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NONFERROUS AND LIGHT METALS RESOURCES

Mr. Simon D. Strauss

NOTICE

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Reviewed by: Colonel P. B. Klein, USAF

Date: 8 January 1960

INDUSTRIAL COLLEGE OF THE ARMED FORCES

WASHINGTON, D. C.

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CAPT. BURKY: General Mundy, Gentlemen: Our nation's strength, as you know, is inevitably tied to its human and material resources, at least those that it can command; and the importance of both is increasing as time goes by. Whereas we used about 35 minerals, for example, at the turn of the century, today it takes about a hundred to satisfy the requirements of our advancing technology.

We are interested today in the increasingly important role that nonferrous and light metals resources play in this progress. To discuss this vital category of minerals, our speaker brings a rich background of over 32 years in the industry, as a scholar, an author, a Government administrator, a financier, a consultant, and a business executive. He's smiling down there. I could go on and on. But it's all true. And in addition to the things that you have read in his biography, I can say that he also has exhibited the kind of leadership and initiative in the industry that has done a lot to advance the security interests of the United States, as well as help the development of other nations.

Therefore it gives me a lot of pleasure to introduce the Vice President of the American Smelting and Refining Company, Mr. Simon D. Strauss, who is here for his fifth time to speak to the class of 1960 on the subject of nonferrous and light metals resources. Mr. Strauss.

MR. STRAUSS: Gentlemen: I have enjoyed each of my four previous visits to the College. I know I will enjoy this one. Captain Burky showed me as we came up this morning where the headquarters of the College will be next year, and I hope I do well enough this morning to merit at least one more invitation to come back when you're in your new quarters.

The subject for which I've been allotted 45 minutes obviously cannot be covered in detail in that time. Captain Burky mentioned that there are roughly one hundred minerals that are now used in the industrial complex of this country, which would give me something like 28 seconds per mineral if I were to try to go down the list with all of them. I won't try to do that. I am going to confine my discussion to the major nonferrous and light metals. I believe that you have already heard a discussion of the steel situation.

There are 100, roughly, elements known to man; and most of these are metals. Only one of them is a ferrous metal, namely, iron or its derivative, steel. The others, therefore, fall into the category of nonferrous, but in varying degrees. There is some dispute in the trade, I think, about where such elements as manganese and chrome, that are usually used as alloys with iron--whether they should be called ferrous or nonferrous metals. I won't get into that controversy. In fact, we'll just leave them to one side, because the bulk of my discussion is going to deal with the four nonferrous metals which rank next after steel in the volume of annual production in the free world.

Roughly speaking, the volume of steel production in the free world these days is somewhere between 175 million and 200 million tons, of which about half is in the United States. We are speaking now of the area outside Russia. In comparison with this, copper and aluminum run around 3 or 3 1/2 million tons a year, and lead and zinc run between 2 and 3 million tons a year. So these are the four major nonferrous metals. Aluminum is also a light metal and could fit either description.

In terms of value, there are two other nonferrous metals that have equal importance with these four, namely, gold and silver. Actually, the annual value of world gold production is in the order of magnitude of the value of the aluminum and copper production. But since to try to describe the gold problems in terms of national security would involve me in the complexities of international banking, currency restrictions, terms of trade, and so forth, I'm going to let that go by.

Silver, which used to be considered strictly a monetary metal, is becoming increasingly an industrial metal. The annual volume of world silver production today is a little over 200 million ounces, which has a value of about 200 million dollars. A good deal of the work of the defense services now involves the use of silver, but there too the problem is a rather complex one; and unless during the question period some of you want to get into the silver situation, I intend to pass it by.

There are several respects in which these four major nonferrous metals are quite different from iron and steel. I think the outstanding respect in which they are different is the degree to which the problems of copper,

lead, zinc, and aluminum can only be looked at in an international context. Steel is primarily a domestic industry. It's true that in the last few years we have begun to import small quantities of steel; but, basically speaking, because of the great bulk and relatively low value of steel, it does not enter into world trade.

In the case of the nonferrous metals, however, the cost of transportation ranges from 10 percent downward. So it's only a fraction of the value of the metal. And when I say "transportation" I mean from any of the principal centers of production to any of the principal centers of consumption. You can move a ton of copper almost anywhere in the world between principal points of export and import for $20 a ton; and the value of a ton of copper today is over $600. So the transport factor is not a barrier.

Geography, therefore, becomes a very important factor in our consideration of the position of these materials. When you're trying to decide where to build an airplane factory or where to manufacture tanks, you can choose your location based on considerations that are important from a military standpoint. When you decide where to produce copper, lead, and zinc and, to a lesser extent, aluminum, you do not have such a freedom of choice. You produce them where they are. And the geography of the world is such that a large part of the production of these metals is obtained in relatively underdeveloped areas, underpopulated areas.

