PLANNING FOR THE PRODUCTION OF COPPER FOR NATIONAL DEFENSE

13 February 1952

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Mr. Simon D. Strauss, Consultant to the Defense Materials Procurement Agency, was born in Lima, Peru, 24 July 1911. He was educated in the New York public schools and the College of the City of New York. In 1927 he became associated with the McGraw-Hill Publishing Company, assigned to the staff and subsequently Assistant Editor of the "Engineering and Mining Journal" of news, financial and markets (copper, lead, and zinc). From 1932 to 1934 Mr. Strauss was Editor of the "Madison Eagle" of Madison, New Jersey. From 1934 to 1941 he was a member of the staff of Standard Statistics Company as Economist, specializing in the nonferrous mining, coal mining, and construction industries. In 1941 he was appointed Assistant to William L. Clayton, Deputy Federal Loan Administrator of the Federal Loan Agency and was particularly active in the Metals Reserve Company, subsidiary of the Reconstruction Finance Corporation. During the latter part of World War II, he became vice-president of the Metals Reserve Company and Deputy Director. After the war he returned to industry and in 1947 was elected vice-president and sales manager of the American Smelting and Refining Company, New York City. He is a Director of the Revere Copper and Brass Company and Member of the Board of Governors of the New York Commodity Exchange. Mr. Strauss is the coauthor of "Two Cycles of Corporation Profits," published in 1936 by Harper and Company, and has contributed numerous articles on "The Economics of the Nonferrous Metals Industry" to financial and industrial journals. From 1931 to 1942 he contributed the chapter "Zinc" to the "Mineral Industry, Annual Yearbook," McGraw-Hill.

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MR. BAUM: We have been always a producer-nation of copper, copper adequate to our needs; but, with the increasing demand for this vital commodity for the defense program, the production of more and more copper is one of today's major economic mobilization problems.

Our speaker is consultant to the Defense Materials Procurement Agency. As you know from his biography, he comes to us with a world of experience and first-hand information on our subject: "Planning for the Production of Copper for National Defense."

It is my pleasure to introduce for the first time to the college, Mr. Simon D. Strauss, Vice-President, American Smelting and Refining Company, Director, Revere Copper and Brass Company, and member, New York Commodity Exchange.

MR. STRAUSS: Gentlemen of the college, during both World War II and the present rearmament effort, the key materials to which the entire military production drive has been geared have been steel, aluminum, and copper. It has been found feasible to base the entire economy of the country on those three materials through the so-called Controlled Materials Plan. The belief is quite general, therefore, that the scope of munitions production and of our civilian economy will be determined largely by the availability of these three materials. It is only natural as a consequence that both you, who are responsible for the military effort, and those who are charged with protecting the civilian economy should become concerned about the volume of supply and the availability of these three materials.

I propose later on to go into the exact copper situation in some detail. But, before I do that, I think it might be worth while to point out certain respects in which the problem of increasing the production and the availability of copper differs materially from the picture with respect to steel or aluminum.

In producing steel one must have iron ore, scrap iron, limestone, and coke. Iron ore by itself is not the determining factor in the location of a steel plant. The determining factor is a combination of these four raw materials plus proximity to the market for the steel, because steel is a relatively low-value material and one can't afford to haul it around the countryside.

In the case of aluminum, the factors that determine a plant's location are, first, the availability of bauxite, which is the raw material for the production of aluminum; and the availability of cheap power.

Aluminum is a much more valuable material than steel, and proximity to the consuming market for aluminum is not quite so important as it is in the case of steel. Consequently, you have a situation where, for instance, a good part of your aluminum production facilities could be in the Northwest or in remote regions of Canada, in spite of the fact that the major aluminum consuming centers would be the areas of Cleveland, Chicago, and Pittsburgh.

Copper is unlike either of these two materials, for the simple reason that the location of copper ore is the all-important and determining factor in the production of the copper. It takes just one ton of iron ore on the average to produce one ton of steel. I think last year the figures show that the iron ore production in this country, plus the imports, were around 110 million tons, and the steel production slightly under 100 million tons. In the case of aluminum it takes four tons of bauxite to make one ton of aluminum. Last year we produced something better than 800,000 tons of aluminum in this country. To get that quantity of aluminum we needed 3.2 million tons of bauxite. In copper the situation is different for the good reason that it takes on the average, say, 100 to 125 tons of copper ore to make a ton of copper metal. The quantity of copper ore mined in this country last year was not very far short of 100 million tons.

Take the world picture; it is the same. The world production of copper metal, at least in those parts of the world that are friendly to us, west of the Iron Curtain, amounts to about 2.5 million tons a year. The same area, I suppose, produces close to 200 million tons of steel. But the volume of copper ore extracted was as great as the volume of iron ore extracted even though the total quantity of metal produced was only one-eightieth as great.

