TUNGSTEN ORES

HEARINGS

BEFORE THE

COMMITTEE ON FINANCE

UNITED STATES SENATE

SIXTY-SIXTH CONGRESS

SECOND SESSION

ON

H. R. 4437

A BILL TO PROVIDE REVENUE FOR THE GOVERNMENT AND TO PROMOTE THE PRODUCTION OF TUNGSTEN ORES AND MANUFACTURE THEREOF IN THE UNITED STATES

JANUARY 23, 1920

PART 2

Printed for the use of the Committee on Finance

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

COMMITTEE ON FINANCE.

BOIES PENROSE, Pennsylvania, *Chairman.*

PORTER J. McCUMBER, North Dakota.
REED SMOOT, Utah.
ROBERT M. LA FOLLETTE, Wisconsin.
WILLIAM P. DILLINGHAM, Vermont.
GEORGE P. McLEAN, Connecticut.
CHARLES CURTIS, Kansas.
JAMES E. WATSON, Indiana.
WILLIAM M. CALDER, New York.
HOWARD SUTHERLAND, West Virginia.
FURNIFOLD McL. SIMMONS, North Carolina.
JOHN SHARP WILLIAMS, Mississippi.
CHARLES S. THOMAS, Colorado.
THOMAS P. GORE, Oklahoma.
ANDRIEUS A. JONES, New Mexico.
PETER G. GERRY, Rhode Island.
JOHN F. NUGENT, Idaho.

CHARLES P. SWOPE, *Clerk.*
WILLIAM B. STEWART, *Assistant Clerk.*

SUBCOMMITTEE.

Senator WATSON, *Chairman.*
Senator McCUMBER, Senator THOMAS.

TUNGSTEN ORES.

FRIDAY, JANUARY 23, 1920.

UNITED STATES SENATE,
SUBCOMMITTEE ON FINANCE,
Washington, D. C.

The subcommittee met in the committee room, in the Capitol, at 3.30 o'clock p. m., Senator Charles Curtis presiding for Senator James E. Watson (chairman), who was unable to be present on account of illness.

Also present: Senator L. C. Phipps, and Representative Charles B. Timberlake, of Colorado.

Senator CURTIS. Gentlemen, owing to the absence of the chairman of this subcommittee, Senator Watson, he has asked me to preside at this hearing. Who will be the first witness?

Mr. BOKER. I would like to be heard, if you please.

Senator CURTIS. All right; give your name and address to the reporter.

STATEMENT OF MR. CARL F. BOKER, PRESIDENT OF THE CYCLOPS STEEL CO., TITUSVILLE, PA.; MAIN OFFICE 120 BROADWAY, NEW YORK CITY.

Senator CURTIS. You may go ahead and make your statement.

Mr. BOKER. I do not want to take up much of your time. I have made a memorandum of what I want to bring before you and, if satisfactory, I may be better able to present it in that way.

Senator CURTIS. We will be glad to have you read from your statement, and the committee may ask you questions, or you may comment on it as you go along.

Mr. BOKER. In reference to H. R. 4437: If an additional duty of $1 a pound is placed on ferrotungsten and tungsten metal the price of tungsten will increase correspondingly, and be $1 a pound above the price of tungsten in England and other foreign countries.

A higher additional duty should be placed on tungsten contained in steel than on ferrotungsten or tungsten metal because the tungsten contained in steel is a manufactured article.

High-speed steel is produced by the following operation: First, the steel containing 18 per cent tungsten is cast into ingots; second, the ingots are made into billets; third, the finished bars are produced from the billets.

During these operations the following losses occur: A loss through scale or through oxidation of about 10 per cent or about 10 pounds of every 100 pounds of the weight of the ingots. The tungsten contained in the scale is a total loss. A loss through scrap of about 35 per cent or of about 35 pounds of every 100 pounds of the weight of ingots. The tungsten contained in this scrap can be saved by remelting the scrap.

The cost sheets at our works, in Titusville, show the cost of the tungsten contained in the finished steel to be 58⅓ per cent higher than the cost of the tungsten metal used in melting the steel. This increase in the cost of the tungsten represents the cost of the labor, and so forth, spent on the tungsten in producing the steel, the actual loss of tungsten in the scale and the coast of labor, and so forth, spent on the scale and scrap.

If an additional duty of $1 per pound is placed on ferrotungsten and tungsten metal, an additional duty of $1.60 per pound should be placed on tungsten contained in steel.

If this is not done, the American manufacturers of high-speed steel will be in a still more unfavorable position to meet the foreign competition than they are now.

Foreign high-speed steel will largely take the place of American high-speed steel in this country. The demand for tungsten in this country will be accordingly reduced, and the object of the bill will not be accomplished.

The cost of producing high-speed steel in England under the present existing conditions is about 20 per cent to 30 per cent below the cost of producing high-speed steel in this country.

Senator CURTIS. What is that in; labor mostly?

Mr. BOKER. In labor and also material.

Senator CURTIS. What do you mean by material; the getting of the raw?

Mr. BOKER. The iron, tungsten, coal, and the material generally which is used.

Senator CURTIS. Your judgment is that the principal additional cost in this country is because of labor?

Mr. BOKER. Principally labor.

Senator CURTIS. Can you tell us about what per cent?

Mr. BOKER. I do not know the percentage exactly. Before the war I had ordered steel from England for some time and was the largest importer of high-speed steel and the first one to introduce high-speed steel in this country. I bought high-speed steel in England at between 20 per cent and 30 per cent of what it cost here.

Senator CURTIS. Do you know what they pay labor over there?

Mr. BOKER. No; I do not know that, but can get it.

Senator CURTIS. Can you send it to us to-morrow or next day?

Mr. BOKER. I could not do that.

Senator CURTIS. Well, send it as soon as you can.

Mr. BOKER. I would have to write over to get that.

Senator CURTIS. Isn't it covered in the report of the Tariff Commission?

Mr. BOKER. I do not know about that.

Senator CURTIS. Is a member of the Tariff Commission here?

Mr. E. P. COSTIGAN of the Tariff Commission. Yes, sir.

Senator CURTIS. Did not you give in your report on this subject the price of labor in this industry in England?

Mr. COSTIGAN. My recollection is that we did not.

Senator CURTIS. All right. Mr. Boker, you may proceed.

Mr. BOKER. Should an additional duty of $1 per pound be placed on ferrotungsten and tungsten metal, and the same duty of $1 per pound be placed on tungsten contained in high-speed steel, the difference in the cost of producing high-speed steel in England and of

producing high-speed steel in this country would be further largely increased, and then amount to 35 per cent to 45 per cent in favor of England, not taking into account the fact that the cost of works and ever thing connected with the same is much lower in England with correspondingly lower charges for interest on invested capital and depreciation, and that overhead and administrative expenses are considerably lower in England and other foreign countries than in this country.

We have not considered, in our calculation, any loss of tungsten in melting the steel.

Other manufacturers of high-speed steel claim to lose about 7 per cent to 8 per cent of tungsten in the melting of their high-speed steel, which, if taken into consideration, would make the difference in the cost between the ferrotungsten and tungsten metal, used in melting the steel and the tungsten contained in steel considerably higher than our figures show.

Senator CURTIS. What is the amount of the product used in this country that you want a duty added to?

Mr. BOKER. I claim that for every cent of additional duty which is put on ferrotungsten and tungsten metal an additional duty of 1.6 cents should be put on the tungsten contained in steel.

Senator CURTIS. Why the additional six-tenths of a cent?

Mr. BOKER. To cover this difference: If you buy tungsten and use it it costs you, after it is finished, that is, when it is in the finished steel, 58⅔ per cent more.

Senator CURTIS. How much do you import of the article you use a year?

Mr. BOKER. We do not import any tungsten. We have bought all our tungsten here.

Senator CURTIS. You have bought all your tungsten in the United States?

Mr. BOKER. Yes, sir.

Senator CURTIS. Is there anything else you want to say?

Mr. BOKER. I believe not.

Senator CURTIS. Representative Timberlake, do you want to ask any questions?

Representative TIMBERLAKE. I do not at this time; but Mr. Franklin does.

Senator CURTIS. Mr. Franklin may ask any questions which he thinks will clarify this matter.

Mr. NELSON FRANKLIN, of Denver, Colo., vice president of the Rare Metals Ore Co., Rollinsville, Colo. I am representing the ore producers, and I would like to have something made clear that the witness just said. What additional duty, Mr. Boker, do you require on manufactured high-speed steel to make it compensatory to the $10 unit on tungsten ore?

Mr. BOKER. I did not speak of $10 on the ore. I spoke about a duty on ferrotungsten and tungsten metal. The duty on ferrotungsten and tungsten metal has been raised beyond the duty on the ore so as to compensate them for the difference in cost.

Mr. FRANKLIN. For the difference in cost in converting and also the difference between tungstic trioxide and metal tungsten?

Mr. BOKER. Yes. We buy tungsten metal and use it for making high-speed steel. We have a loss in scrap and scale, and the labor

which we spend on this scale and scrap. The tungsten content in the scale is a total loss, and as a consequence the tungsten in the finished steel costs us 58½ cents more than the price we pay for the tungsten which we use.

Mr. FRANKLIN. I have received a great many figures from different manufacturers of high-speed steel, and your figures are entirely different from those of any other manufacturer. You say, then, if I understand you, that it would require $1.60 a pound above the dollar already on it?

Mr. BOKER. No; an additional 60 cents.

Mr. FRANKLIN. Well, I have nothing to say as to that. That is not very far out of the way, according to the other figures I have.

Mr. BOKER. You say it is very different from what others claim; I know some other steel manufacturers claim that they lose tungsten in the melting.

Mr. FRANKLIN. Yes.

Mr. BOKER. I did not figure that in at all. If you figure on that, the difference is greater than 60 cents per pound.

Mr. FRANKLIN. You figure then, if I understand you correctly—and I want to say that I misunderstood your first statement——

Mr. BOKER (interposing). All right.

Mr. FRANKLIN. That it would require—in order to be compensatory with the $10 unit on ore and $1 per pound on ferrotungsten and tungsten powder—an additional 60 cents per pound on the manufactured tungsten in high-speed steel?

Mr. BOKER. On the tungsten content in the manufactured steel.

Mr. FRANKLIN. Very well. Now I understand you.

Mr. BOKER. Yes; there has been a duty on the tungsten metal of $1, and the additional duty on tungsten in the finished steel should be $1.60.

Mr. FRANKLIN. Well, I misunderstood your testimony. That is all.

Senator CURTIS. Anything else?