As an example, the second largest producer of copper in the world

is Chile, which is a republic of only 8 million people, situated on the west coast of South America, greatly removed from the centers of consumption of copper. The largest miner of lead in the world today is Australia, a country of 10 million people, which is even farther away from its principal markets. The largest miner of zinc in the world today is Canada, although Canada and the United States have been running neck and neck for the last year. Canada is a country of only 17 million people. The largest miner of bauxite, which is the principal raw material for aluminum, is Jamaica, which is a country of about a million people, situated in the West Indies. So you start off with the fact that in these industries the important thing is, where is the ore, and you start from that point of view.

The United States position is extremely fortunate in respect of all of these materials as compared with other major industrial powers. The reason that it is fortunate is that Nature has seen fit to liberally distribute the deposits of these materials in the North American area. I say "area" because actually not all of them are on the North American continent. The largest bauxite deposits, as I have just indicated, are just offshore in Jamaica. But among the United States, Canada, and Mexico there is a potential production of copper, lead, and zinc which is more than ample to take care of our defense requirements.

When you add to that the factor that in the 14 years since the end of World War II, the United States Government through stockpile purchases has acquired large quantities of these metals, which are not available

to the public--the exact details, rather, are not available to the public and not available to me; but it's no secret in the trade that the quantities involved in these stockpiles run into seven figures. In fact, the estimate generally is that the lead stockpile and the zinc stockpile must be in the neighborhood of two million tons apiece, and copper and aluminum perhaps somewhat less. Whether we're right or not I don't know, but that is the general consensus of opinion.

These figures are very large figures. They mean that the United States has on hand, above ground, produced in the sense of having been mined and refined, quantities equivalent to more than a full year's requirements of copper and aluminum and something like two years' requirements of lead and zinc. In addition to that, you have available the productive capacity, as I have indicated, of the North American continent.

From a defense standpoint there have been many people who have said: "Well, we can only count on the production that is within our own borders." Now, I do not subscribe to this point of view, because the production of Mexico and Canada, regardless of what their political affiliations at any given moment may be, is by nature destined for our use in times of emergency. I say that because during World War II, when I was here in Washington, it was quite clear that the very events that had cut the United States off from certain overseas sources of raw materials had also deprived Mexico and Canada of their overseas markets. Under normal conditions the large part of the Mexican and Canadian production of copper, lead, and zinc is marketed in Western Europe.

But if ocean hazard makes it impossible for us to bring in lead from Australia or copper from Chile, the same ocean hazards will prevent the delivery of Mexican and Canadian production to these overseas markets. So, regardless of what the politicians say, it is my very strong feeling that we have to look at this problem on a continental basis and not on a national basis.

In those terms there is no issue any longer, in my judgment, of national defense in the supply of these four major nonferrous metals. The one possible problem would be that if shipping got so bad that we could not move bauxite safely from the north shore of Jamaica to New Orleans or Mobile, which are the principal points of entry for Jamaican bauxite--if that particular route were cut off, we would certainly be in trouble as far as the bauxite supply is concerned. But assuming that we can protect that particular lifeline, then there is no defense problem that I can contemplate in the resources of these four materials.

Actually the situation is that the production of lead and zinc in the United States has been tending to decline somewhat, partly due to exhaustion of natural resources in certain areas, and partly due to our rising cost of production, which in turn reflects higher wage rates here. But offsetting not a sharp downturn, but a dwindling phase of the lead and zinc industries in the United States has been the terrific strides made in recent years in Canada, where exploration has shown resources the existence of which wasn't even suspected during World War II; and a very high potential in Mexico. The Mexican production of metals has not changed partic-

ularly in recent years. This is due primarily to tax policies of the Mexican government rather than to any lack of resources in Mexico. The potentiality is there in Mexico.

As far as copper is concerned, the picture in the United States is rather different than lead and zinc. The picture in copper in the United States is that we have succeeded in recent years in developing very substantial new resources of copper. For instance, in the city of Tucson, which is rapidly growing in population and has some significance as a center for Air Force activities, as well as for golf and anti-arthritis campaigns, and so forth--within fifteen miles of the city of Tucson there has been developed in the last ten years a major new copper district the existence of which was not suspected. Now, here you are, relatively close to, not a metropolitan area, but a city of some size; and you have found a new resource thanks to new techniques that have been developed in geology and in mineral exploration.

Immediately to the northeast of the city of Tucson another major deposit was found immediately after the end of World War II--the San Manuel Mine. I could elaborate with a number of other discoveries, but I am simply trying to make the point that as far as copper is concerned, the prospective productive capacity of the United States is still increasing. And, in fact, given a year free from labor interruptions and a year of relatively good business, the potential exists of a new all-time record in domestic copper mine production being set in the United States next year. Previous peaks have been around 1,200,000 tons. On an all-out

basis this country is now in a position where it could produce as much as 1,400,000 tons of copper from its own mines.

To finish up on copper on the North American basis, the Canadian production of copper has also been expanding in a parallel way to the increase in lead and zinc, although Canada is not a serious challenger to Chile as the second ranking source of copper in the world. In Mexico the copper production is fairly limited, but what there is, is available to the United States.