I am taking some time to explain this to you because when you look at the copper industry, the steel industry, and the aluminum industry, and you see the relative rapidity with which the steel and aluminum production are being expanded, you might ask yourselves: Why doesn't the copper industry do the same thing? But I think you can all appreciate that if you are going to build a steel plant on the Delaware River between the cities of Philadelphia and Trenton, that is one thing. You are close to sources of supply. You have excellent transportation facilities. You have a large labor pool on which to draw. Or, if you are going to build a new aluminum plant, as Kaiser did, in New Orleans, that is still a relatively simple matter, apart from procuring the equipment and supplies; you are in a community with all kinds of facilities--water, power, and transportation--and with availability of labor. My company is just now trying to build a new copper production facility in the wilds of Queensland in Australia, 700 miles from the seacoast, on the end of a rather fragile, one-track railroad line--we have been trying to build this smelter for three years. We are getting our equipment and supplies either from Pittsburgh in this country or from

Birmingham, England. We have to transport equipment and supplies 10,000 to 12,000 miles by water and then 700 miles by land over this railroad. You can see that this is a very much more complicated and difficult undertaking. This is why the expansion of copper production cannot be achieved overnight, desirable as it might seem to you to start the wheels turning at a faster rate.

Of course, you might say, "Well, why build the plant 700 miles from the seacoast in Queensland? Why don't you build the plant right on the coast?" The answer to that is: If we are going to smelt ore containing from 1 to 1.5 precent of copper and if we are going to carry that any distance at all, the cost is going to mount at a very rapid rate. For instance, nobody gives a second thought in iron ore, the raw material for steel, or in bauxite, the raw material for aluminum, to a transportation cost of 5 dollars, 7 dollars, or 8 dollars a ton to cart these materials around, because 5 dollars a ton for iron ore means only 5 dollars a ton for steel. Five dollars a ton for transporting bauxite means at most 20 dollars a ton for aluminum, just a cent a pound. But 5 dollars a ton on copper ore, when you have to carry 100 tons of it, means 500 dollars a ton for copper, or 25 cents a pound; and that is the present total value of the copper.

It follows, therefore, that the processing facilities of the copper industry must be located immediately at or immediately adjacent to the deposit itself. Since for some reason known best to himself, God chose rather inconvenient locations for putting down most of the large copper deposits in the world, it follows that our industry is faced with this problem of creating facilities in places where the usual amenities of civilization are not available.

Now, before I try to tell you a little bit about the copper supply itself, I might speak briefly about the methods of production of copper. I understand that there was a motion picture shown here yesterday which was produced by one of the Copper Companies that perhaps gave you a good over-all view of that.

Most of the copper deposits of the world are being exploited by one of two methods. One is the so-called open-pit method, in which the material is removed by power shovels on the surface. The other is underground mining through a shaft sunk into the earth with lateral tunnels, driven for the purpose of exploiting the deposit.

In every case production cannot begin until a very large amount of preparatory work has been done. In the case of the open pit you have to provide for railroad track or truck roads into and out of the pit. Grade of these access facilities is a very important factor, because that bears importantly on the cost of handling the materials into and out of the pit. As a rule you have to remove a great quantity of overburden or waste material, which lies on top of or adjacent to the deposit, in order

to make the topography of the pit such that it can be readily worked. As a matter of fact, in the case of almost all the large open-pit mines the volume of this noncopper-bearing material that must be moved is as great as or greater than the volume of copper-bearing material that must be moved. So when you say, for instance, that the Utah Copper Mine has an average copper content of 16 pounds of copper per ton of ore processed, that is correct; but it is only 8 pounds per ton of raw material handled, because there is a ton of noncopper-bearing material that also has to be taken out of the pit.

In the case of underground mines, the amount of waste material that needs to be moved is less, because there is not the same necessity for conforming to topographical needs. The shafts can be driven directly into or adjacent to the ore body. The surrounding rock is not disturbed except for the material that must be mined in getting to and from the ore body. So that there isn't this great amount of preparatory stripping, as we call it, that occurs with the open pit.

However, there is this difference: Any of you who have had experience in sinking shafts or driving tunnels knows that there are actual physical limitations to the speed at which a shaft can be sunk or a tunnel driven. I think the record for tunnel driving is something like a thousand feet or a little over a month. As a large underground mine contains scores of tunnels and several shafts, you can realize that there is a time factor of perhaps several years involved in preparing such an ore body for production.

Furthermore, because of the inconvenient location of copper deposits, before a company can even begin to do that, it usually must provide living facilities at the site of the work. The materials must be brought in over great distances to build those towns. The surrounding countryside cannot be depended on, as is the case with a steel mill or an aluminum production works, for a place to house the workers.

I hope I have made my point abundantly clear, that there is no "Open sesame" to the new production of copper. It would be very nice to say that it takes one year, two years, or three years to bring a copper mine into production; but there is no single answer. Each deposit must stand on its own feet; the amount of time involved to bring it into production depends entirely on the physical conditions and geographical location of that deposit.

The particular company with which I am associated is now working, and has been for the last year or so, on a very large low-grade deposit of copper ore in southern Peru--in an extremely mountainous area. It will be necessary for us to build a railroad, to provide dock facilities and a power plant, and to build a town. We have now determined definitely that there is a very large deposit there, and sometime this year the directors will be asked to decide whether they want to risk the large capital investment that will be needed to equip that deposit. Whenever they decide to do it, we calculate that it will take between four and five years from that day to bring that mine into production.