Mr. BOKER. In case you want to verify these figures, my books are at your disposal, and we will be glad to have you look at them.

Senator CURTIS. If you get anything on labor costs, please send it in.

Mr. BOKER. All right.

Senator CURTIS. Now, I believe that Mr. O'Brian wants to be heard.

STATEMENT OF MR. JOHN LORD O'BRIAN, REPRESENTING THE ATLAS CRUCIBLE STEEL CO. AS COUNSEL, BUFFALO, N. Y.

Senator CURTIS. You may make any statement you desire.

Mr. O'BRIAN. I did not receive notice of this hearing until yesterday owing to some miscarriage of a telegram which Senator Calder sent me, and I hurried down here this morning and am not prepared to proceed this afternoon.

The position of the Atlas Crucible Steel Co., roughly, is simply this——

Senator CURTIS. As I have stated, I am presiding for Senator Watson this afternoon, and inasmuch as we have just adjourned an executive meeting on the subject of dyestuffs, which we must resume

to-morrow, it is important that we should proceed with this hearing. Can not you make a general statement and then file a brief?

Mr. O'BRIAN. I will consult with some other gentlemen who are here and see what can be done.

Senator CURTIS. I will be glad if you will do so.

Mr. O'BRIAN. In the interest of proceeding in the way you have suggested I will ask Mr. Witbeck to speak on costs and the effect of the passage of this bill on the high-speed steel industry. He represents another company, but I will accept him as my witness in behalf of the Atlas Crucible Steel Co., with your permission.

Senator CURTIS. All right. We will hear Mr. Witbeck.

STATEMENT OF MR. B. F. WITBECK, OF THE LUDLUM STEEL CO., AND ALSO REPRESENTING THE LATROBE STEEL CO., ALBANY, N. Y.

Senator CURTIS. Go ahead and state what you wish in your own way, and we will ask you questions when you get through.

Mr. WITBECK. In the first place, I would like to say that my sentiments are exactly the same as those of the gentleman who preceded me regarding the difference between the protection that should be placed on the finished steel as compared with tungsten alloys. In other words, that there is a considerable loss between the mixed product and the finished product; in the manufacture of the finished steel a considerable amount of the tungsten content in the alloys used therein is lost in the form of scale and powder from the grinding. That can not be reclaimed. Then there are certain other losses through oxidation. So that I consider at least 60 cents per pound of the content in the steel should be added to whatever tariff is put on the tungsten alloys to compensate for these losses.

I have come prepared to sustain the figures that we felt should be allowed on this feature, but I understand that the sponsors of this bill admit that there is a loss of approximately 27 cents per pound on account of the losses I have referred to. So I shall not take up your time on that feature of the subject, except to say this, that if this duty is imposed the cost of it to the manufacturers of high-speed steel on the basis of the amount of tungsten that was used in 1918 would amount to practically $20,000,000 additional expense to the manufacturers per year. That is based on these statistics: That 15,000 tons of tungsten content in the concentrates were used in that year, or 30,000,000 pounds of tungstic oxide in the concentrates, and from that amount of tungstic oxide approximately 20,000,000 pounds of tungsten would be the content in the ferrotungsten manufactured therefrom. A duty of $1 per pound would therefore amount to $20,000,000 added to the cost of manufacture. On the basis of production of tungsten in this country for that same year the additional compensation to the miners would be, approximately, $7,000,000.

I think that consideration should be given to the fact that if this tremendous amount is added to the cost of manufacture there is a grave chance of foreign competition coming in to the point where the manufacture of high-speed steel in this country would be greatly decreased, which would thwart the very idea that is covered by this additional tariff. At the present time the adverse exchange rate

against England, for example, makes it possible for England to pay the present duty and furnish finished tungsten steel in this country at about 15 per cent less than if there were no duty and the exchange rate were normal. In other words, the exchange is about 30 per cent against us and the duty is 15 per cent. If the present rate of tariff on the tungsten metal were maintained and a considerably larger duty on the finished tungsten were not concurrently, made, it would simply widen up this gap which now exists, operating against the manufacturers in this country, and would amount to as much as 60 cents a pound in some cases.

I think it would be well, therefore, in considering this phase of the situation, a tariff on the tungstic oxide, to give considerable thought to the general question of the duty on the material that is involved in it—the steel industry. It seems hardly fair to place a duty on this kind of raw material, which involves at the very most 10,000 persons in the United States, including the families of the miners, as against the hundreds of thousands of people that are concerned in the steel industry, and it surely works out that way. You are protecting one two-hundredths of 1 per cent as against several per cent of the population.

So far as adjusting the claims that are made for the fact that many of these mines were started during the war and with the idea of increasing our production for war purposes, it would seem to me to be far better to cover that phase of the situation by the direct method, just as you do in the cancellation of war contracts. It hardly seems fair that the steel industry should pay the losses sustained by the mining industry when they are not necessarily directly related, and especially in view of the fact that we can not possibly produce all the tungsten that is needed for American manufacture. The very best that has ever been done is less than one-third of the total needs of the country. So you will be placing a duty on the entire raw material that is used in this country to protect one-third of the total amount used.

Mr. O'BRIAN. Leaving out of consideration the question of a compensatory tariff will you explain to the committee how much the cost of production of the finished steel will be increased per pound by this tariff, according to your calculation?

Mr. WITBECK. It would be approximately $1.

Mr. O'BRIAN. $1 per pound?

Mr. WITBECK. Yes. It is based on the fact that in producing 100 pounds of steel containing 18 pounds of tungsten metal 23 pounds of tungsten are actually used.

Senator CURTIS. In producing the 18 pounds?

Mr. WITBECK. Yes; in getting 18 pounds of finished product.

Senator CURTIS. All right. You may continue.

Mr. WITBECK. A duty of $10 per unit is equivalent to 50 cents per pound of tungstic oxide contained in the concentrates. To obtain 1 pound of the 23 pounds referred to it is necessary to use, approximately, 1½ pounds of tungstic oxide content in the concentrates, which, at the rate of 50 cents, is the equivalent of approximately 75 cents per pound of tungsten produced. For each pound of tungsten content in the finished steel there will be used, in accordance with the figures which I just gave, $1\frac{5}{8}$ pounds of tungsten, which, at the rate of

75 cents a pound, would amount to practically $1 per pound for the tungsten in the finished steel. Is that clear?

Senator CURTIS. I think it is. Anything else?

Senator PHIPPS. I would like to ask how you arrive at the loss or the increased cost of 60 cents per pound of tungsten content in the finished steel?

Mr. WITBECK. I think that was explained by my predecessor on the stand, but I will repeat it if you wish.

Senator PHIPPS. Well, I would like to have your explanation, please.

Mr. WITBECK. That statement was based on the relative cost of ferrotungsten as compared with the value of the tungsten content in the finished product. There are losses sustained in the manufacture of the finished steel which are considerable. For example, if you start out to make tungsten steel, you find that for every 100 pounds melted you get about 56 pounds of finished product.

Senator PHIPPS. I would like to know what becomes of the other 44 pounds.

Mr. WITBECK. I will come to that.

Senator PHIPPS. I think that is susceptible of explanation, perhaps, but it is not clear to me that any such proportion of loss is possible.

Mr. WITBECK. I will explain what the losses are.

Senator PHIPPS. All right.

Mr. WITBECK. Not all the 44 pounds are lost but a considerable amount of it is lost. At least 5 pounds is lost in the grinding and can not be reclaimed in any way. A very large amount is lost in reheating. The metal generally has to be reheated seven times, and each time a very large amount is lost in scale, at least 2¼ per cent. Then there is a further loss——

Senator PHIPPS (interposing). Two and one-fourth per cent would be the total loss by reason of scale in these different operations?

Mr. WITBECK. Yes; in each operation. I estimate that the loss on account of grinding and scale alone, the minimum amount of loss, would amount approximately to 16 cents a pound on the finished product.

Senator PHIPPS. If you stated that in percentage would it be 7¼ per cent; is that what you mean?

Mr. WITBECK. The loss approximately would be 15 per cent. The loss from grinding——

Senator PHIPPS (interposing). Fifteen per cent scale loss?

Mr. WITBECK. Yes.

Senator PHIPPS. That I think might be stated in little different terms so as to be more understandable. We can not realize that the scaling even if you handle it seven times will amount to 15 per cent. You are including in that figure loss in heating in the furnace, aren't you?

Mr. WITBECK. No. That includes approximately 2¼ per cent scale loss each time the metal is heated, and heating the metal seven times would mean something over 15 per cent of loss. To make it clear I will repeat: That covers scale loss from reheating only. And then you have to estimate that it will take 4 per cent to cover the grinding loss.

Senator PHIPPS. I am not familiar with your process of manufacture of this high-speed steel, but I think that statement of yours that the metal has to be reheated seven times before it becomes a finished piece of tool steel might be restated in a way that I can better understand it. I do not know from what little knowledge I have of the subject why you reheat the steel seven different times.

Mr. WITBECK. Well, to make that clear I will state that in order to roll a billet down to the size in which it is used for commercial purposes it is necessary to put it through the rolls several times. The character of the construction of this particular kind of alloy steel is such that it is necessary to reheat it in reducing the size, and on an average it has to be heated seven times from the billet down to the finished product. The heating and rolling each times takes off a percentage of the total weight with which you start.

Senator PHIPPS. You start with what size ingot in your Albany plant?

Mr. WITBECK. We start with an ingot about 7 inches in diameter or square.

Senator PHIPPS. You break that down to what size billet?

Mr. WITBECK. In the first pass you get it down to about 5½ inches.

Senator CURTIS. Do you have to heat it then?

Mr. WITBECK. Then it is reheated and run through the rolls again. Then it is taken out and a part of the scale is removed and it is ground. The purpose of grinding is to take out apparent cracks that appear on the surface. If those cracks were left in the metal and it were heated and passed through again those cracks would deepen each time and you would arrive at the final rolling with a piece of steel that would be useless. To avoid that the billet is examined and wherever a crack of that kind is found it is ground out to a wide surface so as to eliminate the effect of the crack which has started.

Senator PHIPPS. Now what we are trying to get at is an explanation of the necessity of heating this steel seven different times. We understand that a 7-inch square ingot, which you have at first, is reduced to a 5-inch square billet and then it is reheated. What is your next breaking down process? What do you get the next time? I can not see for the life of me why it is necessary to reheat and go through seven operations to get down to the size of steel that you need with which to make tool steel.

Mr. WITBECK. Because it is simply on account of the nature of the tungsten steel.

Senator PHIPPS. You have gone two steps. What do you get the next time when you reheat your 5-inch billet?