The aluminum situation is curious, in that Nature has seen fit to put most of the bauxite deposits of the world within the Tropical Zone; and, consequently, substantially all of the important aluminum-producing countries of the world, with the exception of France, have to import bauxite for the manufacture of aluminum. We are fortunate in that we are able to get bauxite, as I said previously, from Jamaica or from the north coast of South America, from Surinam and British Guiana.

There are very large deposits of bauxite available in the world. The raw material supply is not the problem of the aluminum industry. The aluminum industry differs from these three other metals in that the location of the plants where the aluminum metal is produced tends to be determined more by questions of the availability of power and the cost of other raw materials than by the location of bauxite.

So I feel, although I am naturally interested in having our industry occupy a position of prominence and importance in your minds, that I cannot truthfully state to you that you should be alarmed about the supply

of the nonferrous metals. It's fashionable to view these things with alarm. The Paley Commission's report, which was published by a commission appointed by President Truman about seven or eight years ago, gave the very clear impression that there were prospective shortages in the supply of these nonferrous metals, and that the United States should be concerned about this matter.

I do not share this view. There have been major discoveries made since the Paley Commission report was published, which the Paley Commission had not anticipated; and, while consumption has increased, within the United States at least it has not increased to the extent that the Commission had anticipated, although to be fair the Commission's report was based on a study projected through 1975 and we've got 15 years yet in which some of those predictions may tend to come true.

How about the position of Western Europe? Well, as good as the position of the United States is, the position of Western Europe is poor. In the cases of lead and zinc there is a fair amount of domestic production of lead and zinc in Western Europe, ~~but~~ chiefly in Italy, Sweden, Western Germany, and Spain. But on balance there is a definite shortage of production of these two metals; and imports must be obtained either from Latin America, Australia, or Africa, which are the three principal sources for imports for continental Western Europe. Canada is a major supplier for the British.

The British are deficient in the production of all four of these metals. They have no mining industry whatever of their own, and no

prospect of having one and no stockpiles. They had some small stockpiles, but financial considerations made them liquidate the bulk of these stockpiles in the last few years, and today they have left only very small remnants. So that they are in the British Isles in a situation where all these ~~materials~~ metals must be imported by water. The aluminum production, a good part of what is produced in the United Kingdom, is all based on imported ore, and a good part of the consumption is satisfied by imports of metal from Canada.

On the Continent, France, as I have indicated previously, has a well-balanced position, because they have a substantial production of bauxite in the case of aluminum. But France has no copper, either in metropolitan France and very little in the French colonial possessions, if they are still possessions. There are one or two prospects in Africa that may be developed, but they are not presently productive. So that the French have to import all of their copper, and their principal source of supply is the Belgian Congo and Chile.

Western Germany, as I said before, has some lead and zinc, but has to import copper, principally from Chile and Central Africa. It has an aluminum industry which is based entirely on imported bauxite.

Italy has a lead and zinc mining industry which supplies enough to take care of its own home needs. But it must import all of its copper. And, while it has a bauxite industry, its aluminum production is relatively small.

And so it goes down the list. Our Western European partners in

NATO are extremely deficient in copper, somewhat deficient in aluminum, and less deficient in lead and zinc.

What about the position of our potential adversary, the Soviet Union? Well, frankly, I don't know, and I don't believe that anyone knows. They publish no statistics worth mentioning. They show figures of increase from time to time in the rate of production of these various metals, but it's a percentage increase and they do not, and have not at any time that I am aware of, published any reliable tonnage figures.

Various estimates have been made. A British team, for instance, made a survey visit of the Russian zinc industry last year and came back with a voluminous report, which I read diligently. It seemed to be concerned mostly with the excellence of the ballet both in Moscow and in Leningrad. They had seen one fairly obsolete zinc smelter and had visited one or two zinc consuming works, but they did not find out what the production was. They were told some figures of capacity of certain plants, but with no indication as to whether these were all the plants or not.

So, whereas I think we do have a pretty good idea of what the Russians can do in steel and coal, in nonferrous metals we really don't know. When Mr. Kozlov was over here in the spring of this year, one of my associates attended an intimate luncheon of only about three hundred people where he was supposed to be given an opportunity to fire direct questions, and asked, not Mr. Kozlov himself but one of his Trade Commission assistants who was present, when the Russians would begin publishing statistics on the nonferrous metals, and was told that all this information

was available to our embassy. Well, the State Department says that our embassy has never received it. So at any rate it's a mystery.

One thing is fairly clear, however--that whatever their production is, it's apparently sufficient to take care of their consumtion whatever that is, because with the exception of copper the Russians have not been been importing any substantial amounts of lead, zinc, or aluminum in recent years. I say "with the exception of copper." In the case of copper the Russians have been fairly steady buyers either of copper or copper products. Our policy in this country has been to list refined copper as one of the strategic materials which is not to be exported behind the Iron Curtain. And for the most part the production of the other countries of the western world has adhered to the limitations that we have imposed on ourselves. For instance, Chilean copper as copper has not been freely sold behind the Iron Curtain. However, there has not been a similar prohibition on copper in certain fabricated forms, and during the last two or three years there has been a fairly extensive trade in the form of copper wire or copper wire rod, which is copper after it's been drawn down to a quarter inch or five-sixteenths of an inch diameter preparatory to the final drawing down as wire. There has been quite an extensive trade in this commodity, and almost all of the wire mills or rod mills of Western Germany have at one time or another participated in this trade. It's difficult to put the figures together, but the impression that most of us in the trade have is that perhaps 100 to 150 thousand tons of copper a year in the form of these products have been

flowing to Russia.