I have mentioned the matter of decision by the directors as to the capital investment required. Under present conditions, with rapidly increasing costs of equipment and labor, and with the declining grade of material mined, the cost of equipping a copper mine for production is constantly increasing. Years ago, when the typical copper mine had ore with a content of 3 to 4 percent copper (which means 60 to 80 pounds of copper to the ton of ore) it might have been possible to bring a new copper mine into production with a capital investment of, oh, perhaps 15 to 30 cents per pound of copper to be recovered annually. At an interest rate of 5 percent, the cost in interest per pound of annual capacity of copper would be about one cent a pound.

Today, however, the cost of facilities for the production of copper is running between 50 cents and a dollar per pound of annual capacity. The reason for this is that the cost of facilities is determined not so much by the amount of copper produced as by the amount of raw material handled in the first place, the volume of copper ore that must be taken out of the ground and put through the mill. Thus the cost per pound of copper recovered in terms of investment, which is what I am speaking of now, will be three times as great for 1-percent ore as it will be for 3-percent ore.

As a specific illustration of what I mean, the largest new copper project now under consideration in the United States itself is the one in southern Arizona which is being brought into production by the San Manuel Copper Company. It is estimated that the cost of bringing that into production will be between 80 million and 100 million dollars; and that the mine will produce about 140 million pounds of copper a year. Furthermore, this investment of 80 million to 100 million dollars does not include any provision for refining the copper. The company will carry the copper only to the stage of blister copper, which is the product of the copper smelter, running 99 percent copper, but also having gold, silver, and other minor impurities.

Well, here is the San Manuel Company faced with a cost, as I say, of perhaps 80 million or 100 million dollars to produce 140 million pounds of copper a year. That works out somewhere around 70 cents as the cost of the plant investment per pound of annual capacity. If the San Manuel Company pays 5 percent interest, as it may, that means that a cost of 3.5 cents per pound of copper just to pay the interest on the investment; and it is this factor which should be the greatest assurance to the military, and to our civilian authorities as well, that once a copper project is definitely decided on, the operators, simply from a selfish standpoint, will begin production just as rapidly as possible, because during the period of time that the plant is being constructed, interest charges are constantly accruing and there is no revenue coming in.

Of course, this same factor, the very large capital cost which exists today, explains why the copper industry has a certain reluctance to maintaining stand-by, idle capacity, because, in addition to the

interest cost, there is naturally a maintenance cost. If you have an 80-million-dollar plant, you just don't let it sit out in the desert by itself. You have to employ a certain number of people there for maintenance. If it is an underground mine, you have to pump it out. You may have to replace timbers. So idle capacity is a very expensive proposition for the copper industry today.

Therefore, when the Government representatives said, as they have been saying in recent months to the copper industry: "We need more capacity," the representatives of the copper industry have replied: "Well, we want assurance of an outlet for the production that will come from this added capacity" because the history of the copper industry has always been one of extreme cycles of damand. At times demand will absorb all production with no difficulty. At other times copper has been virtually unsalable.

These changing conditions can come about very rapidly indeed. During the fall months of 1948, we met here in Washington on the problem of stockpiling copper. We were assured then that the copper situation was such that the demand would continue indefinitely. We were told also by many people that they were considering switching from copper to other materials because the other materials looked as if they would be available and copper would not. But by March of 1949 I was lugging my briefcase around trying to sell copper to most of our leading customers, but none of them seemed interested in buying copper. That included the stockpile, because, unfortunately, Congress had overlooked the matter of supplying the funds with which to purchase it.

So the copper industry feels just a little hesitant about accepting at face value statements that there is going to be a permanent shortage of copper, or that the demand for copper is such that all the copper that can be produced will be taken for an indefinite period in the future. Experience has indicated to us that things may be a little different from that; and it is for this reason that most of the new productions that are being brought in are on the basis of the Government making a contract to buy, usually for five years of production at some agreed price level.

I said that I wanted to go into the details of the copper supply. It is a subject that could take an indefinite amount of time. So I would like to sketch just very briefly what the copper supply of the world is as indicated by the statistics.

We don't know how much copper Russia is producing, like a lot of other things about Russia. But the indication is, and the belief of most of the competent mining engineers and geologists who know something about the industry in Russia, that its production is something like 250,000 tons of copper a year. That is substantially the only copper production of any consequence in the Iron Curtain countries. There is no copper production whatever in Poland or Czechoslovakia. There is minor production in Rumania and Bulgaria. There is a certain

amount of copper in East Germany. There may be a little in China--say 2,000 tons a year. So that the Iron Curtain area is short of copper. On the assumption that 250,000 tons a year is correct, then, adding to that the production of the rest of the world, there is a total world production of copper of about 2.75 million tons a year. In other words, the free world, the Western World, produces perhaps 2.5 million tons a year, and of that the United States produces some less than a million tons. So this country's production is 40 percent of the production of the free world and perhaps 35 percent of the total world production.

Some people say that the United States is a "have-not" nation; that we are deficient in copper. I don't share that view. Here is a country with 6 percent of the world's population and 6 percent of the world's land area with 35 percent of the world's production of copper. I don't consider that this indicates a "have-not" nation. What makes us dependent on imported copper is the fact that our consumption of new copper is so large.

