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EFFECTS OF GEOGRAPHY ON UTILIZATION OF RESOURCES

10 October 1947

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CAPTAIN WORTHINGTON: You have been furnished a copy of the excellent lecture delivered by Dr. Atwood to the class last March on the relationship between geography and economic potential. This term we have asked Dr. Atwood to confine his talk to the relationship between geography and the utilization of resources. I take pleasure in welcoming Dr. Atwood, Assistant Chief of the Division of River Plate Affairs, Department of State, to this platform.

DR. ATWOOD: Captain Worthington and fellow students: Last March, when I had the pleasure of addressing a group here in this room, President Truman had just announced an Aid-to-Greece program, known as the Truman Doctrine. Today we are just beginning to get our teeth into this Help-Europe-Help-Itself Program, which has been called the Marshall Plan. Yesterday, as you noticed, the Argentine Ambassador on returning to this country talked about his Marshall Plan. The Russians apparently have called for a "choosing up sides." Now, with these and the other things that you are all aware of facing us, I wonder what are the material resources of this world.

I am assuming that my job is to help us appreciate the changing significance of geographical factors. I am not going to discuss geographical factors as such. I am going to discuss the changing significance of geographical factors in the utilization of the world's material resources. Now, location and position, size, surface features, climate, soil, vegetation, and animal life, including humans, are thought of as geographical factors. They are also thought of as resources. So I want to try to present, if I can, the geographic viewpoint in approaching the problem of determining what are resources and what are the basic factors affecting the utilization of these resources.

I feel that resources must be viewed and must be analyzed in terms of their significance in the adjustments that man has made or that man is making in certain specific regions of the world. That is the geographic approach, as I consider it. It has a definite and a significant contribution to make. But, as I have said before, it is not by making empirical descriptions of location, climate, soil, topography, and so forth.

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Now, the availability or the utilization of material resources must be analyzed, of course, in terms of geographic location and geologic occurrence. But--and this is the big "but"--today it is increasingly necessary to appreciate the regional and the interregional significance of economic factors, such as transportation and credit; political factors, such as domestic and foreign policies of governments; and social factors, such as labor legislation and standards of living,-- just to mention a few.

First of all, it should be realized that resources must satisfy a need or a want. Otherwise they are not resources. They must be thought of in terms of the people who utilize them as well as in terms of the people who produce them.

In primitive times or in areas today with primitive ways of making a living, resources are the products that nature provides which are consumed or utilized. Geographically speaking we have today all stages of civilization, from the most primitive to the most advanced, represented somewhere on this earth. To me that is perhaps one of the most important concepts that we have, one which we should appreciate. The availability of resources and their utilization must be studied in terms of the geographic conditions existing in those different regions, plus the economic, political, and social organizations that have been developed by the peoples of those different regions.

Now, just to review a little bit: When we go back into the earliest primitive civilizations, we find that among other resources the most important, perhaps, is a dependable water supply. That meant that rivers or rains, such as monsoons, constituted the most important resources. That was true, of course, in the ancient civilizations of Egypt, India, China, Mesopotamia, and so on.

Then you go rapidly up into the period of the Greeks and you find that strategic location with regard to trade routes was of great significance. When the eastern Mediterranean was the known world, Greece did have a strategic location; and that affected its entire development. Later on, when you had the entire Mediterranean plus a little more, the Phoenicians had the strategic location; and perhaps that was their most important resource.

We know that later the Arabs had a very strategic location--not to say they don't have today. But, as you remember, in the early period the Arabs acted as middlemen between Europe and the Far East. Up until the Industrial Revolution the most important factor, I think,

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in the development of trade and in the development of Europe was the fact that there were middlemen between Europe and the Far East. So that in trying to appreciate and understand resources at that time, the strategic location of the Arabs is important.

Now, going rapidly to the old English manorial system, the resources at that time, in this preindustrial revolution period, were basically soil, climate, and unskilled labor. They were resources that were local or regional. The old English manor did not draw resources very much from neighboring manors or neighboring regions. So they had to make use of what there was in a relatively small area.

