic plant. Like all cereals it is an annual, and it is grown primarily by man for the sake of the nutritious seeds. Among secondary products, however, it yields straw, generally of considerable importance owing to its use as bedding for animals, as well as for other purposes (paper making, etc.). In this connection the fact that wheat growing is almost everywhere associated with stock-keeping should be noted. The straw is of course the result of vegetative growth, the seed the result of the process of reproduction. As an

annual the wheat plant has a life-history divided into two sharply contrasted periods, the first being the vegetative and the second the reproductive. For straw production the vegetative period must be one in which there is abundant warmth, but not heat, and abundant moisture. But in order that seed formation may take place on the large scale vegetative growth must be checked at a certain period by a marked rise of temperature and a diminution of moisture. There is, however, more in the matter than this. The amount of seed produced depends upon the extent to which vegetative growth has been carried previously, and especially upon the degree of branching of the individual plants. Wheat only branches in the early stages of growth, and only when the temperature is moderate and moisture abundant. Thus the branching or "tillering," as it is called, is of great importance for the future harvest. If the vegetative period is shortened by an early access of heat and drought, the crop is thin and the yield small. On the other hand if abundant rain prolongs the vegetative period, little seed is set, the plant is very liable to be attacked by rust and other diseases, and the grain is of poor quality.

The net result is that the climate best suited to the wheat plant is that in which it has been grown from the dawn of history, that is the Mediterranean climate. In the zone in which this climate reigns the grain is sown in autumn, and germinates before winter. The mild moist winter season promotes tillering, and small amounts of frost check insect pests without injuring the young plant. The rapid diminution of rainfall in spring, the rise of temperature, the strong sunshine, promote the formation of good heads of grain, and harvesting is readily carried on in the drought of summer. In such a climate the harvest tends to be early, the date varying with the latitude and local climate.

Again, where the winter frosts are very severe but the springs moist and mild and the summers hot and dry, with a long fine autumn, wheat can be grown almost equally well, although it must be sown in spring. Further, if the ground is copiously covered with snow in winter, spring rains are scarcely necessary, for the melting snow supplies the necessary moisture. Much less suitable is a climate in which the winter shows an alternation of mild and cold spells, while the springs

are chilly. The result is that there is a tendency, well shown in the United States, for the zone in which winter-sown wheat is grown to be separated by a non-wheat producing area from that in which spring wheat is produced. Further, heavy summer rains form a great obstacle to wheat-growing; they render, for example, its production almost impossible on the western side of the Union of South Africa. In the same way a climate with continuous heat and moisture is quite nusuitable, so that wheat is excluded in the general case from equatorial regions, as indeed from the tropics with certain exceptions. Finally, want of water during the growing season is a great obstacle, but one which has been partially overcome in some places by special methods (dry farming), and by the use of stocks resistant to drought.

Thus if climate were the only factor to be considered we should expect to find a wheat belt stretching across the globe, on both sides of the equator, in temperate latitudes. Bearing in mind also the usual difference in climate between the eastern and western sides of continents, we should expect that the belt would, as lower latitudes are approached, thin away on the eastern side, where summer

rains tend to occur, and thicken on the western side where the Mediterranean climate with its summer drought prevails. This expectation is only partially fulfilled, and we must turn next to the other factors influencing distribution.

The first of these is soil. Wheat is a very exhausting crop, and requires rich soil. It is usually stated that a heavy loam or light clay is the most suitable, but the plant grows on a variety of soils. Owing to the amount of mineral constituents which it withdraws from the ground, wheat is only grown in old countries as one member of a rotation of crops, and requires heavy manuring. The fact that draught animals are required in ploughing, save in the comparatively rare cases where steam ploughs are employed, results in the crop being most profitable in such countries when carried on in connection with mixed farming. Other members of the rotation form fodder crops, leguminous plants being especially employed to improve the soil, and the manure obtained from the animals, mingled with the straw used in bedding, both restores the mineral matter removed by the growing plant, and keeps this in an open condition, favourable to the

action of the important soil bacteria. The result is that in old countries wheat has a high yield per acre, but what is called a small man-yield, or in other words the amount of human labour employed per acre is considerable.

Quite other are the conditions in new countries. In the plains of Canada and the United States, there are large tracts of virgin soil, which will yield comparatively heavy crops year after year, without rotation of crops, and without manuring. Such lands, which are often old lake beds, are very level, are devoid of trees, and lend themselves admirably to the use of machinery. Thus while the acre-yield is less than in the older countries, and tends to diminish rather than to increase, the man-yield is very high, for little labour need be employed. Under certain exceptional conditions of climate the reduction in the amount of necessary labour is extraordinary. Thus in Australia, where the straw has no value, and the climate makes the shocking of the grain unnecessary, the wheat is cut and threshed on the field by a machine called the combined harvester. This machine is driven through the standing corn, and delivers full bags of

threshed grain at a corner of the field, which only require to be sewn up before being sent to the market. One man can work the machine, with the assistance of a labourer to fetch and carry, and fifteen acres per day can be cut and bagged. With the aid of ploughs making many furrows at once it is estimated that one man can cultivate and sow 250 acres of corn in a season, and he only requires the assistance of a labourer and a boy for harvesting and threshing. By way of contrast it may be added that with the old sickle only $\frac{1}{4}$ of an acre of corn could be cut in a day by one man.

To put the matter in another way, while in 1830 it was calculated that in the United States 133 minutes of human labour were necessary to produce a bushel of wheat, in 1904 with modern machinery only 10 minutes were required. In those parts of the United States where, as in the Columbia valley and in California, the combined harvester and thresher can be used, it is calculated that when worked by steam, or by a team of 25 or 30 horses, no less than thirty acres can be harvested and the produce put into sacks in a day with one machine. It is thus easy to see where the surplus of which we have

already spoken comes from in this type of farming, and further how it is that a high yield per acre is not necessary for profitable farming, provided the climate and relief are such as to permit of these wholesale methods, and that land is cheap and plentiful.

The methods are especially applicable to treeless plains, such as tend to occur in the interior of continents. The treelessness means low rainfall, and often the possibility of drought, but it is in itself and in the associated climate so great an advantage in permitting the adoption of labour-saving methods, that the risks of small yields or even of occasional crop failure are worth taking.

The net result is that wheat as a local supply crop tends to be produced in old countries where rent is high, much labour is necessary, but where the yield is also high, and as an export crop in new countries where land is cheap, the climate often not very suitable, the yield low, but where labour-saving appliances can be applied on a gigantic scale, and where the soil has enormous reserves of fertility. But however great such reserves may be they are not unlimited, and the tendency is for the yield on the new lands to diminish steadily till it becomes apparent

that the fertility must be renewed by manuring, and preserved by a rotation of crops; this change is taking place rapidly in parts of the United States, and is leading to emigration from partially exhausted lands there to hitherto unutilised virgin tracts in Canada.

We must add to this general account a brief note on the chief wheat-growing and wheat-exporting countries of the world, and a few figures to illustrate the difference in yield in the two types of land.

In the pre-war period the United States took first place in wheat production, followed closely by Russia, the percentages of the world total being 18 p.c. and 17 p.c. in the two cases (3 years average 1909-11). In the States the most important wheat belt stretches from Texas northwards to the Dakotas and Minnesota, whence it extends beyond the international boundary into Canada. Beyond the arid area of the Great Basin we come upon another important wheat belt in Washington and California, where the climate is exceptionally favourable. In Russia the wheat-growing zone is in the south and east, the valley of the Volga being especially important. Both countries, in normal times, are large exporters, but while Russia exported

about one-quarter of her total harvest, her own people living largely on cheaper grains, such as rye, the United States exported less than one-sixth (average 1908-10), because her own industrial regions in the east take so much of the western product, and the export is diminishing with the increase of population. In neither of these two cases is the yield per acre high—about 14 bushels to the acre in 1909 in Russia, as against nearly 16 in the States.

India is the next large producer, her average in the three years 1909-11 being about half that of the United States. The crop is chiefly grown in the dry Indus valley, and is subject to considerable fluctuation. Countries like Canada and the Argentine, which bulk large in the popular estimation as wheat growers, are important rather because their crop is chiefly produced for export than because of its actual bulk. Thus Canada's total yield before the war was far less than that of France, but while France in most years imports some wheat, Canada exports about one-third of her entire crop, which she is able to do on account of her small population. Again, since we have said so much of the labour-saving methods used in the new

lands, it may be well to note such facts as that Belgium, with an insignificant total production, gets 40 bushels from every acre of wheat land (1909), while in the same year Canada only got 21,⁷ Australia 12, and the Argentine 10. The figures may serve to emphasise the statement already made that wheat for export is a product of cheap land on which labour-saving methods can be used.

To sum up, wheat as a supply crop is generally grown by scientific and soil-conserving methods in old countries, under specially favourable conditions of soil and climate. The yield per acre in these cases is high, but much human labour is required, and the association of the crop with mixed farming tends to encourage stock-rearing and the use of draught animals, rather than great elaboration of machinery. In such cases the product is absorbed completely in the country where it is produced, for the fact that wheat is only grown on the best lands makes the total supply small in relation to population.

On the other hand wheat as an export crop is usually grown in new countries, often in climates only moderately suitable for the growth of the plant, and therefore there the acre-yield is small. But the steady demand,

the ease of transport, the keeping qualities, the possibility of the use of elaborate machinery make it of great importance as a frontiersman's crop, that is as a means of opening up new lands. In pre-war Russia, the conditions were a little different, for cheap labour, i.e. a peasantry willing to live on cheaper grains while growing wheat, was an important factor in permitting export.

Once again, while it is easy in statistical tables to separate the new countries from the old as regards wheat production, we have to remember that since the great development of means of communication the world has become small, and the two have a marked reciprocal effect upon each other. The competition of the new lands disturbed agricultural conditions in the older ones violently, and was a factor in furthering the development of manufactures there. Both in itself and in its indirect effect in promoting industry it tended to throw much wheat land in the old world out of cultivation. On the other hand in course of time the old world reacted by improving methods, and thus raising its acre-yield while that of the new lands was diminishing. Further, direct human efforts, in the way of import duties and so on, affected the

issue. Thus wheat, more perhaps than other crop, was affected by the industrial and commercial revolutions and their consequences, and the wheat supplies from the New World played a not inconsiderable part in bringing both about. For the commercial geographer the plant is, in consequence, of enormous importance.

Maize and rice offer some interesting contrasts to wheat, so that we may add a word or two in regard to them. Maize is a more productive and a cheaper cereal than wheat, and in most years the total crop is somewhat larger though the area occupied is far less; not much greater than half indeed. Further, there is a marked difference between the two in regard to the degree in which they enter into world commerce. Taking a three years' average in each case we find that while about 18 per cent. of the world's crop of wheat enters into commerce, that is, appears in statistical lists as being exported from the country of origin, the figures for maize are only 5 per cent. In other words maize, to a much greater extent than wheat, is grown as a supply crop for the local or internal market. Figures in regard to rice are more difficult to obtain, but the percentage of the total

production which is exported from the countries of origin seems to be somewhat greater than in the case of maize, nearly eight per cent.

The facts are interesting, for they help us to realise that mere ease of production is not sufficient to enable a product to conquer the world market. The demand for wheat is always tending to rise with improved means of communication, for it is found, in the general case, that it is preferred to all other cereals, and where obtainable rapidly ousts such cereals as rye and barley from the local market as articles of human food. This is because, owing to its content of gluten, it makes better bread than any other cereal—many cereals indeed will not make bread at all. Though, broadly speaking, the Eastern nations remain faithful to rice as their predominating cereal, yet even among them the demand for wheat is increasing.

But we have said that the world production of maize tends to exceed that of wheat. How can we explain this if the grain is not prized as human food? In the first place, we have to note that maize is a plant which grows with great ease under conditions unfavourable to the dearer cereal. Climatically it requires a warmer summer than wheat; and further

heavy summer rains, which exclude wheat from many localities, are favourable to maize. Thus there is a large local production and consumption in regions where wheat cannot be produced.

Again, although wheat can be produced with extraordinary ease in suitable regions, especially in level treeless plains, where wholesale methods of cultivation are applicable, yet irregularity of relief forms a considerable obstacle, an obstacle which is helping to diminish wheat production in the Mediterranean region. In the case of maize, on the other hand, the individual plants are large, and the grains can be planted on rough and stony ground, or even among trees which have only been ring-barked. Where the climate is favourable it grows rapidly, and the unripe ears can be used as human food, the leaves and stalks form admirable fodder for cattle, and finally, a great advantage in regions where labour is scanty, the grain can be harvested at leisure, while the smaller cereals must, in the general case, be gathered in as soon as they are ripe.

These numerous advantages, together with the wide range of the suitable climate in low latitudes, make maize a crop of very wide

distribution. In the zones where it is grown it tends to become the bread plant, as in the Balkan States, and also among negroes in many parts of the world. But its use for human food, outside the regions of production, is very limited. It would thus enter into world commerce to a very small degree indeed were it not for the fact that it is a valuable food for domestic animals. Indeed, in the United States, the region of greatest production, it is grown largely as food for pigs, and the products of the "corn belt" there appear on the world market chiefly in the form of the pork, hams and bacon of Chicago, instead of as cereals.

The great producing region for maize is the Upper Mississippi valley, which yields over 70 per cent. of the world total. It is also extensively grown in the Lower Danube valley, and the adjacent regions to the east. In other regions the production is not great, and what is produced is mostly consumed at home, except in the case of the Argentine, where nearly half the total product is exported.

Rice is a cereal of great interest, in spite of the fact that it enters the world market only to a comparatively small extent. Thus the total rice export of the world is reckoned

as less than the normal wheat export of Russia. On the other hand, the yield per acre is estimated at twice that of wheat, and the price is about double in ordinary years. Though many of the large producing areas are inter-tropical, the plant grows well and gives a high yield in the plains of Piedmont and Lombardy, in Spain, and even in South France. In the East it forms the main food cereal and there is little margin for export, save in scantily peopled countries such as Burma and Siam. In the general case we may say that the rice of monsoon countries appears chiefly in the world market in the form of the labour of Chinese, Japanese and Indian coolies. In the Far East the plant is grown with a great expenditure of human labour, on an intensive system, though draught animals are often used in ploughing. In the United States, where rice is chiefly grown in the south-east and south, especially in the Gulf States, machinery is extensively used, and on the Louisiana-Texas boundary, where there are rice-lands worked by the most modern methods, it is said that one man can look after 80 acres of rice in the year. In China, on the other hand, with the laborious methods employed it takes one man to one or

two acres. Thus rice may be given as another example of a crop which is, to some extent, in process of passing from its old position as a product of intensive methods to one of industrial agriculture. It is not likely to predominate as a cereal in the diet of any people outside the zone in which it has been longest cultivated, save where there is actual emigration of rice-eating peoples. Thus rice cultivation is greatly increasing in British Guiana as the result of the immigration of East Indian coolies. At the same time it is largely used as an accessory article of diet throughout the civilised world, so that the world demand is considerable. In addition to its use as food it is employed commercially as a source of starch.

The remaining cereals are barley, rye, oats, millet, with some minor types, and none of them reaches the importance in the world market of the three just discussed. Their chief interest lies in their adaptability to climates or seasons for which the three chief cereals are unsuited, in their limited use as bread plants in the regions of production, and in their suitability as stock food, or for various industrial purposes (as barley for beer). As an example of the use of a minor

cereal in a rotation it is interesting to note that throughout the maize belt in the United States hay and oats are grown as well as "corn," the farmer's year being so arranged that the three crops require attention at different times. But the export of oats from the States is small, for the country has not in regard to this crop the advantages over the Old World which it possesses in regard to wheat. Moreover, the value per unit weight is not large, and this tends to check world trade, so that the crop is used locally, for the most part as food for stock.

CHAPTER III

EXAMPLES OF AGRICULTURAL PRODUCTS :

(2) LUXURIES AND RAW MATERIALS :

INTENSIVE agriculture, which is a notable producer of luxuries, is one of the great resources of dense populations living under favourable conditions of soil and climate. It is highly productive, if the acreage and not the labour be taken into account, and is at once a cause and a consequence of density of population. In relatively unspecialised forms it is very markedly characteristic of those eastern countries where, as in, e.g., China, the period of high temperature tends to coincide with that of heavy rainfall, so that the two great conditions favourable to plant growth, heat and moisture, are simultaneously present. It then tends to be associated with a markedly sedentary people, and is favoured by a long tradition, which gives time for a very perfect adaptation of plant and animal stocks to

local conditions, and also experience in dealing with local types of climate and soil.

Owing to the large amount of labour required the area of the holdings in intensive agriculture tends to be small, and since the crops often require patience, care and traditional skill rather than great muscular effort, there is a tendency for the women and children to do a considerable amount even of the outdoor work. This is in marked contrast to the conditions which prevail in the case of the industrial agriculture of the newer lands, where, as in Australia and Canada, women field workers are almost unknown.

As we have already indicated, the surplus after the needs of the household are satisfied comes in this type of agriculture from the cultivators' skill in utilising local advantages, in adapting themselves to special conditions of soil, climate and relief. But while this surplus may at times be abundant enough, its conversion into money is often a matter of considerable difficulty. The local market, generally small, is quickly glutted, and the possibility of reaching a more distant one involves two factors, the keeping power of the product and the ease and rapidity of transport. For example, the excellent light wines

produced in such abundance in many of the vine-growing regions of France would certainly command in adjacent countries a price which would yield a good profit to the growers, but the absence of keeping power makes it impossible to reach this market. Similarly the thin-skinned grapes which are superabundant in many parts of the continent of Europe in late summer are better than the thick-skinned Almeria grapes which form the cheap grape supply of the British industrial areas. But the latter owe their virtual monopoly to their power of withstanding the risks of transport, and to their keeping qualities.

When the surplus products of intensive agriculture are in this way too fragile or too readily decomposed to reach in their natural state the most profitable market, various means may be adopted to get over the difficulty. Thus they may be dried or preserved in some way, the drying having the great advantage of reducing bulk and thus the cost of transport; or they may be used as a raw material in the local manufacture of some high-priced product capable of easy transport, and retaining its value for some time.

Fruits, a very common product of intensive agriculture, and one of which a seasonal surplus tends to occur, suffer very notably from the fact that they often deteriorate rapidly, a circumstance associated with their high water content. Seeds on the other hand, as well exemplified by the cereals, have a small water content, and in the general case great keeping qualities. With regard to fruits, the fact that many highly prized kinds have long been grown in climates with much sunshine and little summer rain, has resulted in the extensive utilisation of sun heat for drying purposes. Thus dried dates, figs, grapes (raisins and currants), have not only been long known to commerce, but have shown themselves capable of bearing relatively high freight charges, or in other words the cost of relatively unspecialised means of transportation. Certain other fruits, of which apples and oranges are good examples, can, owing to the nature of their integument, be kept, under favourable conditions, for a long time without noticeable deterioration, and also enter largely into commerce.

Of methods of preservation, apart from drying, one, which has had an enormous effect on commerce, is the process of canning,

which depends upon the fact that if all bacteria in an article of food are destroyed by heat, and the access of others be prevented, the product will keep indefinitely. The use of tins to form the necessary air-tight receptacles has made it possible to preserve almost all kinds of food in this way, and has added enormously to the commerce in fruit, as well as in many other forms of food. But canning is an industrial process which can only be carried on under certain conditions, and can therefore only save a proportion of the fruit crop of the world. Thus, for example, there is in the British Islands an enormous consumption of canned peaches from California, a country separated from England by about one-third of the circumference of the globe, while at the same time there is in a region so near as North Italy a regular seasonal surplus of peaches, which are to a large extent allowed to rot upon the ground because there is no available market.

The process of canning was discovered about the middle of the nineteenth century. Later in coming into commercial use was the practical utilisation of the principle that cold no less than heat can be used to check bacterial activity. Now, the use of cold

storage chambers on steamboats and railway trains renders possible the transport of perishable articles of food from the utmost confines of the world. Its effect on the fruit trade is very clearly set forth by Mr. H. S. Gullett in his book on *The Opportunity in Australia* (1914), from which we may quote some sentences :—

“ Only a few years ago fruit could scarcely be given away in Australia. I have recollections of feeding pigs and calves on prime apricots and peaches, and of seeing plums of excellent quality drying on the branches or rotting on the ground. In those days—some sixteen or twenty years ago—we were almost entirely dependent upon the local markets. Summer would come and the first fruit would ripen. For a week all would be well. Peaches and apricots would sell in Melbourne at high prices, and the heart of the orchardist rejoiced. Then would come a few hot days ; all through the orcharding districts fruit would ripen with a rush. In a week the market was hopelessly glutted, and our selling agents in the cities would send us letters asking for remittances to cover loss on our consignments. It was then that the pigs and the calves became useful, for at that time the Australian orchardist, with few exceptions, knew little or nothing of fruit drying or canning, and the operations of the local pulping and jam factories were limited. . . . To-day our orchards are profitable and are expanding rapidly. . . The sudden change in outlook is easily explained. It is due solely to the advent of cold storage facilities both on land and on the steamships trading between Australia and the outside world.”

It would be difficult to put the matter more clearly than this, and it is obvious that before the intensive farmer can put his produce on the world market, much co-operation and organisation, and a complete utilisation of the resources of science are necessary.

But we might go a step further. The local market, as we have seen, is easily overstocked with a product of which there is marked seasonal surplus. Now if world commerce is organised on such a scale that the utmost ends of the earth can send their surplus products to the consuming areas in cold storage chambers, which are chiefly the manufacturing countries or districts, how is it that the phenomenon of glut does not occur on a larger scale? In the particular case considered, Australia, with Tasmania and New Zealand, gain greatly from the fact that they are in the southern hemisphere. Thus their products reach the market at a time when those of the northern hemisphere are not available, and the result to the consumer is the practical abolition of the seasons as a factor in supply.

The point is interesting because, on a far smaller scale, it affects the intensive agricul-

turist in the crowded parts of the Old World. Wherever a particular area differs notably in climate from adjacent areas, or where, owing to peculiarities of soil, or relief, plant growth is more rapid, then intensive agriculture can be made to pay well because the farmer has a short seasonal advantage. The Riviera coast of France and Italy has a high percentage of sunshine and unusually high spring temperatures for its latitude. It can thus supply the northern lands with early vegetables and flowers, before the local gardeners' supply is ready. Similarly Malta can supply the English market with new potatoes before those of the earliest districts in the country itself are available. But in all such cases very careful organisation, especially of transport, is necessary. In the United States of America, where a very large number of climatic zones are included within the political unit, what is called truck farming reaches a great development, and the trade is well-organised. Generally, with the development of great cities, affording an excellent market for all sorts of garden and orchard produce, the tendency is for every advantageous site within easy reach to be given up to intensive agriculture. Only exceptionally, however, are

the resulting products sufficiently important to have much effect on world trade.