I am trying not to include scrap in the picture. That is always a hard thing to do, because a certain amount of scrap is always handled in addition to new copper; but I am trying to eliminate scrap entirely from the picture.

Our present use of new copper today, when we are on short rations, is 1.32 million tons of copper a year, in other words, half the world's supply. Fifty percent of the over-all world's supply is being used by 6 percent of the people. It is only because of this factor that we are short of copper; not because we don't produce enough copper but because we use so much.

In addition to the production of our own country, which right now is about one million tons, the other countries of the Western Hemisphere produce perhaps another 750,000 tons: Chile is the largest producer; then there are Canada, Mexico, Cuba, and Peru. The Peruvian production some years hence, as I indicated in my earlier remarks, may expand quite substantially. The Chilean production comes from three large mines which are controlled by United States companies and from a very large number of small mines. These account for only about 10 percent of the total Chilean production, which is now somewhere between 400,000 and 450,000 tons a year.

The Chilean production cannot be rapidly expanded beyond, say, 500,000 tons a year--that is about the maximum that it attained during World War II--for the reasons which I have already given, namely, the amount of time that it takes for the preparatory work--the transportation, power and housing facilities.

And, of course, American capital going into a country like Chile is somewhat concerned over the constantly increasing tax burden which

is placed on it by the Chilean Government. We have to recognize the fact that copper is one of the two commodities of which Chile has a substantial exportable surplus. It is only natural that its government should attempt to capitalize on that by taxing the industry heavily. But it does look as if perhaps they have gone a little on the far side in the sense that they are now taxing at such a rate as to discourage any substantial new investments other than the new investments that are made necessary by technological changes. The Anaconda Company, which has the largest mine down there, is now investing over 100 million dollars to equip its mine there with new metallurgical facilities because the character of the ore has changed, so that the old processes won't apply.

Canada has had a fairly constant production for the last 15 or 20 years. During the 1920's Canada's production expanded very rapidly, partly in connection with the nickel production. I think now it is on a more or less even level. Canada's economy itself is developing so rapidly that its requirements for copper are also increasing; the result is that the United States cannot count on getting any large quantity of copper from Canada. The Canadians simply don't have the exportable surplus that they had at one time.

Outside the Western Hemisphere--which, as I said, right now produces about 1.75 million tons of copper a year, with roughly a million tons of that in the United States and three quarters of a million tons in the other countries--the principal prime producer of copper is Africa, in the Belgian Congo and Northern Rhodesia. The Belgian Congo production is controlled by a company in which the Belgian Government itself has a substantial financial investment.

None of that African copper comes to the United States and stays here. A lot of it comes in for the final refining, but none of the refined copper stays here. It is re-exported from this country; it is European-controlled copper and Europe needs the copper and doesn't care to pay dollars for it when dollars are short. The production of Northern Rhodesia is being expanded currently and will expand fairly substantially over the next three to four years. But it is a sure guess that most of that additional copper will be taken by the British Empire.

There remain only a quarter million tons of copper to be accounted for. It is scattered over a score of countries. There is a little in Japan, some in India, some in Sweden, Yugoslavia, and Spain. All of these productions are normally absorbed in the countries where the material is produced or in the countries immediately adjacent to them. The only exception is Yugoslavia, which is shipping a certain amount of copper to us.

So in summary, the expansion of copper production is largely a problem of Latin America and the United States itself. Calculating

on the basis of the plants that have already been approved, and not calculating, for instance, plants such as the one that I mentioned in southern Peru, which is still five years away at a minimum, it appears that there will be added to the present production facilities about 500,000 tons of additional copper capacity over the next four years.

However, part of this will replace copper mines now in operation which are being exhausted. The net gain in total supply will be 400,000 tons, and I think half of that will be in the United States. Of the other half perhaps half of that will also come to the United States because of the fact that we have tied it up under contracts of one sort or another. In other words, based on the work now under way, the supply of copper available to the United States over the next three or four years or so may be increased by about 300,000 tons of copper a year.

That concludes the presentation of the subject that I care to make at this time. I will be happy to answer any questions that any of you may have.

QUESTION: Will you discuss the industrial reports in connection with the allocation of metallic production, the reports that are required now in handling the allocation of the production?

MR. STRAUSS: I don't know too much about the actual allocation of copper. I understand that this afternoon there are going to be some NPA people at the session that you are going to have.

I might state briefly that, as I understand it, each of the divisions in NPA is constituted as a sort of claimant agency. They take the total expected supply for any given month and figure out how much of it they can let each one of these divisions have, presumably based partly on the military potentialities. That is the first thing.

Then after that comes the essential civilian use. Then what is left over is assigned for what you might call straight civilian production, such as automobiles. That, I believe, is tied in partly to past history and partly on the basis of its importance and the availability of other materials.

QUESTION: I would like to follow up that question on your industrial half of it. How does the industry react to the reports required? Are there any duplications between agencies?

MR. STRAUSS: There is a good deal of duplication between agencies in a lot of fields in which we come in contact with the Government, but in this field that you speak of there is none. The National Production Authority has worked out what we consider as good a form of questionnaire, assuming that you have to go through this process, as can be

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worked out. We have no quarrel with the reports we have to fill out, although we do have a lot more people around to fill them out because of the amount of paper work that the Government requires. But I think so far as I can tell, the NPA requirements are rather reasonable; and the information seems to be handled with a reasonable degree of accuracy.