As this resource base enlarged--and, of course, we are all familiar with how that happened, with the development of trade, markets, the times, affairs, and all that--the types of resources changed. The geographic location of resources changed. It is perfectly apparent that without transportation, economic endeavor must be limited to a very small area, and the needs must be satisfied within a limited range of opportunities. Resources are very few and they are very simple.

Now, the advantages of regional and interregional exchange were very soon realized. With the development of communication the geographic base of economic life progressively enlarged. In that the Edwards in England the the Louis' in France were very important, because they were very potent agencies in promoting trade, by creating security, uniform currency, standards of weights and measures, and so on. These were the most important factors at that time, leading to the development of trade and the exchange of these products between regions.

The industrial and mechanical revolutions affected various types of economic endeavor. The effects, however, were not the same in agriculture and in lumbering or in mining and manufacturing or in transportation. In other words, as you go through that period of the industrial revolution--sometimes it is called the agricultural revolution, the mining revolution, the manufacturing revolution, the transportation or commercial revolution--the changes were not the same and the significant resources changed very rapidly. Just briefly I want to mention those changes.

Before the industrial revolution, as I said, easy access to trade routes helped evaluate nations. It was the major resource, because all nations were predominantly agricultural. The differences that existed were differences of degree, not of essence. The resource

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base of agriculture, as you well know, is pretty well distributed over the whole earth. Most countries have what is necessary for agricultural development. But after the industrial revolution you had fuel and power and metal civilizations; and they depend on coal for their energy. Their resources were coal and iron ore primarily.

Now, the resource base for a machine age or for industrial development is located in only a few places in the world—in the North Atlantic Basin and to some extent in the Far East. But the resource base that became essential to the development of these nations after the industrial revolution was concentrated in a very few places in the world, and still is.

Modern industry is based on cheap and rapid transportation and on hundreds, maybe thousands, of widely separated resources, on new methods, on new varieties and new products of steel. You may have heard a statement the other day that there are 56,000 varieties of one-inch steel bars, and that each one needs a slightly different treatment, and many different alloys and chemicals are used. Just imagine—56,000 different types of one-inch steel bars. It is unnecessary to say that that has increased geographic specialization and it has increased the division of labor and interdependence.

As the resources that were needed by these industrialized nations changed, what happened to the resource base of the nonindustrialized nations of the world? This is very important. The increased production of raw materials to meet the rapidly increased demand helped to develop the so-called one-crop or one-mineral countries of the world. It cut down the self-sufficiency in food and in clothing in these areas—Africa and other areas with which you are familiar. That led to dependence on new and far-away food resources. So the resource picture of the industrialized nations changed. We are pretty familiar with that. We are less familiar with the change that took place in the resource base of the nonindustrialized countries, the so-called colonies; but it is equally important.

The ability to obtain these new food resources depended on world market prices for cash crops; the market price affects a good many of the problems that exist today. A good many of the problems that exist all through the Western Hemisphere countries, the Latin-American republics, are found in many of the countries in Africa as well as countries in the Far East. The ability to obtain the basic food resources that these countries need depends on world market prices, with which they have precious little to do.

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All right. Let us get to mineral resources and say a few words about these.

Here, of course, the geographic and geological distribution of mineral deposits has resulted in a permanent unequal distribution among the nations of the world. The geography of mineral production brings about continual shifts in the inequalities established by nature. It also brings about inevitable differences of cost.

Now, the total output of minerals is usually adequate to supply the world's requirements. I realize that it is not true at the present time, but over the long period the production of minerals is usually adequate. The great problem has been to find ways to pay for the required imports from the mineral supplies of the world. Augmented exchange difficulties that exist today have naturally complicated that problem. The depreciation of currencies has very often raised the price of imported articles to the point where the importation of a mineral had to be discontinued. Of course that sometimes has led countries to conquer the mineral-producing area or annex it.

The shifts in the geography of mineral production are most commonly the result of one or more of the following: First of all, new discoveries. Shifts brought about by new discoveries are decreasing today. Second, the exploitation of known but undeveloped areas. That is something we can gauge pretty accurately--when we are going to use these known but undeveloped areas. Third, the exhaustion of old areas. That is gradual and predictable. Fourth, the discovery of new technologies, that is, new abilities to locate ore deposits or the ability to use lower-grade ores with mass-production methods. Fifth, the use of substitutes. That has been talked about a great deal; but, as nearly as I can find out, I don't think it has resulted in very much change. The only significant change that I notice is the shift from the use of coal to oil in the United States. But even that has not really brought about a shift in the geography of mineral production, though it may do so.