The second series of products of the intensive system, those which result from some process of manufacture, include some very important commodities from the point of view of world trade. Among the more important of these are wine, tobacco, tea (in China and Japan), essences of many sorts, silk, which may be regarded as a product of the cultivation of the mulberry tree, olive oil, and so on. The amount of labour required is always large. Thus in Alsace each acre of vineyard is estimated to require the labour of one person. One Chinese worker can look after only a fraction of an acre of tea. With these figures should be contrasted the fact that in the U.S.A. corn belt one man's labour is regarded as sufficient for 80 acres. On the other hand two persons per acre are required for violet growing in the Riviera.

The amount of labour required, and the close adaptation between these skilled industries and the social polity of the people among whom they have been longest established, often make their transplantation to other countries a matter of great difficulty.

Silk is an example of a commodity which cannot be produced in any of the new lands ; its hold even in Southern Europe, where it has been long established, is precarious as compared with its extension in China and Japan. Tea is extremely difficult to grow by an intensive method outside of China and Japan, and where, as in the United States, suitable labour is not obtainable wherewith to establish the plantation system, it is all but excluded. The determined efforts made in Australia and North America (before prohibition) to produce good wines have had as yet relatively little result so far as the world market is concerned, and in both countries there is a tendency for the vine-grower to fall back upon grapes or raisins as his money crop.

In some cases, notably with the vine and tobacco plants, part of the difficulty of the transplantation of the industry to a new locality lies in the great susceptibility of the growing plant to minor variations in soil and climate. The original growers know admirably how to take advantage of these, and the new countries find it difficult to compete against their skill, while the established reputation of their product is also a great commercial asset.

One other point is interesting. In those parts of the Old World where the growing of small amounts of valuable crops, with the aid of much skilled labour, has been practised for a prolonged period, we find that the people have a high standard of comfort, have a considerable amount of leisure which permits of artistic development, but that their land does not yield them large profits in the commercial sense. This is chiefly because, as we have seen, it is often difficult to market their produce, though this produce makes commodities which are luxuries elsewhere of practically universal distribution among them. Provence forms an admirable example of a region dependent upon intensive agriculture in the wider sense, and its combination of cheap luxuries, splendid artistic monuments and dirt, defective sanitation and ill-kept and ill-tended animals is very characteristic. In those parts of the new countries where similar types of agriculture are practised, leisure is little valued, for there is not the social development in the neighbouring districts which would make it agreeable, and the artistic impulse is slow in appearing in new communities. Thus the farmers are far keener to obtain quick profits than their

representatives in older lands. To increase the profit of intensive agriculture the first thing is to facilitate access to markets, and this is a point to which attention is always directed in the new lands. Then there is a constant tendency to try to diminish labour by the use of machinery, a much more difficult process than in the case of industrial agriculture. Further, attempts are made to replace the long tradition of the older countries by elaborate experimentation, especially in the direction of improving or modifying strains of plants, with the object of increasing the yield, or ensuring adaptation to particular conditions.

Again, plant and animal pests form a great menace to all forms of intensive agriculture, where the fact that the land is permanently in use and not fallowed periodically, and that sometimes the same trees or bushes are left for several or many years, makes the destruction of eggs, larvae and spores much more difficult than in the case of ploughed land. It is in this respect especially that the new lands have an advantage over the old, for, in the general case, much more care is taken to deal with pests, and more elaborate forms of apparatus are employed for their destruction

than in the older countries. In brief, intensive agriculture in the recently developed parts of the world tends to become, to as great a degree as the conditions permit, industrialised.

This industrialisation is especially shown in the fact that the tendency in the new lands is for the whole crop, virtually, to be a money crop, while in the old countries the cultivators originally practised mixed farming, growing wheat for their own use, rearing animals, and putting on the market only the surplus of their more valuable products. The result is that, despite the difficulty of transplanting certain economic plants, a difficulty of which we have already spoken, the garden agriculturists have felt the competition of the New World almost as acutely as the wheat farmer, a fact well shown by the wine crises of Southern France, and by the high emigration figures for Italy. The way in which they have in many areas evaded or avoided the competition raises questions of great interest, but one which space does not permit us to consider here in detail.

We saw in the last chapter in the case of wheat that while it is theoretically possible to mark out a girdle round the earth in each

hemisphere, and label this as the wheat zone, yet in point of fact wheat is by no means universally cultivated in the zone which has in theory the suitable climate. It is even more difficult in the case of the chief products of intensive agriculture to make generalisations as to the suitable climatic belt. Theoretically wheat occupies the zone between the temperate forest and the dry steppe, except that it tends to avoid the east side of continents in the lower latitudes, because of the summer rains, and the west sides in the higher, because of the heavy rains brought by the westerly winds. In the same general fashion we may say that the cultivation of the more delicate orchard fruits on the large scale tends to be localised on the desert side of the steppe, where there is much sunshine, especially in regions where deficient rainfall can be replaced or supplemented by irrigation. This is true in Europe and the adjacent parts of Asia, in North America, in Australia, as well as elsewhere.

Of the geographical distribution of intensive agriculture in the wide sense it is scarcely possible to say anything, since the local conditions, especially the nearness of the market, count for so much. Even as regards

fruit-production we must note that the vine extends in Europe far beyond its natural limits, into the forest belt, and the finest product, as in the case of Rhine wines and champagne, is sometimes obtained in the more northerly parts of its zone. In such cases local conditions of soil and relief count for much, and the cool or cold winter is important in the maturing of the wine.

If we think of the margin of the desert, or even oases of the desert itself as in the case of the date, as most suitable for the production of sub-tropical fruits, then as we travel nearer the equator, after crossing the desert belt, and reach the zone of heavy rainfall and continuous high temperature, we come into the region where luxuries and raw materials are produced by the plantation system. Here the rapidity of plant growth, the absence of a cold season, and perhaps the effect of the climate on man, have resulted in a small development of indigenous agriculture, and, with the opening up of tropical lands to white people, any extensive cultivation of the land has been carried on chiefly by coloured labour under European supervision. Parts of West Africa, notably Nigeria, are exceptions in that there seems reason to

expect that in the future the land will yield produce on the commercial scale by means of the independent labour of the natives. Elsewhere, generally speaking, in hot regions an initial collection of wild produce is slowly giving place to the plantation system.

Under this system the land tends to be permanently occupied by one particular crop, and the areas involved to be large. Thus tea estates in Ceylon run to 300 acres, a size in marked contrast to the plots of the Chinese cultivator. In the general case the products grown on the plantation system are either new to commerce, as in the case of rubber and quinine, or owing to their climatic needs have nothing to fear from the competition of the agriculture of temperate lands, as in the case of spices, cacao, and so forth. This absence of competition helps to make tropical agriculture as a rule relatively unspecialised, scientific methods being not extensively applied.

The causes which determine the development of plantations in special areas within the zone of high temperatures and heavy rainfall are various. Among them soil fertility is important, for many tropical soils are very infertile, and the elaborate methods

of soil improvement carried out in more temperate climates are only rarely practised here. Ease of access is another determining factor, very important, for instance, in Brazil, where only certain areas can as yet be cultivated. Most important of all is perhaps the question of labour. The want of it very seriously hampers coffee-growing in Brazil, and the extension of sugar-cane plantations in British Guiana has only been rendered possible by the importation of East Indian coolies. In the equatorial belt itself, where there is no dry season, and rain forest is widely distributed, the difficulty of clearing the land and keeping it cleared tends to limit cultivation.

In regard to labour it should be noticed that one of the reasons why such a large amount is required is that in hot climates there is no sudden temperature check to plant growth, and therefore the harvest, instead of occurring at one definite period, may be prolonged throughout the year. Speaking generally, the more favourable the climatic conditions as regards heat and moisture, the more influence this factor possesses. Thus in China tea is picked three times a year; but in Ceylon picking is carried out at intervals

of two weeks throughout the whole year. As other examples of the prolonged harvesting period of warm-climate crops mention may be made of cotton, which in the United States requires generally four separate pickings, while coffee berries ripen almost continuously. One of the difficulties in the growth of the coffee plant in Brazil is that it is difficult to get labourers sufficiently numerous and sufficiently careful to pick only the ripe berries. Frequently the freed slaves pull both ripe and unripe fruits at once, whereas in Java the unripe are left to mature. The result is that Brazilian coffee is of unequal quality. The continuity of harvest through the year of course greatly increases the total yield, and makes the plantation method of tropical agriculture highly profitable where labour of adequate quality and quantity can be obtained.

It is interesting to note that some of the hot-climate crops do better near the northern, or southern, margin of their zone than in the regions of highest temperature. The phenomenon, which we have already mentioned in the case of the vine, is far from uncommon among cultivated plants, and is chiefly noticeable in those in which seeds, or fruits,

or the surrounding parts, form the crop. The reason seems to be that which we discussed on p. 38 in the case of wheat. A check to vegetative growth results in increased seed reproduction. Thus cotton, apparently a native of the tropics, does better as a cultivated plant in the sub-tropical zone, for the crop consists of the fibres which form round the seeds, and the plants seed best in the cooler parts of their range. Tea, on the other hand, a plant whose green leaves are used, is more productive in tropical than in sub-tropical countries, in Ceylon than in China or Japan.

Cotton is so interesting an example of a crop which is on the margin between temperate and tropical agriculture that we may devote a little space to it, before saying something of a typical plantation crop.

Commercially cotton presents a considerable number of analogies to wheat. Thus the crop is one for which there is practically a universal demand, for there is almost no group of men which will not buy cotton goods if it can, a fact which makes cotton eminently saleable. It has great keeping qualities, and therefore the question of rapid transport to a market is not important. These two charac-

teristics make it, like wheat, the main money crop in the regions where it flourishes, and it tends there to be grown on the one-crop system. Again, as with wheat, cheap land is a factor of prime importance, and the cheapness of the new lands, especially in the United States, results almost necessarily in carelessness of method. Wheat, as we have seen, is grown there on lands so fertile that they are capable of bearing many crops before exhaustion sets in. In the Cotton States of America in the older days it was usual to clear land under pine forest, put it down to cotton, with accessory maize crops as food for the slave worker, work it till signs of exhaustion set in, then abandon the clearing and make another with the utmost recklessness.

Again, as with wheat, but to a much more marked extent, the main crop is accompanied by accessory products, also of commercial value. In the case of cotton the importance of the seed was for long not realised, and it was discarded after the fibre had been extracted. Now the seeds are pressed and the oil, which has considerable commercial value (cottonseed oil), is extracted, while the residue forms "cake," a very important cattle food, largely imported into dairying countries.

Another point of resemblance to wheat lies in the fact, already suggested, that climates only suited to the vegetative growth of the plant at certain seasons are better fitted for crop production than those in which the vegetative period is prolonged. Thus cotton is grown for commercial purposes rather in those regions where winter frost, or the occurrence of drought, hasten the onset of the reproductive period, than in those, like equatorial regions, where the plant can continue to vegetate almost indefinitely. Its production in irrigated lands, as in Egypt and Mexico, is quite analogous to "dry farming" in the case of wheat.

Finally, cotton as a commercial product resembles wheat in that the United States predominate as the chief region of production, though this predominance is far more marked in the case of cotton. Thus a pre-war three years' average (1908-10) gives the percentage for the United States of the world crop as nearly 60; India follows with about 21 per cent., Egypt has under 7 per cent. As in the case of wheat the strenuous efforts made to dispute the United States' supremacy are apt to leave an impression on the general public which fails to do justice to that supremacy.

Cotton is a member of the mallow family, and is a shrubby plant with bright flowers. The flower is followed by a capsule or " boll " which bursts to show the large seeds enclosed in the silky fibres. Till the close of the eighteenth century the seeds had to be picked from the fibres by hand, and this, even with cheap slave labour, made the price very high. In 1793 the cotton gin was invented, and at once the cost of production fell so rapidly as to permit of a large export. Now the chief cost of labour is due to the necessary hand-picking of the bolls, though continuous efforts are being made to invent a satisfactory machine for the purpose. Till this can be done cotton will remain a doubtful crop in otherwise suitable lands if cheap labour is not available. Strenuous efforts are being made at present in Queensland, Australia, to prove that the plant can be grown with success even where relatively costly white labour has to be employed for picking. But as yet Australian cotton is still in the experimental stage.

In the United States the plant is grown as an annual, being sown in spring, thinned with hoes, and then weeded throughout its season of growth. Frost is fatal, and a growing

period of seven months is essential, with much sunshine, and sufficient but not excessive rain. In the United States temperature conditions prevent the growth of cotton to the north of a line drawn from Virginia along the Ohio to the Mississippi, and risk of cloudiness and excessive rain diminish its importance in the South Atlantic States. Deficiency of rain excludes it from the interior states, and the net result is that the cotton belt lies in the south-eastern states, avoiding Florida. The most productive areas are Texas, the Mississippi "bottoms," or alluvial lands to the east of the river between Memphis and Vicksburg, and the "Black Belt" of Alabama; but the highest quality (Sea Island cotton) is produced on the low islands off the coasts of South Carolina and Georgia, and on the adjacent mainland.

In India cotton is chiefly grown on the plateau behind the Western Ghats at a height of 1,000–2,000 feet above sea-level, in a region of light rainfall, but on a soil very retentive of moisture (black cotton soil). In Egypt cotton of high quality is produced on irrigated lands. The yield per acre is high, but suitable lands are not extensive in area. China has

a large production, but the home consumption is also large.

Strenuous efforts are being made to extend cotton cultivation within the tropics, especially in Africa, but these have not as yet been rewarded with any great measure of success. Meantime, stimulated especially by the ravages of the boll weevil, an endeavour is being made in the United States to improve methods by introducing rotation of crops, and the rearing of animals in the cotton belt, and thus generally to take cotton over from being an exploitation crop to be a part of a system of scientific agriculture. The crop has suffered greatly from the demoralising effects of slavery, and the planter has often shown the same ruthlessness in his treatment of his land and of his labour supply. Even now, when cultivators drawn by mules have largely replaced the hoeing process, it is stated that both the mules and the forage to feed them are imported from the more northerly states, and the planters regularly sell their cotton cake and buy butter and cheese, in place of rearing cattle themselves. An improvement in agricultural methods in the cotton belt would establish the supremacy of the United States in the cotton market more firmly than ever.

We may conclude this chapter by a short account of the cultivation of rubber-yielding plants, cultivated rubber being a typical product of the plantation system in the tropics. Rubber is obtained from the latex or milk of a large number of different kinds of plants, but it is sufficient for our purpose here to take note of three of these. By far the most important is the tree which yields Para rubber (*Hevea*), which grows wild abundantly in the hot steamy forests of the Amazon basin. The second important rubber plant (*Manihot*) yields Ceara rubber. Like *Hevea*, it is a member of the spurge family, but unlike the former it can live in much drier regions. Finally, a member of the daisy family, called guayule (*Parthenium*), which grows in very arid regions in Mexico, may be mentioned. It is not at present of great commercial importance, but it has possibilities of considerable interest.

By far the most important source of the rubber of commerce, even up to the present time, is constituted by the wild *Hevea* trees of the Amazon valley, which are tapped by wandering collectors. But with the greatly increased modern demand for the commodity, determined attempts are being made in many

parts of the world to replace this wasteful method by the systematic tapping of cultivated trees. The chief tree so far planted has been Hevea, which requires for its growth high temperatures and much moisture. Thus the regions in which it thrives are not generally suitable for white men. It has been extensively planted in Ceylon and in Malaya (Federated Malay States and Straits Settlements) with results which may be gathered from the fact that while in 1908 plantation rubber furnished only barely 3 per cent. of the world's total, in 1912 the figure stood at 26 per cent., and is steadily rising.

The starting of a Para rubber plantation demands much capital. The regions in which the tree can be cultivated are normally covered with a heavy growth of forest, which requires to be cleared. The young plants must then be raised from seed, planted out, and the resultant plantation kept free from weeds. The planter cannot hope for any return for a period of from four to seven years—a striking contrast to what holds for the cereals. When his trees are of sufficient girth to be tapped the process must be carried on throughout the year, generally every second or third day. Thus

much labour is required, and the rubber, it will be noted, satisfies no one of the needs of the coolies, who must be fed and clothed from some other area. In Ceylon the labour is supplied either from the adjacent mainland, or by the natives themselves; in Malaya abundant Chinese labour is available. In tropical America, notably Brazil, labour is excessively difficult to obtain. Even in Africa labour is not easily available in the forest belt, and plantations of Para rubber trees there have scarcely passed the experimental stage. There is not in tropical Africa generally that tradition of continuous toil on the land which makes the Eastern peoples so admirable a source of labour.

The Ceara rubber tree is more tolerant of climatic variations, but on the other hand it seems more difficult to manage, and yields less latex than Hevea. Its tolerance of drought makes it suitable for the elevated plateaux which occur on the eastern side of Africa, and in these regions Europeans can live more easily than in the damp equatorial forest. The tree is also cultivated to some extent in Brazil, in Southern India and elsewhere. It seems possible that there is a considerable future before it, as it can be

grown in areas which are undergoing a considerable amount of development. In this case the rubber will probably be grown as one of a group of crops.

Finally, in North America great interest is being taken in guayule. This is a small shrub with greyish leaves which grows as a weed on desert lands in North Mexico. It cannot be tapped, and the whole plant is carried to the mills, where it is torn to shreds, and then ground up finely with the help of flints and water. Hitherto supplies have been obtained by the simple method of tearing up the wild plants, and carrying them to the factories, but it is found that the shrub is easily grown on land which is otherwise useless, and can thus be obtained at a very cheap rent. In the United States great hopes are—or were—entertained that the cultivated plant can be grown on such a scale as to yield good profits, and that with white labour aided by machinery. The plots at present are scarcely past the experimental stage, and political conditions in Mexico are not favourable to experimental agriculture, while the supplies of the wild plant seem to be approaching exhaustion.

Should guayule, however, come into

extensive cultivation it will only be another example of the way in which temperate and sub-tropical lands constantly tend to draw towards them products originally tropical. This tendency, again, depends on the fact that tropical agriculture is relatively undeveloped, and cannot compete on equal terms with the elaborated methods of the cooler areas.

It is impossible here to consider the other important products of the plantation system, such as cacao and spices; what has been said may be sufficient to indicate the essential characteristics of the methods employed.

CHAPTER IV.

THE LIVESTOCK INDUSTRY.

ANIMALS are reared by man on the grand scale for three primary purposes:—(1) for food, in themselves (*e.g.* beef and mutton) or in their products (milk, cheese, butter, etc.); (2) to supply raw material for clothing (*e.g.* wool, leather, etc.); (3) for transport purposes, as draught animals or beasts of burden.

Food products of animal origin are almost invariably so rapidly attacked by bacteria that without some method of preservation their transport to a distance is a matter of great difficulty. In consequence, as in the case of most fruits, but to an even greater degree, world commerce in meat and the like is of very recent origin, and practically dates from the use on the large scale of canning and cold storage. Thus a visitor to the River Plate ranching region in 1866 states that at that time the surplus cattle were boiled down at

the ports to make tallow, as the meat had almost no value, while in the interior thousands of legs of mutton could be seen rotting on the plain at once, as they were useless for the production of fat, and there was no available market for the meat. Now, owing to the development of cold storage, the Argentine is a great purveyor of meat to the Old World, while in addition to tinned goods extracts of meat form an important article of export.

The result of this modern ease of transport is that now, except perhaps in the case of sheep, still in some cases kept almost exclusively for their wool, an extensive animal industry in any locality almost always implies a large export of food products of animal origin. Further, for reasons which we shall consider directly, when animals are reared extensively in old countries it is generally the products of the dairying industry which form the largest item in the exports; but in the new countries, where labour is scanty, meat, either frozen or tinned, is usually the chief product. The development of the new lands within recent decades has thus led to a great increase in the consumption of meat, especially in the older countries,

just as it has also led to a great increase in the consumption of wheaten bread.

The geographical distribution of the animal breeding industry on the large scale is interesting and important. But we cannot give it more than brief consideration. We may limit ourselves, in the first place, to cattle, which illustrate all the essential points. Broadly speaking, cattle are reared, or can be reared, in large numbers, throughout the wide belt of savannas and steppes which in many parts of the globe intervenes between the temperate forest and the semi-tropical and tropical arid areas. In this zone occur, for instance, the cattle-rearing lands of Canada and the United States, of the Argentine, of South Africa.

They may also be reared in the belt of hot grassland and park country which lies on the margin of the tropical rain forest, the belt to which is given in Northern Africa the name of Sudan in the large sense. As yet, however, this belt is nowhere the seat of a very extensive cattle industry, though it is believed that within it, *e.g.*, in the state of Colombia in South America, the Northern territory of Australia, many parts of Africa, etc., great possibilities for the future exist.

Again, in countries where the temperate forest has been cleared by man, the lush grass which springs up on the site of the ancient forest is well suited to cattle. The pastures of Ireland, of Denmark, of Holland, all occur within the limits of what was once the forest zone of Europe. Similarly, areas within the forest zone which owing to relief, to local climate, especially the effect of wind, to soil, or other causes, were never thickly forest-clad, bear often a rich seasonal growth of grass suited to cattle. Thus the extensive condensed milk and cheese industry of Switzerland is due to the summer growth of highly nutritious plants—which are very far from being all grasses—on the slopes of the mountains above the forest limit. In this case, however, the cattle must be brought down within the forest limit in autumn, and cannot leave it till the following spring. There is in consequence a constant temptation to destroy forest tracts in hilly regions in order to promote the growth of grass, and this although the mountains form the great forest reserve of densely peopled countries like Europe.

Thus at one of its margins the cattle zone is continually tending to encroach upon the forest, and this whether we consider its ex-

tension in altitude or in latitude. Its other margin overlaps the wheat belt, and almost everywhere there is conflict for space between the rearer of animals and the farmer in the strict sense. In Australia, for instance, where the animal concerned is the sheep, the conflict is taking a very acute form.