Of course, in that sense the company for which I work has exactly this same problem all on its own. We are a custom smelter. We buy copper from the raw material producers on the basis of the prevailing market price of copper. To avoid taking a substantial risk of inventory profit or loss--the risk is really on the losses; we don't worry about the profits risk very much--we try each month to sell exactly an equivalent amount of metal as is contained in the raw materials that we bought. For that purpose each of our plants reports to New York, at the beginning of the month, their estimates of the quantity of copper that will be contained in the materials they buy. We try to limit our sales to that tonnage.

These figures are revised in our own case three times before the end of the month. Nevertheless, there are some months when we either sell too much or too little; and in doing so, naturally we are running a certain risk.

What I am trying to say is that private industry has this same problem and can't work it out to 100 percent perfection, and I don't suppose the Government can either. In my opinion NPA is doing a workmanlike job on the purely statistical end in distributing copper. As to the equities involved, I will frankly say that I am not in a position to judge, it requires information which I don't have.

QUESTION: Would you comment on the international allocation of copper and the control of the world prices, and to what extent your company has taken advantage of world prices which you might get and which might be higher than in this country?

MR. STRAUSS: Yes. Of course, the control of prices is, so far as it affects us, only control in the United States. The international organization has not made any attempt to control prices to any great extent. In our own case, the American Smelting and Refining Company, all the copper we smelt and refine is refined in the United States. Some of it is smelted outside the United States, but it is all brought here for refining.

We are subject to the controls of the Office of Price Stabilization. Therefore we must sell our copper at the price that the OPA has determined, which at present is 27.5 cents for copper of foreign origin and 24.5 cents for copper of domestic origin.

It happens that due to certain circumstances very much higher prices prevail in certain European markets. The small mines outside the United States, which ship their material to us for processing, would like to get those higher prices. We cannot, obviously, pay them the high price that prevails in the foreign markets and conform to the OPS regulations in the resale ourselves.

So we have had to adopt what we consider a temporary procedure in the effort to keep the flow of materials coming to this country. We give back to these foreign producers a certain portion of the copper that they ship to us. In other words, they ship to us the copper in the form of concentrates and we return to them a certain amount of refined copper. The percentage is usually 50 percent of the copper in the raw material. That is the portion which we return to them, because they are foreign companies and not subject to the jurisdiction of the OPS. They themselves sell this copper in the European markets at much higher prices. The balance of 50 percent is sold by us subject to OPS regulations, and we sell that mostly in the United States at the controlled price.

As I said at the start, the international allocation has nothing to do at the moment with the price situation. The international allocation is being handled by the International Materials Conference here in Washington. The copper allocation committee, I think, has 12 countries represented on it. It makes quarterly estimates of the copper supply and doles that out to all the countries in the Western World on the basis of taking first the military requirements at 100 percent of their value, deducting them from the total supply; and then the balance is distributed on a pro rata basis, on a statistical basis.

Statistically we have no quarrel with that approach. There is just the question in my mind as to whether the authority to do that really rests with the State Department and the other agencies of the Government that are going into this. Presumably they have gone into the question and satisfied themselves. I don't know whether the legislation really empowers them to do it. It is a difficult problem, because, obviously, we do want to see that our western associates have enough copper to carry on their rearmament effort.

In the meantime this allocation plan is, in my mind, almost entirely a paper scheme. The first period in which allocations were made was the fourth quarter of 1951. Every consuming country was dissatisfied with the allocation given to it. They all put up quite a bit of fuss. The result was that in the first quarter of 1952 the allocations were more generous.

But merely telling a fellow that he can buy some material doesn't mean that he gets it. It is my impression that international allocations, too, will be subject to the same statistical difficulty that the NPA is

subject to unless the figures are much more accurate, because they are doing it on a quarterly basis instead of monthly. This complicates matters as they are dealing with the whole world picture where the time lag in transportation is much greater and much more severe.

The United States, as it looks now, will not secure its first quarter allocation. I believe most of the foreign countries won't secure theirs either. So if there is any consolation in that, I think we can find plenty of it.

QUESTION: Do you know what effect the policy of buying copper here as needed has on the copper price, and how other parts of the copper industry look on that situation?

MR. STRAUSS: That is a very good question, because it accounts for the unpopularity of my company in times of limited demand.

We are under long-term contract to buy ore from the mines. We are not under long-term contract to sell the copper recovered from the ore to the consumers because we never know how much copper bearing material is going to be actually received at our plants, and we don't want to enter into commitments that we cannot live up to. So we have first the obligation of taking all that the copper mines will ship regardless of whether we sell that copper or not.

When the demand starts to diminish, it becomes increasingly difficult for us to sell copper. Of course, the amount of money we have tied up in the business can become very large at times, with prices where they are. At roughly 500 dollars a ton, if you have an intake of 10,000 tons of copper a month, that is 5 million dollars of capital which could be tied up in copper in a single month. If you are not selling metal currently, you begin to get a little uneasy about the price. So when that happens, the practice of the custom smelters is to offer copper at a little lower price to induce consumers to buy copper from them rather than from their competitors, the mining companies.