Now, when we are considering small mining operations, the richness of the deposit is very important. However, when you are talking about large-scale mining operations where they use large amounts of capital, the richness of the deposit may not be the significant factor. It may be only one of many, as you well know.

This unequal distribution of mineral deposits, as I said, is permanent. The unequal distribution of smelting and refining facilities is fully as important. It is man-made and it is not permanent.

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This distribution of the smelting and refining facilities is concentrated in fewer countries than are the minerals themselves. In some cases that is due to the need for fuel, or it is due to the large size necessary for efficient and profitable operation. It may be due to political or social factors as well. I will give you a few figures on that.

These figures are for the 1940's and they are not right up to the minute. You probably have much better statistics available right here. But you may get an idea from them of the marked concentration of smelting, and refining resources.

For instance, in the refining of petroleum 59 percent of it is in the United States. That figure may be higher now. If the report of the Committee on Economic Aid to Europe goes through, you know that has a tremendous request for refining facilities in Europe; and that would change this balance very perceptibly. In the cracking of petroleum 66 percent of it is in the United States.

Concentration of smelting and refining resources in the United States is given in the following percentages: Of the pig iron facilities 37; for steel 44--that is probably higher now; copper 44; lead 33; zinc 30; aluminum 31.

Then if we shift to nickel, 67 percent of it is in Canada, that is, the refining and smelting, not the production; magnesium, 40 percent in Germany; and tin smelting, 47 percent in Malaya. I could go on. As I say, those figures should be brought up to date; but the idea is what I wanted to develop.

Now, when speaking of the availability of mineral resources, it should also be kept in mind that the amounts that enter into foreign trade are often more important than the total amounts produced. What are the countries that export their mineral resources? In 1938, 70 percent of the production of chromite entered into world trade, and 70 percent of this amount came from Southern Rhodesia, the Union of South Africa, and Turkey. The remainder came from three or four other countries.

So far as iron ore is concerned, only 30 percent entered world trade. France and Sweden supplied about 60 percent of this amount. You see, the countries that you mention in iron ore when you talk about exports are very different from the countries that you mention when you talk about iron ore production. But, so far as the iron ore deposits that are available to other countries are concerned, it is the exportable surpluses that are significant.

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The United States and Chile used to provide about 50 percent of all the copper that entered world trade. The Belgian Congo, Northern Rhodesia, and Canada supplied another 40 percent of it. That 50-40 relationship has definitely changed during the war.

Yugoslavia was the largest exporter of lead ore. But when we shift to the refining of lead, it is Mexico, Austria, Canada, and Burma that supplied about 80 percent of it.

As I said, Canada supplied 86 percent of the nickel. Venezuela supplied over half, from 56 to 57 percent, of the exports of petroleum. These countries are the largest exporters, not the largest producers.

From these statistics it is perfectly evident that the concentration of exportable surpluses is more marked than the concentration of production, and the geographic inequalities are more significant. The factors that influence the availability of exportable surpluses become fully as important as the factors influencing production.

Now, these factors are different in different countries and in different regions. Let me pose just a few questions here that may remind us of the additional factors that are essential to any evaluation of resources. Whether these are geographic, or whether they are economic, whether they are political, whether they are social, religious, or cultural appears to me to be somewhat academic. These factors are real. They exist and they exert tremendous influence in the different regions or the different nations of the world.

One question is this: To what extent is the utilization of the coal resources of Chile determined by the Communist coal-miners' union or by action of the Chilean Government?

2. What factors will determine whether 150 million dollars will be spent on a new process to open up what has been described as unlimited resources of sulphide copper in Chile? It is there. At least, I am told it is there. But it is going to take 150 million dollars to change over the process to get the sulphide copper ore out. Now, what are the factors that are going to determine whether that 150 million dollars is spent? Those are the factors that are going to determine the copper resources of Chile.

3. Are the reported exportable surpluses of wheat in the USSR food resources in terms of western Europe? (I am giving these questions to you, so you won't give them back to me.)