Mr. WITBECK. When you reheat your 5-inch billet you reduce it correspondingly depending upon the size you are going to finally arrive at. The smaller the finished size the more carefully you have to roll the material because your percentage of loss if you have not ground to the final cutting is accentuated where the size is very small. At the second rolling you have it at 5½ inches. You might get it down the next time to 4 inches, and then you have to examine it again.

Senator PHIPPS. What I am trying to ask is, are you familiar enough with the actual practical process to tell me what sizes you get it to at these different rollings, or are you not?

Mr. WITBECK. Yes, sir.

Senator PHIPPS. Well, just tell me what the process is in getting it down from the 7-inch size to the size you use for tool steel?

Senator CURTIS. You have given us the 7-inch size and the 5½-inch ingot and tell us now what the next one is.

Mr. WITBECK. Do you want to start with the 5-inch.

Senator PHIPPS. I want to get at your actual size. You say you start with a 7-inch ingot?

Mr. WITBECK. Do you want to find out the last size of the steel, or do you want to get down to the general average as the result of making it?

Senator PHIPPS. I am trying to get at a little understanding of the necessity for reheating that steel seven times, which you have told us is the practice. That I can not understand from any explanation anybody has so far given.

Senator CURTIS. Have you anybody else here who is a practical man in the mill, if you can not give it?

Mr. WITBECK. I have not with me the exact sizes.

Senator CURTIS. Give them as near as you can. We do not care for the exact size, but give us the approximate sizes.

Mr. WITBECK. I think it would be better for Mr. Tuck, who is familiar with these statistics, to give them to us.

Senator CURTIS. All right; let him come forward and do so.

STATEMENT OF MR. WILLIAM H. TUCK, OF ALBANY, N. Y.

Senator CURTIS. Go ahead and answer the question.

Mr. TUCK. In connection with the rolling of steel we use 7-inch ingots as a rule where we are making very fine sizes. There are very large sizes of high-speed steel rolled or hammered, and in such cases we use very large ingots. The average number of times, as Mr. Witbeck has stated, which it is necessary to roll these ingots in order to get the steel down to the proper size will average seven. Sometimes the steel is brought down in five passes and sometimes in nine passes.

Senator PHIPPS. You do not have to reheat a piece of steel for every pass, do you?

Mr. TUCK. Absolutely we do.

Senator PHIPPS. You do?

Mr. TUCK. You understand we may go through different rolls while it is red hot to get it down to the proper size, but it has to go back into the furnace again before it goes back. It is a very hard steel, and that is the reason it requires more heating than the average carbon steel, and the scale is more. So, when we come from the 7-inch ingot and get down to the quarter-inch rods, we have easily had seven rolls, and sometimes the steel cools so that we have to put it in a second time.

Senator PHIPPS. The figures given by the Cyclops Steel Co. indicated a 10 per cent loss by scaling. Mr. Witbeck said the loss was 15 per cent. There seems to be a little discrepancy there. Can you explain it?

Mr. TUCK. Well, these are from actual tests that I made myself in the mill during the latter half of 1919. We did that in order to check up our costs, and we know positively that the steel loss averages 15 per cent. If thought desirable we can furnish the committee with figures to that effect if they will be of any benefit.

Senator PHIPPS. Will you tell us about the scrap loss? The figure given by the Cyclops Steel Co. was 35 per cent. Of course the tungsten content in that scrap may be recovered; but does that agree with your practice—that you only use 65 per cent of the ingot in the finished product?

Mr. TUCK. We get 56 pounds out of 100 pounds of finished steel that we can send to the customer. We have a very good method of inspection, what we call superinspection. We are not sending out a pound of steel that has any imperfection of any kind. Therefore our return to the melting pot is more, and after deducting scale and melting loss we have 56 pounds out of 100 pounds, or 56 per cent.

Senator PHIPPS. Mr. Witbeck made a statement, I noticed, that in no event is the United States able to produce its own supply of tungsten, basing it upon the idea that to-day about one-third of the amount used in the United States is domestic production and the remaining two-thirds has to be imported. That is a correct statement, is it?

Mr. WITBECK. That is true.

Senator PHIPPS. What information have you on which you can form an opinion or judgment as to the effect on the mining industry of placing the proposed duty on raw materials? Have you gone into that at all?

Mr. WITBECK. Yes; I have the information given by Mr. Frank L. Hess, geologist of the United States Geological Survey, where he said the total tungsten in the United States is not equal to more than three years of our total needs.

Mr. FRANKLIN. May I interject?

Senator CURTIS. Do you want to ask a question?

Mr. FRANKLIN. Mr. Hess did not exactly make that statement. He said that the tungsten in sight would last three years, but in that he did not count that any new tungsten might be developed, and so stated in a subsequent letter explaining that matter. His testimony shows it. If you read only a part of his testimony and do not read it all you get that idea, but if you read it all you will find that he does not make the statement that there is only a three years' supply of tungsten in the United States.

Mr. WITBECK. If that statement is made with the idea that possibly additional ore will be found, would not the same logic apply if there were only 5 per cent of the needed supply in sight? Could not you then say perhaps you will find more so as to supply the other 95 per cent?

Mr. FRANKLIN. I do not think that is a good comparison. But in your statement you said we required 15,000 tons of tungsten in the United States. We do not require that much, Mr. Witbeck; as a matter of fact, 7,500 tons of concentrate carrying 60 per cent Tungstic irioxide is a very large estimate of the requirements in the United States in normal times.

Mr. WITBECK. How much do you estimate was the consumption of tungsten in the United States in 1918?

Mr. FRANKLIN. Oh, that was in war time. I am speaking of normal conditions.

Mr. WITBECK. What percentage of the total tungsten would you say there was used in the United States was produced here?

Mr. FRANKLIN. One-third of the abnormal war time maximum of 16,000 tons of 60 per cent concentrate, but we can produce probably

7,500 tons, of concentrate, the amount that is required in the United States in normal times.

Mr. WITBECK. Then my statement is not so rash as to the future. The fact that we overproduced so far as the needs in 1919 were concerned, on account of conditions being exceedingly subnormal owing to the sudden cessation of war will not permit you fairly to base your estimate of the future on the subnormal year of 1919. I think it is fair to take 1918. The use of tungsten steel is constantly increasing. There is every reason why it should. People are beginning to realize the great advantage of the use of high-speed steel, and that fact should result in a greatly increased production year after year.

Mr. FRANKLIN. No doubt there will be a great increase from the mines.

Mr. WITBECK. So I do not think it is a rash assumption after all, what I said.

Senator CURTIS. Let us not have any argument about the matter. Mr. Franklin, you may just ask questions if you desire.

Senator PHIPPS. I want to ask Mr. Witbeck if he is familiar with the mining conditions in the tungsten industry, from his own personal information, in the United States?

Mr. WITBECK. Not in the actual operations themselves. I am interested in manufacturing ferrotungsten.

Senator PHIPPS. In the tungsten alloys and the finished steel, as I understand it?

Mr. WITBECK. Yes.

Senator PHIPPS. Conceding that the United States produced for itself from its own mines 5,000 tons in 1918, which was one-third of the total amount used during that year, and two-thirds of the total tonnage I believe, that has been used in normal years, do you think if we had adopted this proposed tariff on the raw material, raw tungsten, that the mining industry would develop to the extent that we can furnish our own requirements of tungsten?

Mr. WITBECK. I do not, and I base that on facts.

Senator PHIPPS. What are your facts, please?

Mr. WITBECK. That in the year 1916 we produced in the United States nearly 1,000 tons more than we did in the year 1918, although the price in 1916 was practically double the price in 1918.

Senator PHIPPS. What was the price in 1915 compared to 1916?

Mr. WITBECK. The price in 1915 was somewhat less than in 1916.

Senator PHIPPS. So that there was a natural increase in the output in 1916 by reason of the stimulation given to the industry. Isn't it a fact that the price was never stable around $10 a unit before the war time, and that the price was abnormal owing to the demands of the war which resulted in increased production in 1916 and 1917?

Mr. WITBECK. Yes; but the point I make is that there wasn't any considerable growth between 1916 and 1919.

Senator PHIPPS. Yes; but what became of the market price in the meantime, between 1917 and 1919?

Mr. WITBECK. The price was exceedingly high for a very short time in 1916. But it was not at that very abnormal price long enough to develop mines. In the year 1917 the price was greater than the amount you would get as a result of this proposed tariff, and the amount in 1918 was greater than what you would get as a result of this tariff, and yet tungsten did not increase.

Senator PHIPPS. In 1918 another slump came in price. Do not you recognize this difference between an abnormal demand, which was an unusual thing, and a stable demand affecting the industry itself? That is to say, you would not engage in the manufacture of high-speed steel if you were going to have all the orders your mill could turn out for two or three months and possibly have none whatever for the next two years. But if you know your ability to find a market so as to be able to sell your stuff right along, which would justify you in engaging in business on a narrow margin of profit, might not you do so, and does not the same principle apply in the mining industry? To mine properly it involves putting in a reduction plant or a concentrating mill of some kind, and the man who goes at it properly has to have a quarter of a million dollars or half a million dollars at his command in order to make it a success. He is not going to make an investment like that with a chance of his market sliding away from him next month, but only if he has reason to believe that his market is steady, so that he may figure on a reasonable margin of profits. That is the basis for any assumption whatever, and it is the only basis for a consideration of a tariff on this tungsten ore, it seems to me.

Mr. WITBECK. The reason for my assumption is this: That in 1916 the price of tungsten was considerably more than the price that tungsten would sell at as the result of this $10 duty.

Senator PHIPPS. Oh, yes; but——

Mr. WHITBECK (continuing). In 1916 the Government as well as everybody in the United States, or the greater part of the business people of the United States at least, felt that the war would last for a long time, and the tungsten-mine owners, and those who held options to operate mines, were certainly justified in the assumption that they would have at least a few years of the prices that obtained at that time.

Senator PHIPPS. No; I do not agree with you on that, Mr. Witbeck. That was not their feeling, not even those who developed the biggest mines—the Atolia and others in California, and those in the Boulder region in Colorado—they had no reason to believe that tungsten was going to remain on the basis of the price that then prevailed. They did not expect it; they were speculating on how long it would last. Now, if they had had any reason to believe that that was a genuine thing, that that price would go right along, they would have been justified in putting in more improved plants than they did; they would have made further explorations; they would have developed their sources of tungsten supply. But the slump came after this abnormal demand, and prices went off, and mines closed down, and, as a rule, they are closed to-day.