The mining companies don't have the same problem, because they haven't bought their copper. They are producing it from their own mines. Their investment is in terms of their own cost of production of copper, which in the case of certain competitors may be substantially below the market price. Therefore they are not tying up their working capital as rapidly as the custom smelters. So it is naturally very disconcerting to them to have the custom smelters cutting prices.

On the other hand, I think it is one of the healthy things about our industry. I believe that in the long run it tends to make a realistic copper price, one that bears some relation to the economic picture as a whole.

There have been times in the past when the copper industry has held on to a static price, has held the price unchanged for a period of time

when conditions didn't really justify it. The consequence of that action was overproduction, burdensome surpluses, and great difficulty in the industry. A notable example of that was in 1929, when the copper industry kept the price pegged at 18 cents a pound for a period of seven or eight months after the great depression of October 1929. Then once copper did begin to drop, it dropped rapidly and didn't stop until it came down to 5 cents a pound, a price which was absolutely ruinous to the producing industry. No one could operate profitably at that price.

If the copper industry had been a little more flexible then, it would have dropped its price sooner, production would have been curtailed sooner, the surpluses would not have been as burdensome to the industry, and prices would probably never have gone down to the 5-cent level. So we have the feeling that the custom smelters are a healthy influence on the industry, but you couldn't get our competitors to agree to that.

QUESTION: You have spoken about the additional requirements of Canada as due to its expanding economy. You indicated that there is some fear on the part of the copper industry in opening too much capacity because of fear of a loss of markets after the war economy drops off. You speak now of the effect of the law of supply and demand on fluctuating copper prices. Isn't there a sufficient tendency to expand commerce worldwide to persuade the industry that any new production that might be opened up can be absorbed without any necessity of holding back and waiting for contracts and pool orders to support new mines?

MR. STRAUSS: Well, of course, there is in certain directions. I mentioned in the course of my talk, for instance, the project for a new mine in Peru. That is a project that my company is considering without any such contract or assurance. We have known of this copper deposit for several years and it seems now the logical thing to go ahead and develop it. We felt that market conditions justified it.

The same thing applies to many other projects for expanding copper production which were initiated before the current emergency came on. The Anaconda Company had the project that they call the Greater Butte project in Montana. It is the company's intent to mine the fringes of the high-grade ore bodies by the block-caving method in such a way that the copper will be reasonably cheap.

So the copper industry today does have its normal rate of growth and does bring in new properties. Naturally, in trying to cover briefly a subject as broad as this, one always tends to overgeneralize any situation. There are a number of marginal situations in the United States which would not have been brought into production without the Government's willingness to assure a market for the additional production.

A typical example of that is the mine in Arizona that my company is bringing in--the Silver Bell. This is a small deposit--small in comparison with some of the very large ones now in operation--of low-grade ore, running nine-tenths of one percent copper. We have known about the existence of that deposit for the last 20 years. During that period the copper industry has been growing and the consumption of copper has been growing. But there has never been a time when we felt convinced enough that this mine would carry its own weight to justify us in bringing it into production.

When the Government in November 1950 appealed to all the copper industry to report projects which might be brought in, this particular one was brought to the attention of the Government. All the facts available were put before the Government. A satisfactory contract was eventually negotiated with it, and we are going to put it into production.

So there is a certain growth, yes. But I am not sure that the copper industry is convinced the copper-consuming requirements of the world economy will go ahead and grow by 400,000 tons a year in the next four years. That is a much more rapid expansion than the copper industry has ever experienced in a similar period in the past.

QUESTION: Considering the long-range world picture and the possibility of a war within four or five years, and the chances of our imports being stopped by either the lack of ships or submarine activities, would you further discuss the opening up of marginal mines to broaden our base or add to our stockpile, letting the Government assist on the cost of opening these mines for equipping our own armed forces?

MR. STRAUSS: Of course, the only substantial overseas source of copper that we have in this country is the Chilean production. During World War II my recollection is that only one cargo of that material was lost. It was a fortunate circumstance perhaps. We lost many cargoes of other materials at a higher rate than that. But, at any rate, there wasn't any substantial loss of copper. I have a feeling that in a future war we could continue to get that Chilean copper, because it can move up either coast, and I have enough confidence in our Navy to feel that it will see that we keep getting it.

But, assuming for the moment that even that confidence is misplaced, in the event of what you are talking about happening, something else would happen also. Canada would not be able to export that portion of its copper which now is exported to the United Kingdom. So if there is no overseas movement of copper, there is going to be some loss, but not by any means a total loss, speaking now of North America as a single pool.

I think that stockpiling is the logical answer to that. As to the exact level of stockpiling required, that would depend on what you consider your absolutely essential military needs. But the fact is that we

have in the Western Hemisphere, as I have indicated earlier, almost 70 percent of the world's supply. So whatever happens, we are going to be that much better off, because of our potential production than the Eastern Hemisphere. I want to make that very clear.

QUESTION: Would you care to make a comment or a guess as to when we might obtain our stockpile of copper? I understand that we keep losing it now because of drawing on the stockpile for industrial purposes.