To understand why this is so let us consider the food of the great herbivores which man has been so successful in taming. They are all, with the exception of the pig, natives of wide open spaces, the cattle and horses of the plains, the sheep and goats of the mountains and plateaux. Their natural food is constituted by the grasses which make so marked a seasonal growth alike on the plains and on the mountains, and under natural conditions they are constantly migrating in order to avoid seasonal scarcity. The Swiss cow, which follows the sprouting herb from the valley to the mountains in the spring, and reverses its journey in the autumn, exemplifies in one form the method which the herbivores adopt to get over the difficulty of winter frost and snow, which check growth periodically in many latitudes and at many altitudes. Economically, one might say, it is the function of cattle to convert grass, a

food useless to man, into meat and milk which are useful.

But though the green parts of grass plants are of no food value to man, certain grasses, as we have seen, yield at the end of their vegetative period an abundant crop of seeds which form the basis of his food supply over by far the greater part of the globe. When man first began to cultivate those kinds of grass which we call cereals, he entered into competition with cattle in regard to food supply, and initiated the age-long conflict between pastoralist and husbandman.

This competition may take a variety of forms, depending to a large extent upon the degree to which the land concerned is settled. Where the population is scanty, and wide spaces are available for the cattle, these may live under conditions which are almost those of wild herbivores. Thus the vast inner plains of the United States and the adjacent parts of Canada were once occupied by enormous herds of bison, which migrated north or south according to the seasonal abundance of food. When the bison were ruthlessly exterminated for the sake of their hides, their place was taken by equally large herds of cattle. To the west of the 100th meridian

the land has been regarded as too dry for agriculture, and here, through the States of Texas, Oklahoma, Kansas, Nebraska, the Dakotas, and on into Canada, herds of cattle roam the plains. In the early days the animals received the minimum amount of attention. There were no fences, the cattle belonging to many owners were branded and turned loose, and at an annual "round-up," a certain number were sold. The amount of labour required was small, as was also the care given.

But such methods led inevitably to overstocking and to consequent deterioration of the pastures, with the risk of heavy loss. Further, the meat is inferior to that of fattened cattle, and it is now customary to collect the cattle after they are a year or two old, and send them to the corn belt to be fattened for market. Moreover, as civilisation pushed westwards, a method which imitated the wastefulness of nature could scarcely survive unmodified. Thus it was found that even in the arid and semi-arid areas there are numerous valleys in which irrigation is feasible, and here fodder crops, especially the very important alfalfa, can be grown. This plant is a member of the

pea-flower family, very resistant to drought, furnishing nutritious food for stock, and also acting as a soil-improver. It is now extensively grown in the western States in regions of low and deficient rainfall, and it is becoming usual to grow it either as a fattening crop, or to enable the land to carry a heavier stock of animals than the natural grass permits in the winter season and in times of drought. Thus even in the "Wild West" cattle compete with man by their demands on irrigated land which could otherwise be used to produce human food directly, instead of through the intervention of a living creature.

So far, then, our survey has shown us that meat, as a commodity entering into world trade, is a product of the new lands, especially of those areas which are not well adapted for wheat growing, and is menaced there by advancing agriculture, more especially by the continuous efforts which are made to extend cereals into areas which at first sight seem unsuitable. The history of its production in the older lands is interesting, both in itself and in relation to the probable future of the industry in the wide plains of the Americas.

We may begin with some brief quotations from Prothero's *English Farming* (1912), taken from the chapter on the Manorial System, which prevailed until the fourteenth century. Under this system—and the statement is true for much of England down to a far later date—"fresh butcher's meat was rarely eaten," and when so eaten was grass-fed. During the summer the cattle pastured on the commons, in winter they lived "in a state of semi-starvation on hay, straw and tree-loppings." The difficulty of obtaining food for winter, in the absence of all artificially-grown feeding stuffs, was so great that much of the stock was killed and salted in the autumn, and only a few lean animals managed to survive till spring brought fresh abundance. In this case it was the cold of winter which led to the scarcity of natural pasture, but the same result is brought about in Mediterranean countries by the summer drought, and there one may see to this day the animals being fed on leaves and branches of trees.

In England, as in Holland, Normandy and elsewhere, the next stage came with the cultivation as winter-keep of special crops of roots, etc., on land which might be used to grow food for man, and the establishment of

cattle-rearing as a part of the farmer's complicated rotation. This made it possible to produce excellent beef for home use. But the high price of land, and its relatively small area in relation to the total population, kept down rigorously the number of cattle which could be reared, and thus made beef a high-priced luxury. When the new lands began to pour their cheap food stuffs into the old world, especially their maize and such by-products as cotton cake and linseed cake, the need for fodder crops at home diminished, and the number of cattle kept increased. At present the cattle in the pastoral regions of western Europe would be as badly off in winter as were their far-off ancestors in mediaeval times were it not that feeding stuffs are being poured into the regions from all parts of the world. In addition to the American supply, Manchuria sends soya beans, Africa sends the residue of the palm oil industry, the cane-sugar regions send their molascuit (a mixture of molasses and the spongy part of the cane), and so on.

But such food is richer than hay, and leads to increased milk production, and the old lands have abundant labour. Thus the tendency is for the cattle to be more and more

employed to yield the raw materials for the dairying industry, meat being as it were a by-product obtained from the surplus males, or from dairy cattle which have ceased to be good milk producers. In the dairying belt which stretches across Europe from Ireland through North France, Holland, Denmark into Sweden and Russia, imported feeding stuffs are almost everywhere essential. The vicinity of the great industrial centres not only gives a ready market for the butter and cheese, but also for the milk, which in the fresh condition can only be transmitted short distances. So much stress is often laid in geography books on the richness of the natural pastures in *e.g.*, Ireland, and the English Midland Plain, that it is well to emphasise the fact that the cattle in such regions depend to a very large extent on imported food materials. They are fed from America, no less than the operatives of the Lancashire cotton mills. Or, in other words, cattle rearing in old countries is an industry which depends upon the import of raw materials from the new lands, much as do the manufacturing industries proper. The scarcity of animal fats in Germany from the early part of the war, and the subsequent scarcity in this country,

were both direct consequences of this dependence upon overseas products.

The result is that the markets of Western Europe are supplied with a limited amount of excellent home-fed beef, and with much dairy produce. The large increase in meat consumption in recent years is due, not so much to an increased home supply, as to the flooding of the market with cheap meat from the new lands.

It is, however, clear that there is a tendency for the empty plains over which the cattle now roam in the western states of North America to be gradually filled up by farmers, who will push wheat-growing to its utmost limits, and elsewhere, by the aid of irrigation, produce special crops, using where possible alfalfa as the basis of a rotation. At the same time, as population increases throughout the continent, labour-saving occupations like cattle-ranching will tend more and more to give place to labour-absorbing ones, so that dairying will tend to increase. More and more there will be a tendency for the great herds of semi-wild cattle, to disappear as the bison disappeared, and their descendents will be absorbed into general farming. In the Southern States of America the Department

of Agriculture is already awake to the desirability of introducing cattle rearing as a means of absorbing the cotton cake locally, in place of exporting it elsewhere, and all such changes must tend to raise the price of feeding stuffs, and thus diminish the extent of the dairying industry of the Old World. In the case of meat production, it is likely enough that for many years the loss of open pastures in temperate and semi-tropical regions may be counterbalanced by the development of the drier tropical lands as ranching areas, and there is of course the possibility that even dairying may find a home ultimately in such regions. Generally, however, it can hardly be doubted that the enormous increase in meat production and meat consumption which occurred in the decades before the war is a temporary phenomenon. It is reckoned that it takes five to ten pounds of grain to make a pound of meat, and even the countries which are at present meat-eating may be forced to eat the grain themselves instead of using it in the production of meat. The constant attempts which are being made to produce from the cheaper vegetable food-stuffs substances with as high a fat content as butter, and as high a proteid content as meat, shows

that the increasing costliness of animal products is being realised.

Sheep afford in many cases an interesting contrast to cattle, and require separate consideration. They have the supreme advantage of yielding in their fleece an annual money crop, capable of easy transport, not perishable, and one for which, especially prior to the entrance of cotton into commerce, the demand was wide-spread. "Sheep," says Mr. Prothero in the chapter already quoted of his *English Farming*, "were the sheet anchor of farming. But it was not for their mutton, or for their milk, or even for their skins that they were chiefly valued. Already the mediaeval agriculturist took his seat on the wool-sack."

In undeveloped agriculture sheep have many advantages over cattle, for they can live on poorer pastures, and eat these down much more closely. Further, they are tolerant of drought, and are more prolific than cattle, twin births being usual. In England with the enclosure of common lands they were driven more and more from the low grounds to the higher, and the wide stretches of upland, alike in England and Scotland, are responsible for a still considerable home

production of wool, which has however long ceased to enter into external commerce.

Of the new lands Australia predominates as a wool producer and exporter, and the woolsack would be as appropriate an emblem for the Commonwealth as for the Mother Country, for its development has been largely due to the merino sheep. The reasons for this predominance are various. The pastures are not rich and suffer from the constant menace of drought; they are thus better suited to sheep than to cattle. Further the distances are enormous, and railway development in the interior is very limited; thus the fact that wool is easily transported is important.

The River Plate region stands second in the list of wool-exporting countries, for somewhat similar reasons to those which make Australia important. The sheep are reared on the cooler and drier plains, for they are intolerant of moist heat, and the cattle on the warmer and wetter. Considerable extension of sheep-farming is now taking place southward into Patagonia. In the United States though there is a production of wool not greatly inferior to that of the River Plate region, the relative importance

of the sheep is not great, and there is a very considerable import of raw wool. One reason which is sometimes assigned for this is that the presence of warlike Indian tribes in the plains made sheep-rearing impossible in the days of undeveloped communications when it would have paid, and that after the coming of the railways cattle paid better. But it seems clear that in addition other factors are at work in diminishing the relative importance of sheep. The cheapness of cotton and perhaps the nature of the climate make cotton goods, or mixtures, preferred to the woollen garments so popular in the Old World, and the cattle interests are opposed to extensions of the sheep area. Perhaps it is sufficient to say that sheep-rearing for wool belongs to an early stage of land utilisation, and where it does not predominate from the start, it is not easy for it to displace forms of agriculture or cattle-rearing.

After Australia and the Plate region South Africa comes third in the list of wool-exporting countries, though the total production is not very large. New Zealand also has a large number of sheep, and generally it may be said that parts of the world remote from markets, having scanty populations and cool, moist,

or warm, dry, climates tend to rear sheep for wool, the tallow, hides and bones being secondary products. Tropical climates are generally unsuitable. Of remote temperate areas the Falkland Islands, with 300 sheep per head of population, form a good example.

But sheep no less than cattle yield human food in the form of meat, and this mutton now, though not in earlier days, enters largely into world commerce. The extent to which mutton forms an article of export in sheep-rearing countries is a point of some interest, for it is affected both by climate and by facilities for transport. Thus in New Zealand, where the mild, damp climate gives good pasture throughout the year, where fattening crops such as turnips are easily produced, and where the distances from the most productive plains to the coast are not great, frozen mutton is of great importance as an article of export to the mother country, and commands prices which yield a good profit. In Australia the export of frozen and tinned meat is relatively unimportant in relation to wool production. Among the reasons for this may be noticed the dry climate, which renders fattening difficult and expensive, and

the great distances which separate the sheep-rearing areas from the coast. Further, the sheep have been bred for their wool alone, and their flesh is less appreciated than that of some other breeds. Since it is practically certain that all the damper and more fertile parts of the sheep-rearing belt in Australia will be gradually taken over either by the dairy farmer, or as arable land, the probabilities of Australia ever becoming a great mutton-exporting country are not great.

Sheep and cattle, no less than horses, goats, etc., all yield in addition to their other products hides and skins from which leather is made. Hides resemble wool in being easily exported, and not perishable. They are in consequence an article of export from practically all areas where domestic animals are numerous in relation to the population. Even very undeveloped countries, such as many parts of Africa, export hides, which are tanned into leather in the industrial countries, especially the United States.

Before closing this chapter we must add a few words on another exceedingly important domestic animal, the pig. Pigs, in contrast alike to cattle and to sheep, are forest animals, inhabitants especially of marshy places, where

their spreading feet support the weight of the body, and where grow the succulent herbs which they love. They do not ruminates and the nature of the teeth no less than of the digestive apparatus renders it impossible for them to live exclusively on a diet of grass. They must have roots and nuts, that is concentrated forms of food, and are not averse to animal matter. Indeed few edible substances come amiss to a pig. Thus under primitive conditions they are household scavengers, consuming in a very literal sense the remnants from man's table, the discarded refuse which results from the preparation of his food. They are highly prolific, and have, to a very marked extent, the peculiarity of being able to put on fat when the food supply is in excess of immediate needs. In nature this store of fat enables the animal to live through a period of scarcity, but from early times man learnt to utilise it by killing the pigs in autumn as soon as abundant food ceased to be available, and salting the flesh for winter use. The pig is thus the stand-by of the small crofter, and whether in Ireland or in Spain it often constitutes his chief meat supply. As it does not require the wide spaces necessary for the grazing animals it

can be reared in crowded countries, *e.g.*, in China.

In the Mediterranean belt the periodical scarcity of grass, and the frequently small area of the pastures does not affect the pig as it does true grazing animals, and further the mountain slopes, with their forests of oaks, furnish a rich source of food, so that pigs are often abundant. Indeed in those parts of the forest zone of Europe generally where the woods have not been destroyed, forest products, especially beech mast and acorns, constitute a very large part of the food supply of the pig. The extensive and as yet undestroyed forests of the Balkan peninsula have much to do with the presence of numerous pigs there, and Serbia's export of pigs and pork is directly related to her forest wealth.

Once again, the fact that buttermilk and whey form admirable foods for pigs, results in the rearing of these animals being nearly always carried on in connection with the dairying industry. Thus alike in Ireland and Denmark, two great dairying countries, bacon is produced on a large scale.

Finally, wherever cereals are produced extensively and cheaply there pigs tend to be

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raised in large numbers. This is true in the barley-producing region of Germany and Russia, in the corn lands of Hungary, and more especially, in the maize-belt of the United States (*see* p. 52). In the last country the animal is chiefly bred for pork, fresh or salted, the pigs being very fat owing to the nature of their food. Chicago is of course the great centre of the American pork trade. Since pigs must have much water an arid climate is unsuitable, and they thrive best in a mild moist region, that is better in the maize belt than in the wheat zone.

It will thus appear that while the pig was initially important in that it would thrive on food unsuitable for man or other animals, it is now, in the regions where it is reared on the largest scale, dependent upon some of the most important cereals. Thus, no less than cattle, though to a much smaller extent, it has become a direct competitor for food with man.

CHAPTER V

NATURAL PRODUCTS OF ANIMAL AND VEGETABLE ORIGIN

It might be thought that from the logical standpoint the commodities considered in this chapter should be discussed rather before than after those due to agriculture and the rearing of animals. But the order adopted is intended to suggest the relative unimportance, so far as both human life and world trade are concerned, of products of animal and vegetable origin, not directly due to man's activity.

There are, it is true, a few small human groups which contrive to subsist on the produce of forest or ocean, virtually unassisted by trade, agriculture, or the rearing of animals. We have already mentioned the Congo pygmies as one example, and the Eskimo afford another. More than this, white men have here and there lived for short

periods almost entirely "on the country" in different parts of the globe. For example the explorer Stefànsson ascribes his success in Arctic exploration to his capacity to live in all essentials as do the Eskimo, and even on the border of the barren Antarctic continent small groups of explorers have maintained existence for short periods on natural products. But these exceptions do but confirm the rule that wherever man can settle and found considerable groups, there he tends to destroy the natural resources so rapidly that agriculture or the domestication of animals becomes a necessity if he is to persist. It follows from this that regions which are unsuited for settlement will tend to be those in which natural resources are most likely to remain, and may serve as a basis of trade. Of such regions the "unharvested sea" is the most important, and even the seas round the densely crowded islands which form the United Kingdom keep to this day enormous, though apparently not undiminished, natural wealth. Over tracts which are permanently water-covered man cannot sow his cereals, and the unploughed waves remain as the unchallenged pastures of the marine organisms.

Furthermore, to primitive man the forest offers great disadvantages as an area of settlement. In early days his tools were too feeble for wholesale destruction of the trees, and even to this day the labour and cost of clearing wood land for the plough is such that it is only undertaken in special circumstances. Indeed the equatorial forest represents a still unsolved problem even for civilised man. The result is that while plains are generally first taken from the wild herbivores for man's grazing animals, and then from the stock-rearers for agriculture, as is happening alike in Asia, in Australia, and in America, the forests, especially those of isolated regions and of climates unsuited to man's activities, remain important sources of natural commodities.

Apart from the sea and the forest belts, regions which can continue for many years to yield wild products for trade are few in number. Canada was once a great fur-exporting country, the fur-bearing animals being found in the forest belt and to some extent in the tundra. The forest still persists to a considerable extent, but the fur-bearing animals have greatly diminished in number, while the bison of the plains which yielded

hides have, as already noticed, practically disappeared. When it was discovered that the guayule of the Mexican deserts (*cf.* p. 83) could be made to yield commercial rubber the region, previously neglected, was searched for the plant with such zeal that it seems as though only cultivation can save it from extinction. The oil-producing mammals of the icy polar tract are other examples of forms of life which were greatly reduced in numbers almost as soon as their commercial value was recognised. The net result is that it is chiefly the forest zones and the sea which yield natural commodities of much importance in trade, and it is only these that we need discuss.

Even in regard to forests, however, that human destructiveness which is always tending to eliminate natural products from trade is much in evidence. The temperate forest yields a greater amount of valuable produce than the tropical one. Thus it is in the temperate forests that the chief timber-producing trees grow, those required for constructional purposes, tropical woods being chiefly ornamental. It is further the temperate forest which yields material for the important paper industry, no less than the

barks, etc., used in the process of tanning. Tropical forests yield cabinet woods, many gums, rubber, drugs (*e.g.*, quinine and camphor), dyes (logwood), fruits (oil palm), nuts, etc., but on the whole their commercial products are less important than those of the temperate forest.

Further, temperate forests tend to occur in regions inhabited by the more energetic races, and also where the climate and relief are more or less suitable for the extension of pastures or of cultivation. Thus, both because of their exploitation for their products, and because of their wholesale destruction to further land utilisation, the disappearance of temperate woodlands has proceeded more rapidly than that of the tropical ones. The usual sequel has followed. After destroying natural resources with his customary non-human wantonness, man has had to proceed to reconstruct with human care and forethought. But with regard to the forests, as also in so many other cases, the apparently limitless wealth of the New World has made the old countries slower than they otherwise would have been in learning their lesson. Further, the countries which have carried on most foreign trade, and thus

have had easiest access to the new lands, have been most reluctant to learn that all natural wealth is easily exhausted. Scientific forestry, which has made great strides in France and Germany, is only beginning to receive careful consideration in the United Kingdom. In the United States it is still in its infancy.

On the other hand, since the world's resources in regard to tropical woodland still seem boundless in relation to the rate of exploitation, few efforts have been made either to conserve or to extend the forests of the tropical and equatorial zone. The Government of India has done a considerable amount for the forests there, though chiefly in the mountain zone, the United States is striving to do something in the Philippines, but throughout most of tropical Africa and in the case of the marvellous forest of equatorial America practically nothing has been attempted, save that in the latter case efforts are being made to cultivate the Para rubber tree. Generally in tropical regions the forest retains the position which it once occupied also in temperate regions, that is, is regarded as the enemy of man, rather than as a source of wealth.

The most important product of the temperate forest is timber, an article of great and increasing importance to civilised man. In the first place, as we all know, timber is very extensively employed for all sorts of constructional purposes, from the fittings, etc., of houses and ships, to boat-building and the lining and supporting of tunnels in mining. Again, in countries where coal is not present, or is not worked, or is not readily available, the demand for firewood leads to large destruction of forests. More recent is the demand for wood blocks for street-paving in large towns, and for wood pulp for the manufacture of paper, the last being a very potent cause of forest destruction. Finally, a somewhat less obvious point is that the export of agricultural produce from the new countries has both been facilitated by the cheapness of the wood used in the manufacture of barrels, crates and boxes, and has made an additional demand of considerable importance on the woods. It is interesting to note in this connection that in the Mediterranean countries, where scarcity of timber is of old standing, baskets are generally preferred to boxes for transport of produce, and the Great Reed (*Arundo*) is extensively planted

to supply material for these, just as the basket willow is planted further to the north.

For most of the purposes just mentioned it is desirable that the wood should have certain special qualities. Thus it should be reasonably durable, relatively soft so that it is easily worked, and—a point specially important—one kind should be obtainable in bulk so that machinery and wholesale methods of exploitation may be employed. Thus the wood merchant distinguishes between softwood, which for commercial purposes is the timber of a few social coniferous trees and is used for general purposes, and hardwood, which is that of certain broad-leaved (dicotyledonous) species and has special uses. The cone-bearing trees most used in commerce grow rapidly, and branch little, so that the trunk is tall and straight and yields much available timber; their resin assists in the preservation of the wood, and the habit is markedly social. These statements apply to the pines, firs and larches which supply so much commercial timber.

These northern conifers have the further advantage that they grow in climates where the winter snowfall is great, and where the rainfall is heavy enough to give constant

summer streams — both points of much significance in timber exploitation. To understand why this is so we have to realise that timber is both bulky and heavy in proportion to its value, and thus easy transport is of great importance. Now while it is difficult to drag tree trunks over rough ground, except where a steep slope permits of the establishment of a “slide,” they can be easily transported in sledges over a snow surface. In this way they can be carried during the winter season to the margin of the rivers, ready to be carried down stream in rafts when the spring freshets arrive. Such methods are widely practised, in the European Tyrol, for example, no less than in the Eastern Highlands of Canada.

In the latter country the exploitation of the forests forms a seasonal occupation of much importance in that it absorbs labour in winter. In summer there is much demand for labourers on the farms. As autumn comes and the harvest is gathered in this labour is no longer wanted, but it can be readily utilised in the forests, for autumn and early winter is the season for cutting down trees. During the process of felling, roads are cleared to the nearest lake or stream, and

the vicinity of one or other of these is of much importance in connection with the question of where timber can be cut at a profit. The "roads," which are mere openings in the wood, soon become covered with the early snowfall, and constant traffic, combined with artificial watering, turns the snow into an icy mass, on which friction is greatly reduced. It is over these ice-slides that the loads of timber are dragged, and spring finds the logs piled high by the sides of the stream, ready for transport to the market. Since the Canadian woods consist, to a large extent, of pure "stands," as they are called, of one or other species of conifer, or other useful tree, the contractor is able to deliver quantities of similar logs, capable of being dealt with by wholesale methods.