Mr. WITBECK. Well, of course, I base my assumption on the fact that if the mine owners recovered only $435,000 in 1914 and recovered $12,000,000 in 1916, that they felt they could well afford to do some developing, to do some extensive developing, to take care of the future.

Senator PHIPPS. No; the reason they did not do that was because they had no confidence in the future, and they had no reason to believe they could depend upon the stability necessary in the situation for the future. In other words, they were aware of the fact that it was an abnormal price and that in all probability that price would

not continue. Now, I would like to ask you as a manufacturer: Would you rather buy your supply of tungstic acid from a foreigner because you can get it cheaper, or would you rather pay a little more to the domestic producer in order to develop a source of supply in your own country?

Mr. WITBECK. I am a firm believer in buying in your own country when it is possible so to do to the best advantage of the people of your own country.

Senator PHIPPS. Now, go beyond that.

Mr. WITBECK. I am trying to answer your question fully. It is not a very simple question that you have asked me, but I will try to answer it briefly, limiting any answer that may be made to it. I would be for buying it in my own country provided it does not hurt my own country, as one big family making up the world. In our own domestic affairs we have to consider that if we want to do any exporting of any commodity we have to do importing. We have to give the other fellow a chance to pay for the things he buys from us. I do not say that this industry does not need protection; I say that is a matter for the people here in Washington who are engaged in tariff making generally to decide—whether tungstic acid is one of the things that is so important to the United States that it needs to be protected. I say if that be true then we should have a protective tariff on it. If that is one of the things that can be made somewhere else to very much greater advantage than we can make it here, and if it happens to be one of the commodities that our foreign trade must use to do business with us, then those conditions should be given due weight. If, for example, Peru needs our business in tungstic acid to repay us for the things we can make in the United States to advantage and sell there, that should be given due consideration. The same thing would apply in the case of our purchases from China. It is a very broad question and is not one that I would attempt to answer offhand. I simply want to point out the fact that in order to give this additional compensation to the mining interests that are involved in this matter we are very apt to pay two times as much at least as the amount the miners get for it, and it may react on our own business, and it certainly will prohibit us from doing an export business in this particular alloys field.

Senator PHIPPS. Based on your importation price to-day on tungstic acid, what does it cost you, what is the market to-day?

Mr. WITBECK. The market for ferrotungsten?

Senator PHIPPS. Yes.

Mr. WITBECK. It is worth anywhere from 95 cents to $1.40 a pound. The reason I give that apparently wide range is that its value is dependent on the quality of the ferrotungsten, the amount of deleterious matter that is in the ferrotungsten, such as copper and tin.

Senator PHIPPS. Do you not think it is quite possible that with encouragement to this domestic industry so that the producers would have reason to believe that their investments in the development of their properties and the natural resources of the country were justifiable that production would increase and at the same time with a lowering of cost in the domestic product that would in time allow them to compete with foreign product at a very much lower rate of duty than that proposed by this bill?

Mr. WITBECK. I have consulted quite lately with people interested in tungsten mining and my impression is that there is another side to the question—there are grave doubts as to the wisdom of encouraging an increased operation of our tungsten mines. There is not on the surface or blocked out an unlimited amount of tungsten available in the United States, and if you were to do something in the way of a tariff to greatly increase the mining of tungsten there is a very good chance that you would deplete the resources of tungsten in the United States to the point where there would be practically none available. I do not think that a healthy condition of affairs from the standpoint of war precautions. I have not read in connection with this proceeding or in any other way of anyone who is willing to state that the supply of tungsten in the United States was quite large compared with our needs here. Isn't it a big risk to go on and use up all the tungsten in sight and take the chances of being able to develop some more?

Senator PHIPPS. You might make the same assertion with regard to silver or gold.

Mr. WITBECK. That is hardly a fair comparison.

Senator PHIPPS. I do not think that idea is of any consequence at all. That is a mere theory—some one's expression based on a guess. We do know that the minute the demand came and we had to have tungsten it was found, and it was found in large quantities.

Mr. WITBECK. Chiefly in China.

Senator PHIPPS. I am speaking of the mines found in the United States.

Mr. WITBECK. Yes; and I add to your statement that the larger amount of what we got was obtained from China, and if we were in a war with Japan, or with any other nation for that matter, it might be considerably more difficult for us to get our supply of tungsten if we had to depend upon the United States. I am sure Germany would have been very glad if she had had more of it in her own country regardless of the amount of gold and silver that she had there.

Senator PHIPPS. Has it occurred to you that we would have been better off at the outbreak of this war if our tungsten mining industry had been developed to that point where we could take care of our own requirements? Would you advise going on and allowing that industry to lag and drag and not be developed, or at least determine what the possibilities are?

Mr. WITBECK. I think our embarrassment in that particular case would be infinitesimal compared with our situation if we were in war with a nation that was not bottled up as Germany was.

Senator PHIPPS. Well, it seems to me from your testimony that you are reasoning from the standpoint of a manufacturer who wants to buy his raw material in the cheapest market and sell his finished product to the best advantage. I think there is another feature there even from the manufacturer's standpoint—if there is a possibility of supplying his requirements of raw material from the domestic markets it should be encouraged as he would be ultimately the gainer.

Mr. WITBECK. I would say if it is to be assumed, as I do assume, that we would prefer to buy in the United States instead of out of the United States, that we should at least have as much protection on the finished material as is given to the raw material that we have

to use. I do not see why you should put a duty of $1 on the tungsten in the ferro and make the duty on the finished material that can be shipped in here exactly the same amount when everyone concedes that more than 1 pound must be put into our finished product to produce that same article.

Senator PHIPPS. That is not my contention.

Mr. FRANKLIN. As representing the ore producers I can clear that up.

Senator CURTIS. When Senator Phipps finishes his statement or questions you may ask a question.

Senator PHIPPS. I have finished what I wanted to ask.

Mr. FRANKLIN. I should like to ask the witness a question or two. It appears in the hearings before the Ways and Means Committee of the House that the ore producers were not familiar with the cost of manufacture of high-speed steel. They were familiar with the cost of the manufacture of the ferrotungsten and the compensatory duty as provided in the bill for ferrotungsten is all right—that is conceded by the witness, is it not?

Mr. WITBECK. Approximately, I should say; yes, sir.

Mr. FRANKLIN. We did not figure on any other operation having to take place to make the high-speed steel—that is, the people who were fathering the bill at the time did not feel that way. For argument sake, we will say—I, as representing the ore producers, have letters from them to that effect, and telegrams—that while the duty as provided as compensatory on high-speed steel was not sufficient in the original bill as passed by the House, and we are perfectly willing that that should be made compensatory, and we so stated in our hearing before the Finance Committee of the Senate.

Senator CURTIS. The amount asked by the first witness would be satisfactory?

Mr. FRANKLIN. We think it is too much. We think $1.50 is plenty.

Senator CURTIS. Instead of $1.60, you would make it $1.50?

Mr. FRANKLIN. Instead of $1.60 as stated by the two witnesses. In other words, Senator, if the producers of high-speed steel in this country can not sell their product on account of the tariff on ore, we would then be out of a market for our ore, and there would be no necessity for this tariff. We want in that bill what would make it compensatory to the high-speed steel people, and we are perfectly willing that $1.50 should go in there, and I am authorized to say that.

Now, I would like to ask Mr. Witbeck a question. You gave some figures there to the effect that 15,000 tons was the requirement of tungsten ore in the United States. Those figures are entirely wrong, and therefore it would change all your other figures as to the amount it would cost this country in the tariff on ore. The figure is really only 7,500 tons, the normal requirements—it actually is not that, but I am willing to concede 7,500, although it does not reach that amount.

Mr. WITBECK. I am not willing to concede you are right. I think you are basing that on a half year's consumption.

Mr. FRANKLIN. No, I am not; I am basing it on 1920 requirement.

Mr. WITBECK. I think we can furnish you with figures to prove that I am correct.

Senator CURTIS. You go ahead and furnish your figures to the committee, and then Mr. Witbeck can look it over afterwards.

Mr. FRANKLIN. I am satisfied you will find that 7,500 tons per year for the next 10 years would be the average requirement.

Senator CURTIS. Let him furnish any figures he pleases, and then you can submit counter-figures.

Mr. WITBECK. I hope that is not so.

Mr. FRANKLIN. What do you do with the scale that comes from your tungsten?

Mr. WITBECK. We do not do anything with it.

Mr. FRANKLIN. Do you not recover any tungsten from your scale?

Mr. WITBECK. We have not found out how to do it; we hope some one will show us how.

Mr. FRANKLIN. I could show you how.

Mr. WITBECK. At a profit?

Mr. FRANKLIN. Yes, sir. You should recover some tungsten out of your scale.

Mr. WITBECK. You undoubtedly can recover tungsten out of the scale, but can you do it at a profit?

Mr. FRANKLIN. You can do it at a profit.

Mr. WITBECK. We think it is doubtful whether you can recover tungsten out of the scale at a profit at the present price of tungsten.

Mr. FRANKLIN. Right now at the present price of tungsten, it would not be as much as if tungsten was twice as high, I will admit that, but you can recover tungsten and eliminate a good deal of that loss. Supposing we should, according to your argument, close down all the mines in the United States. What would become of this country in event of war with China? You spoke of war with Japan.

Mr. WITBECK. I think if you were to take some of the $12,000,000 you made in 1916, the $4,000,000 that you made in 1917, the $6,000,000 you made in 1917, and $5,000,000 made in 1918—I mean the profit above cost that you derived from that, I think you could do a tremendous amount of developing in the United States, and it seems to me that if the people of the United States are to pay $30,000,000——

Mr. FRANKLIN (interposing). They are not going to pay it.

Mr. WITBECK. We think they will pay it——

Mr. FRANKLIN (interposing). No.

Mr. WITBECK (continuing). As a result of this bill.

Mr. FRANKLIN. That is disputed.

Mr. WITBECK. We could set a very small part of that aside as a sinking fund for tungsten mine development in the event of war.

Mr. FRANKLIN. That part is disputed about the amount it would cost the people.

Senator PHIPPS. You would have to get some of that money back which has been paid to the Government in the way of excess profits tax, would you not? Just like your high-speed tool industry, the mines had to account for their profits and pay their taxation accordingly.

Mr. FRANKLIN. You are not familiar with mining—you are not a mining engineer, are you, Mr. Witbeck?

Mr. WITBECK. I am familiar with mining, but I am not a mining engineer.

Mr. FRANKLIN. You know nothing can be produced unless it is opened up and developed?

Mr. WITBECK. That is true.

