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# INTRODUCTION TO NATURAL RESOURCES

Colonel C. P. Connor, USAF

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

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# INTRODUCTION TO NATURAL RESOURCES

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COL CONNER: Gentlemen, from a review of the weekly schedule for this week, it seems to be designed very well. We started off the week with a very fine student presentation. Then you heard from Mr. Ward. I think that was a very outstanding talk. Then you heard a three-star Air Force General, a two-star Air Force general, and a four-star Air Force General. As if that wasn't enough competition for me, we had to import from overseas for yesterday's talk the present Earl of Mountbatten. I want to thank Dr. Reichley for including me on this list.

Anyway, you come to the end of your meal here today. Of course I consider this as dessert. It might be that it is just the price you have to pay for the weekly meal. I think there is probably a lot of truth in that latter statement. I notice that I scared General Hollis out of town.

This morning you start another facet of study in your Economic Mobilization Course--that of Natural Resources. This Unit is sponsored by the Economic Potential Branch (or "Eco Pot" as we are sometimes called), and this is the first of two units which we sponsor. The other is the Economic Potential Unit, which you will begin in March.

The objective of this Unit is rather simply stated on the easel chart: "To provide an understanding of the present world natural resources situation and trends, as they bear upon economic mobili-

zation and national security."

Just like Manpower, this Unit is placed very purposely early in your course, because it is one of the basic factors to be integrated into your subsequent studies. What you learn in this Unit will have direct application in the units to follow.

In Requirements, for instance, one of the things you will be considering will be the problem of balancing military and civilian requirements with the total resources available to the nation. In Production, a part of your study will be focussed on the limitations of industry, the expansion capabilities of industry. Certainly, raw material resources must be considered there. In Procurement the availability of raw materials has a direct relationship to procurement policies and procurement planning. In the Economic Potential Unit next March you will be studying the economic potential for war of countries throughout the world. The availability of raw materials to a nation is one of the leading things that bear on its economic potential for war. Then, lastly, in the last Unit, when you work on the mobilization problem, you will be expected to cover the raw materials aspect. So this subject indeed cuts across our whole economy and the mobilization thereof.

Since we are going to be talking about natural resources for several weeks, let's get a clear understanding of that term. Let's see exactly what it does mean.

The definition given in this branch monograph, R-186--I hope

you have all read at least part of it, as we have asked you to--is perhaps as good as any. It says: "Natural resources are all those materials of nature which are used by man for his own existence and benefit."

Materials of nature are popularly divided into the three categories, animal, vegetable, and mineral, just as in the radio and TV quiz program "Twenty Questions." But those concerned with a serious study of the subject categorize natural resources a little bit differently, as shown on this chart.

(CHART )

Normally we consider that natural resources are divided into two general categories--mineral and agricultural. Agricultural resources are either animal or vegetable, and they can be used either for food or for industrial purposes. Some of us seem to overlook the fact that, in addition to its medicinal uses, coming out of a bottle, corn is sometimes eaten.

The second general category of materials is minerals. This is further divided into two general classes, metallic and non-metallic. Under "metallic" you see two further break-downs. The first consists of the ferrous materials--those having to do with the production of iron and steel. You see there iron ore and low-grade taconite, for example. You see also the alloying materials, such as chrome, nickel, manganese, molybdenum, and such as those. All other minerals are non-ferrous. They in turn are broken down into the base metals--copper,

lead, zinc, etc.; the light metals--magnesium, aluminum, titanium, etc.; and the precious metals, like gold, silver, and platinum. I won't go into great detail on those.

Finally you see petroleum, gas, coal, various building materials, and fertilizers. I don't think I need to spend any more time on that chart. I just want to give you the framework in which we are going to talk about this subject of natural resources.

Most of our time and attention in this Unit will be on that category "minerals," because minerals present the most critical problems as far as this country is concerned. For that reason this afternoon we will give you a hand-out giving a more detailed break-down for minerals.