More recently the Russians have been able to get some copper as copper. They appear, if they can, to buy refined copper and then fabricate it themselves. Whether this means that some of their consumption is in forms other than wire or not I can't say. I am unable to interpret this factor. Actually most of the copper that they buy is in the form of wire bars, which in turn are really primarily suited to the drawing of wire. So the Russian bloc as a whole does definitely appear to have a net deficit in copper.

In aluminum, in lead, and in zinc they have been from time to time been small net exporters. During parts of last year, 1958, when conditions in the nonferrous metals markets were rather depressed and prices were low and there were surpluses mounting in the market, the downward trend of prices was accelerated by a rather what appeared to be concerted dumping of small quantities of lead, zinc, or aluminum at just the wrong times by the Russians. Some people felt that this was part of the economic warfare on the Russian part; that they were deliberately trying to disorganize the commodity market by selling substantial amounts of these metals just at the time when prices were weak in order to weaken them further and thereby cause unrest in the raw material exporting countries to whom the prices of these metals are important. Other people felt that while this might be so, it was unlikely that the Russians--when they decide to sell, they'll sell and price is no object.

As an example of the difference in what I would call the commercial

thinking between the Russians and ourselves, I would like to cite a single instance which I know something about. A good part of the zinc requirements of Western Europe is met by the smelting in Europe of zinc ores imported into Europe from other parts of the world. The largest industry in this respect is the Belgian industry. The Belgians produce about 225,000 tons of zinc each year, and all of it is recovered from ores imported into Belgium. The normal sources are Latin America, Africa, and Sweden, which exports some zinc ores, and some other such countries.

Well, in the spring of last year the Belgians received an offer of 40,000 tons of zinc concentrate, which is the ore after it has been concentrated but before it has been reduced to metal, from Russia; and because at the time they had the available capacity, and because it was offered on terms which they could hardly refuse, in other words, terms which assured them a fairly substantial profit margin, they bought this ore.

Now, in buying ore the practice is for the smelter to give the miner or shipper of the ore the price of zinc at the time the ore is delivered to the smelter, less a conversion charge. Of course that means the mine has to pay the cost of transporting the ore to the smelter. Well, this Russian ore was delivered during the period when the London price of zinc was about the equivalent of 8 cents a pound. The conversion cost that the Belgians charged for the treatment of this ore was the equivalent of about 4 cents a pound. The ore that the Russians delivered was of very poor quality. It contained only approximately 900 pounds of payable zinc per ton of concentrate. So the Russians got paid at the rate of 4 cents a pound

for the 900 pounds, or got the equivalent of $36 a ton for this material.

The freight charges on the Western European part of this trip alone were such, because it came all rail, that the Russians could not have met it at the Russian border much over $12 or $15 a ton for this material. Now, it surely cost the Russians something to lug this materials from the Urals, where it was mined, to the Iron Curtain frontier. And so you come to the conclusion that actually, in this particular instance, there was really nothing left for the miner. No western miner, of course, would have sold his concentrate under those circumstances. He would simply have held on to it and waited until the price recovered and then sold it under conditions in which he would have gotten ~~something~~ some net return for the material that he had laboriously extracted from the earth. But the Belgians tell me that, as nearly as they can calculate, there was no residual value left to these materials after paying transportation and smelting charges.

I say this because I think it is illustrative of the Russian approach, which is that once the decision has been made by the upper echelon in Moscow and the wheels are set in motion, the fact that commercial development may render the deal unattractive from our point of view will not or cannot stop the deliveries being made.

So much for the position of Russia. I think it's a fair guess to say that, while we know very little about it, with the enormous land area that the Russians have , with the scientific advance that they have made in many directions, although not necessarily in this particular one but

that they could make if needed, it's extremely unlikely that nonferrous metals would at any time constitute the Achilles' heel of the Russian economy. It's reasonably certain that they can get what they need when they need it.

But we know, of course, that when Mr. Khrushchev and other Russian leaders speak of matching the U.S. economy, giving his people a standard of living somewhat comparable to that of the citizens of the United States, then their requirements for these nonferrous metals are going to increase astronomically, because the big use of copper in this country, as an example, is certainly in such things as telephones, automobiles, electric refrigerators, vacuum cleaners, and so on down the line. I am talking naturally of the peacetime economy. And since the Russians today have very little of this sort of requirement for nonferrous metals, it is not strange that they are able to take care of their requirements on a strictly heavy industry and defense essential basis.