As contrasted with these vast uniform northern woods tropical forests suffer from many disadvantages. Thus in the general case the number of species is great, while the individuals of the same species are usually scattered and not collected in large groups. As a rule only trees prized for special attributes are worth hunting for through the dense forest, and the sale of a mixed lot of logs is impossible under modern business

conditions. Further, some of the beautiful cabinet woods of the tropics are heavier than water, so that the cheap method of water transport cannot be employed, and other methods are not available in the dense forest. Once again, in some tropical regions the rainfall is very variable from year to year, and the streams vary naturally with the rainfall. Thus in British Honduras valuable timber is produced in the interior, but the export of wood varies much from year to year, for in dry years the streams are too shrunken to permit of its transport to the coast.

In addition to the exploitation of forests for their timber, there is now an enormous demand for wood as a source of pulp for the paper industry. Paper from wood pulp was first manufactured in the United States in 1867, but since 1890 the manufacture of such paper has increased enormously, and this has had two consequences. In the first place it led to a great increase in forest destruction in North America, and in the second place it is leading to a better utilisation of the woods. The original lumbermen had as little interest in the husbanding of the resources of the forest as had the original sealers and whalers

in taking measures to ensure the continued existence of whales or seals. A logging camp was established, the trees within easy reach were cut down, and as soon as one area was exhausted a move was made to a fresh one. But while the transport of a camp is a relatively simple matter, pulp factories are necessarily stationary. In making the pulp the wood requires to be ground up finely, and as an enormous amount of energy is required for this the mills use water power whenever it is available. It is an obvious advantage that the stream so used should be one draining a forest country, so that the logs can be delivered by it at the factory door. But the factory cannot be moved so soon as the wooded hinterland is exhausted. Thus in the United States there is a tendency for the paper companies to buy up large tracts of forest land, and then to see that this is exploited systematically and with care, so as to permit of natural regeneration where this is possible. Further, with a permanent demand of this kind it is possible to elaborate means of transport, and thus obtain wood from tracts which the lumberman would regard as inaccessible. Here, then, is the possibility of the development of scientific

forestry, of that careful exploitation which is almost universal in those parts of the Old World where extensive natural forests remain. Thus with the development of industry, "natural" resources tend to pass into the cultivated class.

A minor point of some interest is that while in the United States the spruce alone was at first used to make paper pulp, it was found later that a great variety of other woods could be used for the same purpose. At the present time some twenty species are so used, a fact which increases the probability that the Government will take scientific forestry seriously in hand. Further, the fact that the refuse of saw mills, small branches, tree tops, etc., can be used in paper making, will also tend to diminish the reckless waste which has been taking place in the forests of the New World.

To emphasise the contrast between the tropical and the temperate forest we may add notes on two typical products of the former, rubber and palm oil.

We spoke on p. 80 of the Para rubber tree (*Hevea*). The tree occurs in individual specimens throughout the vast equatorial forest which occupies the basin of the Amazon,

and thus is found not only in Brazil, but also in Bolivia, Peru and Ecuador. This forest is so dense, so tangled with undergrowth, so replete with noxious forms of insect life, so unsuited for human habitation that the rubber is practically not obtainable save in a belt stretching some two or three miles back from the banks of the numerous streams into the forest. The central office of each rubber-collecting estate is always placed on a waterway, and the collectors communicate with it by water, while the final export of the product takes place also by water, Para being the great centre.

The actual collection of the latex is a very simple matter. The collector lands from a canoe on a stream bank and hacks his way through the dense undergrowth till he reaches a rubber tree. An incision is then made in the bark, the sap collected in a vessel, and brought to the camp, where it is coagulated by means of wood smoke, a lump of rubber being thus formed. These lumps of rubber are then carried to the central office, whence a steamer conveys them downstream. The life is so full of danger and hardship, so unsocial, so unproductive for the collector, that labour is naturally difficult to obtain.

and the more remote the forest area undergoing exploitation is from civilisation, the greater is the difficulty. Therefore the greater is the temptation to enslave unwilling workers. If the equatorial forests as yet show but little signs of exhaustion from this primitive method of exploitation, the natives, notably in Peru, are less resistant, and the cruelties there, whose revelation shocked the civilised world some years ago, indicate that man, if unorganised and defenceless, is as liable to ruthless destruction in the course of the exploitation of natural resources as ever was beast or bird. A methodical utilisation of the resources of the equatorial forest does not meantime seem possible, and thus the cure for rubber atrocities is to be looked for in the steady competition of cultivated rubber with wild rubber in the world's market.

The story of the oil palm is a little different. The tree occurs abundantly in the West African coastal forest, especially from Sierra Leone to the Kamerun. The fruits occur in somewhat cherry-like bunches, and both the pulp, used to produce palm oil, and the contained seed or kernel, which produces palm kernel oil, are prized by the natives. The oil from both sources is a valuable com-

mercial product, being shipped in large amounts to Liverpool and Marseilles, and extensively used in margarine production. The pulpy fruits will not keep, and their oil is extracted in a wasteful fashion by the natives. On the other hand the kernels can be exported to Europe to have their oil extracted there; though this is also done on the spot by the natives. After the extraction of the palm kernel oil, the residue can be used to form an excellent food for cattle (palm kernel cake).

The oil palms seem meantime so abundant that cultivation is scarcely attempted, and since the collection of the fruits, which is never more than partial, does no harm to the tree, the need for cultivation in West Africa is not yet apparent, though it is being attempted elsewhere. Efforts at present are chiefly being directed towards improving methods of collection and transport to the ports, and also towards getting rid of the wasteful native methods of extracting the oil. Machinery for systematic oil extraction is being set up in factories in West Africa, and one would expect that if this is done on the large scale the same consequences will ensue as have already been noticed in the case

of the paper industry. Such factories are necessarily permanent, and as means of communication in West Africa are very poor, it is to be supposed that a more thorough collection of the fruits within a certain radius of the factory will lead sooner or later to a diminution in the number of seedlings and thus of young trees. When this has gone on sufficiently long to menace the source of supply the advisability of providing for future needs will present itself, and the tree will probably pass from being purely wild to the position of one the growth and reproduction of which are at least to some extent controlled by man.

Let us add to these notes on forest resources in temperate and tropical climates a brief account of some of the resources of the sea.

Though there are many minor marine products, such as pearls and coral, sponges and pearl-shell, oil and whalebone, the food fisheries constitute the most important asset of maritime populations. Both the food fishes and the important fishing grounds are somewhat irregularly distributed over the world. In variety of kinds of edible fish the northern hemisphere is much more fav-

oured than the southern, and the fish which enter into world commerce as articles of food are practically all products of northern waters. Of these cod, herring, haddock and salmon are most important.

In regard to fishing grounds, while it is easy to name the more important of these, we are just beginning to be able to state the reasons for their excellence. The most important are the North Sea, the richest fishing ground in the world, the Newfoundland Banks and neighbouring waters, and the seas around Japan. In all cases the shallowness of the water, due to submarine "banks," is an important feature. The presence of a combination of warm and cold currents seems also a very important feature, and extensive drainage from the land, which brings much material required by the minute plants of the sea, exerts much influence. It is obvious that where the streams pour the water into a shallow sea, especially if this be more or less enclosed, there the mineral substances derived from the land will be more in evidence than where deep water lies close off the coast. The open waters of the ocean, indeed, especially in low and middle latitudes,

seem generally to be singularly poor both in minute plant life and in fish.

Moreover, recent investigations point to the conclusion that the fundamental food-supply of the fishes that live on the floor of shallow seas (in North temperate zones) consists in great part of the organic detritus swept down from the beds of sea-grass (*Zostera*) and sea-weed along the shores.

In early days fishing was carried on by inshore fishermen, with rowing or sailing boats, and there can be little doubt that the natural power of reproduction of the food-fishes enables them to keep pace with this kind of fishing, especially as the means employed did not lead to any great destruction of immature fish. It is otherwise with the highly industrialised methods of fishing now practised in the open seas, and there seems much evidence, *e.g.*, in the case of plaice in the North Sea, and halibut in the western United States, that systematic fishing seriously reduces the numbers of particular kinds of fish in certain areas. Attempts have been made to increase the supply of valuable kinds of fish by hatching eggs artificially and returning the fry to the sea. The evidence so far obtained does not show that this can be

done on a scale likely to have any effect on the fishery problem. It would seem that, as in the case of natural forest, the most hope lies in such measures of protection as will enable the productivity of nature to keep pace with the destructiveness of man. More especially are measures necessary to prevent the reckless destruction of immature fish, which have never had a chance of breeding.

Generally we may say that man, when confronted with any natural resource of plant or animal origin, uses his intelligence and skill in the first place to destroy. When trade develops, with the moral qualities which are inseparably bound up with it, he learns, often slowly, to husband and to protect. Broadly speaking, the more the trade becomes established and constant the more definitely is the natural resource taken over into the category which includes the products of agriculture and livestock-rearing, though to this statement, for the reasons already given, fisheries form in part an exception.

If then it is true than in the last hundred years there has been an increased output of natural products, no less than of those due to agriculture and animal-rearing, this has been brought about by the discovery of new

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resources for exploitation, and of new methods of transport and utilisation. The result has been, on the whole, to impoverish the world, to waste man's heritage, not to enrich it. Permanent forms of commerce cannot be established on such a basis, and natural products are much more likely in the future to decrease than to increase in importance.

CHAPTER VI.

MINERALS, MANUFACTURES AND THE LOCALISATION OF INDUSTRIES.

WE have still to consider two very important kinds of commodities which enter largely into world trade. These are minerals and manufactured goods.

The distribution of minerals over the surface of the earth is not in the general case determined by geographical causes. It is the character and sometimes the structure of the rocks which decide where coal, iron, copper, lead, gold, precious stones and petroleum occur, not the surface relief. But in economics the mere fact of the occurrence of valuable minerals is less important than the question whether the deposits are of such a nature and in such a position that they can be profitably worked. This in its turn is affected partly by geographical, but also by economic and historical causes. Spitsbergen has a considerable amount of coal, of reasonably good quality, but the geographical

position of the archipelago, remote from important trade routes, and the climate, which greatly increases the difficulty of working, make the deposits of far less importance than those say of Fife. In the Balkan peninsula there are many kinds of mineral deposits, some of which were worked in Roman times. Here the difficulty of obtaining capital, due to political instability; historical causes, especially the long domination of the Turk; also difficulties of communication, combine to render their exploitation meantime all but impossible. In the same way the mineral wealth of China is but little developed, while in industrialised countries like the United States of America, England, France, etc., mineral deposits are worked wherever conditions permit of this being done at a profit.

In regard to manufactured goods we must note first that man has been a manufacturer since those early days when he began to chip flints roughly in order to make tools and weapons. Rarely has he been content to leave natural products as he finds them; almost always they are moulded and modified to enable them to achieve his purposes better. On the other hand, the production on a

gigantic scale of manufactured goods, intended not exclusively for home supply but for an often distant market, is a very modern phenomenon, associated with the rise of the factory system, and rendered possible by a use of machinery which has increased enormously the individual's power of doing work.

This fact is perhaps best illustrated by a brief consideration of the cotton industry, the most important one in England.

The essential point in regard to all textile industries is that fibres, whether of plant or animal origin, can be twisted or spun together, to form yarn or thread. The yarn so formed can be woven to form a fabric, on precisely the same principle as basket work can be made by interweaving strands of straw, or flexible rods. Thus two processes are involved, the making of the yarn, and the subsequent weaving of it into cloth.

The earliest form of spinning apparatus consisted of a distaff and a spindle. The distaff was a stick upon which the bunch of fibres to be spun was placed, the spindle a tapering rod whose rotation gave the necessary twist, and upon which the yarn was wound as it was formed. By the simple mechanism of the spinning wheel the spindle

was caused to rotate continuously, the improved form leaving the spinner with both hands free, and thus able to produce two threads at once. Even so, however, thread production was very slow, the spinning being a more laborious process than the subsequent weaving.

Towards the end of the eighteenth century a series of inventions in England led to a sudden increase in yarn production. The important dates are the following. Hargreaves in 1764 invented the spinning jenny, by which eight threads could be spun at once; this machine replaced the spinning wheel in domestic industry, and thus increased the home output. In 1767 Arkwright invented the throstle or water-frame, which could be driven by water-power, and was much more suited for large factories than for the home. In 1779 Crompton combined the principle of the two previous inventions in the spinning mule, which in an improved form, is still used. Meantime Watt was working at the steam engine, his important inventions falling into the period 1769-1784. In 1790 steam was first used in cotton factories in Lancashire, and, thereafter, assisted by the economic disturbances on the continent of Europe

due to the great wars, the great cotton industry of England took a sudden leap forward, and acquired the position of importance which it has since kept.

To make clear the causes of this, however, we have still some other points to consider. The successive inventions in connection with spinning were stimulated by the fact that the handloom weaver was always being kept back by the difficulty of obtaining yarn. But no sooner did spinning machinery begin to be developed than it was found that the amount of yarn made was far greater than could be absorbed by the handloom weaver, and further that larger supplies of wool, lint, cotton, etc., than were previously available were required to feed the spinning mules. The next steps therefore, were to increase the output of raw fibres, and to improve weaving machinery.

The most important fibres from which textiles can be made are cotton, lint (the fibre of the flax plant) and wool. In regard to the first of these it is important to note that the invention of the cotton gin (*see p. 77*), with the immediate consequence of enormously increasing the output of cotton fibre in the United States, synchronised with the period

when cotton manufacture was developing in England owing to the invention of machinery and the use of steam power. Thus raw cotton became abundantly available at a time when much greater amounts of raw textile material could be absorbed than ever before. Now cotton has many advantages for use in machines. It is remarkably uniform in quality, a very important element in all cases where machinery is used, and further the fibre can be spun without needing to go through elaborate preparatory processes. The fact that a sudden cheapening of the raw material, due to increased ease in production, coincided with the invention in England of machines capable of dealing with huge masses of it, combined with the special characters of the cotton fibre, were all factors which helped to establish machine-made cotton fabrics on the world market. They tended at the same time to diminish very greatly the importance of cotton weaving as a domestic industry, save in more or less isolated parts of the earth.

Woollen fabrics are at least as old as cotton fabrics, and in England were for long of more importance. The methods of spinning and weaving are, broadly speaking, similar, so

that the new machinery and methods were as applicable to wool as to cotton. Further, just as the sudden increase in the output of raw cotton in the United States coincided with an increased demand in England, so, similarly, the increased demand for raw wool coincided with the establishment of the merino sheep in Australia, which took place at the close of the eighteenth century. Here again, therefore, increased demand was met by greatly increased supply. But wool has several disadvantages as compared with cotton, which more or less offset its obvious advantages of warmth, lightness and elasticity. In the first place, as already suggested, animal products must always tend to be dearer than vegetable ones, and the area occupied by the sheep is always diminishing as settlement advances. Again, since it forms the coat of an animal, wool is always more or less dirty and requires to be carefully washed, or "scoured," before it can be used. But it is not only extraneous dirt which must be removed. Wool fibres are covered with minute overlapping scales, and owing to these scales and the tendency to curl the fibres would become matted or felted together on the animal, were it not that each

hair is enclosed in a film of grease. This grease or yolk must be removed before the wool can be woven into cloth, and to effect this it must be steeped in a bath of soft water, impregnated with a mild alkali. Finally, wool is far from uniform, for that growing on the different parts of the body in the same animal differs in character. Thus the fleeces have to be dealt with by a trained sorter, who separates the various types.

The combination of all these characteristics makes woollen fabrics necessarily more costly than cotton ones, so that the market for them is more limited. The advantages of cotton indeed are such that attempts are constantly being made to replace wool, linen and silk by some form of cotton or by a mixture.

Before cotton goods were produced on the large scale in factories, their present place was largely occupied by linen, which had the great advantage of being dependent upon a raw material widely produced in temperate climates. The existing linen industries of Scotland and Ireland, no less than that of Yorkshire, are historically derived from the widely spread home linen industry of all three parts of the British Isles. In earlier

days every farmer grew a patch of lint, which was prepared, spun and sometimes woven by the women of his household. But, in marked contrast to cotton and wool, linen failed to respond to the new conditions brought about by the industrial revolution, and the poor man's linen sheets and shirts were rapidly replaced by cotton ones.

The reason is two-fold : first, lint, the raw material, is not readily obtainable in bulk of uniform quality, and second, it is not so well adapted to spinning and weaving machinery as is cotton. Flax is somewhat more difficult to grow than cotton. It requires rich manuring, a long rotation, and must have neither too much nor too little moisture. The uncertainty of a successful crop induces farmers to grow the plant in small plots only, and the result is that the quality of the flax put upon the market varies very greatly. Then, in contrast to the simple methods by which raw cotton is produced, flax fibre requires to go through an elaborate series of processes, which can only be carried on where both labour and water are abundant. Thus it is a crop chiefly suitable for peasant farmers, or for regions agriculturally depressed.

Even when the prepared lint reaches the manufacturer the difficulties are not over, for the fibre is impregnated with pectose (a carbohydrate common in the cell-walls of many plants), which makes it difficult to work, and demands skill and care on the part of the workman. Thus a more important human element enters than in the case of cotton, and machinery has increased the spinner's efficiency to a much less degree. This means that the margin for profit is less than in the case of cotton, and linen has lost its place as a necessity and is becoming more and more a luxury. It is of interest to note that it is a luxury which under present conditions cannot be manufactured on any considerable scale in the New World. In the United States flax for fibre can scarcely be grown, on account of the difficulty of obtaining cheap labour in the temperate belt. Even with imported lint, moreover, it is difficult for the linen industry to establish itself, for the small margin of profit, as compared with other textiles, keeps down wages. In the British Isles it is notable that the chief seats of the linen industry are in North Ireland, an agricultural district where wages are low, and in those parts of

Scotland which are remote from the great industrial centres, and where wages are thus also relatively low.

The above summary account may serve to explain why the invention of spinning machinery, and the use first of water power and then of steam to drive it led to an enormous increase in the production of cotton goods; also, though to a less extent, of woollen goods. It makes it clear also why there was a *relative* diminution in linen production as compared to that of cotton goods, though *absolutely* the output of linen increased as well as that of cotton and woollens.

The increase in yarn production led inevitably to the invention of machinery by which weaving was facilitated, and a few words may be added on this point.

Till nearly the close of the eighteenth century weaving was carried on by means of the hand-loom, which consists essentially of a means of keeping the stout threads of the warp stretched, while a shuttle carries the finer thread of the weft alternately above and below the successive threads of the warp. In 1785 a Leicestershire clergyman, by name

Edmund Cartwright, invented the first power-loom. It is interesting to note that he was stimulated to do this by a visit to a Derbyshire factory containing some of Arkwright's spinning machinery, and that he set himself the problem of obtaining a mechanical repetition of the movements necessary in weaving without any knowledge of practical weaving, and little of mechanics. His first power-loom, though it solved his problem theoretically, required two men to work it, and was far less efficient than the ordinary hand-loom. Cartwright later corrected some of the worst faults of his machine, but it had to undergo many improvements and additions before it became practically useful, and its introduction, naturally enough, met with determined opposition on the part of the hand-loom weavers. By the beginning of the nineteenth century it was, however, firmly established, and the improved power-loom is described as "the most marvellous of mechanical combinations." In combination with spinning machinery it led, inevitably, to the establishment of the factory system, the decay of home industry, and the appearance on the world market first of the products of English factories, and later of

those of the other nations which followed England along the path of industry. The development of the factory system, as we have already suggested, was greatly assisted by the fact that the operatives at the critical starting period were fed on the cheap food of the New World, and also that in England peace reigned while continental lands were being devastated by war.

As another example of a modern industry we may take that of iron, which affords in some ways an interesting contrast to the textiles.

Iron is of course used in the manufacture of a vast number of articles of daily life, but its commercial importance arises largely from the fact that it is required for all modern modes of transport, whether we consider the rails upon which trains are run, or the ships which carry raw material and manufactured goods to and from the ports, and for all the forms of machinery by which industry is carried on. Thus the industrial revolution would have been impossible if civilised man had not acquired, from the beginning of the eighteenth century onwards, an increased capacity for extracting this singularly refractory metal from its ores. In this case

though the progress of invention has done much, the utilisation of sources of energy, either previously unutilised, or not employed on a large scale, has been perhaps the most important factor.

To understand why this is so we have to realise that iron rarely occurs in nature in the pure state, in spite of its great abundance and wide distribution. It is found chiefly in the form of oxides, such as those which form the various kinds of haematite. Before the pure metal can be obtained from such ores superheating is necessary, and by primitive peoples this is obtained by driving a current of air, produced by some form of bellows, through a charcoal fire placed round the ore. As a result of the smelting process carried on in such simple forms of forge small quantities of very pure iron can be made from ores rich in the mineral.

From the forge the blast furnace was evolved by strengthening the draught, and in such furnaces poorer ores could be used, though the iron is not of such high quality. We need not follow here the various improvements which have been made in the methods of smelting, or of manufacturing steel, which is iron containing a small amount of carbon.

These improvements are mostly of a highly technical character, and the essential economic fact is that iron and steel can only be made on the large scale where fuel is superabundant.

As already stated the first fuel used was charcoal, and this led to a great wastage of forests in iron-producing countries, and gave also to forested countries a great advantage in iron production. It was for this reason that Germany predominated over England as an iron-producing country down to the early part of the eighteenth century. But no forests, however extensive, can resist the demands of a large iron industry, and since the middle of the eighteenth century the development of the industry in any country has necessitated the search for other forms of energy. Among the more important of these are coal, with its derivative coke, natural gas, petroleum, and electricity generated by water power.

Coal was first used in the smelting of iron in England during the seventeenth century, but it was not till the second half of the eighteenth that it was employed to any general extent. Thereafter the iron industry in England suddenly increased in importance,

and that country became the great iron-producing nation, as she was also the great textile producer. Coal was soon replaced by coke, a more economical form of fuel, and in the first half of the nineteenth century a considerable number of inventions and improvements greatly increased the iron output.

Three main causes assisted the iron industry in the United Kingdom at this period, apart from the skill and ingenuity of its inhabitants. These were that coal was abundant and easily worked, that iron occurred on the coalfields, and that both iron and coal were found near the sea or navigable waterways, permitting of easy export of iron goods, and later of the establishment of iron ship-building. A disadvantage which did not show itself for a considerable period lay in the fact that the iron deposits were not very large in amount in relation to the demand. Even this, however, was to some extent counterbalanced by the facts that iron ores could be easily imported, and that the coalfields lay near the ports.