So much for terms and classification.

This monograph to which I referred a minute ago, which you have read, I think covers rather thoroughly the relationship of raw material resources to the industrial power, and hence the political and military power, of a nation. Likewise, that monograph gives a pretty good coverage of the distribution of raw materials throughout the world. I don't think it is necessary or advisable for me here to go into any detail on that. However, in a few words I should like to bring into sharp focus this raw materials problem of ours as a basis for my remarks to follow.

You have but to reflect for a moment to realize the part which raw materials play in both our peacetime and our wartime economy.

The automobile, the electric refrigerator, the deep freeze, radio, TV, the electric toaster, the electric dish washer--I could go on naming them for a long time--many of these are no longer conveniences, but they are absolute necessities to our economy. Our whole marketing and distribution system is based on many of these things. We are often referred to as a "deep freeze and automobile economy." Of course, all these things take materials.

I don't have to tell an audience such as this that our weapons of war are far advanced from the bow-and-arrow days. Our aircraft, our ships, our tanks, our guns, our electronic equipment, our transportation and the other services which support the military--what a tremendous quantity and variety of war materials are needed to feed the machines which produce them!

It is astounding to realize that the quantity of most metals and of most mineral fuels used by the U.S. since World War I exceeds that quantity used by the whole world prior to World War I. In fact, the U.S. has consumed since 1900--the U.S. alone--75 percent of all the coal and 97 percent of all the petroleum consumed by the whole world since the beginning of recorded history! Today, with 6 percent of the world's population, a little less, and 8 percent of the world's land area, we are consuming 50 percent of the world's annual raw materials production.

As a result of this, we find ourselves not as a "have-all" nation, but as a "need-more" one--a nation whose raw material needs can no

longer be met from domestic sources. And, according to conservative projections of future requirements, the situation promises to get worse.

With that very hasty and broad picture of our materials production in mind, I would like to direct my remarks to follow along three points. I should like first to give you some background information which we in the Branch consider is important in appreciating this materials problem. Second, I should like to tell you a little bit more about the plan of the Unit than appears in the curriculum book. And, lastly, I want to suggest to you some important considerations in developing a possible solution to the present problem.

In that connection, when I use the word "problem" I don't want to infer that we have a stated problem in the curriculum book, a problem on which you will be expected to present a written report. We don't have any written reports in this Unit, with the exception of the eight oral presenters, who do submit individual reports. When I speak of the "materials problem," I have reference to the fact that all is not well; that an unsatisfactory situation exists with respect to our natural resources position.

On this first point, let us look at the background for this problem. It is pretty well agreed that in the last century very few people gave much thought to the possibility that this country might exhaust the raw materials that she had available. President Theodore Roosevelt was one of the first who foresaw that possibility. From 1904 to 1908, during his second term, he pushed a policy of conservation of our natural

resources.

Still, this subject was not considered serious until World War II demonstrated our vulnerability to materials shortages. In 1944 the Bureau of Mines and the Geological Survey recognized the need to take stock and appraise the outlook on minerals for the future. They conducted quite a detailed study, covering 39 materials.

The gist of this interbureau committee study was that, although the United States was not a "have-not" nation, there were certain vulnerabilities, major deficiencies; and they concluded that the outlook for improvement was not at all favorable. This study was an objective study. There were no recommendations on the subject.

Mind you, this study was only eleven years ago. That was really the first study that went into this problem of raw materials in this country. And the fact that they couldn't get money to publish the darn thing pretty well attests to the fact that as late as eleven years ago this country thought we had no materials shortage.

The next study that went into this was in 1947, when a Senate subcommittee looked into the problem. Their conclusions were very similar to those of the interbureau study on the 39 materials in 1944. They again highlighted our deficiencies. No important legislation came out of it, and it had no significant effect on our economic policy.