Mr. FRANKLIN. I am here to state as a practical mining operator of 40 years' experience that you can not produce a mineral unless it is developed and opened up, and we do not know what the big resources are in this country in tungsten until the mines are opened up.

Mr. WITBECK. I was simply answering the questions you asked me. You did not ask me the cost of developing to find out how much we did have. That would be a comparatively small expense, if the United States wanted to prepare and find out how much we would have in case of war; they could block out three or four years' needs.

Mr. FRANKLIN. You can not block it out; you have to take it out. If you were familiar with mining operations you would know that.

Mr. WITBECK. They could block out sufficiently so that they would not have to take any chances in event of war.

Mr. FRANKLIN. If you were familiar with mining operations you would know that statement is not true. If you block it out and leave it there it will cave in.

Senator CURTIS. We would rather each side would state its case, and then let the committee work it out.

Mr. FRANKLIN. I claim his figures are wrong, Mr. Chairman.

Senator CURTIS. You can put in any answer that you please in the way of figures, if figures are necessary. I have not had time to go over the figures to see whether they are or not.

Mr. FRANKLIN. I simply want to say this: He did make a positive statement that we could not produce the tungsten required in this country, and that if we did go ahead and take out this tungsten we would not have any more tungsten in case of war. I claim that is not true.

Senator CURTIS. I think that is a question in regard to which each side should make a showing.

Mr. FRANKLIN. I have tried to ask him questions that would prove my contentions.

Mr. WITBECK. I am basing my figures on the United States geologists' reports.

Mr. O'BRIAN. I have no technical knowledge on this subject, but renew our request for what I asked for in the first place, that is, an opportunity, if we can have it, to present some further facts. This is the situation: The Atlas Steel Co. has a pay roll of $1,200,000. As we figure, the effect of this tariff on our operating cost will be an increase in cost of ore of $1,000,000 a year; and somebody will have to pay that, either the consumer or we will have to pay it, one or the other. There is no alternative to that.

I asked for this hearing in a letter to Senator Watson, and also wrote the Senator from New York, Mr. Calder, asking him to speak to Senator Watson, and I received no reply to either letter. The hearing was granted, but through some slip I received no notice of it. I learned of this hearing by accident yesterday. The Atlas plant is not located at Buffalo, but is located at Dunkirk, N. Y., and I

have therefore had no opportunity to talk with the technical men of the Atlas plant. This is a serious situation for the Atlas company.

Senator CURTIS. We will adjourn the meeting subject to further notice from the Chairman, Senator Watson.

Mr. FRANKLIN. I should like to ask Mr. Witbeck another question or two: If the duty on high-speed steel and tungsten alloy steel should be made compensatory with the $10 unit tariff on ore, in what way would it hurt the steel industry?

Mr. WITBECK. It would practically prohibit our doing any foreign business with any country in the world.

Mr. FRANKLIN. There is a law by which raw material may come into this country under bond, be fabricated and shipped out without paying any duty, of which you could avail yourselves if you want to do foreign business.

Mr. WITBECK. We have opened up an office in South Africa; we have an agency in Greece.

Mr. FRANKLIN. If you are not doing any——

Mr. WITBECK (interposing). We have done some advertising in Sweden, although we have not taken any orders there. We are hoping to do a foreign business.

Mr. FRANKLIN. Is it not a fact that high-speed steel is to-day coming into this country, and that you are now on the same level as everybody else in the manufacture of high-speed steel?

Mr. WITBECK. The present exchange rate would make it possible for England to compete with us right in the United States. They can cut under us considerably at the present time.

Mr. FRANKLIN. And you are on the same level they are in reference to buying ore at the present time?

Mr. WITBECK. We are, at the present time, yes, except that the method of handling in England gives England some advantage as compared with the United States in the matter of ferrotungsten.

Senator CURTIS. The hearing will be adjourned subject to the call of the chairman, Senator Watson.

(Subsequently the subcommittee decided to close the hearings and to permit persons interested in the subject to prepare and file briefs, and submit them to the subcommittee at once, so they could be printed as part of the record.)

(The matter referred to is here printed in full, as follows:)

BUFFALO, *January 29, 1920.*

Hon. JAMES E. WATSON,
Chairman Subcommittee on Finance,
United States Senate, Washington, D. C.

SIR: In accordance with the permission given by Senator Curtis, acting as chairman of your subcommittee, and further instruction given us by your secretary, Mr. Stewart, the Atlas Crucible Steel Co. transmits herewith, for your consideration and your entry upon the record of your committee, the inclosed statement of its reasons for opposing in its present form H. R. 4437, relating to a proposed tariff on tungsten ores, etc.

Respectfully,

O'BRIAN, DONOVAN, GOODYEAR & HELLINGS.

STATEMENT OF JOHN LORD O'BRIAN, ESQ., COUNSEL FOR THE ATLAS CRUCIBLE STEEL CO., BUFFALO, N. Y.

This bill in its present form proposes to impose upon tungsten ore a tariff of $10 per unit on the ore and a compensatory tariff of $1 per pound of tungsten contained in all high-speed and special alloy steels and other compounds. To this proposal the Atlas Crucible Steel Co., of Dunkirk, N. Y., respectfully presents its objections as follows:

This company is engaged in the production of high-speed and special alloy steels and is a large user of tungsten. During the year 1918 the company used approximately 100,000 pounds of tungsten per month, or a total of approximately 1,200,000 pounds for that year. Its normal use at the present time amounts to 80,000 pounds per month.

A scientific analysis of the cost items of this company shows that the proposed tariff of $10 per unit on ore will increase the acutal cost of ore to this company at least 85 cents per pound as a minimum, without making any allowance for losses and additional costs in conversion and the operations of production. Making due allowance for the additional costs of conversion and other increases in cost of production, the increase in the cost of the tungsten in the finished steel resulting from the imposition of this duty on ore will be at least $1 per pound, and this conclusion therefore coincides with the statements made by Mr. Witbeck on January 23, when he testified in behalf of the Ludlam Steel Co. and the Latrobe Steel Co.

On a basis of 12,132,900 pounds of refined tungsten, used in 1918, the increased cost of ore to the high-speed steel manufacturers will therefore amount to about $12,132,900 per year, which must be paid either by the consumer or manufacturer.

That this large increase in cost will be most detrimental for the Atlas Crucible Steel Co. is manifest from the fact that on the basis of its use of tungsten in 1918—1,200,000 pounds—its increased cost of production due to cost of ore will be at $1 per pound, $1,200,000. The effect of this is further emphasized by the fact that the pay roll of this company amounts to only $1,200,000, so that the increase in cost of ore in a single year would equal in amount the actual pay roll of the company.

As regards the proposed compensatory tariff of $1 per pound an examination of the figures demonstrates that this amount would be wholly inadequate and that the high-speed steel manufacturers can not continue in operation under the terms of this bill if it becomes law in its present form. This is so for two reasons:

First, in addition to the increased cost of ore, amounting as above stated to $1 per pound, there are further increases in cost resulting from grinding, reheating, scale resulting from reheating, etc., and these losses as shown by the testimony of Mr. Boker, of Mr. Witbeck, and Mr. Tuck (based on actual experiment) amount in gross to about 60 cents per pound loss in addition to the initial increase in cost of $1 per pound, making a total increase in cost of about $1.60 per pound. In other words, the cost of material to the Atlas Co. would not only be increased in an amount equivalent to its entire annual pay roll, but that company would suffer in addition a further loss of approximately 60 cents per pound, none of which would be covered by the proposed compensatory tariff of $1 per pound.

Second, attention is directed to the effect of foreign competition, particularly that of the British manufacturers. As pointed out in the testimony of Mr. Boker, the British can produce high-speed steel at from 20 to 30 per cent below the cost of manufacture in this country. It is the experience of the Atlas Co. that the British to-day can make a profit on the sale in this country of high-speed steel at 75 to 85 cents per pound, and are actually taking orders at the present time for the delivery in this country of high-speed steel at 85 cents per pound. The ability of the British to undersell American manufacturers will be strengthened if the present bill passes, and the gap between the American cost of production and the British cost of production will be further increased because the American cost of production will be increased to a point in the neighborhood of $1.60 per pound and the proposed compensatory tariff amounts to only $1 per pound.

The Atlas Co. therefore submits that on the face of these figures the operation of the proposed law in its present form would be not only detrimental but ruinous to its business and that of all high-speed steel manufacturers in this country.

THE ATLAS CRUCIBLE STEEL CO.

COLONIAL STEEL CO.,
Pittsburgh, Pa., January 29, 1920.

Mr. W. B. STEWART,
Secretary Senate Finance Committee, Washington, D. C.

DEAR SIR: The Timberlake bill, providing for a tariff on tungsten ore concentrates and tungsten metal and the products containing tungsten, is now before your committee. This bill was introduced for the purpose of granting protection to the producers of tungsten ore in the United States against competition which has recently arisen from foreign ores imported from sources of much cheaper supply, and this is an entirely proper matter for consideration. The producers and mine operators in the United States deserves consideration and are entitled to compensation for any sacrifices which they may have made for the purpose of assisting the United States to carry on the war, by increasing the output of tungsten ore to the greatest possible amount while the war was in progress.

It must, however, have become increasingly apparent to your committee, as hearings in regard to this bill have taken place, that the matter is far more than one affecting solely the interests of certain mining sections, for the bill, if passed, will affect to some extent every industry throughout the United States.

The principal and only important use for tungsten at this time is for alloying with iron in the manufacture of what is known as high-speed steel for making tools for metal cutting and other purposes. Practically all of the tungsten produced is consumed in this way. Proper tools are the keys to all industries. Without high-speed tools, production at modern standards is impossible. High-speed steel tools are not only employed directly in the operation of all machines for removing metal, but they consequently are a factor in the cost of production of machinery of every kind, whether this machinery be used on the farm, in the shop, in the mine, or elsewhere. Anything which increases the cost of tools adds its portion to the increased cost of all products. Cheap tools are more desirable and necessary than cheap labor.

This bill provides for a tariff of $10 per unit on tungsten ore concentrates, or its equivalent of $1 per pound on tungsten metal. If the bill should be enacted and fully carried out to the purpose for which it is proposed, it will mean an increase in the price of tungsten metal of $1 per pound above the price at which it could be otherwise manufactured under the conditions such as those that now exist. Inasmuch as the United States does not produce sufficient tungsten ore to satisfy the need of the metal for steel production, or an amount equal to the present consumption, it is not reasonable to suppose that the domestic product will be offered for sale at any price below the price which foreign ores or metal must bring, which will be the price prevailing outside of the United States plus the duty which will have to be paid under this bill.