During the latter half of the eighteenth century, and the first half of the nineteenth, while the English iron industry was making great headway, that of the United States

was in a state comparable to the hand-loom weaving industry. Iron-ores are abundant in that country, the Appalachian Highland is well-forested, and has much water power. Therefore all down the eastern belt, where settlement first took place, iron was made everywhere on a small scale to satisfy local demands. The forest supplied the charcoal, the ore was easily dug up, and the blast was driven by a water wheel. The wide distribution of these three advantages made one locality as suitable as another, and thus no considerable iron trade could develop at any special point.

But the States have large coalfields, and the first to be developed on any considerable scale was the Pennsylvanian anthracite field. Now anthracite can be used instead of coke in iron-smelting, and the effect of the development of the anthracite deposits in eastern Pennsylvania, a development which became considerable from about 1850 onwards, was to attract the iron industry there, and to lead to the scattered charcoal forges falling into disuse. But as industrial development progressed, railways were built, and it became possible to work the bituminous coalfields of western Pennsylvania. From this soft

coal coke was made, and came to be employed instead of the more costly and harder anthracite. The result was a shift of the iron industry westward, which became marked from about 1875 onward. The result was that the basin of the Upper Ohio, especially Pittsburg, became the iron centre. The next step was the replacement of the ores of the Appalachian valleys by the richer deposits from the shores of Lake Superior. The tendency has been recently for the industry to shift nearer and nearer to the shores of the lakes, as to Chicago, Cleveland and Buffalo, where the transport charges for ores are small.

The large supply of fuel, for petroleum and natural gas were soon added to coal, the abundant supplies of home ores, the ease of transport over the Great Lakes, the large home market, protected by duties, were all favouring circumstances for the United States iron industry, and some years before the close of the nineteenth century the States had definitely and finally taken over the world supremacy in iron production from the United Kingdom.

Only a few years later Britain was relegated to the third place by the great development

of the German iron industry, especially in the district of the lower Rhine, notably the Ruhr basin. Among the favouring conditions here were home supplies of iron, especially from Lorraine, some of which are of so poor a quality that they could only be utilised after the development of certain new processes, which originated in England; the easy transport offered by the great Rhine valley; the large home market, artificially protected by import duties. The iron industry of Germany has been much affected by war-changes, which have reduced the natural advantages, especially as regards supplies of iron-ore.

Of other iron-producing countries we need say nothing beyond pointing out that the use of electricity in smelting iron, and in making the more costly forms of steel is developing notably in Sweden, Norway and the French Alps. The fact is important, for it may lead in the future to another migration of the industry. It has already, as we have seen, shifted from forested areas to the coal-fields; there is at least the possibility that in future it may move at least in part to the mountains where water power is available on the grand scale.

This brief study of certain forms of modern industry may serve as a basis for a summary consideration of the circumstances which determine the localisation of industries.

We have already noticed in the case of commodities of plant and animal origin that when these enter into world trade they are generally produced in certain special localities which for some reason have a big advantage over possible competitors. Sometimes this advantage can be discounted by human skill; we have seen that Java and Malaya are contesting successfully the Amazon basin's original monopoly of Para rubber. In other cases, as with wine and silk, the old-established producers have hitherto triumphed over those who desire to become their rivals. In general, as we saw, the factors which favour one locality at the expense of another in the case of products of animal or vegetable origin, are suitability of climate, the nature of the surface relief, the characters of the soil, the labour supply, the access to the market, and the density of population, *i.e.*, the cost of the land. Some but not all of these affect also the localisation of the great industries, a subject which rewards careful study.

In the first place it is clear that since manufacturing industries depend upon the working up of raw material of some sort, that locality is favoured which can obtain such raw material easily and cheaply, and since a factory industry depends upon the use of machinery, which must be driven by power in some form, fuel, or water power in the form of electricity, is also necessary. The relative importance of raw material or fuel varies very considerably. The linen industry of Belfast has some local raw material (though not sufficient for all its needs), but practically all the fuel has to be imported. On the other hand in the case of the cotton industry of Lancashire all the raw material must be imported, but fuel is abundant locally, and the local iron industry supplies machinery. In the United States Lake Superior ores are carried to Buffalo to be smelted with Pennsylvanian coal, but Pennsylvanian coal is also carried to Duluth on Lake Superior to smelt local iron ores. In all these cases some special circumstance accounts for the relative importance of coal and raw material. In the last case it is the existence of a market for heavy iron goods to the west of Duluth that makes it worth while to reverse the usual

law that iron is brought to fuel and not fuel to iron.

Dundee is an example of a town whose chief local manufacture (jute goods) is dependent upon both imported fuel and imported raw material; Galashiels (woollen goods) is another though to a less extent, for there is some local wool. In both cases historical causes count for much, and neither can be held to disprove the statement that, in the general case, a manufacturing industry cannot be successful without easy access both to raw material and power. Since the rise of the factory system indeed it has been true that supplies of fuel, which has hitherto been predominantly coal, have been the most influential factor in localising industry. Not all coalfields are suitable for the establishment of industries, but it is rare to find large industries except on coalfields, or in regions where coal can be obtained by cheap water transport. It is possible however that this is a temporary phenomenon, and that water power used to generate electricity may take over to a large extent the function of coal in attracting industry. Indications of this are to be seen in some Alpine regions, in the mountain belt of Scandinavia, and, to a very minor

degree, in the Highlands of Scotland (*e.g.*, the aluminium works at Kinlochleven, where there is no local ore, no local fuel, no local supply of labour, but abundant water power). It is of some interest to note that before coal was extensively used to generate steam in factories, water power, used directly in water wheels, was a determining cause in the localisation of industry, notably in the case of the textile industries of the Pennine counties, the linen industries of Forfar, the early iron industry of the U.S.A. (p. 143), etc. In this direct form water power has ceased in the general case to exert much, if any, influence.

The factory system is closely associated with the rise of modern large towns, whose function from one point of view may be said to furnish a local reserve of labour. The essence of modern industry is that it tends to give rise to great overproduction. Lancashire, for instance, produces far more cotton goods than the United Kingdom can absorb, and the distant markets fluctuate in response to local conditions within the areas in which they are placed. One consequence is that most industries are subject to great variations, they are alternately "slack" and busy.

A portion of the population of all industrial towns forms a labour reserve, absorbed when trade is good, unemployed in periods of depression. Of the social consequences of the existence of this labour reserve this is not the place to speak. Economically it helps to explain why countries in which industries already exist are much more suitable for the establishment of new ones than those whose population has hitherto been agricultural. In Great Britain the labour available for the development of industry arose from the setting free of agricultural labour at the time when the competition of the fertile new lands across the sea began to be felt. In the United States it arose indirectly in the same way, for many of the operatives of the populous eastern towns are Europeans, by birth or descent, compelled to emigrate by the relative decline in value of the agricultural lands of their own countries.

In the states which have been industrialised since the industrial revolution it is not only the labour reserve which is important, tradition also counts for much. In Imperial Russia deliberate attempts were made to establish the factory system by force, instead of allowing it to develop as a natural result

of changing economic conditions. One consequence has been to implant in the peasants a deep-rooted aversion to town life, strongly contrasted with the attraction which the towns exercise on the country people further west. Thus after fuel or power and raw material, the available supply of labour, its skill and its cost, are important factors in determining the localisation of industry.

A fourth element is ease of access to the market, and in the general case this market must be, at least in part, an adjacent one. Both the United States and Germany have profited greatly, in so far as their iron industry is concerned, from the large home market, and from their situation in great land masses, whose inhabitants can be supplied with iron goods without break of bulk. Such countries as New Zealand are never likely to become highly industrialised, for the home market must remain small, and other possible markets are all remote. The position of the British Islands has greatly aided them to develop industry, in spite of their small size, because almost all markets can be reached with ease.

Climate may be named as a fifth cause of the localisation of industry, though it is

especially important only in certain cases. Thus the damp climate of Lancashire is more favourable to the cotton industry than the dry one of Yorkshire, for the threads will stand more tension in moist air. In Lancashire days of dry east wind diminish the earnings of piece workers, owing to the frequent snapping of the threads. Again, what is known as geographical inertia, or the momentum due to early start, has a considerable effect in preventing the establishment of new industries. Birth is always a difficult process, and the going concern can very generally stifle nascent industries elsewhere. Finally, all industries require a considerable amount of capital, and capital is generally available to a greater extent in old countries than in new ones, in those which are already industrial than in those which are chiefly agricultural.

But of all these varied causes, we may repeat, in the history of industry during the last hundred years coal has been the predominating factor. In Europe those countries have become industrial which possessed abundant coal and iron; those without these mineral resources have tended to remain agricultural.

CHAPTER VII.

THE TRANSPORT OF COMMODITIES OVER LAND AND WATER

THE preceding chapters have been devoted to demonstrating that it is an important feature of the modern world that certain commodities, mostly relatively cheap and very bulky, are produced on an enormous scale, a scale which has often no relation to the local demand. We have seen that among the more important of these commodities, so far as world trade is concerned, are the products : —(1) of those forms of agriculture which can be carried on where land and power in some form are cheap ; (2) of the rearing of animals, again carried on in regions of cheap land ; (3) of modern industry, which depends primarily upon cheap fuel and the use of elaborate machinery. Further, we have emphasised the fact that the large production of such commodities is only possible where transport is cheap and rapid, for otherwise

the products would merely glut the local market. From this brief survey of the conditions of modern production we naturally turn to the question of transport and communications generally.

In the last chapter it was pointed out that one cause of the industrial revolution was the fact that the development of the new lands, which resulted in an enormously increased output of raw material, coincided in time with the development, first in England, and later elsewhere, of machinery capable of dealing with such raw material, and with the demonstration that the coalfields could be used as sources of power to drive the machinery. But it soon became obvious that the harnessing of steam not only made manufacture possible on a scale which the world had never witnessed before, but that also it gave man a greatly increased power of dealing with space.

By the end of the eighteenth century the factory system was firmly established in England, and the first half of the nineteenth saw, not only in England but elsewhere, the building of many railways, and the establishment on the great oceans of steamboat services. The utilisation of the electric tele-

graph and the laying of submarine cables came later, but these have proved almost as important for modern commerce as railways and steamships themselves.

It is worth while to notice a few dates, to illustrate the importance of the nineteenth century in connection with improvements in modes of communication. The first ship using auxiliary steam crossed the Atlantic in 1819, and the first railway for general purposes was the Stockton and Darlington line, opened in 1825. The electric telegraph did not come into practical use till 1846, and the first submarine cable was laid some five years later. On the other hand the telephone only dates from 1876, and wireless telegraphy from the early years of the present century. Broadly speaking, it may be said that modern commerce depends upon steamships, railways and the electric telegraph, and is thus a nineteenth century product.

But this statement is far from meaning that at the present time the railway and steamships alone are employed for commercial purposes. Even in the most specialised countries a great variety of modes of transport still exists. This is easily realised when one reflects that the raw

cotton conveyed in huge ships from New Orleans to Liverpool docks, and thus to the railway, may be carried in horse-drawn vehicles from the railway to the factory; and that Canterbury lamb, brought across the seas by the most elaborate modern modes of transport to the retailer, may be ultimately delivered to the consumer by a human porter in the form of an errand boy. Indeed, so relatively commonplace a journey as that from, *e.g.*, Paris to a high Alpine hut will show that almost all known forms of transport co-exist at the present time, even in the heart of industrialised Europe.

It is worth while to sketch such a journey in order to summarise the chief transporting agents. The traveller with his baggage starts in a heavy international train, with restaurant car and sleepers, a collection of vehicles so cumbrous and unwieldy that it demands not only a specially laid track, but one the gradient of which, by means of tunnels, embankments and bridges, has been reduced to a minimum. But the costliness of the original track, and the expense of upkeep are more than counterbalanced by the rapidity and certainty of running. The storms which on the sea delay or may even wreck the great

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liners have no effect upon the train, and for the rapid conveyance of passengers and of relatively small amounts of valuable or perishable goods it has no rival.

From such a train and its connections the traveller may dismount at the foot of a mountain slope, where a specially constructed track, perhaps with trains worked on the rack-and-pinion system, will convey him up slopes entirely impossible to the ordinary express. Here the power used may be derived from some mountain torrent, but even with this cheap source the train must be short, and its carrying power is strictly limited. Such trains are practically incapable of carrying merchandise at a profit, unless the merchandise has much value in relation to its bulk.

The mountain railway may convey the passenger as far up the slopes as any wheeled vehicle can go, or, in other cases, he may find at the upper station a horse diligence or automobile which will carry him still further. Here again the baggage freights will convince him that, at least on steep slopes, such vehicles are not adapted for the transport of bulky commodities. Soon all forms of wheeled transport become impossible, and a

beast of burden, probably a sure-footed mule, must be employed. As the slope steepens still further, and climatic obstacles also intervene, there comes a point where only one transporting agent, the costly, mechanically inefficient, but nimble, human porter can be used.

In the particular example selected the use of unspecialised modes of transport is due to the fact that the relief is very strongly accentuated; the small local production is also not without its influence, for in all cases the means of transport employed depend upon the relation between the physical difficulties on the one hand and the amount of trade on the other. But it is worth note that in some parts of the world commodities which enter into commerce are still conveyed over part of their route by human porters. Rubber, ivory, palm oil are all examples of articles which in Africa are still carried by men or women to the collecting station, and yet ultimately find their way to a very distant market. Again, though generally speaking beasts of burden are too costly to be used in modern trade, yet the camel even at the present day carries on its back across the deserts of Africa and Arabia goods which

enter into world commerce. Finally, as we have already stated, wheeled vehicles, drawn by animals or self-propelled over ordinary roads, maintain to a very considerable extent for short distances their position as agents of transport, even in highly-developed communities. But in all cases there is a very definite limit to the distance over which such relatively unspecialised modes of transport can be employed if the goods are to be sold at a profit. Thus in Australia it is regarded as risky to undertake wheat-farming if the nearest railway station be more than twelve miles away, though once on the rail the grain may be conveyed 11—12,000 miles to the overseas market. It is difficult to put the contrast more vividly than this, and the example may serve to illustrate the importance of the railway and steamboat for modern commerce.

We must next proceed to consider some of the contrasts between land and water transport, a point of very considerable interest. Large water surfaces, such as seas and lakes, have two obvious advantages as compared even with level land-surfaces. The first of these is the diminished friction in water, and the second the theoretical possibility of

movement there in any direction in the horizontal plane.

With rare exceptions rapid movement on land surfaces is not possible except over a specially prepared track, and movement is limited to two directions—forwards and backwards—on this track. A mantle of snow, or more rarely a covering of ice, may give certain land surfaces great advantages as regards diminished friction, and some deserts allow much freedom of movement in many directions. But though a snow covering often facilitates movement, as is well seen in winter in eastern Canada (*cf.* p. 114), in Alaska and in Russia, it is associated with temperature conditions which interfere greatly with human activities, and the same disadvantage applies to ice surfaces, which are moreover often very irregular. Deserts also do not as a rule produce many commodities, so that the relative mechanical ease of communication there is of less importance. Generally we may say that the fact that on land a costly prepared track is necessary, and that this track occupies space which could otherwise be employed in the production of commodities, gives water surfaces a great advantage as compared with dry land.

The other advantage possessed by lakes and oceans is practically of less importance than it might seem. Theoretically any coastal point on a land-locked ocean can be served by water traffic, so that all points should share equally the advantages of cheap transport. In point of fact, however, this is far from being the case, and modern conditions tend to accentuate the advantages of certain stations at the expense of all others. To the original necessity for adequate harbour accommodation is now added the need for means of dealing rapidly with bulky goods, and for good connection by rail with the interior. The result is well seen in the decay of many of the numerous small fishing ports round the North Sea, which, under modern trade conditions, have given place to a few great centres, favourably placed for dealing with the large catches obtained by the steam trawlers.

More important than the freedom of movement over the waters is the fact—which is a consequence of the small frictional resistance of water—that the size of vessels can be increased to a much greater extent than that of vehicles travelling over land surfaces. Apart altogether from the huge floating

palaces destined to carry passengers, the increase in the size of cargo boats has been an important factor in promoting modern commerce. In consequence bulky goods like coal and ores can be carried great distances by water, but the cost of transporting them by land, even under the most specialised conditions, is high, a fact which has had much bearing upon the localisation of particular industries.

On the other hand it is much more difficult to get up a high rate of speed in water than in the case of land travel, and, as we have already suggested, punctuality of running is more readily obtained on land than on water. Storms and winds and currents contest continually man's control of the sea highway, but on land his grip, at least in temperate latitudes, is firmer. In earlier days, of course, wind over water surfaces was an ally as well as a potential foe, this being especially true of those constant winds, or trades, which played so important a part in connection with navigation down to the days of steamships. Under existing conditions the propelling force of wind is not used on the ocean on any great scale.

So far we have said nothing of running

water, which, as water controlled by land forms, is in some ways intermediate between the ocean and the land in its relation to transport. In the case of river navigation, much as on land, the possible directions of movement are limited, the river bed being the equivalent of the track, though its width may give additional possibilities. On rivers also there is a much more definite limit to the size of vessels than in the case of the sea. But the fact that the movement of the water can itself be used as a transporting agent in one direction is important, and makes many rivers valuable means of exploiting the resources of hilly districts, especially their timber (*cf.* p. 114). On the other hand the current is a drawback in the attempt to establish a reciprocal trade. Despite their disadvantages, however, rivers are often of enormous importance in promoting the commercial development of a country, a point to which we shall return in a moment. Meantime we need only add that while often of great use as arteries when considered in the longitudinal direction, when they cross other lines of traffic they form a very considerable obstacle to free communication.

The net result of this brief comparison of

the relative merits of land and water as sites for lines of communication may be said to be that water carriage is better for cheap and bulky commodities, such as those which enter so largely into modern commerce, especially if they are not perishable, or are efficiently protected from bacterial action by refrigeration. On the other hand valuable articles, not of great bulk in proportion to their value, which must be sent rapidly and punctually to their destination, are under modern conditions almost invariably forwarded when possible by rail, in spite of the fact that railway freights are everywhere higher than those for water-borne goods. We may add that notwithstanding the developments of motor traffic, self-propelled vehicles are not yet generally employed on any large scale in commerce, except for short distances.

In addition to land and water the air now presents a third possibility as a medium through which goods may be conveyed. As yet, however, no flying machine has much commercial importance.

Thus we arrive at the conclusion that the "unplumbed, salt, estranging sea" in modern life unites instead of separating. For a

member of a non-maritime people it was possible to visualise the millennium as a period in which there would be no more sea, but the economist knows that were the sea to dry up the nations would be starved as completely as they could be if all their accesses to it were cut off by a stronger sea-power. The modern state, like the modern city, tends to be a parasite on distant regions, but while the city generally spread its "tentacular" railways only over the surrounding lands, the state as we know it has radiating from it shipping routes which reach throughout the world. Not even the United States, with all their extent in latitude, with all their natural wealth, are self-supporting; they import raw material no less than the Old World, and on that Old World they are still largely dependent for labour, carried in the great emigrant ships, as well as for some kinds of manufactured goods.

But important as it is for commerce, we have to remember that the ocean produces relatively little; and is not a consuming area. It is the surface over which most of the world's goods are carried, but is only significant in its relations to the surrounding lands. The products of those lands drain

chiefly towards certain oceans, and only towards certain parts of those oceans. Thus the important point for us to consider is the question of where and how the products of the lands reach the ocean margin, and of the control which geographical features exercise upon the points towards which they converge. In all cases where a country has undergone commercial development the products of a certain land area, large or small according to circumstances, drain towards one or several definite points, which form the great ports. From such a port or ports the commodities are transported across the sea, to some other port, whence they are distributed again to a greater or lesser inland area. The tendency, as we have already suggested, is always for certain ports to predominate at the expense of others, and the reason for the predominance of these is to be sought in geographical facts, in the relation of the port to what is called its hinterland. To understand this relation we have to grasp the principles which determine the lines adopted by land routes.

This implies essentially an appreciation of the importance of river systems, both initially as determining the natural lines of exploration

of a new land, and subsequently as influencing the direction of the made tracks over which land communication takes place.

A moment's reflection will convince us that the exploration of an unknown country almost invariably takes place along the lines marked out by the rivers. This is so whether we consider explorers like Captain Cook landing on unknown shores, or expeditions investigating the interior of little known lands, or climbing parties pushing into the imperfectly mapped parts of the Rocky Mountains or Himalayas. Even where rivers are absent, as on the Antarctic continent, the exception is only apparent, for the explorers follow, when they can, the lines of glaciers, which mark what would be river valleys if it were possible for running water to exist.

Let us note briefly what are the motives which induce an explorer landing on a sea-coast to choose the river valleys as his lines of penetration into the interior. In the first place, of course, the estuary frequently affords a safe and sheltered harbour for his vessel, a place where it can be left without risk. Secondly, the river as a line of advance gives security as regards one important human need—an abundant supply of

drinking water. It gives at least the strong probability of a certain amount of food, for river waters usually contain edible fish, and the banks are often frequented by edible birds and by mammals who come down to drink. The banks usually also give fuel, for they are generally forested to a greater or less extent. Finally, a very important point, the river constitutes a certain means of directing the journey into the interior, and a line of possible retreat. The traveller by river, in marked contrast to the Polar explorer, needs no instruments to guide either his outward or his homeward journey. If the waters of the stream itself are used, they give further the possibility of a retreat swifter than the advance, for the party can go down stream with the current. This is an enormous advantage in totally unknown country.

If instead of considering only the pioneer exploring new lands we direct our attention to the river as a line leading from a known region into the unknown, we have to note that it affords many motives for gradual penetration. Almost all rivers, large or small, flow through regions of different characters, between which there is thus the

possibility of trade. If we regard the course of a typical river as falling into the three divisions of mountain, valley, and plain track, then it is clear that the productions of the three belts which it traverses are likely to be in marked contrast to one another. The mountain area may produce ores, it often affords good pasturage, either to wild animals whose hides and flesh are of value, or later to man's flocks and herds. The valley track is frequently forested, and will produce wood and possibly other forest produce. The plain track is likely to have around it cultivated lands, or may serve as the site of settlements within which there is a demand for the products of the upper reaches. The river affords a means of transport, and thus a considerable number of motives exist for the establishment of settlements first in the lower parts of the river's course, and later at successive points up its valley.