One thing is worthy of note from these hearings. In spite of the fact that the Secretary of the Interior, the Bureau of Mines, and the Geological Survey recommended that this raw materials problem

be made a matter for continuing review instead of just a hit-and-miss proposition, no money was ever appropriated; and it died, for all intents and purposes, for a while.

That brings me to two studies that I want to talk about, two major studies in this area, which you will hear a lot about, and which we consider important.

The first study is commonly referred to as the "Paley Report" or "Paley Commission Report." Actually the official title of the body commissioned to make the study was "The President's Materials Policy Commission"; and, as you might guess, it was headed by Mr. William S. Paley, now president of the Columbia Broadcasting System. This body was commissioned in January, 1951, by President Truman; and it had as its purpose the studying of the materials problem of the United States, and its relation to the free and friendly nations of the world.

The report of this Commission--I think most of you probably have seen these booklets--is contained in five volumes. I just have four of them here. I think you will recognize these (showing books). It is in five volumes. These four volumes are part of your room sets. Certain minor parts of those are essential reading. This little pamphlet is entitled "Summary of Volume 1." It is what it says--a summary of Volume 1, this big volume. This volume 1 contains, I would say, a general analysis of the problem and the general philosophy of the Commission. This is considered essential reading, and is in your room sets.

This Paley Study is a very comprehensive one, I think. It goes into the supply and consumption of our materials. It goes into the overall political and economic considerations. It has a detailed analysis of our minerals position on many key minerals. It has a volume on selected key commodities. It has a whole volume on technology. I think it is well written. It is easy reading. It has some wonderful graphs. I think you will enjoy reading it, and will get a heck of a lot out of as much as you can afford to read in addition to your essential reading.

I can't give you a summary of the Paley Report. I think it would be a little presumptuous for me to try. But in a few words I would like to point out my interpretation of some of the things that I think the Paley Commission has more or less highlighted.

First of all, the Paley Report takes cognizance of our increasing difficulty in meeting our raw material needs from domestic sources. It also says that our military and economic security demands a vast international exchange of materials; that the U.S. must reject self-sufficiency as a policy and instead adopt the policy of lowest-cost acquisition of materials. There are certain exceptions to that. It also says that all Free World nations must coordinate their resources to the ends of common growth, common safety, and common welfare.

That, as I say, is a thumb-nail sketch of the Paley Report.

The other major study which I mentioned, and which you will hear a lot about in this Unit, is the Malone Committee Report. It was

a report of the Senate Minerals, Materials and Fuels Economic Subcommittee. It was headed by Senator George W. Malone, of Nevada.

This Malone Committee, as it is known--incidentally, it met in July bf 1953--had for its mission, first, to determine the accessibility of critical raw materials to the United States during a time of war; and, second, to recommend methods of encouraging the production of the critical war materials adequate for the expanding economy and the security of the United States.

This committee held over 58 hearings, extending over a period of ten months. They heard over 360 witnesses. I couldn't get anybody from the Branch to carry over a transcript of the hearings. They occupy about a two-foot shelf. There is a lot in them. They are very interesting to read. I don't know how much you are going to be able to don in that line. However, this little report, which is a part of your room sets, is a summary. It is entitled "Report." I think that gives you a picture of the Malone Committee Report; and certain parts of this we think are good and we have considered them essential reading.

This Malone Report takes great exception to the Paley Report in many instances. It says in effect that the western hemisphere is self-sufficient in natural resources. It disagrees with the Paley Report's international concept of the exchange of materials. It says that--and I am quoting from the hearings, from the two-foot shelf of books that I mentioned--the Malone Commission says that the State Department has been running our national resource policy. Senator Malone used

rather harsh language, I think, in these hearings. Talking about the State Department, he accused what he calls junior statesmen of using our resources as a political pawn. He says that some of them "don't know the difference between a ton of ore and a bale of hay." He says the Paley Commission has created a minerals "have-not" philosophy throughout the nation which has made us dependent on foreign sources of materials. He says that is a danger to our security and harmful to our domestic mining industries. I think in all fairness those are pertinent comments on the Malone Report.