MR. STRAUSS: Yes, to a limited extent. That would depend entirely on unpredictable factors as to the level of military need. I will be frank to say that I am very skeptical about the value of most of the requirements figures that have been turned in, because I think that it is only natural for the Ordnance Corps, the Bureau of Ships, and the other people that are involved to overstate their requirements in order not to be caught short. I think the requirements figures are too high. I believe the stockpile is going to be accomplished sooner than some people think.

But the figures that have been drawn up by the Defense Materials Procurement Administration indicate a deficit in total supply each year right on through 1955. That deficit includes stockpiling requirements. In the last two years, the deficit is less than the amount required for the stockpile--for 1954 and 1955. So that by 1954 presumably they expect some addition. But if we accept their statement and project it forward, it will be around 1957 or 1958 before the stockpile would be completed, based on these present objectives and these estimates of requirements. As I say, personally I think these requirements are a little on the high side.

QUESTION: You mentioned these new facilities being opened up where the Government is guaranteeing a market for the output for five years. I would like to know if there is any further limitation in that agreement as to what they can do with it. My point is this: It is not going to help the copper industry to guarantee a market for those mines if you merely provide that market by cutting off the market for what is already in existence.

MR. STRAUSS: Yes. That is one of the puzzling factors about this. I want to make clear that most of these agreements are being written so that if the industrial demands, presumably supervised by the Defense Materials Procurement Agency (DMPA), are less than enough to absorb the copper, the producer has the option of delivering the copper to the consumer or to the Government. In other words, the Government is putting a floor there in case the industrial demand does not absorb the production. The understanding is that the surplus will go into the stockpile and therefore will not interfere with the normal marketing of the copper from existing mines.

QUESTION: I would like to hear your comment on the wisdom of attempting to fulfill the stockpiling requirements now--would it mean restricting copper for civilian production of goods required for the civilian economy?

MR. STRAUSS: I personally feel that you have to be very discriminating in stockpiling activities. I have always felt, for instance, that in the case of the tin imports, the essentiality of the tin stockpile was such that one would have to disregard the civilian economy to assure at least a minimum stockpile of tin, because this country can get into the position where there would be no tin.

I don't see that position for copper, and therefore I believe that the stockpiling should be a function that would be subordinated to the essential civilian and naturally the direct military requirements. I believe the stockpile should be used simply to absorb copper at times when there is surplus copper available.

QUESTION: I saw somewhere that we have about 22 million tons of copper that is in end item use, and that this represents a scrap turnover of approximately 2 percent a year. What would be the possibility of increasing the scrap turnover from end item use in the event of an emergency if we had a wartime scrap drive or something of that sort?

MR. STRAUSS: Of course, scrap is the most stubborn source of copper. The more you try to get it, the more elusive it becomes. If you relax your attempts to get it, the more likely you are to get it. At least, that has been my impression.

The more you advertise your need for scrap, the more the fellow that owns it holds on to it. After all, from his standpoint it is quite different from the current production of the mine. He looks on it as sort of a capital asset, just as if he owned a share of stock in Anaconda Copper. If he sees it going up, he will hold on to it in the hope that it will go up further. That is the way people feel about scrap. So I have always felt that many of these drives do more harm than they do good, because they call people's attention to the fact that scrap is badly needed.

The thing that will actually bring scrap out is the feeling on the part of the holders of the scrap that they can replace the copper-containing articles readily. If you are running a small power company, let us say, in the backwoods of Kentucky, and you are not sure that you are going to be able to get new wire, naturally you are going to hold on to whatever copper-containing articles you have around. You will hold on to your existing wire. You won't sell it to the junk dealer. But you will sell if you feel that any time you call up your wholesaler or your staple manufacturer, he can supply you with new stuff.

So I quite agree with you. The scrap reservoir in the next emergency is the biggest copper asset we have to fall back on. That is

what Mr. Hitler did during World War II. That is where he got most of his copper. He was confiscating church bells, tearing down people's railings, taking name plates off buildings, and things of that sort. That was based on an actual requisitioning of copper. If we ever reach that situation, I think really that a requisitioning of scrap would be best, but I hope and believe that we will not reach it.

QUESTION: I would like to ask about the Government buying copper during periods of low prices generally and putting it in the stockpile. Of course, stockpiling is surrounded by a great deal of legislation and is tied in directly with national defense. Has the industry given any thought to possibly a national stockpile to cut off some of the humps and valleys in the long run by stockpiling copper, not necessarily for national defense, but just for economic stability?

MR. STRAUSS: For some time I have been telling our customers that it would be a darned good thing if they did it. But in our own case we are actually stockpiling during these periods of valleys, because that is when we accumulate our stocks.

I have our book on metal statistics here. Let us see what happened to our copper stocks. We find that our copper stock at the end of 1947 was 114,000 tons; at the end of 1948 it was 79,000 tons--we had disgorged 35,000 tons. Then in 1949 it went to 104,000; so we had increased it by 25,000 tons. In other words, we do have a certain amount of stockpiling by producers going on. At the end of 1950 it was 119,000 tons. At the end of 1951 it was down to 51,000.

The limitation on that is the financial resources of the company. The Government has better access to the Bureau of Printing and Engraving than we have.