It is obvious that in the general case the lower reaches of rivers are more likely to be navigable than the upper, and that large rivers, flowing through regions of no great relief, are more useful than small ones traversing highly accidented country. But to this rule there are exceptions. Parts of

Canada, more especially the Eastern Highlands, contain a network of small streams, often broken by rapids, which are nevertheless still of great use as lines of communication, and in earlier days were the only means by which it could be carried on. Owing to the recent glaciation of the country the headwaters of these streams sometimes interlace, and the water partings are always low. Rapids are frequent, but the resultant stretches of interrupted navigation are short. Further, in the region generally movement on land is only effected with great difficulty. The density of the forest, the superabundance of streams which must be crossed, the numerous marshes, make summer travel on land all but impossible except with elaborately made roads, involving the construction of many bridges. The result of these conditions was the invention by the North American Indian of the birch-bark canoe, which can find its way up the narrow streams, can be readily transported past interrupted reaches, or over the low water-partings, and is well adapted for the transport of small quantities of valuable goods, such as furs. The canoe was taken over as a means of transport by the French *voyageurs*, and not only the initial

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exploration of Eastern Canada, but also the trading of early days, when furs constituted the chief product, was carried on by its means. It will be noted that fuel, always a bulky commodity whatever form it takes, did not need to be transported, for it was everywhere available in the form of wood, and the forest also yielded a considerable amount of animal food. Thus, with all its obvious disadvantages, the river system of Eastern Canada could be extensively used in the earlier stages in the development of the region, when the only articles of trade were small in proportion to their value.

But the usefulness of the river as a line of advance is not dependent upon the possibility of its navigability. For reasons which we need not consider here, streams often flow in valleys which are much too large for them, and the sides or walls of the trough afford space first for track, then for road, and later for railway, which may thus all three penetrate far up into a mountain region without difficulty, or with little difficulty. The Rhone from nearly its source to its point of entrance into Lake Geneva lies, for the most part, in such a wide, empty valley, and it is interesting to note that this valley

is utilised, nearly throughout its length, by one great transcontinental railway route, that of the Simplon. Further, since rivers, owing to their double action as eroding and as transporting agents, tend to give rise to valleys whose slope is much gentler than that of the adjoining country, these valleys, especially in certain parts, form the easiest line of advance through a country, and tend to be followed by lines of communication in all cases where the surface is accidented.

But it frequently happens that the valley floor is either permanently marshy, or liable to flooding. In Europe also, before the forest was so largely cleared as it is now, the valleys were very generally clothed with dense thickets which presented great obstacles to communication. For these reasons roads in early days more often ran along the shoulder of the sloping walls of the valleys, than over their floor, and sometimes even rose high up on the bounding hills, where the forest was absent or thinner, and the ground firmer. In such valleys it is not at all uncommon to find still the old road, sometimes reduced to a track, with its heavy gradients, and below the modern road, close to the river, often changing from one side to the other by means

of bridges as the ground alters in character, and beside it the railway, both having gentle gradients as compared with the reckless fashion in which the first track attacked slopes, with, apparently, the one object of finding the nearest route between two points. The effect on road and rail of sudden bends on the course of a stream is a fascinating subject but one which we must not stop to consider here.

The passenger on the valley track has one great advantage over the boatman on the stream in that the latter's progress, save in exceptional cases such as those which we mentioned above as occurring in Eastern Canada, is blocked as he nears the headwaters of the stream. On the other hand, at least throughout much of Europe and North America, the pedestrian as he approaches the source of the stream in the hills very frequently finds ahead of him a gap on the skyline, forming a pass or col. He knows that beyond that pass he is likely to come upon some other stream which will again guide him downward to a lowland area, and both history and psychology teach us that he tends to follow the lure of the pass. It is worth note also that the river as guide does

not abandon him till it has ceased to be necessary, for from the crest he has a wide view over at least two valley systems, and is high above the trees and surface irregularities which bound his horizon below. Further, if the hills or mountain reach a considerable height, there is a probability that the hither side will differ in climate, character and productions from the region he has left, and therefore here again the possibility of trade will arise, but on a larger scale than within the limits of a single river valley. The importance of this crossing of the passes is notably illustrated in the history of the United States, which did not prosper till pioneers had pushed over the eastern highland, and entered the wide plains beyond.

We shall devote the next chapter to an application of the general points just considered to the different continents of the globe, in order to show their bearing in actual practice. Meantime we may sum up this one by saying that, owing to the fact that commodities are more easily carried over water than on land, those which enter into world trade tend to gravitate towards the great oceans, following in their journey thither the lines marked out by the river

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valleys, which form the easiest routes, and also possess, in the general case, characters which stimulate up and down trade within them. Because of the important part played by the river valleys, we find that the Atlantic, the ocean which receives by far the greater part of the land drainage of the world, is the most important commercial ocean, and, broadly speaking, the capacity of countries for commercial development may be measured by the ease and rapidity with which their products can reach its shores.

CHAPTER VIII.

THE STRUCTURE OF THE CONTINENTS AND LINES OF COMMUNICATION ON LAND

WE discussed in the last chapter the reason why bulky goods must be transported over water, rather than by land, and saw that in consequence particular regions can only produce such goods for purposes of world commerce if they have easy access to open water, and preferably to the Atlantic, which washes the shores of the chief commercial countries of the world. We went on to show that goods tend to drain from the interior towards the sea along the same lines as those by which water flows to the ocean, partly because rivers wear out an easy pathway, which can be generally utilised by man, at least in sections of their course. In this chapter we propose to consider first the continents of the world from the point of view of the ease of access of their various

regions to the great oceans, and then to say something in regard to the distribution of roads and railways, and the causes of the rise of large towns.

It is clear that, other things being equal, a continent will be well-fitted to engage in world trade when its coast-line is long, and when its rivers have direct connection with the most productive areas within them on the one hand, and with the Atlantic Ocean on the other.

In regard to the first point we can draw an interesting biological analogy. It has been shown that among the very simple forms of animals which are found in water, both fresh and salt, there is a well-marked limit to advantageous size. Each little organism feeds and breathes by means of its surface, and when it increases in size the bulk grows more rapidly than the surface, and thus the inner parts of the cell body would starve, were it not that division into two parts is effected, as it were automatically, as soon as the limit of advantageous growth is reached. All countries which have undergone any degree of commercial development are fed through their sea-coast, but unfortunately they cannot, like the amoeba, increase their

water boundary at will. France, with an Atlantic Coast, a Channel and North Sea coast, and a Mediterranean coast, is by nature better fitted to engage in trade than Germany ; much better also than pre-war Austria which had only a very short Adriatic coast. Similarly North America, with an indented coast-line, and many bays and inlets, is better fitted for trade than Africa or Australia, in both of which the coast is remarkably uniform.

In the second place it is not sufficient that a country should have good river systems ; those rivers, to be commercially useful, must communicate on the one hand with productive belts, and on the other with the open ocean. The Diamantina, which makes so brave a show on the map in Central Australia, fulfils neither one condition nor the other ; the Volga flows through fertile lands and is an important internal waterway, but it ends in a " dead " sea, and is thus virtually useless for foreign trade.

With these points in mind let us look generally at the characters of the continents. It becomes obvious at once that Europe, and, to a less extent, North America, are highly favoured. Taking Europe first we see that not only is its coast-line greatly indented,

with many bays and navigable estuaries, but that—a very important point—the ocean is continued far into the land by the great inland seas of the Mediterranean and the Baltic, with their respective connections and continuations. Owing to the presence of the Mediterranean, ocean-going ships can penetrate to the extreme eastern boundary of Europe in the south, and the Baltic, at least in summer, plays a very important part in the commerce of the north. No other continent has so extensive a coast-line in relation to total area as has Europe, and therefore in no other continent is it so easy to bring the produce of the land to the ocean margin.

Further, the Great European Plain, traversed by many branching river systems of great extent, opens directly to the sea. No marginal upland, as in North America, presents an obstacle to the seaward movement of men and goods. It is true that, on the other hand, the Mediterranean Sea is all but surrounded by a mountain ring, but that ring is interrupted at certain critical points by gates through which the stream of traffic may flow, and the volume of this stream is swollen by that climatic difference which the

northern mountains are so important a factor in producing.

A physical map of Europe will enable us to note its advantages in a little more detail. On such a map we see at once that the western countries, and especially the United Kingdom, France, Belgium and Holland, and (in part) Germany, have notable advantages over the southern and eastern. It is not only that these countries are near to the Atlantic, and thus to sources of raw material and to extra-European markets generally, but their productive plains are near the coast, and, owing to the position of the mountain ranges and highlands, they are traversed by large, often slow-moving and copiously branched river systems, which open up their lands to their furthest extremities, and afford easy routes from all parts to the sea.

Let us note for a moment the special characters of Great Britain. It would appear, at first sight, as though the island suffered from a great disadvantage since the uplands here are western in position, the plains lying to the east. But, especially in England and in Midland Scotland, the uplands are broken by openings, the Cheshire Gap being especially important, and, further, owing to the island

character, the eastern plains are directly accessible from a sea which is but a part of the Atlantic. The rivers in this case do not merit special note, for the distance between any part of the interior and the sea is so insignificant that no great difficulty in regard to the construction and maintenance of land routes presents itself.

Turn next to the adjacent continental countries. The rivers here flow generally westward or north-westward. Sometimes, as is notably the case with the Rhine, they open up pathways through what would otherwise be difficult country, and since a considerable part of their course is in all cases over the Central European plain, they can be linked together by canals, and their valleys offer also few obstacles to the construction across the plain of transverse land routes.

In the case of France the relation of the Atlantic-flowing rivers to those which enter the Mediterranean is particularly interesting. We spoke a moment ago of the gates which break the Mediterranean mountain rim. One of the most interesting of these lies within French territory, and is formed by the Rhone valley in its lower course. Most of the rivers of France rise in the Central Plateau, and

flow to the English Channel or to the Bay of Biscay. But that Central Plateau is separated from the Alps and their connections by a wide trough, through which flows first the Saône, and then the united Saône and Rhone. Owing to the course of the Saône, and also to the way in which the great western rivers have eaten back the Plateau, there are easy passages in almost all directions from the Rhone valley trough both to western and north-western France, and to the countries lying to the north and north-east. The trough itself affords, of course, a direct passage to the Mediterranean Sea. One consequence is that practically all the large rivers of France can be, and are, connected together by canals, and another is that the two sea-boards of France, the oceanic and the Mediterranean, have a singularly intimate connection with one another. More than this, the country as a whole is admirably fitted to act as an intermediary between the Mediterranean countries and the oceanic ones, a part which it plays both as regards goods and passenger traffic. Further the marked contrasts in climate and productions between the different parts, and yet the ease of internal communication,

make the country more self-sufficient than either a purely Atlantic or a purely Mediterranean state can hope to be.

To some extent, no doubt, the very advantages for internal trade, and the varied products of the different regions, have, in combination with a relative paucity of coal, helped to check the commercial development of France, which remains largely agricultural and self-sufficing. It is interesting indeed to note the contrasts with Germany, a country whose external trade is much greater. Germany suffers from the obvious disadvantage that the North Sea coast-line is short, the greater part of the seaboard facing the Baltic, a sea in which navigation is interrupted by ice in winter. It has the advantage of numerous rivers flowing across the coastal plain, which are easily connected with one another by waterways. Over this plain, also, railways and roads can be constructed without difficulty. But German territory includes a part of the course of the Danube, a river which, owing to the fact that it opens into the Black Sea, and that after a long course, and not into the Mediterranean, is, despite its navigability, of far less commercial significance than the shorter Rhine.

The course of the Danube, indeed, which is associated with the structure of the central mountain mass of Europe, has much bearing upon political ambitions in eastern Europe. From the standpoint of modern trade the fact that it flows away from the most important commercial region of Europe is significant. Its direction affects the commercial development of Austria and Hungary more than that of Germany, but before leaving the latter country we should notice that the fact that it has, relatively, considerable difficulty in communicating with the Mediterranean region, and thus with the east, is a great disadvantage. The world has been witness of the way in which Germany has sought to employ military power to remove her two great geographical disabilities as a trading country—her short North Sea seaboard, and her difficulty in communicating directly with the south of Europe and the East generally, but it seems worth while to emphasise here the connection between geographical conditions and foreign policy.

The vast Hungarian plain is watered by the Danube and its tributaries, and for Austria and Hungary, much more than for Germany, the direction of the main stream is a geo-

graphical calamity, which is only accentuated by the productiveness of the great plain, and the ease of communication over its surface. The former Dual Monarchy was constrained to seek an outlet to the south-west, over the lip of the mountain rim which encircles the plain. But neither Trieste nor Fiume are geographically well-adapted to serve as outlets, for both are backed by mountains.

Trieste has the further disadvantage that it may be regarded as marking approximately the eastern boundary of the great North Italian Plain, which, like the Hungarian one, is separated by mountains from what would have been its best outlet, the south-western one. The Italian plain is the most important part, commercially, of the Italian peninsula, and the relative difficulty of communicating with Genoa over the mountains, no less than the direction of flow of the Po, tends to make its products seek an eastern outlet. Because Venice is not a good port, from the modern standpoint, and the coastline on the Italian side of the North Adriatic is nowhere suitable for the establishment of a great modern port, Italian ambitions have been naturally directed towards Trieste; though other factors are also involved. We cannot

discuss here these questions in detail. All that it is wished to suggest is that while Europe as a whole, and especially western Europe, is well adapted for modern commerce, both from the structure of the land, and from the way in which the sea runs up into the land, yet in detail, especially to the east and south-east, the demands of modern commerce, combined with the existence of separate states, whose fiscal arrangements tend to block natural outlets, give rise to many difficulties. These difficulties had much to do in leading up to the great war, and the post-war settlement has as yet failed to solve them.

Before leaving Europe, however, we must say a word about the conditions in Russia, a country which, in its relation to the sea and in the nature and course of its rivers may be regarded as intermediate in character between Europe proper and Asia.

Owing to the way in which Europe widens out where it joins Asia, the interior of Russia is much further from the sea than is the case with any other part of Europe. More than this, though Imperial Russia touched three seas, none of these was of much use for commerce. The Black Sea has the great dis-

advantage of communicating with the Mediterranean only by narrow, easily-blocked straits; the Baltic Coast is short, and, further, pre-war Russia's share included the part where the winter interruption of navigation by ice is longest. The Arctic Sea, which washes the north coast, has only a short period of free navigation, and the coast here is remote from the most productive regions.

On the other hand, the numerous large rivers, the generally gentle relief, render internal communication easy, and were it not that the rivers mostly end in seas or parts of seas which are of little or no use for commerce, Russia's capacity for participating in world trade would seem to be great. We have already indicated that in the productivity of her lands from the point of view of cereal production she is comparable to the New World, and it is interesting to contrast her facilities in the way of land communications with those of the United States.

To indicate the contrasts let us consider generally the characters of the North American continent as compared with Europe. The most important feature here is that from Labrador southward, *i.e.*, within the region

climatically available for settlement, the eastern coastline is deeply indented, with numerous estuaries and bays, affording deep and safe harbours, often protected by islands. In the United States this is especially true of the coast from Cape Hatteras northward, the most important commercial region. Inland from this broken coast line lies the Atlantic Coastal Plain, not well adapted for wheat-growing, at least in the north-west, but generally fertile and productive. This plain slopes upward to the system of hills and plateaux to which the general name of Appalachian Highland is given, and it is obvious that here we have one of the disadvantages of the United States as compared with Europe. The richest and most productive agricultural lands lie beyond the belt of Highland, and stretch in a huge series of plains, westward to the Rocky Mountain system, northward into the Arctic wastes, southward to the Gulf of Mexico. The most direct ocean outlets for these great plains are therefore northwards to Hudson Bay, or southward to the Gulf of Mexico. Hudson Bay is as yet of no commercial importance. Hopes are entertained that it may be possible to utilise it in the near future as a summer

outlet for parts of the Canadian plains, but the climate must always be an obstacle. Again, the Gulf of Mexico, though free from any climatic drawback to navigation all the year round, and having easy and direct communication with the Atlantic, is some distance from the most frequented trade routes, always a disadvantage in modern commerce, where the most frequented routes are the cheapest and the most efficiently managed.

It might be thought then that the great plains of the United States would have some difficulty in getting their products to the market. A number of causes, however, minimises the apparent disadvantages of their position. In the first place the Appalachian Highland is pierced by a number of passage ways which facilitate commerce with the interior. The most important of these is the wide Hudson valley, leading northwards from New York, into which there opens from the west the Mohawk valley. The Hudson-Mohawk valley gives, over a low watershed, easy communication with the plains round the Great Lakes. When, in 1825, the natural means of communication here were supplemented by the opening of the Erie Canal,

which connects the lake of that name with the Hudson valley, and so with the seaboard, New York suddenly increased in importance, and the wheat of the near west first became available at a cheap rate to the inhabitants of the eastern belt.

We have to note further that there is easy connection between the headwaters of the Hudson and Lake Champlain, from which the Richelieu river leads directly to the St. Lawrence. Again, further south than the Hudson, other rivers, notably the Susquehanna and the Potomac, run in valleys which penetrate into the Highland, and make it relatively easy to traverse this.

Important, however, as these river valleys are they would not in themselves be enough to permit of the establishment of extensive trade between the Atlantic seaboard and the interior plains. That commerce is greatly facilitated—we might almost say originated and maintained—by the existence of the series of Great Lakes which form together a body of water which has been described as the Mediterranean of the States. The comparison is quite unjust if we think of area, for while Europe and the United States are of approximately similar extent, the total water

surface of the Great Lakes is less than one-tenth of that of the Mediterranean. But it is, on the other hand, quite justifiable if we consider commercial importance, for that of the lakes to North America is enormous.

Two facts greatly increase their importance. The first is that the lakes lie in a lowland region and their banks are almost everywhere such that harbours can be constructed at any point at which it happens to be convenient for a railway to approach. No encircling mountain chain here, as in the Mediterranean, excludes whole tracts of the shore from participation in modern commercial life. Further, in marked contrast to so much of the Mediterranean area, the surrounding lowlands are highly productive from the agricultural standpoint, and minerals, rare in the Mediterranean zone, occur within easy reach.

The second fact which increases the value of the great body of water formed by the lakes is that a number of large river systems and valleys can be reached from them without difficulty. The lakes as we know them are relics of glacial conditions, and it is believed that as the ice withdrew northwards the water first escaped seawards towards the Mississippi by a route the exit of which from

the lake area is marked by the position of the Chicago of to-day. As the ice-front retreated still further a lower outlet was afforded directly to the east by the Mohawk valley. Finally, at a still later stage, as the ice disappeared from the St. Lawrence estuary, the surplus waters escaped in that direction, and present conditions were established.

Such deductions belong rather to geology than to commercial geography, but we state them here because they afford a convenient means of emphasising the very important fact that from the Great Lakes there is easy access not only to the Mohawk-Hudson valley, but also to the St. Lawrence on the one hand, and to the great Mississippi system on the other. The political frontier, and the effect of the presence of the Niagara Falls, as well as the fact that the St. Lawrence is ice-blocked in winter, combine to diminish the importance for the United States of the present direct sea-exit of the lakes. One of these difficulties, the obstacle of the Falls, is circumvented by the Welland Canal (first canal completed in 1829), which runs parallel to the Niagara river, and connects Lakes Erie and Ontario directly. But this canal was later in date than the Erie canal, is even in

its improved form somewhat shallow, and the traffic through it remains small.

The relatively small importance of this outlet increases that of the other two, and it is necessary especially to lay stress upon the easy connection with the great rivers which unite to form the Mississippi, for it is the combined presence of the Great Lakes and these rivers which has made the development of the interior plains of the States possible. Among the tributaries of the Mississippi the Ohio should be specially noted. The northern headwater of this stream, the Alleghany, rises not far from the shores of Lake Erie, and thus the river is well fitted for the part which it has played in history, that of serving as a line of advance from the coastal to the interior plains. Further, the point where the southern and northern headwaters of the Ohio unite, where now stands the town of Pittsburg, is not far removed from the source of the Susquehanna river. As a result the Ohio basin, and with it the Mississippi system generally, has here an easy exit across the Highland to the Atlantic coast.

To sum up then, the most obvious defect of the United States from the commercial

standpoint, the fact that the fertile inland plains are cut off from the Atlantic coast by a belt of Highland, is minimised by three great facts:—(1) the presence of several important river valleys, affording easy access from the Atlantic coast into the Highland; (2) the existence of the Great Lakes, which stretch far to the west, and facilitate greatly communication between the interior and the sea, especially to the north; (3) the existence of the great Mississippi system, and especially of its mighty eastern tributary, the Ohio, which takes on the function of the Great Lakes in facilitating communication between the coastal belt and the interior, just in the region where the effect of the lakes is least felt. The advantages which the plains of the States enjoy as compared with those of Russia are thus obvious. They have easy communication with the Atlantic; the Great Lakes may be said to form a small northern "Mediterranean," while the Gulf of Mexico may be regarded as functioning like a southern Mediterranean.

As it is meantime chiefly the eastern half of the United States which has undergone commercial development we need not stop to consider the structure of the western half.

But it may be noted that the western mountain axis, though a disadvantage in that it renders intercourse between the east and west coasts more difficult than it would otherwise be, is an advantage in that it helps to produce that climatic contrast between the different longitudinal belts of the States which is a direct stimulus to transcontinental traffic. We may notice further that the proximity of the mountain axis to the Pacific coast diminishes the size of the zone which can be economically developed from that coast. But this is only another way of saying that here, as usual, Pacific coasts with their short rivers are less important than Atlantic ones where the rivers tend to be longer.

In regard to the other continents we need only point out that Asia suffers greatly from the fact that the northern plains slope to a sea largely ice-blocked, which renders the splendid rivers of the plains relatively unimportant. Further, the fertile plains of the east and south-east are cut off by a huge block of mountains, plateaux and deserts from the western plains, and have therefore undergone independent development. Meantime it is not too much to say that Asia, despite the existence of the Trans-Siberian

railway, has not as yet undergone commercial development as a whole; only certain separate regions have been brought within the sphere of modern commerce. To an even greater extent these statements are true of Africa and South America, and in both cases the most important areas are those in which navigable rivers occur, the Nile in the one case and the La Plata system in the other. The Amazon system, despite its obvious advantages, has not yet been won for trade, for civilised man has as yet failed everywhere to conquer the equatorial forest, though long ago he conquered the temperate one.