I should like to emphasize right here that our objective in this Unit is not a critique of the Paley Commission versus the Malone Committee. Our objective is economic mobilization and national security. It just so happens that both these reports are the latest and about the most thorough that exist. They cover all major aspects of this problem, and many of the minor ones. So when you are studying them, actually you are studying this raw materials problem. And both these reports figure rather prominently in the formulation of our foreign policy. For these reasons, we have concentrated most of our essential reading in these two reports.

I don't want to give the impression that one is all black and the other is all white. There are many areas involved. There are many areas of general agreement. I think they both pretty well agree that we have enough coal in this country to keep the miners striking for another thousand years.

Well, that's the background information on this problem. I would like now to tell you why we in the Unit have planned this curriculum as we did. I think you have a right to know, and I would like to tell you our thinking behind it.

We in the Natural Resources Unit, in spite of our individual or collective opinion, are not going to try to preach an answer to this raw materials problem. We probably don't have it. But it has always been the policy of the College that when we deal with controversial subjects, we try to present both sides of the thing. Then, with all the facts in hand, you are in a better position to decide for yourselves the best line of action or policy to adopt.

Bearing in mind that this is a controversial subject, we tried to formulate our curriculum so that you can get this information on which you can formulate your own opinion. Though you don't have a requirement for a written report in this Unit, nevertheless you do have the task of satisfying yourself, as I see it, of the seriousness of the situation, and of crystallizing your thoughts with respect to what should be done about our raw materials problem.

In general, in looking at the curriculum, we have considered this monograph as orientation and background for you with respect to world distribution of materials and the importance of raw materials to the various economies. If I may get in a little plug, we are rather proud of this curriculum. We revised it this year. We, unfortunately, can't take credit for it all. It has been in existence for many years. But

there has been a lot of hard work done on that monograph by the branch personnel. We think it is pretty good. We hope you do.

As a means of orientation, and also to better acquaint us with some of these mineral exploration problems and the language of some of our lecturers, we have scheduled three periods of films.

Then in our lecture program, eight of our lectures deal with the Free World raw materials situation, with emphasis on the U.S. Seven of the lectures are going to deal with specific categories of materials. For instance, we have a lecture on materials used in the production of steel. We have one on water, one on petroleum, non-ferrous and light metals, food, industrial agricultural products, and materials for the production of atomic energy.

Now, from these lectures we hope you will learn a little bit more about these materials, and about their uses. We have also asked a speaker to comment on the latest technology as it perfains to the extraction and processing of these materials. We also asked them to comment on measures that could possibly be taken to improve our situation as regards the specific material that they are discussing that day.

In addition to these seven specific lectures, we have one on stockpiling, which, of course, covers many materials. I am sure that, if you don't already realize the importance of that subject, you will.

In order to be of true significance in this, our raw materials situation must be related to that of our most likely enemy. Hence we have a lecture scheduled on the natural resources of the Soviet Union.

Dr. Shimkin is going to give us that talk. I mention that only because I think it was Jim Brock the other day who referred to Shimkin as one of the most outstanding authorities on the Soviet economy in this country.

Then we have a class seminar scheduled for the final day of this Unit. We have scheduled it for the final day so that you might have an opportunity to clarify any questions remaining in your minds toward the end of the Unit with respect to this subject, and also to assist you in crystallizing your thoughts.

I don't know how good this seminar will be, but I would like to say that two of our three seminarists were specifically invited--and we were extremely glad they accepted--because of the very strong differences of opinion that they have on this thing. We in the branch have read some of their literature. Incidentally, they appeared here several years ago on a similar panel. It sounded to me like they were actually fighting. I hope they still share those strong differences of opinion. Maybe when we turn you loose on them, we will find out.