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4. Are the exportable surpluses of corn and wheat in Argentina to be considered as resources by European countries? Or, for that matter, are they to be considered resources by the neighboring countries--Chile, Bolivia, and so on? "World Report" intimates that, if Argentina joins the IEFC (International Emergency Food Council) over one hundred million bushels of wheat will be added to the food resources available to starving Europe. Now, what are the factors that are going to determine whether Argentina is going to join the IEFC? And, assuming that they join it, do we have those one hundred million bushels of wheat available to Europe? There is a little matter of price to be considered too.

5. Would the coal resources of England be different under a Conservative government than under a Labor government, as has been intimated in some circles?

6. Would the resources of the United States be increased if prices went down or ocean freight rates were cut in half, or if rationing was instituted?

It becomes evident that geographical factors are not simply mountain ranges, oceans, rivers, coal fields, climates, soils, forests, and minerals. They are young, rugged mountains; or they are old, worn-down mountains, acting as barriers to transportation and communication; or they are mountains providing essential minerals; or they are mountains cutting off rainfall, or keeping out the freezing winds of winter. They are oceans acting as barriers; or they are oceans that are developing isolationism and nationalism; or they are oceans that are acting as connecting links, developing trade, bringing about division of labor, interdependence, and world empires.

They are coal fields which constitute the fundamental resource base of a great industrial nation like England; or they are coal fields that are causing that industrial resource base of England to become less significant, or more troublesome, at least. They are coal fields that are located on the banks of streams, like the Ruhr, where the coal can be exported easily; or they are coal fields in the hinterlands of China, that are yet to have their significance in Far Eastern affairs.

Geographic factors are not just petroleum reserves, but they are petroleum fields that are being developed by the government monopoly operating under a policy of strict nationalism; or they are petroleum fields that are being operated by private enterprise under a policy of freedom of access. They are not just petroleum reserves.

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When machines are used in agriculture, topographic or surface features become increasingly significant. Adjustments to climate become closer when some new type of seed is developed which permits wheat production in the colder and drier areas. Thus the significance of topography and climate as geographic factors changes as man learns to grow crops in a different way or to grow different crops.

These are some of the major factors that affect the utilization of the world's material resources. They are basically geographic because the realization of their full significance is dependent on the regional and interregional adjustments that man is making to this ever-changing world environment. Geographical perspective requires that one eye be kept on the job while the other eye interprets the human adjustments in these different regions of the world or in the different nations.

It is hardly necessary to do more than mention the overriding influence of the foreign policy of the USSR on the availability and utilization of the resources of Poland, Czechoslovakia, Hungary, Roumania, Yugoslavia, Bulgaria, Albania, Manchuria, Northern Korea, Outer Mongolia. The policy of the USSR is also very important when you are analyzing the resources of Finland, the resources of Greece, or Iraq, Iran, Afghanistan, Turkey, and Sinkiang.

The policies, and the success or failure of the economic and social program of the Argentine Government, are absolutely essential to any intelligent evaluation of Argentine resources today.

The answers that are made by the twenty-two nations of the American continent to the Committee of European Economic Cooperation will go far toward outlining the resource pattern of this continent (North and South America) for several years. The answer that we make to that program which they have presented will go a long way in determining what the resources are of this continent.

The report of the Committee of European Economic Cooperation, the Harriman Committee report, and the other reports that are going to follow, should be on the "must" reading list if you are going to study the availability or utilization of world resources for the next several years.

It is perfectly evident that regional or national self-sufficiency results in economic strangulation, because it makes it impossible for a nation to utilize the world's resources to satisfy man's needs and wants. No great nation today that ever hopes to maintain a high standard of living can operate in an area less than the entire world.

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The sixteen countries of western Europe have produced not only an acceptable analysis of the significance of resources in the economic and political life of their countries, but they also have produced one of the most realistic pictures of global interdependence that I have ever read. The nations of the Americas, calculated to supply over two-thirds of the total requirements, are faced with a challenge even greater than was faced after Pearl Harbor. To answer it in peacetime and through democratic procedures will require super-human efforts and a determination which cannot be sidetracked by back-stage "behind the curtain" propaganda.

(No questions or discussion.)

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