

PART III

THE PRODUCTION OF WEALTH

CHAPTER VI

NATURAL RESOURCES OF THE UNITED STATES

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The Factors in Production. — Production is the process of creating or increasing utilities in economic goods, that is, of creating want-satisfying qualities in the raw materials of nature which supply the basis of all economic goods.

Meaning of production. Of course, according to the theory of the indestructibility of matter, man can neither create nor destroy a single unit of matter. However, it is perfectly possible for him to change the form of this matter so that it will serve some definite purpose. This process, taking place everywhere and at all times, results in what we have already described as the creation of form utilities in economic goods. Man's efforts in the field of production consist, therefore, of all those activities which lead to the creation of utilities of one kind or another.

Production, which furnishes the material basis of welfare, depends upon natural resources, labor, and capital.

Requisites of production. Natural resources are gifts of nature, limited in extent; labor is industrial effort; capital is an economic good used to assist in production.

Every modern productive operation requires these three factors. Land furnishes the raw material; labor, the effort; and capital, the tools which are to assist in increasing the want-satisfying power of economic goods. Thus, specifically, the tree standing on the hillside is a natural resource. A man approaches the tree and begins chopping it with an ax. The man is labor; the ax is capital. The felling of the tree, which has brought it one step toward its final form of chairs, let us say, is one act in an operation which

will enable the wood to satisfy human wants. Therefore the act is productive.

The Part played by Natural Resources. — Natural resources may not make a civilization, but without them civilization would be impossible. A study of the great civilizations of the past shows that without exception the basis of their success was an adequate supply of natural resources. Babylonian, Egyptian, Carthaginian, ^{In ancient} Roman, and Chinese civilizations were all estab- ^{times.} lished in fertile valleys or with a nucleus of fertile land. In an age when agricultural land was almost the only resource relied upon, civilizations were necessarily founded in fertile agricultural districts. This truth was clearly recognized by the preacher who publicly gave thanks to Heaven for making the great rivers flow beside the big cities. Although his economics was certainly defective, he was grasping at an important principle.

Natural resources are more important to-day than they were in any historic period, because modern civilization is founded on mineral as well as on agricultural resources. What, then, are the present resources of the world? Where do we find the possibilities for the development of great modern civilizations? The retarded development of the African continent is the outcome of its vast desert, great heat, regular coast line, and few navigable rivers. South America has its Amazon basin, but the tropical location and dense vegetable growth make the region at present of little real agricultural value; while the southern portions of the continent are too restricted in extent ^{In modern} to furnish the basis for an extensive civiliza- ^{civilizations.} tion. In Europe, the fertile basin of the Danube alone provides a really adequate physical background for this

purpose. Australia is in parts far too barren and the sections which are usable are not sufficient in size to permit the establishment of a world power. Three other districts provide a basis in natural resources for a great world civilization. The first is India, whose semitropical climate in part militates against its success as the home of a dominant civilization; the second is China; the third is the United States.

These last two centers afford perhaps the largest resource possibilities for civilization in the world. The Yang-tse-Kiang Valley of China, fertile and wide in extent, provides means of transportation and rich agricultural land, while the timber-covered mountains of the north are rich in mineral wealth. The United States, with its Mississippi Valley, its variety of climate, its mineral and vegetable wealth, its great rivers, and its broken coast line has already spelled opportunity to millions of home seekers, and it promises in the future even greater development.

Natural Resources of United States. — In economic terms the word "land" means not only fields and meadows, but also rivers, lakes, bays, mines of coal and metals, and oil, fish, forests, and wild game. In short, "land" includes all the gifts of nature (other than air and sunlight) which exist in their present form without the expenditure of any human labor. Most of this wealth is converted by mining, chopping, and similar operations into raw materials upon which men work to secure their livelihood.

The character of natural resources frequently determines the lines along which people will direct their energies. Could Columbus, when he first reached American shores, have seen

the vast continent with all its latent possibilities, he might easily have predicted many of the transformations which have since taken place. Along the barren New England coast with its sharp, forested hills, thin soil, rivers, creeks, and bays, he would have observed the possibility of developing lumbering, shipbuilding, fisheries, commerce, and manufactures. In Pennsylvania he would have seen that the pioneer would eventually employ coal, iron, and oil, and from them construct the new industry. Again, could he have traveled over the fertile valleys of the South with its congenial climate, he would readily have foretold that here was a basis for extended agricultural development.

Natural resources assist in the development of civilization chiefly in four ways: (1) soil and climate furnish the basis for agricultural development; (2) mineral resources furnish the basis of industry; (3) forests provide wood and conserve rainfall; (4) water resources furnish transportation and power.

Nature has been free in her gifts to the United States, but perhaps nowhere more so than in the wide range of climatic and agricultural conditions which she has afforded. The fertility of the soil has already been pointed out. The land, stretching fifteen hundred miles north and south, makes possible a wide range of climate, further diversified by altitudes ranging from sea level to elevations of several thousand feet. The most southern part is parallel with the great Sahara, while the northern limits, exclusive of Alaska, are in the latitude of many. Most parts of this vast area, about the size of Europe, will support a variety of crops. Even where the amount of rainfall is inadequate, natural obstacles may often

be overcome by irrigation. If varied climate is an aid to varied agriculture, there is no other section of the world in which a more effective combination of climatic and agricultural possibilities exists.