Now, the overall plan of this Unit IV is based on the following philosophy: We don't expect that when you leave this unit you will have remembered a mass of statistics. You will be exposed to a liberal share of them, I am sure. But they naturally are important only insofar as they illustrate some point or principle.

This raw materials situation is a very fluid problem. The ever-changing status of reserves and the technological changes make a statis-

tical approach, I would say, highly undesirable. But we do expect that when you leave these studies in Unit IV, you will have a general knowledge of these natural resources, that you will have an appreciation of the major problems, and a further appreciation of just what these things mean to our economy and to our economic mobilization capabilities.

So much for the curriculum, my second point.

As my third point I'd like to throw out on the table some considerations which I think are important when you starting thinking about what we can do about this raw materials problem. I think these are some things that you should keep in mind throughout the Unit.

Whatever the solution for this problem, it appears to me that it must provide first for our military security. It must then give us economic security. And it must recognize the role which politics play in this international struggle. In other words, it must be politically feasible.

In considering military security, let me amplify a statement I made earlier--that the U.S. is not self-sufficient in raw materials. To be specific, there are 76 materials--I think the monograph says 75. One more material was added. But the list of strategic and critical materials refers to those materials that are not available domestically either in sufficient quantity or quality to meet expected wartime requirements.

We are presently dependent for considerable quantities of these raw materials on areas all over the world. We rely on imports for

more than 90 percent of our current consumption of tin, manganese, nickel, chrome, platinum, mica sheet, asbestos, mercury, and cobalt. Over 75 percent of our consumption of tungsten, bauxite, and antimony comes from foreign areas. Over 50 percent of our lead and quartz, over 33 percent of our zinc and fluorspar, and over 25 percent of our copper. Surely you recognize these materials, and in their relation to the end items we use every day.

Now, the question arises as to how secure would be these foreign sources during wartime.

From the standpoint of shipping, it is well for us to remember that during the first six to eight months of World War II, German submarines sank from 88 to 90 percent of our ships carrying chrbmite and manganese from South Africa. Likewise, 85 percent of the ships carrying bauxite from the northern coast of South America were lost in the early days of the war, before the submarine menace came under control.

I don't want to get into an argument here in front of this very practical audience as to whether our sea lanes can be protected or not. But for the purpose of expediting discussion, let's just assume that they can be. Isn't it possible that these foreign materials might otherwise be denied us, for political or other reasons? It certainly is conceivable that during wartime, areas adjacent to the Soviet Union could be pressured by the Soviet Union into a neutral status. I certainly would hate to bet on getting manganese from India. You can think

of examples in any other group of materials.

Our stockpile will largely be the answer to this military security angle, once it is complete. Theoretically we would have enough materials in our stockpile and from domestic and nearby production to see us through a five-year war. But the fact remains that our stockpile is not complete. It will be, as I understand it, several years before it will be. So what are we going to do in that interim period? We need some kind of interim policy. So I think that is one of the things we want to consider. The fact is, we have to do something about it in the next few years if we want to assure our military security.

As regards economic security (our second consideration), we might ask ourselves: "Do our domestic mining industries warrant economic protection, in the form of tariffs and subsidies, so that they might compete with low foreign wages and high-grade ores? Senator Malone in his hearings pointed out that in the lead and zinc industry we were paying fifteen dollars a day, whereas overseas in the lead and zinc industry the labor rates were less than forty cents. In the mercury industry in Spain and Italy labor was one dollar a day, whereas in this country for cheaper ores we were paying eighteen dollars a day. As regards content of the ore, foreign copper ores are four to five percent copper, whereas our ores are less than one percent. So that is rather tough competition. The Malone Committee leans decidedly in favor of such protection.