Whether they can expand their production to meet the needs of an improved standard of living for their civilian or not I don't know. I'm frank to say, I can't say. I suspect that a well-concerted effort on their part might accomplish this. But today probably in relation to our level of consumption of copper, aluminum, lead, and zinc, the chances are that the Russians are much further below our standard of consumption of nonferrous metals than they are below our standard of consumption of iron and steel. In other words, they are using roughly half the amount of steel that we are using, and I doubt that they are using as much as a third,

and probably not even a quarter, of what we are using in copper, aluminum, lead, and zinc.

Part of my assignment this morning was to discuss technology. There have been no major breakthroughs in the technology of the nonferrous metals as far as the metallurgical end is concerned since the development of electrolytic refining, which is the basis on which the very pure metals that are available to the market today are made possible. Electrolytic refining in the case of aluminum dates back to 1890 and in the case of copper dates to about 1900.

It doesn't seem likely that there will be any. The processes for the production of these metals are incredibly efficient, if I may say so. Today in the United States the copper industry is based for the most part on the mining of ore with a content of less than 20 pounds of copper per ton. We are producing over a million tons of copper, which means that we are mining over a hundred million tons of ore. To get at that hundred million tons of ore, we also have to remove, in the case of the open-pit operations, probably about 150 million to 200 million tons of overburden. So there's roughly 300 million tons of earth being moved in total to get our million tons of copper. Yet the value of the million tons of copper, as I indicated before, is something like $600 a ton, or $600, 000, 000. In other words, 300 million tons of material is being physically handled by the copper industry to get 600 million dollars worth or product, or a two to one ratio--two dollars per ton of raw material actually taken out of the ground or removed.

You can't do very much better than that, particularly when you consider that after the material has been extracted, it has to first go through the process of concentration, in which the ore, containing less than one percent copper, is concentrated to a product containing about 25 percent copper. Then this 25 percent material is smelted, which is a process really for removing the waste materials, chiefly sulphur and iron. Then it's refined, which is the basis of separating out the impurities in nonferrous metals, including by-product gold, silver, and similar materials. And then it must be marketed. And all of this has to be done within the context of the 600 million dollars gross revenue.

So it does not seem possible or probable that there will be any great changes in the present highly efficient techniques used by the mining industry for the recovery of these metals. Where the improvements have been made, they have been constant betterment in materials handling. Our company today is about to venture on a new copper project in Arizona in this area that I mentioned earlier, which is close to Tucson. We placed an order with General Motors the other day for 29 trucks capable of handling 55 tons of ore at a time. The tires on those trucks stand 10 feet in diameter. So that what we are doing is learning to handle more raw materials at a lower labor effort and at a lower cost per ton. But this is not the type of change which you have seen in such industries as electronics, airplanes, or misselry, where brand-new techniques have been developed. We are simply learning how to do better and better the things that we've been doing. And, as I say, I don't see really where

the possibility exists of any major technological breakthrough.

One place where there has been a vast change has been in the technique of finding mineral deposits. This is through the development of the geophysical prospecting method, which involves the, in effect, determination of likely areas through the electrical conductivity of the earth. There have been in recent years the development of a number of major deposits the existence of which was not previously known.

In the old days, mineral deposits were located mostly by people stumbling across the outcrops. In fact, I once contemplated writing a book about the animals that have discovered mineral deposits, because there was a pig that was responsible for the discovery of the Michigan copper area. There was a jackass, or possibly a mule--it's not quite clear--that stumbled across the outcrop of the Bunker Hill lead-silver mine up in Idaho; and there was an antelope that was shot and conveniently fell upon the outcrop of a copper deposit in South Africa. And so on down the line. There have been a number of these accidental discoveries.

Well, these accidents are probably not going to happen very often in the future, because--I don't know how many of you saw the television program the other night, where Mr. Howard K. Smith pointed out that if the rate of population increase continues, in a few hundred years there's going to be one person for every square foot of the earth's surface. I think under those circumstances it's rather unlikely that there's going to be any part of the earth's surface visually apparent that won't be noticed as far as mineral deposits are concerned. But there are a lot of deposits that never come to the

surface, and it's in this respect that mineral exploration has made a really major advance.

Now, the last part of my assignment as Captain Burky sent it to me was to discuss recommended policies that should be adopted by the United States in relation to its resources, its position as a leading producer and consumer of these nonferrous metals.

Well, there are at least two ways of approaching almost any problem. I heard the other day about this gentleman whose hearing was failing and he went to see the doctor and he said: "Doctor, I'm getting so hard of hearing that I can't even hear myself cough." The doctor looked at him and wrote out a prescription and said, "Take one of these pills after every meal." So the patient said, "Doctor, is this going to help my hearing?" "No, but it will make you cough louder." Well, as I say, there are ~~xxxxxxxx~~ several ways of approaching various problems.

The favorite remedy on the part of people who are having difficulties, of course, is to have the Government come to your assistance, either through the imposition of high duties to exclude foreign products or through restrictions on the quantities of materials that will come in, or subsidies, or something of that sort.

Now, I know, because of my previous connection with the Government, that there are areas in which this sort of Government assistance or Government intervention is essential in terms of the wider national security and the well-being of this country. But I would like respectfully to suggest

that this does not apply to the four major nonferrous metals of which I have been speaking this morning. I do not believe that there is any security problem, as I have said already, in our supply of these nonferrous metals any longer. In terms of 50 years from now perhaps; but, frankly, I'm inclined to doubt that.