The standard high-speed steel commonly used in the United States contains tungsten to the extent of 17 to 18 per cent of the total weight. To produce a finished steel bar containing this percentage of tungsten it is necessary to use not less than 25 pounds of tungsten for every 100 pounds of steel ready for sale. With the duty provided in this bill, this means an increased cost to American manufacturers of high-speed steel of $25 per hundred pounds, which is the amount of duty at $1 per pound, or an increased cost of 25 cents per pound. This increased cost will be distributed among and will have to be borne by all industry in the United States.

If this bill passes it will absolutely prohibit the possibility of any export from the United States of high-speed steel or tools made therefrom.

This bill if passed will place the American manufacturers of high-speed steel and of tools made therefrom under a serious handicap, because of the advantage which foreign manufacturers will have from their access to the cheaper ores and the great opportunities which they will have to compete. Foreign manufacturers, through the lower cost of manufacture, will be enabled to do business with a smaller investment of capital and with much diminished risk, and will therefore be enabled to compete on a margin over cost, which would not be large enough to compensate the American manufacturer for the much larger investment and risk which he must carry.

We consider it a matter of grave national importance that the limited supplies of tungsten in the United States be conserved as much as possible for future requirements, and that we should, in view of the limited quantities so far developed in this country, make every possible use of the supplies existing elsewhere.

For the above reasons this company is strongly opposed to the enactment or adoption of tariff or duty whatever on tungsten ore or metal.

Yours, very truly,

COLONIAL STEEL CO.,
CHARLES M. BROWN,
Vice President, in Charge of Sales.

THE CLEVELAND TWIST DRILL CO.,
Cleveland, Ohio, January 29, 1920.

Mr. W. B. STEWART,
Secretary Finance Committee,
Washington, D. C.

DEAR SIR: We view with great apprehension the efforts to pass the Timberlake bill, which will impose a heavy duty on imports of tungsten. The enactment of this bill would immediately raise the price of the principal ingredients in high-speed tool steel with increases in the price of all tools made therefrom sure to follow.

English makers of high-speed steel have received substantial aid from the British Government in the securing of their tungsten ore and, consequently, are able to undersell American steel makers. The cost of 18 per cent tungsten high-speed steel is now less than 80 cents per pound in England, whereas it is much higher in this country, due to the higher costs of American steel manufacture. This situation has already resulted in a material loss to us of our important export business in high-speed drills, but we have every hope of being able to recover this business in the near future, provided the Timberlake bill is not passed. This is because the British Government's assistance to the tungsten refiners and steel makers will be discontinued within the next few months and American steel makers will be able to produce tungsten high-speed steel on more even terms with the British makers.

High-speed steel is the tool steel of the future for the reason that it enables the individual workman to produce several times as much as he could with the old style carbon tools. Any action which our Government takes which will make it impossible for American tool manufacturers to obtain enough high-speed steel will result in a most serious curtailment of production here at home and an equally serious curtailment of one of the most staple export products, i. e., twist drills.

Notwithstanding the higher wages paid in the tool industry in this country as compared with the wages in foreign countries, we believe that owing to our more efficient manufacturing methods we can produce high-speed drills at a price which will enable us to regain our foreign business if we can secure our raw material on even terms with the foreign manufacturer.

Foreign buyers of twist drill desire to buy both their carbon and high-speed drills from a common source, which means that we must either be able to furnish high-speed drills at a reasonable price to the foreign buyer or ultimately suffer a loss of our export business in carbon drills as well. Our export business in carbon drills amounts to more than $1,000,000 a year in addition to our high-speed drill export business, which normally amounts to several hundred thousand dollars a year. This business provides employment at high wages to several hundred American workers.

We understand that most of the crucible steel makers in this country are, equally with ourselves, opposed to the Timberlake bill, and that the bill is sought only by a limited number of tungsten mine operators. We believe that the greatest good of the greatest number would surely be served by the defeat of this bill. The number of men employed in the tool-manufacturing industry in this country must surely greatly exceed the number employed in the mining of tungsten. Besides which the tool-manufacturing industry is one capable of very large growth and expansion if we can compete on even terms with the manufacturers of other countries, while the tungsten deposits of this country are limited in expansion and can only be worked at a cost considerably in excess of other and richer deposits in other countries.

We hope that you will not permit the enactment into law of a bill which will injure such an important basic industry as the manufacture of high-speed tools.

Yours, very truly,

THE CLEVELAND TWIST DRILL CO.,
L. B. WEBSTER,
Assistant to President.

THE CARPENTER STEEL CO.,
Reading, Pa., January 29, 1920.

Mr. W. B. STEWART,
Secretary Finance Committee,
Washington, D. C.

DEAR SIR: We beg to confirm to you our telegram of January 26, 1920, to Senator Watson, Finance Committee, United States Senate, Washington, D. C., as follows:

"Timberlake bill, House of Representatives, 4437. Unless this bill is amended to read high-speed tungsten steel and all alloy steels containing tungsten $1.50 per pound of tungsten contained therein in place of $1 as now provided, foreign compe-

tition will practically cause American manufacturers to suspend the production of tungsten steels. English high-speed tungsten steel can now be placed in New York on a basis of 68 cents per pound, against which price no American manufacturer could do business."

Yours, very truly,

THE CARPENTER STEEL CO.
J. S. PENDLETON,
Treasurer.

ALVORD REAMER & TOOL CO.,
Millersburg, Pa., January 30, 1920.

HON. W. B. STEWART,
Secretary Finance Committee, Washington, D. C.

MY DEAR SIR: Referring to the Timberlake bill, bearing on duty on tungsten ore, we wish to convey our firm opinion of the undesirability, from a national and commercial point of view, of adding duty on tungsten ores. We will paragraph to save unnecessary verbiage:

(1) Our information, which is reliable, is that only a very small percentage of tungsten used in the United States is from United States deposits.

(2) At the present time we can import high-speed steels at considerably less than we can purchase American-made steel. The best known products of American high-speed steel contain 17 to 18 per cent tungsten.

(3) It is apparent that the cost of foreign-made high-speed steel to foreign manufacturers is now so much below the cost of American high-speed steel to American manufacturers that it precludes American manufacturers from selling high-speed steel tools in foreign markets.

(4) To add further duty on tungsten ores simply exaggerates the difference in the cost of foreign high-speed steel compared with American high-speed steel, and curtails the use of high-speed steel for United States consumption on account of the excessive cost.

(5) The price on high-speed steel to-day is very high compared with the prewar cost of the same grade steel, which was from 55 cents to 60 cents a pound, while the price now is very greatly in excess of the prewar price. Many users of high-speed steel tools consider them economical to a certain cost, but when the tools exceed a reasonable price, they revert to the use of carbon steel tools in many instances.

(6) I understand that those favoring this bill think foreign tungsten ores are inferior, but this statement is not consistent. Imported tungsten ores have been used in most of the high-speed steels on the market, which have attained a reputation for quality and efficiency and are meeting all requirements to the fullest extent.

We respectfully submit the above as of great importance, and we hope it will be worthy of your consideration.

Yours, respectfully,

ALVORD REAMER & TOOL CO.,
F. T. MCGUIRE, *President.*

STATEMENT OF NELSON FRANKLIN.

Under the privilege granted me by Senator Curtis, acting chairman of this hearing, I desire to submit the following:

At the hearing of November 10 and 11 it developed that the manufacturers of high-speed steel had been discriminated against in the bill, but not that the discrimination was so drastic that it affected the life of the high-speed steel industry.

After the hearing strong English competition developed, aided by the position of foreign exchange, and it became clear that in order to save this branch of the tungsten industry the discrimination would have to be removed in order to accomplish the purposes of this legislation.

In demonstration of this fact a number of the manufacturers of high-speed steel requested to be heard, and this hearing was granted them, and the testimony of some witnesses shows that $1.60 per pound tungsten contained in high-speed steel would be necessary.

In order to have a wider expression a canvass has been made of the high-speed steel manufacturers for their views on this subject and their opinions as to the effect of the proposed legislation on the whole tungsten industry, provided the bill should be amended to carry $1.50 per pound tungsten contained in high-speed steel and that section 2 of the bill (known as the Green amendment) be eliminated.

In answer to this inquiry the following replies are herewith submitted:

FIRTH-STERLING STEEL CO.,
McKeesport, Pa., January 30, 1920.

NELSON FRANKLIN,
New Willard Hotel, Washington, D. C.

DEAR SIR: On the 23d instant we telegraphed Senators Watson, McCumber, and Thomas recommending the passage of this bill. The messages were sent from New York and copies were not made, but they read substantially as follows:

"Our invested capital, $4,000,000; 500 employees; monthly pay roll, $70,000. We urge passage of Timberlake bill with proper compensatory duties on tungsten steels."

We understand that the bill now being considered by the Finance Committee of the Senate carries the following provisions:

"Ten dollars per unit of tungsten trioxide on tungsten ores and concentrates, $1 per pound of contained tungsten in tungsten powder and ferrotungsten, and $1.50 per pound of contained tungsten in high-speed steel and other tungsten-alloy steels."

The changes in the bill if recommended by the Senate committee give steels containing tungsten a satisfactory compensatory duty and we think should be ample to cover all losses in getting tungsten into the steel.

We have always felt that it would be a mistake to discourage the mining of tungsten ores in the United States and consider it of the utmost importance for our country's commercial advancement to pass such measures as will enable the present mines to operate and to encourage prospecting and development within our borders. A large tungsten supply will be one of our greatest safeguards in time of war and we should have it in times of peace to be prepared for such an emergency.

It is well known among the users of tungsten that the quality of our western ores is superior to that obtained from foreign countries, and we should not allow our mines to remain undeveloped and be forced to use the impure ores from abroad.

Our belief is that the duties proposed in this bill will have the effect of placing the tungsten mining industry in a healthy condition, that prospecting and development will be stimulated, and that a stable market will be the result which will be much more satisfactory to both the tungsten producers and the users of the alloy than to have wide fluctuation which we may expect should our tungsten mining industry be ruined and the market placed in foreign hands.

Yours, very truly,

FIRTH-STERLING STEEL CO.
D. E. JACKMAN, *Treasurer.*

THE VANADIUM-ALLOYS STEEL CO.,
Latrobe, Pa., January 30, 1920.

Mr. NELSON FRANKLIN,
New Willard Hotel, Washington, D. C.

DEAR MR. FRANKLIN: As refiners of Tungsten ore, manufacturers of ferrotungsten, and especially as manufacturers of high-speed steel, we are vitally concerned in the legislation now before the Senate, known as the Timberlake bill, or H. R. 4437.