It sounds very good from the security angle to give our domestic

mining industry that protection, so that we can have all we need produced at home. But what would the effect of it be on our standard of living? The resultant price increase from subsidizing our domestic industry in any one metal certainly wouldn't hurt our pocketbooks; but if it were multiplied manyfold, it would have a decided effect on the value of your and my dollars. In this connection, I read that a two-cent increase in the average price per pound of basic metals would cost the consumers an additional two and a half billion dollars annually. That is a lot of money, that we would have to pay in this country if we are going to subsidize or otherwise favor our domestic mining industry.

There is a powerful school of thought that such economic protection as Senator Malone advocates is contrary to the principle of obtaining materials according to the least cost--a practice, which, its advocates say, is necessary if we as a nation are going to continue our economic expansion and maintain our position of leadership in world affairs.

I would like to quote from the Paley Commission on this. The Paley Commission, in subscribing to this least-cost principle, sizes up the issue in the following words:

"The growth of the United States has depended upon the availability of materials from low-cost sources of supply, and the continued growth of this country is dependent on the maintenance of this situation. If we are forced to procure materials from higher and higher cost cources, the growth on which both our security and

prosperity depend will eventually be checked. Procurement from higher cost rather than lower cost sources means essentially the diversion of manpower and capital away from efficient and toward inefficient employment."

That is how the Paley Commission thinks.

The last consideration I want to bring up as being highly important to the solution of this materials problem is the political one. Is the destiny of this nation inalterably bound with that of other Free World countries? I think that is a question we must try to answer. The Paley Commission thinks so. Judging from our political alliances (NATO and SEATO), it does appear that we have charted a course where it is the Free World as a whole versus the Soviet Bloc.

If that's the case, then is it politically feasible for us to adopt a policy of economic self-sufficiency, as some would advocate, barring foreign imports in effect--a policy which would have a serious effect on the already low standard of living of many of our allies--people who have a very low standard of living, but want to live just as well as we do?

You and I know that the threat today is not strictly a military threat, and neither is it solely a battle for the control of men's minds. It is also an economic threat. In fact, many of the experts feel that the danger is not one of military action. They feel that it is one of long-range economic considerations.

If, indeed, we believe that this is going to be a long-drawn-out, cold-war struggle, a long-range proposition, then political and economic

considerations must be given added emphasis, must have more influence than otherwise in the formulation of our natural resources policies.

But if we believe that this is not to be a long-drawn-out cold war, if we think we are going to go to war in the very, very near future, if we think that minerals self-sufficiency at any cost is our more important thing, we just can't push a button and obtain that situation overnight, either through our stockpile or by calling upon our domestic mining industry. It would take time, as I suggested a while ago. We would have to do something in the interim to get our materials. What, I don't know.

That about winds up my announced purpose for being up here on the platform this morning. But I would like to say one more thing in line with technology.

Technology has made great contributions in the past to materials supply. It has given us new methods of discovery. It has given us new mining and processing techniques. It has given us substitutes for scarce materials. As a result, the Paley Commission warns that most Americans have been nurtured on the romantic notion that technology will always come to our rescue with a new miracle whenever the need arises.

It is true, we do seem to have a blind faith in technology. But we can't take refuge in the hope that today's problems will somehow be averted. The stakes are just too high. We may never have to fight another war, but still we must be prepared.

Instead of alleviating this materials problem, future technology

might very well create new products and uses which would have the net result of adding to the demand for already scarce materials, thus creating new scarcities. Technology gave us the automobile. It also helped make lead more critical by adding it to gasoline and shooting in out the exhaust pipes of our automibiles. In 1929, thanks to our ingenuity, we discovered how to chrome-plate metal. Chrome is now a critical material. Then, thank God, somebody perfected the jet engine. But it has also given us a cobalt problem. I am not against technology. I just want to point out that it does have some bad consequences.

When you examine this raw laterials situation I don't think you can look into a crystal ball and get the answer. I think we have to face this problem squarely. Sure, let us take into account the technology that we can foresee definitely today. But I think we have to plot our course from here with what we can now safely predict, and alter as we go along as technology will permit.

Thank you very much.

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