Australia, which has the supreme advantage of forming one political unit, is handicapped by the great desert of the interior, and by the defects of the Murray-Darling system, the single great river.

The next point is to show how the existing land routes are, as it were, superimposed upon the continental structure just outlined, and to illustrate this we shall take an example in Europe. The continent differs from that of America very markedly in this respect, that while here modern commerce, with all its peculiarities, developed in a region in which less specialised forms of trade had

existed for centuries, in America there were, throughout much of the country, virtually no roads nor definite lines of communication till the modern period. In Europe a complete map of the ways of communication on land is comparable to a palimpsest, for old, half-obliterated ways coexist with new ones. In the United States, on the other hand, trade and lines of communication developed side by side, and the development of the routes is still incomplete. The difference justifies us in taking some account of historical facts in the case of Europe.

We know that civilisation first reached a high standard in parts of the Mediterranean area, taking this term in the wide sense to include the lands of similar climate to the east of the actual basin. Thus in early days the Mediterranean Sea was the magnet which attracted commodities, just as is now the North Atlantic. But, as already suggested, it is one of the disadvantages of the Mediterranean, that, owing partly to the generally low rainfall, and partly to the encircling mountains, large river valleys opening directly into the sea are rare. One of the more important of these is the lower Rhone valley, that widely-open trough which leads into the

heart of France. Northern and western France, like the north-west of Europe generally, was in very early days an all but unexplored region, a Mediterranean "Far West" as it has been called. But many centuries before the Christian era it became known that this western world held stores of that metal, so precious to the ancients, namely tin. The tin deposits of Cornwall are well known, but Brittany also in early days contained, between the mouth of the Vilaine and that of the Loire, the same metal. Perhaps so early as the fifth century B.C. it was possible by means of the Rhone valley to reach the north-western tin deposits overland through France. Strabo, writing near the beginning of our era, quotes an earlier writer, Posidonius, as saying that British tin was sent to Marseilles in his time, while Diodorus of Sicily, also writing in the first century B.C., describes how the metal was carried by horses from the shores of the Strait of Dover to the mouth of the Rhone in thirty days. If the traveller to-day, making the same journey in some 18 hours, has cause to congratulate himself on living in the age of steel and iron, he must yet remember that the route down which the great expresses thunder night and day, is in

all essentials that which was trodden by the patient packhorses over two thousand years ago.

Initially, then, the track from the lower Rhone valley to the shores of the Strait of Dover was opened for a transit trade in tin. But while in the Rhone valley proper the lie of the ground, and the small productivity of the surrounding region, tend to make the existing routes preserve their original character as lines of transit trade, the fact that to the north and west there lie fertile productive plains, has not only resulted in a multiplication of ways here, but has also led to the linking together, by many side tracks, of the radiating roads which in Roman times spread out from the Rhone valley trunk.

The railways to-day are far too numerous for us to attempt to describe them here. Let us note only a few interesting general points. If we take the roughest of railway maps we cannot but be struck by two features which are common to railway maps of all commercial countries. In the first place the lines form a network, there dense and here loose, and in the second certain towns stand out vividly owing to the way in which the lines converge upon them, giving what

French geographers describe as the spider's web effect. Of this Paris is the most striking example on the French map, and it will be noted that Marseilles, though an important port, has no web of lines about it, while smaller towns like Orleans and Tours have, showing that the effect is not due merely to the size of the town.

In discussing first the causation of the close network of lines we have to note that this implies a considerable production of commodities in the region concerned. If on a physical map we perceive that the rivers of a particular region have many tributaries, we know at once that there is a heavy rainfall, if not in the region itself, at least in some closely adjacent one. Similarly if a main railway trunk has many interlacing branches, we know that the line is running through a productive country. Again, when the map of North Africa shows us the Nile running through a land which for some 1,700 miles yields it no important tributary, we conclude at once that the country through which this section of the stream flows must be rainless or almost so. The mere fact that the river, unfed from either bank, contrives nevertheless to reach the sea, and reach it

as a still mighty stream, convinces us further that it must take its origin in a region of great precipitation—the fact that this is seasonal precipitation does not need to concern us here. If we again apply the analogy to railway routes, we are led to believe that a main line running through many miles of territory, and yet receiving few or no branch-lines, is carrying transit trade, and is crossing an unproductive country; or at least one whose products are meagre, or which is as yet undeveloped. The Trans-Siberian is perhaps the best example of such a trunk route, but on a very much smaller scale, the section Lyons-Marseilles of the Paris-Marseilles line illustrates the same point.

The tin road from the vicinity of the mouth of the Rhone to the Strait of Dover was the precursor of a very loose network of roads which in Roman times traversed France. These roads diverged from certain centres to a comparatively small number of points which were again connected by main roads, but the places off the main roads can only have been served by tracks or paths. That early net has been replaced to-day by a very much denser net of railways, roads and waterways. Through all the changes

certain general features have been preserved. Thus the main routes have always kept much the same general direction, a direction determined by the physical conditions, though certain centres, for instance Reims, have lost much of their early importance. Further, regions, such as the northern plain, which had a relatively dense network of roads under the old conditions, have also a relatively dense network of routes under the new, while those, like the Central Plateau, which were scantily served in the old days, have, despite the total increase of ways, still a relative paucity.

On the other hand though certain centres, such as the present Lyons and Reims, even in those early days showed a tendency to drag roads towards them, that tendency was far less marked than it is at present. Broadly speaking it may be said that Paris is so much the centre of the French railway system, that it is an economy of the traveller's time, if he be almost anywhere in North France, and wishes to reach some considerable town, to travel first to the metropolis and make a fresh start from there. In other words the centralisation reaches a much higher degree than even the map suggests, and the advantages of modern travel are largely con-

centrated upon a few routes which start from the capital. This concentration is of course but one aspect of the modern tendency to the formation of great cities, which, once started, often tend to outgrow the size which the original advantages of the site seem to justify.

In detail the determining causes of the exact site of such great towns are manifold ; a few have already been considered in *Modern Geography*. But whatever be the geographical accident to which the city owed its original foundation, its growth into a modern commercial centre is conditioned by two main factors. It must occupy an intermediate position in relation to great markets, and it must be itself situated in a region of great productivity. In both cases of course it is understood that there must be easy lines of communication connecting the city with the producing and consuming areas. For example, Lyons stretches out one arm to the Mediterranean direct by the Rhone valley, and thus reaches the products of the east by that sea, while it puts out another "tentacle" towards Italy by the Mt. Cenis and thus reaches the Mediterranean again. It is connected also with the coalfields of

St. Etienne, draws local supplies of raw materials from the lower Rhone valley, and is connected northwards to Paris no less than to North Switzerland and to Germany.

But it is a small centre compared with Paris which draws abundant supplies from all the plain around, a plain which is agriculturally rich, and has also to the north mining and manufacturing towns. The ease of communication over the whole of the European Plain again enables Paris to trade with a vast extent of territory, despite its distance from the sea.

Paris in its turn is a small centre compared to London, lying in that part of England which was originally the richest; but drawing also easily upon the new mining and manufacturing areas of the Midlands and North; linked by sea-routes to virtually every market of the world, and occupying an intermediate position in space between the new countries which produce raw material, and the old countries which use it in their manufactures.

On the other side of the Atlantic New York, though still smaller than London, is a very striking example of an *entrepôt* city, this being the name given to trade centres of

the type we are discussing. New York is the centre of a very busy industrial region. For the reasons we have discussed it has very easy access to the rich agricultural lands of the inland plains, and as a seaport on the western margin of the North Atlantic it stands midway between the producing and the consuming areas, whether we consider raw materials or manufactured goods. Its importance is suggested by the enormous number of routes which converge upon it, and by the statistical fact that no less than 44.7 per cent. of the foreign trade of the United States passes through its port.

We cannot discuss here the causes which determine this concentration of trade at a few great centres, nor yet enter upon the wider question of whether this predominance is likely to be permanent. It may be sufficient simply to say once again that modern commerce means the application of wholesale methods, the abundant use of machinery which will only pay when operations are conducted on the grand scale. The traveller in France who willingly takes a short extra journey to Paris rather than face a cross-country journey from one provincial town to another, is but taking a course which

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commodities also tend to follow. Running water wears away its bed and the tramp of feet, if indirectly rather than directly, tends to smoothe out the obstacles in a path. So also the flood of commerce pouring in one definite direction makes for itself an easy channel, and cannot readily be turned from its course once the stream is established.

CHAPTER IX

THE STATE AS MARKET : INDUSTRIAL AND AGRICULTURAL STATES

WE saw in the first chapter of this book that commercial geography deals with the production, transport and exchange of commodities. Now we have already considered in some detail the chief commodities which enter into world commerce, and the conditions under which they are produced on the large scale. We have also discussed the lines along which transportation tends to take place on land, and the chief modes by which it is effected. There remains for treatment the market, that is the area in which the actual exchange takes place. All states are to a greater or less degree markets for commodities produced outside their boundaries, but it would obviously be impossible within the limits of space available to describe, even in briefest outline, the

more important of these. We shall therefore confine ourselves to a study of certain representative communities.

If we take a general survey of the chief trading states, confining our attention in the first place to their total trade and the relation of their exports to the imports, we find that they fall into two main groups. In the one we have states in which large-scale industry is carried on, and such countries, in the general case, show the peculiarity of importing far more than they export. On the other hand the states of the second group, in which agricultural activities predominate, tend to export more raw material than they import manufactured goods. The accompanying table, which shows the total value of the foreign trade, and the percentage value of exports and imports of two pairs of states in the pre-war period may serve to illustrate the point :—

<i>State.</i>	<i>Total trade in millions of pounds, 8 yrs. aver- age, 1911-13.</i>	<i>Percentage of exports.</i>	<i>Percentage of imports.</i>
United Kingdom	£1,327	45%	55%
Germany ...	£996	47%	53%
India	£312	53%	47%
Russia ...	£207	57%	43%

It will be noted from this table that while the total foreign trade of India in the period specified was less than a third of that of Germany, the relation of exports to imports, or what is called the balance of trade, was reversed, India having 53 per cent. of exports, and Germany 47 per cent. Owing to an economic doctrine which still lingers

in some quarters, and has recently received a new lease of life owing to the peculiar conditions which exist during war, the condition in India is described as a "favourable" balance, and that in Germany an "unfavourable" one. We should, however, try to rid ourselves of the prejudice which such a nomenclature may tend to rouse, and realise that the cause of the relation between exports and imports in any particular case is to be found in the special conditions of the country concerned, its geographical position, its social and economic history, and a number of other causes which require special consideration.

Let us begin by looking at the trade of the United Kingdom in a little detail, with the object of discovering the reason why before the war we seemed able to buy so much more than we sold, and yet were not on this account nearing bankruptcy.

As stated in the table given above, the average annual overseas trade of the United Kingdom, as determined by a consideration of the last three years free from war disturbance, was £1,327,000,000, an enormous figure in which imports counted for £730,000,000, and exports for £597,000,000.

In the official *Annual Statement* of our trade, the imports are classified under three headings, whose names and amounts are indicated in the table which follows:—

IMPORTS INTO THE UNITED KINGDOM.

3 years' average, 1911-13.

<i>Nature of Commodity.</i>	<i>Amount, in millions of pounds.</i>	<i>Percentage of total.</i>
(1) Food, drink & tobacco	£280	38%
(2) Raw materials and articles mainly unmanufactured	£270	37%
(3) Articles wholly or mainly manufactured ...	£180	25%

From this table it is clear that in the first place we import a very large amount of food, in the broad sense, and second a very nearly equal amount of raw material. Less important, but still noticeable, is our large import of goods partly or wholly manufactured.

Going a little more into detail we find that under the first heading grain and flour is by far the largest single item, wheat being the predominant kind of grain. Meat is also very largely imported. Now it is clear that the fact that we obtain from other countries articles such as wheat and meat, commodities which, so far as climate, soil, etc., are concerned, could be home-produced, speaks to very different social and economic conditions from the mere import of articles like tea, coffee, cocoa, wine, tropical fruit, etc., which could not, under any circumstances, be products of our own agricultural industry.

Under the second heading the largest single item is cotton, which accounted, in the period named, for more than one quarter of our huge imports of raw material. Wool is the next largest single item, but it only reached about half the average for cotton. England was once a considerable exporter of wool, and the appearance of this commodity in her list of imports, especially on so notable a scale, is another indication of the relative unimportance of the agricultural and pastoral industries at the present time in the activities of the community. Obviously our home

supply of wool, no less than of wheat and meat, is now insufficient for our needs.

Under the third heading, that of articles wholly or mainly manufactured, we find that metals and manufactures of metals bulk most largely, forming about one-fourth of the total. There are two reasons for this. In the first place though parts of Scotland and England are rich in mineral deposits, especially coal and iron, yet other metals, notably tin, for which there is a large demand, are present only in small amount, and even our iron deposits, extensive though they once were, cannot meet all the demands made upon them. Other metals again are not represented in Britain at all. In the second place, we have to notice that, as a general rule, metals are not imported in the crude state, for their bulk, weight and relatively small value make this uneconomical. More than this, it is not infrequent for British manufacturers to confine themselves to the more skilled operations connected with the use of metals, the less complicated processes being carried out in the country of origin. This explains why our imports of metals tend to appear chiefly under the heading of manufactured articles,

rather than only under that of raw materials.

Other important items under the heading of goods partly or wholly manufactured are due to the fact that, owing to difficulty in obtaining raw material, or want of skill, or imperfect technique, or the price of labour, or a combination of such causes, many classes of goods are not made in this country, or are made in different qualities or at different prices from those obtainable elsewhere. Among such articles are dyes and many chemicals, made chiefly in Germany.

If we sum up the main facts shown by the statistics just given in regard to our imports we may say that we import large supplies of food, especially wheat and meat, large amounts of raw material, especially cotton and wool, and considerable amounts of certain kinds of goods wholly or partially manufactured, especially metals. A certain amount of these manufactured goods is intended for use in the form in which they are imported; perhaps a larger proportion is destined to be used in some further process of manufacture.

But there is one additional point in regard to our imports which is of importance. Of

the enormous total imports given above, a proportion, which in the last three years before the war rose to an average of £108,000,000 per annum, is destined to be re-exported to foreign countries and British Possessions, without undergoing any change. Such goods do not, strictly speaking, enter into our internal trade at all, but constitute that entrepôt or transit trade (*cf.* p. 204), of which we have already spoken. The great importance of this kind of trade in Britain is due to a variety of causes, of which one is our central position in relation to the markets of the world. Thus we import and re-export in large amount such commodities as rubber, the trade in which now reaches large proportions, tin, wool, cotton, hides and skins, and so forth. In regard to some of these Britain is, or has been, the central market of the world, and this kind of trade is largely concentrated in London. As the articles named show, much of this trade is carried on in raw materials, for we tend to act as intermediary between the countries producing raw material and those engaged in manufacturing.

If we deduct this entrepôt trade from the total exports of the United Kingdom, we

find that the exports of home-produced articles amounted to a total of £489,000,000 (3 years' average as before), and, using the same classification, they may be arranged as follows :—

**EXPORTS FROM THE UNITED KINGDOM OF HOME
PRODUCE AND MANUFACTURES.**

<i>Commodities.</i>	<i>Amount, in millions of pounds.</i>	<i>Percentage of total.</i>
(1) Food, drink & tobacco...	£32	8%
(2) Raw materials and articles wholly or mainly unmanufactured ...	£61	12%
(3) Articles wholly or mainly manufactured ...	£386	78%
The remainder is constituted by miscellaneous and unclassified goods.		

This table shows that our exports are predominantly manufactured goods. Among

these cotton goods are most important, constituting nearly one-third of the total manufactured goods. Iron and steel and manufactures thereof come next, then woollen goods, and then machinery. Our exports of food materials are insignificant, and here fish, derived from our teeming seas, is the most important item. Spirits, beer and ale, and goods containing sugar are also exported to a considerable extent. We have little raw material to export except our abundant supplies of coal, and that commodity forms 77 per cent. of our exports under this heading.

The table of exports thus but confirms the conclusions we arrived at by a consideration of the imports. We buy large quantities of raw material, especially cotton, metals and wool, and we export cotton goods, metal goods, and woollens in large amount with other goods in addition. We have so abundant a supply of coal that we can not only carry on our large home manufactures but have also a margin for export. Our home food supplies are entirely inadequate, except in the case of fish, of which we export a surplus, chiefly salted or preserved in some way. The other articles of food or drink exported are of insignificant total amount,

and are constituted by more or less specialised local products, in the making of which we have special advantages. All the essential articles of our diet are largely imported, even down to butter and eggs, and this although parts of the British area are admirably adapted to the pastoral industry. An important point in regard to our trade, which has been already noted, is that there is a very large transit trade.

The next point to consider is the question how our imports reach our island shores, and how our exports reach their markets on the confines of the commercial world. The answer to both questions is the same, and can be very briefly put. There is an enormously large British mercantile marine, which is stated to have constituted before the war some 46 per cent. of that of the whole world, and the result is that we fetch and carry not only for ourselves, but for many other nations of the world in addition. This is part of the reason why we are able to import so much more than we export, for the profit on this carrying trade is very large. Thus the Tyne ports, to take an example, are chiefly engaged in carrying the coal of the local field to the Baltic ports and elsewhere, and bring-

ing back raw material and food. This carrying trade leads to the establishment of various industries, notably shipbuilding, but is in itself a profitable industry.

Further, since, as we have already shown, England was the first nation to start manufacturing on the great scale, we have accumulated much profit from our past trading, and the capital thus obtained has gone to develop the new countries of the world. There it is sunk in railways, canals, land improvement schemes, systems of irrigation, and so forth, and the interest on the money thus invested comes back to this country in the form of the raw material produced by the aid of these improvements, or brought to the sea margin by means of them. Thus, as contrasted with some of these newer countries, the United Kingdom is a going concern, with money well invested in various parts of the world, while they are still at the stage of borrowing capital in order to render the carrying on of a large business possible. A good many of these statements, it may be noted, refer rather to pre-war than to present conditions. But it is impossible meantime to determine how far the latter will persist.

Let us next compare the trade of Imperial

Russia with that of the United Kingdom as just described.

We have already pointed out that the export trade of pre-war Russia was much larger than her import, the actual amounts of the two on a three years' average being: exports, about £170,000,000, imports £127,000,000. If we take a similar classification to that adopted in the case of the United Kingdom, we get the percentages for the chief exports and imports respectively shown in the following tables. It may be noted that the old Russian tables recognised a separate category for animals. The total amount concerned is small, and for convenience sake we have included the animals with food, though they are not necessarily employed for this purpose.

CHIEF IMPORTS INTO RUSSIA.

3 years' average, 1911-13.

(1) Articles of food and animals	...	13%
(2) Raw material and articles partly manufactured	50%
(3) Manufactured goods	37%

EXPORTS FROM RUSSIA.
3 years' average, 1911-13.

(1) Articles of food and animals	...	61%
(2) Raw material and half-manufactured articles	37%
(3) Manufactured goods	2%

The two tables show some very obvious contrasts with the conditions which we have just described in the case of the United Kingdom. Imperial Russia exported far more food material than she imported—the exact reverse of the conditions here. On the other hand she imported a far larger supply of manufactured goods than she exported. It is clear then, even from the mere list of exports and imports, that the old Russia was more important agriculturally than industrially. Let us look at the items in the two lists in a little detail, in order to gather some further facts in regard to her economic condition.

First it will be found that in the list of articles of food exported, grain takes by far the most prominent place. Its exact position in the scale varied with the harvest, but in

1911, a good harvest year, nearly three-quarters of the total exports under the first heading were constituted by grain. The chief grains exported were first and predominantly wheat and second barley. Other grains were exported in smaller amount. Now at first sight it might be thought that this extensive sale of wheat, the most valuable of the cereals, meant agricultural prosperity, as does, for example, the wheat export of the United States. In point of fact, however, Russia's export of wheat was rather a measure of her poverty than of her wealth. In the United Kingdom the vast majority of the population—indeed with trifling exceptions the whole of it—eats bread made of wheat, day by day and season by season, and this although the wheat production of the country is small in relation to the population. Russia before the war sold large quantities of wheat every year, but this was because a large proportion of her population was obliged to be content with cheaper grains than wheat. It is usual for writers on agricultural subjects in Britain to mourn over the steadily diminishing amount of land which produces cereals. But one must not forget that that reduction, so marked in Scotland, has been accompanied

by an equally steady rise in the standard of living, which has enabled almost every member of the community to eat wheaten bread, even though the wheat must be brought across the seas. Russia in the pre-war period was increasing her acreage of wheat, but this for the benefit of the foreigner rather than directly for the home population.

Under the second heading, that of raw and partially manufactured goods, the most important items were timber and wooden goods, from Russia's abundant forests, forming more than one quarter of the total under this heading; then flax, also an important item; then furs and leather. The agricultural and pastoral industry furnished various other exports, mostly in minor amount, and minerals, especially naphtha, were important. Generally, in view of the fact that the export of manufactured goods was wholly insignificant, we may say that Imperial Russia entered the markets of the world with the produce of her fields, her forests and her mines, and it was only to a very minor degree that she was able to enhance the value of the raw material so produced by the expenditure of labour upon it.

The imports tell rather a different story. Among the articles of food imported fish stood first, for Russia's limited seaboard, and the position of this seaboard, throws her back upon the products of her streams and lakes for this important and cheap article of food. Thus, though her rivers are rich in food fish, she imported in addition much sea fish, notably herrings from the United Kingdom. Other important items are (1) tea, which could not be locally produced, (2) fruits, vegetables and nuts, including tropical produce, and (3) spirits and wines. Generally we may say therefore that under the heading of food Russia only imported articles which could not be locally produced.

Under the second heading the most important item was raw cotton, showing that although Russia only exported cotton goods to an insignificant extent, she yet manufactured them on a considerable scale for local use. In 1913 the import of raw cotton was almost precisely one-sixth of the total imports of raw material and partially manufactured goods. Next to cotton the imports of coal and coke were important, showing that the Russian supplies of these essentials for manufacture are insufficient. Then came

leather, hides and skins for the fairly extensive leather industry, raw wool, such raw metals as are not locally produced, and rubber.

Under the heading of manufactured goods machinery stood first, for Russian technical industry was not sufficiently far advanced for her to supply her own needs. Cotton and other textiles came next, and then chemicals and colours, the production of these being a highly specialised industry not possible in a relatively backward country.