During the consideration of this bill by the Senate subcommittee on finance, we took occasion to telegraph Senators Watson, McCumber, and Thomas as follows:

"We urge favorable action on Timberlake bill. As manufacturers of high-speed steel we deem it imperative to safeguard the American tungsten mining and manufacturing industry, and we consider the passage of this bill vital. We employ over 200 men and are large factors in the industry."

It is our firm conviction that the continuity and development of the tungsten mining industry is dependent solely upon the passage of this legislation. We deem a tariff of $10 per unit of tungstic trioxide contained in ores and concentrates imported into the United States as being absolutely necessary to safeguard the operation and further development of the tungsten mining resources of our own country.

We deem a continuation of this mining as absolutely essential because of the very superior quality of American ores and the almost imperative need for them in the arts, both in peace and in war times.

For the same reasons the provisions in the bill levying a tariff of $1 per pound on tungsten contained in ferrotungsten and tungsten powder imported into this country is vital, while a tariff of $1.50 per pound on contained tungsten in high speed steels and other alloy steels containing tungsten imported into this country is satisfactory and reasonably compensatory.

The manufacture of ferrotungsten and tungsten powder is an industry developed to meet war-time needs and should be maintained without interruption, but without the protection afforded by the provisions of this bill this industry will immediately lapse.

Manufacturers of high-speed steel will find their business seriously curtailed by the importation of steels from Europe carrying cheap oriental alloys, unless the industry is immediately safeguarded by the passage of this legislation, carrying a satisfactory compensatory tariff on tungsten contained in the imported steels.

All of the industries affected by the legislation are already in a chaotic condition, and as tungsten manufacturers and refiners and producers of high-speed steel, we see no relief for the stabilization of the industry except by the passage of this legislation.

Yours, very truly,

VANADIUM-ALLOYS STEEL CO.
W. S. JONES, *Vice President.*

BRAEBURN STEEL CO.,
Braeburn, Pa., January 28, 1920.

Mr. NELSON FRANKLIN,
New Willard Hotel, Washington, D. C.

DEAR SIR: It seems very plain that in order to stabilize the tungsten bearing steel industry that suitable protection must be given the tungsten producers. In other words, something should be done to protect the tungsten production against competition which on account of low wages we can not meet.

A compensatory tariff of $1.50 should be established. As users of tungsten we want protection against foreign competition and think that the tungsten industry should be protected and encouraged. Our experience has been that domestic tungsten is more pure and uniform than the imported. We used quite a fair tonnage of imported tungsten before the war and during the war used domestic, and we would not go back to the imported article as long as we could make tungsten steel at a price allowing us to compete with those of our competitors who might use the cheaper imported article and thus be in a position to undersell us. Quality in many cases is not as attractive to a buyer as a low price.

Very truly, yours,

BRAEBURN STEEL CO.,
G. H. NEILSON, *President*

THE CARPENTER STEEL CO.,
Reading, Pa., January 30, 1920.

Mr. NELSON FRANKLIN,
Washington, D. C.

DEAR SIR: In the absence of our Mr. J. S. Pendleton, I am writing to advise you that we are very much in favor of the Timberlake bill as I understand it has now been revised. The Green amendment would be eliminated and the tariff of $10 per unit tungstic trioxide would remain and a tariff of $1 per pound contained tungsten in ferrotungsten and tungsten powder would remain, and the bill to carry $1.50 per pound duty on tungsten contained in high-speed steel.

From our experience during the World War it would appear that it would be for the best interests of everyone that this bill be passed in order that domestic ore can be mined and thus insure an adequate supply of tungsten ore in this country at all times.

Our experience proves beyond a question of doubt that domestic ore is of a much superior quality to the foreign ore and we have no doubt that the tariff on ore will stabilize the industry from the standpoint of both the manufacturer and the miner.

If an import duty of $1.50 per pound tungsten contained is not imposed on high-speed steel brought into this country, the American steel manufacturers will be forced to discontinue the manufacture of high-speed steel as they will be absolutely unable to compete with similar steels made in England and other European countries from low-priced ores and with low-priced labor.

Yours, truly,

F. A. BIGELOW,
Vice President and General Sales Manager.

STATEMENT OF NELSON FRANKLIN, RESUMED.

Mr. B. F. Witbeck, of the Ludlum Steel Co., in his testimony before the committee, said that the proposed duty would add $20,000,000 to the manufacturers' cost of high-speed steel is absolutely at variance with the facts.

He takes as a basis the year 1918, the strikingly abnormal year of greatest known consumption, in which we used in the United States over twice as much ore as was produced by the entire world in the year 1914, and one and one-half times that produced by the world in 1915. Then he misquotes the statistics of 1918. His $20,000,000 increase is based on these statistics: That "15,000 tons of tungsten content in the

concentrates were used in that year." This figure is over twice too large. In order to produce 15,000 tons of tungsten content in the concentrate, the required tonnage of concentrate carrying 60 per cent WO_3 would be approximately 31,500 tons. To illustrate: A unit is 1 per cent of a ton, or 20 pounds; there are 100 units in a ton, so in a material carrying 60 per cent there would be 60 units in a ton; 31,500 tons times 60 equals 1,890,000 units of tungstic trioxide. One unit of tungstic trioxide contains 15.86 pounds metallic tungsten and 4.14 pounds oxygen, so 1,890,000 units of tungstic trioxide contain 1,890,000 times 15.86, equals 29,975,400 pounds of metallic tungsten, or, roughly, 15,000 tons.

But according to the United States Geological Survey figures, the United States imported in 1918, 12,892 tons of ore, and the domestic production was 5,029 tons, so the total ore available for consumption was 17,921 tons, carrying 60 per cent tungstic trioxide, which is equivalent to 8,526 tons of metallic tungsten. As there was practically no carry-over of stocks from 1917 and there was a large carry-over in 1918, what Mr. Witbeck probably meant to say was that 15,000 tons of concentrate carrying 60 per cent tungstic trioxide were used in 1918. Then this 30,000,000 pounds of concentrate would carry 14,274,000 pounds of metallic tungsten, or under 7,500 tons. The refining loss in converting this ore into ferrotungsten is 15 per cent, so only 12,132,900 pounds of tungsten were available for steel making and his $20,000,000 becomes $12,132,900, admitting the correctness of his statement of $1 per pound increase in cost. But the only proper basis for figuring the real increase in cost would be the duty of $10 per unit on the ore; therefore his supposed figure of 15,000 tons of ore or 900,000 units of tungstic trioxide at $10 per unit would be $9,000,000 instead of his $20,000,000.

If a tariff of $10 per unit had been in existence during the year 1918, the Government would have received a revenue of $10,655,000 from the ore imported that year. Furthermore, it would not have added 1 cent to the manufacturer's cost or to the sale price of high speed steel, because the foreign ore seller has always regulated his sale price on the basis of the New York market.

If Mr. Witbeck is anywhere near correct in his assumption of the tonnage required, the potentiality of this act as a revenue producing measure is great, and in this event our Government would receive a large return, which in the absence of a tariff, would go to the Asiatic producer.

I, however, contend that the normal consumption will not exceed 7,500 tons, in support of which I quote from Mr. Hess, of the Geological Survey: "Tool steel makers have figured on a consumption of 7,500 tons during the current year" (1919), "but, as is shown by the lack of market for ore, this is undoubtedly much too high and probably 4,000 tons is amply large." Mr. George Otis Smith, Director of the Geological Survey, testified before the Committee on Ways and Means at the hearing on this bill in June, 1919, in regard to the consumption of tungsten ores in the United States, as follows:

"Last year it increased to something over 16,000 tons. I think that shows the stimulus given by war conditions, but that is not an estimate of what we may expect after the war. I think a conservative estimate is that 5,000 tons would probably represent the normal consumptive needs of this country."

Mr. Witbeck testified "on the basis of production of tungsten in this country for that same year (1918), the additional compensation to the miners would be approximately $7,000,000." The production in this country in 1918, according to figures of the United States Geological Survey, was 5,029 tons, or 301,740 units, which at $10 per unit would equal $3,017,400, instead of $7,000,000, as stated by Mr. Witbeck.

It does not appear that too much reliance can be placed upon Mr. Witbeck's figuers or his conclusion as to the requirements of tungsten in this country.

If we assume as correct this estimate of the Geological Survey of 5,000 tons of ore carrying 300,000 units, the proposed duty would levy a tax of $3,000,000. On the assumption of the tool steel makers' maximum of 7,500 tons the tax would be $4,500,000 Therefore, the total burdens on the steel trade will be between $3,000,000 to $4,500,000 a year. This burden will not fall on the steel manufacturer, but will be spread over the huge tonnage of finished steel and so widely distributed that it will be negligible so far as the ultimate consumer is concerned.

High-speed steel manufacturing must be strictly differentiated from the great steel industry if we are to get a proper understanding of the questions involved in the tungsten trade. There are comparatively few makers of high speed or tungsten alloy steels. These steels are complicated in their manufacture, use costly materials and a large amount of labor as compared with output. They are not "tonnage" steels but are dealt with in small lots on the pound basis, with prices varying from $1 per pound to several dollars per pound in war times. The total normal production will not be over 10,000 to 15,000 tons per year. The number of men employed in this industry is

small. When Mr. Witbeck referred to "hundreds of thousands of people are concerned in the steel industry" he means the great steel industry where millions of tons of steel are produced. The only relation that the very small tonnage of high-speed steel bears to this vast tonnage steel is that it finishes huge quantities of steel and therefore the extra burden placed on the steel industry through the proposed duty is negligible.

This is well illustrated by Mr. George Otis Smith, Director of the United States Geological Survey, in The Strategy of Minerals:

"When it is remembered that a tool weighing a few pounds may be used to shape a cannon weighing tons, the utility of tungsten in the metal-working industries becomes apparent."

Mr. Witbeck, who says that he is not familiar with the mining conditions in the United States, presumed to state definitely that we could not produce or develop properties to produce our demands in tungsten ore. He bases his definite conclusions on the amount of ore produced in 1916, 1917, and 1918.

In 1916 the price soared to $90 per unit in March. I quote from the report of the United States Tariff Commission: "Then followed a spectacular fall to $25 and later to $18, all within less than three months. Since September, 1916, the price has remained in the range $18 to $26, averaging about $22 a unit." The production in 1916 was 5,923 tons; in 1917, 6,144; and in 1918, 5,029 tons. He argues the fall in production between 1917 and 1918 proved the decline of tungsten ore resources. He did not seem to know that the market broke in November, 1918, and tungsten ore production practically stopped. He did not know of the large new mills that were just starting their production from the contact-metamorphic deposits upon which it is admitted our future production depends.