As far as we can see over the next few years there is going to be an abundant supply of these four major materials. We already have built up a very sizeable stockpile, which should be adequate to take care of any unexpected emergency. We have two neighbors, Canada and Mexico, that are potentially very large sources of these raw materials; and we have at our doorstep in the Caribbean very large access to the raw material for the aluminum industry--bauxite.

Policies which cause international ill will through discrimination to assist our own producers might in the long run be detrimental to our best interests. The ability of the domestic copper mining industry to increase its capacity proves, I think, in that one case at least, that the handicap of high wages--and it is a handicap--is not sufficient where the mineral resources are good, to prevent expansion of our domestic industry. And even in the lead-zinc industry, which is the one that's been crying loudest and longest for help, if you examine the details, you will find that, where perhaps our production as a whole has receded from its peak, there are areas of exception.

Tennessee last year had the highest zinc production it has ever had. Tennessee has been one of the oldest sources in our country.

The present rate of production in Tennessee is only a small part of the potential based on the ore reserves that have been developed in recent years in Tennessee. That expansion of production occurred in 1958, a year of low prices and depression. This year the production in Tennessee is increasing still further.

Are we going eventually to get to the point of view where the mines of Oklahoma have to be protected against the unfair competition of the mines of Tennessee? I don't know, gentlemen. But it is my own considered opinion that there is no justification in terms of defense requirements for a policy of favoring the domestic producers of these nonferrous metals.

To make my position quite clear, I must point out that the company with which I am associated operates both in the United States and outside the United States; and that regardless of what remedies might be adopted by the Government as a result of political pressure, some of our operations will be benefited and others will be hurt, no matter which solution is reached.

So my conclusion is, frankly, that in raw material supply the best interests of the United States are served by keeping this market available to all suppliers, and that the most efficient supplier is the one on which we should rely. And, considering that we know that among the most efficient suppliers are our immediate neighbors on the north and south, I think we are in a singularly fortunate position.

Thank you very much.

CAPT. BURKY: Mr. Strauss is ready for your questions.

QUESTION: Would you say a little bit on tin?

MR. STRAUSS: Yes, sir. Tin is in quite a different position from the major nonferrous metals in that the seven principal producing countries of tin are all non-consumers of tin. In other words, none of the important consuming countries has any substantial home production; and tin enters almost entirely into the world's export trade.

For this reason the producers, or the producing countries, do not have the customary interest in keeping prices down that will occur in the cases of countries that are both producers and consumers; and it's been much easier to try to work out cartel arrangements on tin than on any other major metal for that very reason.

It's also easier to regulate, because when you try to work out international agreements on production or consumption, you always have the problem of the home market and how much it is and how much is exported and so on, whereas in tin, substantially all the world's tin production is exported and regulation becomes fairly automatic.

Tin is almost the only one of the major metals which is not growing in use. The reasons for that I think are partly the fact that it isn't produced at home in any of the important consuming countries. In other words, all the consumers, since they import substantially all of their tin requirements, are constantly seeking for ways to avoid dependence on something that is imported.

In the case of the United States, furthermore, of course, the imports

must come from overseas sources and are subject to perils, as we found out during World War II. For this reason I am very much in sympathy with the stockpile policy of accumulating a much larger quantity of tin in relation to our annual consumption than has been the case with the other major metals. I believe our stockpile is equivalent to many years of requirements of tin.

Technological advances dealt rather hard with the tin industry. The two biggest uses of tin have been its alloy with lead in the manufacture of solder, and as a coating of tin on tinplate. Well, we all know that the tin can is subject to intense competition from glass, from cardboard containers, from frozen food packages, for instances, which don't require any tin covering.

Furthermore, technique has developed a method of using less tin to cover a larger surface area of steel. The other major use, solder, has also been subject to some attrition. Many of the modern processes have gone around the use of solder. For instance, the automobile industry is using much less solder today than it used to, and this is tending to cut down the consumption of tin.

So there I would say that certainly we are never going to find any tin in this country that would fill a substantial part of our requirements, because we've been looking for it so long. There have been some possibilities in South Dakota and up in Alaska, but nothing has come of them so far, except congressional hearings. We will always have to import tin, but our position is certainly very comfortable today, thanks to the

stockpile policy which we have been following.

QUESTION: Mr. Strauss, in the last couple of years we have been bombarded by information that the aluminum industry is going to expand and expand, and is going to outproduce all the other nonferrous and ferrous industries and take away their markets. But recently I noticed that the aluminum production has dropped down to 80 percent of capacity when steel cut back. What's your opinion of the long-range look for aluminum in production and competing with other metals ?

MR. STRAUSS: Aluminum has made very substantial inroads. We are all familiar with particular places where aluminum has replaced other materials. I think it will continue to expand in terms of consumption more rapidly than steel or the other major nonferrous metals, because of the inherent advantages it has of lightness of weight and particularly ease of fabrication.