Climate is a basic resource which cannot be destroyed or materially altered by human wastefulness. Modern world powers have their homes in the temperate zone; and it is fair to assume that, so long as the present forms of civilization prevail, cold, invigorating winters with warm short summers will combine to produce the greatest vitality and the most enduring energy. Since it is upon vitality and energy that civilization largely depends, the climatic location of the United States is most favorable.

If, now, we look under the surface of the earth, we shall find that nature has endowed the United States with rich mineral deposits. This kind of resource has always been of value to mankind, but it is only with the advent of modern industry that it begins to assume its greatest importance. In primitive civilizations, stone, bronze, iron, tin, zinc, gold, silver, and other minerals were used for ornaments, for weapons, and for similar purposes. In advanced civilizations, however, minerals determine largely the direction of national progress and the extent of national prosperity.

For convenience of discussion, minerals may be divided into two groups: fuels and ores. Of the fuels, coal is by far the most important. As a factor in promoting prosperity, it is second to none of the minerals in its threefold function of providing heat, light, and power. One hundred years ago the nation had a supply of coal paralleled only by that of China. To-day, however, authorities say that at our present rate of increase in con-

**Minerals
of United
States:**
*Their im-
portance.*

Coal.

sumption the available supply of anthracite coal will be exhausted in about forty years and the available beds of high-class bituminous coal in about one hundred and twenty-five years.

The increased use of coal has been phenomenal. From 1816 to 1825 there were mined 331,356 tons; from 1856 to 1865 there were mined 173,795,000 tons; while from 1896 to 1905 the amount mined had increased to 2,832,599,000 tons. So far as present indications are concerned, this consumption will increase in the future, subject only to the increasing cost of production. It will thus be seen that in no other field is conservation of more vital importance.

Coal exists in three forms: anthracite, bituminous, and lignite. Anthracite coal contains the highest percentage of carbon and is the most valuable as fuel. The available fields of anthracite, located in Pennsylvania, are being rapidly exhausted. Bituminous coal, which contains less carbon and is less desirable for domestic consumption, can be used for almost all commercial purposes. Furthermore, it exists in nearly all parts of the country. The third form of coal, known as lignite, consists of vegetable matter which has undergone chemical change and is much less valuable commercially. Vast fields of this lignite have been found in the Northwest. If its use can be made commercially profitable, it may be the coal of the future.

The other mineral fuels, petroleum and natural gas, which have been discovered in connection with most of the coal fields, are being rapidly exhausted. Already abundant supplies in Pennsylvania have been depleted. Ohio, Indiana, Illinois, and West Virginia are failing to increase their supply; and the time may soon ^{*Petroleum*} _{*and gas.*} come, perhaps within a quarter of a century, when the

better forms of petroleum and natural gas will be commercially unusable because of their scarcity and high price. In the Southwest, many new forms of petroleum have been discovered which may, with the advance of chemistry, replace the better grades now in use.

This question of the rapid diminution of the fuel supply presents us with a serious problem. When men first lived in the temperate zone, they depended upon wood and peat for fuel. Gradually, coal and gas replaced the more primitive forms of fuel. With the exhaustion of these fuels, the temperate dwellers are face to face with the problem of keeping warm in winter. Without some form of artificial heat, life in the temperate zone is impossible. What, then, shall civilization do? Furthermore, since modern industry is dependent upon power, mechanically produced, the future must discover some substitute for the rapidly vanishing mineral fuels. Though the immediate future is by no means certain, water power may ultimately prove an adequate substitute.

Among the mineral ores, iron and copper are by far the most important, and the apparent supply of these minerals is far larger than the available supply of coal. Originally, bog ore was taken from the lowlands of New Jersey and Virginia and converted into iron and steel products. This bog ore industry was then displaced by the ore mines of Pennsylvania, which, in turn, have been supplanted by the ore fields of the Lake regions. In these latter fields, the ore lies on the surface and is frequently shoveled by means of steam power into cars in exactly the same way that a gravel bank is removed.

Gold, silver, tin, lead, zinc, cement, brick clay, and stone are also produced in considerable quantities throughout the

United States. While less important than iron, they nevertheless play a leading part in determining the progress of an industrial civilization. Especially is this true of cement, brick clay, and stone, all of which are particularly valuable in structural operations. *Other minerals.*

These mineral ores together with the mineral fuels constitute the most exhaustible form of natural resources. A forest which is burned away may be replanted and replaced, but each ton of coal or silver ore which is mined is irreplaceable. It has disappeared and, although some substitute for it may be found, the coal or the silver itself will never, at least in historic times, be replaced.

Too much emphasis therefore cannot be laid upon the necessity for conserving minerals. *Necessity for conservation.*

When coal is mined, all of the coal in the mine should be removed. The policy frequently followed of removing the easily mined coal and then permitting the mine to fall in, thus forever sealing up millions of tons of less desirable fuel, is disastrous. Mineral resources are at the basis of every modern industrial society, and the welfare of both industry and society demands conservation.

We have seen, from this brief review of our natural resources, that, so far as they are concerned, nature has amply endowed the United States with the basis of progress and prosperity. Her great extent of territory, her fertility of soil, her variety of climate, her great mineral wealth still capable of conservation, all lead us to this conclusion. *The conclusion.*