If we produced over 6,000 tons in 1917 at prices ranging from $17.50 per unit to an average of $22 per unit before the contact deposits were developed, I claim we are justified in assuming a future production large enough to take care of our normal needs.

In reference to the future production and resources of tungsten ores of the United States, Mr. George Otis Smith, Director of the United States Geological Survey, testified before the Committee on Ways and Means:

"We have tungsten ore sufficient to meet our needs for many years, but there is reason to believe that the deposits would begin to decline in course of time, but, of course, we would expect to find some other deposits as yet unknown."

STATEMENT OF MR. FRANK W. GRIFFIN OF THE TUNGSTEN MINES CO., CALIFORNIA.

I desire to present the following in reference to production of tungsten ores and the effect on the industry of the proposed legislation.

Production.—One who relies on statistics for his information in regard to the tungsten industry will be led far astray, for tungsten statistics are likely to be obsolete before they are made.

Tungsten production in 1918 in the United States had settled down to a steady basis, the placers and rich surface deposits having been depleted in the 1915 and 1916 excitement. The place of this spasmodic production was taken by mines which had been discovered, developed, and equipped. The future of production can not be predicated on the past, because the output from the contact metamorphic deposits of low grade but large volume had only just begun when the armistice came. In these deposits lie the future of tungsten deposits as we now know it. In regard to the productiveness of the contact metamorphic deposits Mr. Frank Hess, of the United States Geological Survey, states: "These only recently have begun to be of commercial importance, but promise to be among the greatest, if not the greatest, producers of this country."

In speaking of the Australia deposits, he says: "The cream of the known deposits is gone, except in Tasmania, where contact metamorphic deposits on King Island have quadrupled the Tasmania output."

Mr. Hess further states in the United States Geological Survey Bulletin No. 652: "It has often been said that tungsten veins are more erratic than veins carrying other metals, and that the distribution of the ore in them is more irregular, so that deposits can not be depended upon as well as deposits of other metals, but of this statement there is at present no proof. * * * Many tungsten-bearing veins are at least as even in content as the average metal-bearing veins of other kinds. * * * Most tungsten deposits doubtless extend to depths as great as those reached by deposits containing other metals."

We now have large bodies of ore developed, and our mines equipped at a great investment are all closed down. Some conservationists have demanded that we must

leave them as they are against the country's day of need. It is true there is but one crop of ore. But this is true not only of tungsten but also of every other precious mineral, of every mined product. It would be just as logical to say "Stop all gold and silver mining, for when your crop is harvested there can be no more." Great is the temerity of the man who limits definitely the extent of products from the earth. What we want a tariff for is to permit us to work our mines and dispose of our product. Only by the removal of our ore can we carry on our development work so that the mining of tungsten may become an increasingly dependable industry.

We owners of these mines, who have spent very large sums of money in their development and equipment, are, I submit, in the best position to estimate their future yield and permanence. While there are many mines in the United States that can be worked only at high prices, still the large contact deposits alone can, in my judgment, produce a tonnage closely approximating our highest at selling prices of about $17 per unit.

Export and foreign trade.—Some objection has been raised that by putting a tariff on tungsten we will make exporting of tungsten steel impossible and will interfere with our foreign trade relations, especially South America.

So far as our exporting any tungsten products goes now, it is a dream. We never did export more than a small amount of special finished tools, but now, with both England and France underselling us in our home markets, all idea of building up an export trade must be abandoned. Japan is also going into the refining of tungsten and manufacture of high-speed steel.

So far as our trade relations with South America go, they can not be influenced by tungsten. The mines are largely controlled by England, but Ross Hazeltine, (consul, La Paz, Bolivia, report to State Department July 9, 1919, Foreign Files No. 4), states: "The average cost of production in 1918 was about $12 gold per unnit. * * * The poorer mines can not operate unless the price goes well above $12 per unit. * * * No imports of ferrotungsten are listed in official statistics, and the imports, if any, are negligible. * * * No tungsten is used locally." Such priced ore can not compete with Asiatic ores any more than ours can, so how can American tariff legislation injure Bolivia or American interests in Bolivia? Any ore which Bolivia can sell us now in competition with Asia would have to be produced at a cost low enough to warrant its being sold at $7 a unit, and, of course, whatever ore Bolivia can produce in competition with Asia we could buy as well with a tariff as without a tariff. So where would she be injured?

England is in absolute control of all tungsten in her possessions. We can not acquire mines in her possessions. Hongkong is the port of southern China, where are the greatest fields of Chinese production, and so England controls the export of ores produced in these districts. She also has large control of Bolivian deposits through ownership of mines and control of banking. Over one-half of the world production is absolutely under English control.

We are the largest consumers of tungsten products, so it seems evident that without a tariff great enough to permit our industry to live we will irretrievably lose all tungsten trade to Germany and England. England is now using every endeavor to secure our tungsten trade by selling refined tunsgten and high-speed steel here at prices which our American manufacturers can not meet.

England's attitude in regard to the tunsgten industry is illustrated by the following quotation from the presidential address by H. K. Picard:

[The Institution of Mining and Metallurgy, London, May, 1919.]

"Further, it is much to be desired that such industries as have sprung up in response to our urgent necessities (other than those concerned with the production of purely war material) will not only be retained by us, but will continue to develop to the advantage of the country and the nation. Certain of these have been recreated in an artificial atmosphere of State support or subsidy; several, with such assistance, having reached a stage of technical efficiency, it appears to be of vital importance that further encouragement should be offered them for such periods as will secure their permanence or of their requiring a minimum of external support.

"A typical example of this is the Tungsten Industry, about which so much has been made public. Even the nontechnical reader is now familiar with the general facts regarding this metal, while a certain amount of information as to its production has also become known through the technical press. It will be sufficient to refer to Julius L. F. Vogel and A. F. MacLaren, whose able work resulted in the production of this essential metal—essential not only in war, when its supply was a vital necessity to the country, but also in time of peace. Its importance is well expressed by the American Metallurgist, Colin Fink, who says: 'It may some day be said that tungsten made democracy possible.'

"Through the efforts of these metallurgists and their associates we are now independent of foreign supplies, and moreover the quality of the British production is superior to that previously imported from Germany."

Mr. Otis Smith, Director of the United States Geological Survey, in the Strategy of Minerals, states the importance of tungsten in the economic life of the world in the following language:

"From the earliest time man's tools have formed a useful measure of his progress in civilization. Passing from the age of stone, the age of iron, and the age of steel, mankind may now be said to have reached the age of tungsten steel. * * * The importance of this metal is altogether out of proportion to its relative meager tonnage. * * * When it is remembered that a tool weighing a few pounds may be used to shape a cannon weighing tons, the utility of tungsten in the metal-working industries becomes apparent.

"So well aware was Germany of the value of this metal in warfare that for several years before the war she imported large quantities in her preparation for the struggle; in 1916 she carried from the United States in the submarine *Deutschland* 55,000 pounds of metallic tungsten, and afterwards she lost no opportunity to smuggle tungsten from neutral countries. * * *

"The United States is the only great steel-producing country that is fortunate enough to possess large domestic deposits of tungsten ores * * *. The competition for tungsten among the Allies during the war was so severe and the problem of its equitable distribution was so complicated and vexatious that an interallied commission was formed to handle the supply of tungsten."

Mr. Hess, of the United States Geological Survey, strongly emphasizes the vital importance of tungsten to our national life and further says:

"The use of tungsten in high-speed steel is as standard as the use of yeast in bread, and, though assiduously hunted, no substitute is known which will satisfactorily take its place."

Every important nation recognizes the peril that would follow the cutting off from it this essential mineral, and each, with the exception of the United States, is safeguarding and encouraging the tungsten industry. Especially active in this encouragement are England and Japan.

Our danger has been recognized and the suggestion has been made that we should use the low-priced ores now being produced in the Orient, and that it would be one of the best forms of national life insurance were the Government to purchase and store 10,000 tons of these ores while they may be had. The question is one of national life insurance as meaning a guaranty of mere existence.

While I agree that it is necessary for the Government to purchase tungsten ore, the remedy suggested is only one of emergency and does not prevent the death of the tungsten industry of America. I believe the Government should purchase tungsten as the basis of our industrial system, just as it purchases gold as the basis of our financial system; but, instead of increasing our burdensome taxation to supply the $4,200,000 that would be needed to buy the 10,000 tons of cheap ore above referred to, I maintain that the way open to secure our independence of the world and of foreign supplies and save the tungsten industry of our country from sure destruction, absolutely without cost to the Government, would be through the levying of a tariff. To illustrate:

For argument's sake let us assume our commercial requirements are 5,000 tons per year, and that at $17 per unit our mines can produce only 3,000 tons per year. Suppose the Government purchased these 3,000 tons containing 60 per cent WO_3, or 180,000 units, at $17 per unit for storage against the country's day of need, it would require $3,060,000. Then 5,000 tons, containing 60 per cent WO_3, or 300,000 units, would have to be imported, and the payment of $10 per unit duty would return $3,000,000 to the Government. In other words, through the operations of the tariff the Government could store 3,000 tons of tungsten ore per year for "national life insurance, as meaning a guaranty of mere existence," without cost.

If it be true, as some conservationists assert, that our supplies of tungsten ores will be quickly depleted without the development of other ore and that no new ore will be discovered, it then seems of vital importance to extract this ore now while the mines are opened and equipped, and so insure its physical possession in Government storage when it can be done without cost to the Government. If the ore is not recovered now, much of it will be irretrievably lost through destruction of existing mines, and the remainder will call for great additional expense to extract in the day of need—a sheer economic waste.

If, through the tariff, we are permitted to work our mines and save our large investments, and our theory of the development of new ore bodies is the true one, then the Nation is in infinitely stronger position in regard to this vitally essential mineral.

Government purchase could cease and we could fill the commercial demands at a low price.

The industry in all its branches would be saved and no economic loss would result.

If our mines are permanently closed down, then England, Japan, and Germany will be in control of the ores of the world. All three are manufacturers of ferrotungsten and tungsten powder as well as steel. Will they keep the price of tungsten ores so low that America can compete with them on the finished product, or will they raise the price of ore to prevent such competition? The whole tungsten industry of our country, the three branches, are facing sure destruction without a tariff of $10 per unit on ores, $1 on ferrotungsten, and $1.50 on steels. The emergency now confronting the industry should be met by the enactment of an emergency tariff which could readily be revised to meet conditions developed by its action.

(Thereupon at 5 o'clock p. m. the subcommittee adjourned to meet at the call of its chairman.)