This survey of the items in the list of exports and imports enables us to picture pre-war Russia as a country predominantly agricultural, producing especially vast supplies of cereals and having extensive forests and considerable deposits of minerals, though the supplies of coal are not very extensive, a fact, which handicaps industry. The large import of raw materials suggests that there was a considerable amount of industry, but the products were for the most part absorbed by the local market. Imperial Russia traded chiefly with the west, especially with Germany and the United Kingdom. Both countries took large quantities of her agricultural produce, but while Germany in return

supplied a large amount of manufactured goods, chiefly machinery and woollens, the imports from the United Kingdom were very much smaller and chiefly made up of machinery and coal. Russia's mercantile marine was relatively insignificant, and her overseas commerce was to a considerable extent carried on in foreign ships. Thus she not only got no carrier's profit, but for the most part had to pay foreigners for the transport of her goods. Further, owing to the geographical position, the country was not well-fitted for entrepôt trade, so that no middleman's profit was available. Finally, as capital within the country was not abundant, she had to borrow funds for large undertakings, the interest on these loans being paid in exports.

Economically, therefore, the state presented a very marked contrast to the United Kingdom, and it is this contrast which makes it worth while to give space to the discussion of conditions which for the present have ceased to exist. Among the causes of the post-war economic collapse, we have to note the isolation of the early part of the war period. Economically, Imperial Russia was of the nature of a "dependency" of western,

industrialised Europe, and the rupture of the old trade relations during the war brought the organisation based upon this dependence to the ground. The fact that, within a few short years, the state fell from the position of a great food-exporting country to one in which widespread famine prevailed, illustrates well the delicacy and complexity of the conditions upon which large-scale production depends in the modern world. For the Russian famine cannot be wholly explained as the result of exceptional drought.

CHAPTER X

A TRANSITIONAL COMMUNITY : THE UNITED STATES

IN contrast to Great Britain as a typically industrial state, and to Imperial Russia as a typical agricultural one, it is interesting to consider the United States, which form in many ways a transition between the one type and the other.

The United States, owing to their late origin, and rapid development, offer many remarkable contrasts to the older states. These latter have all arisen as the result of a slow, generally century-long, process of evolution, which has meant the combination of separate elements, within a more or less well-defined framework. Thus, for example, France, whose boundaries are mostly natural, consists of lands which differ considerably from one another in climate, soil and productions. The moist mild climate of Normandy,

admirably suited for dairy produce, and such fruits as the apple, differs markedly from the dry hot climate of Provence, especially suited to the vine, olive, mulberry, and generally quite unsuited for cattle-rearing. But France, despite such contrasts, forms none the less a unity. This is partly due to historical causes, partly to the admirable system of lines of communication, natural and artificial, which, as we have already explained, links the different parts together, and partly also to that passionate attachment to the land which binds the Norman to his fields and the Provençal to his *mas*, and is recognised by both as a bond of union. Further, the fact that both look to Paris as the centre of the national life and its aspirations also makes for national unity.

In the States it is very different. No bond of past life spent in common, no common interest in the land and its products, no broad similarity of climate, social life, tradition nor ideal binds together Florida and New England, Alaska and California, Pennsylvania and Washington; no single great centre exerts its attractive force to the furthest extremities of the national lands; no converging system of lines of communication leads

inevitably to a single capital. On the whole, indeed, the States are comparable rather to a federated Europe, than to a nation as we know nations in the Old World. One other point is worth a moment's consideration. We have emphasised so repeatedly, in the earlier chapters of this book, the productivity of American agriculture, in relation to the labour absorbed, that it may be well to add that, from the point of view of the state, this industrialisation of agriculture has its dangers. In marked contrast to the attitude, *e.g.*, of the French peasant, whose emotional life is bound up with his land, the American agriculturist tends to regard his broad acres as almost as purely a money-producing concern as a Chicago slaughtering establishment. One result of this is seen in the tendency, well-marked before the war, for western farmers in the States to abandon their partially exhausted fields and trek to new lands in Canada: another effect is seen in the unwillingness, said to be very obvious in Canada, of the second generation to remain upon the farm, which is regarded merely as a temporary stepping-stone to prosperity. Thus one must not exaggerate the gains of New World agriculture over that of the Old

World; part of the gain may prove to be fleeting.

In size, if we include the vast territory of Alaska, the United States and Europe are broadly comparable (U.S.A. with Alaska, 8,600,000 sq. miles; Europe, without the Arctic islands and archipelagos, 8,750,000 sq. miles), and the countries of Europe do not offer ~~greater~~ contrasts of climate and productions than ~~do~~ those which exist between the states of the union. One result of these contrasts, a result which the ~~ordinary~~ figures of external commerce are apt to ~~obscure~~, is the enormous dimensions of the internal commerce, and the nature of this. The eastern seaboard, the only part of the States where the population reaches densities comparable to those prevailing in most parts of Europe, is as dependent for its food upon the states of the west, as is, for example, England upon the agricultural communities. Similarly, those western states depend as entirely upon the east for manufactured goods as does any agricultural community in Europe upon the industrial ones; much more so, for example, than was the case in such an agricultural state as Imperial Russia, for we have already seen that Russia manufactured

largely for her own needs. Further, in the Old World all the agricultural states show remnants of the old conditions, that when peasant industries supplied the local market for manufactured goods, *i.e.*, when textiles, clothing, boots and shoes, household utensils, etc., were made in the villages on a small scale. Such conditions never exist in the western states, which have been dependent from the beginning upon the railway which links them with the east and its "stores."

Another great contrast between the various parts of the United States and the independent countries of Europe is the total absence of customs boundaries between the different states, which can thus trade with one another free from all artificial checks. One should notice, however, that there is a customs barrier between the States and Canada, and this although the frontier generally is a purely artificial one, drawn without any relation to the lie of the ground. This means that while within this artificial line buying and selling can go on uninterruptedly, outside it a check is imposed, so that, for example, Boston, in Massachusetts, may find her desire to buy cheap coal in Nova

Scotia for her manufactures thwarted, and townships near the frontier may have to pay more for their food than if they lived a mile or two further north, within the Canadian boundary.

Hitherto two reasons have reduced the amount of friction between the conflicting interests within the States in regard to tariff questions. The first is the relatively small population. This has increased with great rapidity, but is still only some 106,000,000, that is, less than that of pre-war Russia (148,000,000). Thus in the States, exclusive of Alaska, the population works out at about 36 persons per square mile, while the old Russia, with a density of 69 persons to the square mile, ranked as one of the scantily peopled countries of Europe. Further, not only is the population of the States small in relation to area, it is also small in relation to the resources of the country. Problems which do not press on a community with enormous resources in relation to population are likely to become more serious as population increases.

In the second place, till recently, the States have been the only part of North America whose resources have been at all systematically

developed. The development of Canada is just beginning, that of Mexico can hardly be said to have started. Thus while the countries of the Old World have had to consider their internal problems in relation to those of adjacent countries, the United States have hitherto been able to set about the task of working out their own economic salvation in what has almost corresponded to an economic void. This has hitherto simplified their problems, but a change is now taking place. Thus the present economic life of the region is worth careful study, in order to discern, if possible, the lines along which modifications are likely to occur.

In proceeding to consider the foreign trade we may notice that as the American financial year ends on June 30, the period 1912-14 can be taken as the last three-year period free from war interference. During these years the average annual foreign trade reached a value of £819,000,000, nearly thrice that of Russia (p. 209), and yet, curiously enough, the relation between exports and imports was almost precisely that of Russia. Thus the imports reached an average figure of £357,000,000, or 44 per cent. of the total, and

the exports £462,000,000, or 56 per cent. of the total trade.

In detail both the export and import trade differs considerably from that of pre-war Russia. Beginning with the imports, we find that they fall into the three chief categories recognised in the last chapter. Among these raw material, or partially manufactured goods, serving as a basis for further manufactures, accounted in 1913 for about one-half of the total, while the remaining half was divided almost equally between manufactured goods ready for use and foodstuffs, either in the raw condition or partially prepared. During 1913 the imported foodstuffs, of all kinds, were smaller in amount, though not very greatly smaller, than the exports, that is on balance the States were still food-producers for the world market. In the year 1914 the condition was reversed, the States being a food-importer on balance. Since 1914 conditions have been wholly abnormal, belligerent and devastated Europe having made great demands on the States for food. But in the pre-war period the exports of food material were steadily diminishing in relation to the imports, showing that, despite the vast internal resources, the country was

beginning to pass into the condition of most developed countries, that of needing more food than the homeland can supply.

When we come to study the nature of the food materials imported we find that these consist predominantly, though not exclusively, of sub-tropical and tropical produce. Lands with a sub-tropical climate are of relatively limited extent within the States, and in the continental area there is no portion which reaches the tropics. Thus for such substances as coffee, imported to an enormous extent, the States are entirely dependent on countries outside the continental area. Further, though both cane and beet sugar can be grown over a considerable area, the sugar produced within the States is quite insufficient to supply the demand, partly on account of labour difficulties, and partly owing to the fact that in regard to sugar, as also in regard to other products such as tea, flax fibre, etc., the States have not the overwhelming advantages which they enjoy in regard to cotton, wheat, maize, etc., for machinery counts for more in regard to these latter than in the case of the former.

Finally, among the commodities which

are largely imported are tropical and subtropical fruits, especially bananas. This trade has increased enormously of recent years, because American capital is being used to develop the adjacent tropical lands, especially those round the Caribbean Sea. A curious result, the explanation of which is to be sought in part in the difference between the cost of land and ocean freight, is that bananas are said to be cheaper in New York than bread. In other words in the chief commercial town of a country producing wheat on an enormous scale, and with all the advantages of cheap land and the most modern machinery, bread is dearer than a tropical fruit not produced within the confines of the vast state.

The source of the tropical produce which enters the United States is interesting. Fruit, as just suggested, tends to come from the nearest tropical region, especially the islands and shores of the Caribbean. Sugar comes from Cuba, Hawaii, Java and elsewhere. Coffee is chiefly imported from Brazil, but efforts are being made to develop plantations with American capital in Porto Rico (exports already considerable), Cuba, the Philippines, and also in Central America. Generally one

may say that on the one hand the desire, still a common one among the politicians of the States, to increase exports and diminish imports, as a means of obtaining a "favourable" balance of trade, has been one of the motives which led that country to extend its lands by the inclusion of non-contiguous tropical regions. On the other hand, the gradual accumulation of capital within the States, in excess of that needed for the utilisation of home resources, is resulting in the development of adjacent tropical lands by American financiers, interest being paid in the form of tropical produce. So long as such tropical lands are not included within the States as at present constituted this necessary payment of interest in kind must increase the imports of the States as compared with the exports, and thus tend towards an "unfavourable" balance of trade.

In the second group of imports; that including raw material and partially manufactured goods to be used in further processes of manufacture, the chief items are hides and skins for the extensive leather industry, the local supplies, great though they are, being insufficient; raw silk which, for reasons already explained, cannot be locally

produced; indiarubber, a tropical product; wood, especially cabinet and dyewoods; many kinds of fibres including such tropical ones as jute, and those like flax which cannot be produced at home on account of labour conditions; raw wool, of which the home supply is insufficient; tin, a metal only produced on a very small scale in the States and greatly required there for the canning industry.

Under the third heading of imports, that of manufactures ready for consumption, the most important item is that of chemicals, drugs, and dyes, of which the last-named might perhaps be more accurately classified as coming under the heading of materials used in further processes of manufacture. We have already spoken on p. 214 of the fact that Germany has had hitherto almost a monopoly in these branches of manufacture, which is partly due to the fact that, owing to pre-war Germany's relative deficiency in colonies and dependencies, trained university men could be obtained in the country for relatively low salaries. In Great Britain the openings for such men in connection with the development and administration of the dominions are so numerous, that it is more difficult to obtain

trained and educated labour at a low cost. In the States, again, with their vast natural resources, business openings tend to absorb labour of this kind, so that it is again too expensive to make it possible to carry on manufactures requiring high skill and intelligence in competition with Germany.

A second important item in the list of imported manufactures is constituted by textiles of vegetable origin. Among these linen goods are important. We have already explained that flax for fibre cannot under present conditions be produced in the United States, and since further the fibre, even after the costly and complicated processes of preparation, is difficult to weave, and machinery can be less advantageously employed than in the case of cotton, American factories cannot compete with those of the Old World. But, as in so many other cases, the protective duties tend to diminish the demand, and thus to increase proportionately that for textiles which can be home manufactured, *e.g.*, cotton goods. Jute manufactures, notably sacks and bags, are also extensively imported into the States. The Ganges plain has almost a monopoly of the raw material, and manufactures are carried on extensively

in Dundee in Scotland and in Calcutta. To some extent such goods are also manufactured within the States, but the dearer labour, as compared with the wages paid to the women workers of Dundee and the natives of Calcutta, handicaps American production.

A third large item in the list of imported manufactures is constituted by cotton goods, a noteworthy point, considering that the States have something approaching to a world monopoly of the raw material. The imports come mostly from England, and consist of the finer kinds of cottons, for the cost of running the factories, and the want of prolonged experience, together with a less favourable climate, make it possible for the manufacturers of Lancashire to produce a higher grade of materials than those made in the United States. After cotton goods come manufactures of copper, of silk, of wool, and of iron and steel.

Summing up broadly the imports of the United States, we may say that these comprise :—(1) Raw materials originating in tropical or sub-tropical climates, which either cannot be produced in the States at all, or only in insufficient quantity. There is

an increasing tendency in the States to attempt to obtain these either from tropical dependencies or from lands developed by American capital, especially in Central America and the adjacent islands. (2) The second class of goods extensively imported consists of metals of which the supply at home is insufficient; tin is the most important of these. (3) Finally the States import to a considerable extent manufactured goods from the Old World. These comprise goods which owing to the lack of the necessary skill and experience, or the cost of labour and materials cannot be home-produced, and the presence among them of a considerable amount of fine cotton goods is an interesting point.

Let us turn next to the exports. In the year 1913 manufactured goods exported ready for consumption amounted to about one-third of the total exports, raw material and partially manufactured goods to about one-half, and food materials to about one-sixth. Thus in regard to her exports the States seem to occupy a more or less intermediate position between the United Kingdom and Imperial Russia. As compared with the United Kingdom they are distinguished by the fact that raw material

predominates over manufactured goods ; as compared with Imperial Russia the relatively small part played by food substances in the list of exports is remarkable.

Taking first the raw and partially manufactured materials we find that cotton, as we should expect, predominates, as it does indeed among the total exports. In the year ending June 1914, raw cotton constituted about 27 per cent. of the total exports, so that the States may be said to enter the world market primarily with their raw cotton, as pre-war Russia entered it primarily with her wheat. Iron and steel manufactures, a somewhat recent development, come next, with much less than half the value of cotton. Then come breadstuffs, followed in descending order by mineral oils, meat and dairy products, copper manufactures, the States being large copper producers, wood and manufactures of wood. Manufactures of cotton appear among the long list of other exports, but the exports in this case are of less value than the imports, and constitute less than 10 per cent. of the total production of cotton goods within the States. This shows that the cotton industry within the States is primarily to supply the home market, not for purposes of export.

With this condition should be compared that which prevails in the United Kingdom.

Perhaps we should add to this brief consideration of the exports a note on the fact that, in contrast with Russia, where food materials were exported in more or less the natural state, in the United States the exports have frequently had a considerable amount of labour expended upon them, as in the case of tinned and preserved meats, etc. This of course gives an enhanced value to the products.

In connection with the exports it should also be noticed that the mercantile marine of the United States before the war was small, less than 8 per cent. of the world's total in 1910-11 as compared with the 46 per cent. represented by British shipping in the same period. This partly helps to account for the excess of exports over imports, for of every 10,000 bales of cotton, for example, shipped at Galveston, a certain proportion are, as it were, ear-marked to pay for the cost of transport across the Atlantic in a British ship, and thus do not directly represent profit to the producing country.

But though this fact partially explains the excess of exports it is not the whole explanation, for this is very complex. In part

the excess no doubt represents interest on foreign capital sunk in the country, being thus comparable to the Russian excess. But of recent years there has been a considerable export of American capital, especially to adjacent lands, and this takes the form of the export of machinery, etc., which is paid for, not directly, but in the stocks and bonds of the railways, irrigation schemes and similar enterprises undertaken by the aid of the capital. As this is really a deferred form of payment, its effect on the country supplying the capital is in the first place to increase the exports, while at a later stage, when the enterprises are in full activity, the imports will increase, for the interest on the capital invested will be sent into the country in this form. For example, suppose a rubber plantation is being started with American capital. The capitalists will send, *i.e. export*, the necessary implements, materials for construction of buildings, etc., food for the coolies and so forth, and for some years there will be no corresponding increase in imports. But, as the trees begin to yield, the import of rubber will more than balance the export of necessary material, and the balance of trade on this particular transaction

will become what is called "unfavourable." Thus the present relation between exports and imports in the foreign trade of the States must be regarded as a temporary phenomenon.

Still another factor is the export of capital involved in the "tourist industry" of Europe in so far as the inhabitants of the States are involved in this. The attraction which the Old World exercises in virtue of its historical, artistic, literary and other associations induces a constant movement of tourists from the New to the Old World, and this may be regarded in a sense as the return of the capital which the Old World forwards in purchasing raw cotton and other American produce. It is obvious, therefore, that the factors which influence the balance of trade in a country are both numerous and complex, and can only be unravelled by careful study of individual cases.

We have emphasised so constantly throughout the preceding pages the effect which the discovery and development of the New World has had upon the Old, that it seems worth while to summarise the facts disclosed in this chapter in regard to the trade of the United States, the first part of the New World to

undergo commercial development, and still by far the most important part.

The States, with their scanty population, their vast tracts of fertile land, the relative ease of railway construction, especially over the central plains, began by being food-producers and food-exporters on the large scale. The food products were produced by wholesale and often destructive methods, and there has been in consequence considerable deterioration of land. This first stage, which is now the predominant one in Canada, is in the act of disappearing in the States, which are—or were just before the war—within measurable distance of requiring the whole of their own food supplies, and of having to economise their resources of soil fertility. But in the fertile southern lands, especially round the Mississippi, the climate, and cheap black labour, no less than the use of machinery, have enabled them and still enable them to produce cotton on a scale unparalleled elsewhere. This cheap fibre, in combination with the development, first in England and later elsewhere, of the factory system based upon machinery driven by steam, has revolutionised the textile industry of the world, and, in combination with the

cheap breadstuffs supplied by the New World, has made possible the rise of the United Kingdom to her present position as an industrial power. Next to raw cotton it was the products of the mines of the United States, and manufactures of metals, which before the war bulked most largely among her exports.

After the exhausting Civil War taxes were put upon imported manufactured goods, and these protective duties, combined with the great natural resources, especially in coal, iron and raw material, have made possible the development of industry in the States, and the country is now a considerable exporter of manufactured goods. But these very protective duties, by increasing the price of living and thus the wages bill, have handicapped and are handicapping the States in many branches of manufacture, especially those which require much labour or skill. As the population increases, the interests of the manufacturers of the East are likely to come into sharp conflict with those of the agriculturists of the West.

The conflict is indeed already beginning, and forms the economic cause of those apparently sudden fluctuations in American

foreign policy which have been a feature of the post-war period.

Before the summer of 1914, as we have seen, the tendency was for the U.S.A. export of food-stuffs to diminish steadily. Active negotiations led to an enormous demand on the part of the Allies for both food and manufactured goods, especially munitions of war. The devastation of large areas in Europe and the economic collapse of Russia caused a continuation of the demand for food after the armistice, despite the poverty and indebtedness of the European belligerent nations. This means essentially that while before the war the States of the Central Plains, owing to reckless methods of exploitation, were beginning to lose the economic advantage which their wide tracts of virgin land had given them over the Old World, the war suddenly and greatly increased the market for their products—gave a new stimulus to American agriculture. But poverty-stricken Europe can only buy grain from the States if there is a market there for the goods which it produces. Thus there is necessarily a conflict of interest between those States of the Union which want both to protect the home market for manufactured

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goods and to acquire foreign ones, and those which want to supply foreign markets with food and raw material. The subject is too complex to be elaborated here; but it is of interest as showing how the subject of commercial geography branches out into wide questions of economics and world politics.

NOTES ON BOOKS

As commercial geography is but a branch of the general subject, reference should be made in the first instance to the ordinary text-books of geography, such as those mentioned at the end of *Modern Geography*. For the special subject the following two books are important, and as their treatment is dissimilar they supplement each other: *Handbook of Commercial Geography*, by George G. Chisholm. (London: Longmans, Green and Co., 25s. net, periodically kept up to date), and *Industrial and Commercial Geography*, by J. Russell Smith (London: Constable and Co., 1914, price 15s. net). In *Economic Geography*, by John Macfarlane (London: Pitman & Sons, new edition, 1923, price 10s. 6d.), the physical geography of the different countries is treated more fully than is usual in books on the subject, the separate countries being divided into their natural regions, and the products of these separately considered. Albert Perry Brigham's *Commercial Geography* (Boston: Ginn and Co., 1911, price 6s.), a comparatively small book, treats the United States in some detail and the rest of the world more briefly.

The raw material of commercial geography is to be found in the trade reports, etc., of the various countries concerned, though it should be noted in regard to these that it will certainly be some years before the disturbances due to the great war can be estimated and allowed

for. The annual issues of *The Statesman's Year-Book* (London: Macmillan and Co., published in the spring of each year, price 20s. 6d. net) are invaluable for their summaries, figures for several years being usually given in the case of each country. Among Government publications mention should be made of *The Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions* (London: H.M. Stationery Office), which is a mine of information in regard to British trade. For the trade of foreign countries the lists of references given in connection with each country in the *Statesman's Year-Book* will be found useful.

In addition to an ordinary atlas, a good commercial atlas is very necessary for the study of the subject. Mention may be made of Bartholomew's *Atlas of the World's Commerce* (London: George Newnes, 21s. net), with much letterpress; and Bartholomew's *Atlas of Economic Geography* (Oxford University Press, 1914, price 5s. net), with introduction by Prof. Lyde. There is a good and inexpensive German School atlas, Lehmann und Scobel, *Atlas für höhere Lehranstalten* (Bielefeld und Leipzig: Velhagen u. Klasing, 1912, price 5 M.), containing some clear physical maps, in addition to a number of commercial ones.

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