The fact that it isn't possible to keep capacity and consumption exactly in line is hardly surprising, because it takes a long time to build plants and you have to guess what consumption is going to be. I believe that the aluminum industry is not going to be able to maintain a curve of increase at quite the rapid rate of recent years, but it's certainly going to continue to grow.

The fact that bauxite is a very abundant raw material--for instance, I don't think I've made any mention of this, but within the last two or three years there has been developed in the extreme north of Australia a bauxite field which is not in production yet and may not be for many

years, but which has larger reserves probably than all the other known fields in the world put together--it has abundant raw material and it has certain inherent properties which make it a very desirable commodity; and I suspect it will continue to grow.

Before World War II the consumption of copper in this country was about a million tons a year, and the consumption of aluminum was roughly 200,000 tons a year. Today the consumption of both is about a million and a half tons a year. So aluminum has caught up.

Now, I think, like many new things, that some of the places where aluminum has replaced other materials have been based on propaganda and enthusiasm, and that some of the markets it has captured it is not going to keep. Other markets which it is just beginning to develop are probably going to expand further.

For instance, you have all probably seen this use of the aluminum home, which is being developed by the Aluminum Company of America with one of the big prefab builders. They estimate that today the typical dwelling unit will contain 40 to 50 pounds of aluminum, whereas the aluminum home will run something like 2400 pounds of aluminum per house. If you multiply that by the million dwelling units built a year, of course the possibilities there seem quite staggering. On the other hand, I hear that if you are mowing your lawn in front of your aluminum house and happen to run the lawnmower a little too close to the siding, you may have to call somebody out to straighten the house up.

QUESTION: You just touched on silver. I got the impression that

there are some technological advances that are coming that would like to use more silver, but that the price is high. The question is, Is the price arbitrarily controlled or is it just because silver is hard to get at?

MR. STRAUSS: Sir, I'd like to stand up and cheer for that question. That's one of my favorite questions.

There is a widespread impression that the price of silver is high and that it is arbitrarily controlled. That is based on the fact that the United States Government in 1934 passed something called the Silver Purchase Act, which has been amended several times since then; and under the terms of that act the United States Government will take an ounce of silver from any domestic miner, provided he certifies that it came out of a domestic mine, and give him 90 cents for it in silver coinage. The silver producer says he isn't selling the silver to the United States Government. He's just giving the United States Government the dollar twenty-nine cents worth of silver as a bar and he's getting back 90 cents as a coin.

The consumer of silver says this is an unwarranted subsidy, and it's keeping the price of silver high, and that if it weren't for the U. S. Government policy of purchasing, the price of silver would lower and we could buy it cheaper.

The fact is that this is not a subsidy, because the world production of silver is declining. It's considerably lower now than it was before the war, in spite of the fact that most silver is recovered as a byproduct from copper and lead production. It's ~~dxxinx~~ declining simply because

the new mines happen to have less silver in them than the old mines did.

If the price represented a substantial subsidy, of course, and since there is no ceiling on the amount of silver that the United States Government will buy under this act, then production would expand very rapidly. The fact that it is not expanding shows what the true situation is.

Last year the world production of silver was about 210 million ounces. Industrial consumption--by which I mean use that has nothing whatever to do with money, coinage--was around 180 million ounces. There was about 80 million ounces coined. So the total requirement was 260 million ounces, as against the supply of 210. The remaining 50 million ounces had to come out of the accumulations of silver from past years.

Many countries that used to have silver coinage dropped them, because they couldn't afford them. But the interesting thing to me is that many of these countries are now returning to silver coinage. For instance, the French, who felt they couldn't afford silver coinage, have just within the last year decided to revert to the coinage of silver. They are putting out a new five-franc piece, which on the basis of the new franc will have a face value of a dollar and will have 50 cents worth of silver in it. Well, the average French peasant who's gone through all the devaluations that have occurred in France in the few years is going to take that five-franc coin and dig a hole in his garden and put the coin in it and cover it up again, because here is the automatic guarantee that his money isn't going to be cut in value more than half from his point of view; and he's seen it cut by a good deal more than half in recent years.

We have seen the same thing in Italy. That has reverted to silver coinage. West Germany has reverted to silver coinage. Japan is reverting to silver coinage. The fact is that the people of the world who lived through deflations and devaluations are interested in a commodity with certain intrinsic value in their coinage.

Now, from the French Government's point of view, of course, this is not a bad deal, because they'll buy 50 million dollars worth of silver in a year and sell it in the form of coinage to their people for a hundred million dollars in a year. The coinage will be withdrawn from circulation, which means there's a hundred million dollars worth of purchasing power taken out of the rather inflationary French economy, and there's a profit or tax of 50 million dollars which the French Government is accumulating.

So I expect this sort of thing to grow. And as it grows, the competition for silver is going to be such that the United States Government is going to be placed in this position: At present, under the law I referred to, the United States Government is supposed to buy or acquire from domestic miners any silver at 90 cents an ounce. At the same time the Secretary of the Treasury may sell silver, to domestic consumers only, if in his discretion it is necessary, at a price no lower than 90 cents an ounce. It's entirely in the Secretary of the Treasury's discretion.