QUESTION: Is there an industry advisory committee under the DPA or NPA for the copper industry? If so, what are its objectives, and how successful has it been in accomplishing them?

MR. STRAUSS: I am a member of the industry advisory committee on copper in NPA, OPS, the Munitions Board, the DMPA, and, I think, two or three others which have escaped me--oh, yes, the Commerce Department. We meet whenever the honorable government representatives feel that they need our advice.

We have no objectives as such that I have been able to ascertain, because it would be against the law, I think, for us to have any understanding of any kind. The Justice Department is usually very careful to see that our meetings are governed by a government chairman. We are not supposed to have separate meetings at which government representatives are not present. These meetings are all used to cover emergency situations that arise from time to time.

So far as working out any long-range or consistent policies, the nearest approach to that was the work done by the National Security Resources Board. When Mr. Forrestal was here, he had some connection with that. But, like so many other plans that are prepared, these plans were prepared and then either forgotten or overlooked when the emergency came along.

No, sir. There is no consistent approach to this situation. Usually we are called in to scrutinize some proposed regulation or change of export license, change in allocations, or things of that kind.

QUESTION: We are told that the defense of this country lies in its production capacity. I would like to ask a question on one facet of production. In view not only of the high capital investment in copper facilities, but also of the fact that copper is one of the critical metals, will you please tell us what your company or the copper industry as a whole has done to minimize the damage in case of attack, or after an attack, to get back into production?

MR. STRAUSS: Frankly, that is a question with which I am not too familiar; it doesn't fall into my particular responsibility.

We have known of a number of plants in exposed locations that during World War II were given special protection by the Navy. I am thinking, as an example, of the power plant that served a copper mine in Chile, which had a naval contingent to protect it. It was in an area where it might have been damaged by shelling from a submarine.

One of our metallurgists was one of the first men in Germany after the occupation of Germany. He made a tour of the various metal smelting and refining plants. He found that the bombing had not disrupted production to any extent.

I think the damage would be greater perhaps from the standpoint of internal sabotage than it would be from the standpoint of outside damage in most of the plants with which I am familiar. The difficulties there arise partly from the fact, to be very frank, that the leadership of the union of our employees is dominated by Communist sympathizers. This fact has been brought to the attention of the Government times without number. We cannot refuse to deal with them because they are our present bargaining agent.

We are conscious of that threat but we are powerless to act. I think we have had to turn over the names of some of our employees as Communist sympathizers; but, so far as I know, nothing has ever happened to them. We would be provoking labor unrest if we took action of our own without government direction.

QUESTION: Since we cannot expand our production any more rapidly than we have already, the alternative would be to reduce civilian

consumption. Copper is very widely used for a great variety of non-essential things, such as brass door knobs, copper and brass skylights, and so on. Could we make any significant saving in total by cutting all of those out? Is there anything being done about that?

MR. STRAUSS: The NPA is writing regulations limiting the use of copper in certain places and actually prohibiting it in certain uses. It is a question of judgement. During World War II almost all those uses were prohibited. While a little copper found its way into things like jewelry, there was very little of it. Today the limitation is based more on the actual restriction of quantity that is made available to such industry than by direct prohibition of use.

It depends on how grave you think the current emergency is as to whether you want to prohibit uses. The automobile industry, for instance, feels that it is a very essential trade. Other industries think they are essential. Once you start curtailing these items, you run into the unemployment problem and similar factors, and it is pretty difficult to make such regulations stick.

I am frank to say that personally I don't believe it is necessary as yet to prohibit civilian uses. I don't believe the copper shortage is as bad as the talk about it makes it look. I have a feeling--this is just a hunch on my part, with no basis in scientific reasoning--that the copper situation is going to ease.

QUESTION: Has the copper industry used the Certificate of Necessity in any case?

MR. STRAUSS: Yes. As a matter of fact, all of these projects with long-term contracts have a Certificate of Necessity. The Certificate of Necessity doesn't apply to the work one does in opening up the mines, because that is subject to depletion and is not a depreciable item. It does apply to buildings and equipment, and there substantial certificates have been issued and are of material assistance, particularly in the present tax picture, in getting new production under way.

Of course copper is not being exempted from the excess-profits tax; thus if you get any large additional production, you are likely to be in the position of having your additional earnings subject to 82 percent income tax. So unless you get accelerated depreciation, it is very hard, just looking at the balance sheet, to see any justification for investing large sums of money in new production. But the amortization certificate does that and has some use.

MR. BAUM: With all this planning for increased production, is there any planning being done at this time for increasing the earth-moving equipment or railroad equipment that seems to be in great demand by the copper industry, especially during times of expansion?

MR. STRAUSS: I am not in close enough contact with our suppliers to answer that question properly. I know that we have placed orders and our competitors have placed orders, and, because we have both tax amortization certificates and government contracts, those two factors are assisting us to get a high degree of priority on such types of equipment as moving and transportation equipment. It has been of assistance to us. As to whether anybody has added to the railroad equipment capacity specifically because of the copper program and others, I don't know.

MR. BAUM: On behalf of the college, I thank you, Mr. Strauss, for a very excellent lecture and a very interesting discussion period.

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