What he can sell is only the silver that's in the so-called free account. Once silver has been monetized, that is, once there has been silver certificates issued against it, he can't sell it. At present he's got about

190 million ounces in his free account. At the moment he happens to be selling about 5 million ounces a month, partly due to labor difficulties in the copper and lead industries, which have cut down domestic silver production temporarily. But sooner or later the Treasury is going to be faced with a situation where they are either going to run out of silver or decide that maybe they oughtn't to be selling for 91 cents an ounce when the world market is somewhat higher than 91 cents an ounce. So, rather than see a lower price for silver--to try to get to the meat of your question--I think the chances are the price will be higher.

So, you said, What effect would this have on consumption? Actually in the places where silver is being used industrially today, the matter of price is not important. The industrial uses of silver are largely going into fields where it can do a job so much better than anything else that at any price, within reason, of course, silver is being used.

For instance, silver is an excellent conductor of electricity, even better than copper. Well, nobody puts a silver wire in, or would put a silver wire in in place of copper for the ordinary wiring job even if the price of silver were half of what it is. But when you are talking about wiring inside one of these space missiles or something else, then silver wire will be used if it's the best conductor and it's going to stay up there longer.

I believe the price of silver is going to go up rather than down regardless of what policies the United States Government follows as far as this legislation is concerned. But the existing legislation is not

at the moment the cause for the present price of silver. The price of silver is higher than the price at which the United States Government buys, and therefore the United States Government at the moment is not buying at all.

QUESTION: Sir, I have heard of an operation in Arizona where iron is being recovered economically from copper slag. Would you tell us the significance of that ?

MR. STRAUSS: Yes, sir. There is a contemplated project in Arizona. They are not recovering iron at present. Mr. Zechendorf, of Webb and Knapp, who is a very astute financial operator, purchased a lot of property in Arizona some years ago when the United Verde Mine, was closed down. They had a whole town to sell. They had exhausted the copper deposits. And in selling the town to Mr. Zechendorf, who I think at the time might have thought that he wanted to convert it into a kind of winter resort-- Parkdale is a very attractive part of Arizona--in selling the town to Mr. Zechendorf they also sold him this large accumulation of slag.

I think earlier, when I was talking about the smelting of copper, I pointed out that in the smelting of concentrates, the chief impurities were sulphur and iron. The sulphur goes up the smoke stack and the iron goes out in the slag pile. This slag pile contains a lot of iron.

Now, it's not correct that it is being recovered at present. Mr. Zechendorf, of Webb and Knapp, announced the plan the other day for the recovery of steel from this enormous slag pile and indicated that if that

that is successful, he's going to look into other similar dumps of high-iron copper smelter residues around in the West. Whether his venture will be successful or not is quite an open question. Our metallurgical people rather doubt it, because the iron content of this material is, I think, between 30 and 40 percent, and there are lots of iron ores that are available in better locations in relation to markets than Parkdale, Arizona. So there's some question about it.

There's no question about the technical feasibility of it. That iron content of that slag can be converted into steel. But there is serious question as to the economic feasibility of it. It will be something well worth watching. But its success, I would say at the present, is not assured. There is a great difference of opinion. I am no metallurgist; so I won't burden you with my opinion, because it wouldn't be worth much. But it's in the early stages, let's say.

QUESTION: There was a very brief article in the local press about two weeks ago wherein the Atomic Energy Commission announced that it planned to cancel its contract with Canada for uranium. The explanation was contained in one sentence--that new deposits of uranium had been found in the United States. Can you tell us something about that?

MR. STRAUSS: Our company doesn't operate in uranium and I am only familiar with this in a sort of general way.

I think that explanation isn't really quite the correct explanation, and I don't believe that the United States actually canceled contracts. What the United States said it was going to do was that it wasn't going to

renew those contracts, which was an option that the United States had.

The success of the uranium exploration program of the United States Government has been far in excess of anything that anybody conceived of at the time that it was launched. When the atomic uses of uranium became evident at the end of World War II, it was decided that we would do what we could to stimulate interest in uranium and increase the production in order to seize upon this atomic potential. In doing this the Government outlined a policy of buying uranium-bearing materials at fixed prices for extended periods of time, giving bonuses for new discoveries, and so forth. I think that in making those announcements, to a certain extent, as far as the United States was concerned, our officials of the Atomic Energy Commission then were not terribly hopeful, but they felt that they had to make this effort at the same time that they pressed the Canadians, South Africans, and others also to do similar exploration and work.

Well, if you hold the price high enough long enough, it's amazing what will turn up. And that's exactly what happened in the case of uranium. These large deposits in New Mexico, Colorado, Wyoming, and other parts of the West are far in excess of anything that had been expected. The potential uranium production is now far outstripping any military needs; and, as far as the civilian need is concerned, of course what people are finding is that the capital cost of using atomic energy for power generation for purely civilian purposes is very high, and the technology is constantly changing; so that the consumption is not rising to the extent that it was originally anticipated. Some day all of this uranium probably