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I N T E R R O G A T I O N

o f

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of
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Before:

15 June 1945

FRANCIS A. MAHONY

Steno: MM

BY MR. MAHONY:

Q Dr. Röchling, yesterday we talked for about three hours of your background and experience and your recent activities, and today I would like to put some of that information on the record. A Yes.

Q So I shall ask you a series of questions and expect you to give full and complete answers to them.
A Surely.

Q And I may interrupt you from time to time only to be sure that we get German expressions and technical phrases exactly right. You understand, Doctor? A Yes, I understand.

Q You were in what kind of business up to the time you were taken into custody by the American forces?
A I had two businesses. One business is I am chief of the firm of the house Röchling. We are specially producer and dealer with iron and steel.

Q How long have you been in that business?
A I am now fifty years in that business.

Q Was that a business that your family was in

**SECRET
CONTROL**

**SECRET
CONTROL**

Röchling

-2-

before you? A Yes, my father has built it up and he got part of it from an uncle.

Q Where was the business located? A My place we have been living was always Völklingen Saar. And the second business which I got during the war, from 1942 in the month of May, was to lead and to rule and to give instructions to the whole iron and steel industry of Germany and the occupied territories. Occupied territories I got a little later, on the 18th of June.

Q Who gave you that designation? A I have been designated -- I have been proposed on this job by Reichsminister Speer and he has proposed me to Adolf Hitler, and then I have been nominated by Speer for Germany and by Goering for the occupied territories.

Q Did Hitler make the appointment on these nominations? A No, he agreed.

Q And you got the job? A And I got the job.

Q Let us hold a discussion of the second business for the moment until we take up certain others matters first.
A That's right.

Q What happened to the territory in which your business was situated after the conclusion of World War I?

A This territory has been under the rule of the League of Nations.

Q As the so-called Saar Territory? A Saar Territory has been under the rule of the League of Nations.

SECRET

CONTROL

Q Prior to that it was part of Germany? A It was part of Prussia, Bavaria and Germany.

Q During the First World War did your plant make armaments for the German Army and Navy? A Yes, we made shells, only two sizes of shells.

Q When did you resume civilian production after the last war? A Immediately.

Q What kind of production was that, Doctor?
A It was the same kind of production which we had always.

Q What was that? A We made two classes of steel. One class was high class of electric molten steel, molten in electric furnaces.

Q Electric furnace steel? A Yes. It was a private scheme or invention of mine together with Mr. Rodenhauser.

Q That was an invention of what kind? A An electric furnace. It is known as the Röchling Rodenhauser furnace. It has only historical significance now but it shows I have always been on the line to bring new things.

Q For what purposes was such steel used? A This steel was used for all kinds of high grade steel, for instance, tool steel.

Q Surgical instruments? A Surgical instruments; even afterwards for cutlery. We made also a good deal of construction steel.

Q That was the second part of the business? A No, that was all the same high grade construction steel, for

SECRET

CONTROL
Röchling

-4-

automobiles, for instance; for cars, for automobiles and such things. Even -- I don't know what you call it -- for the valves. That is a very difficult production.

Q What about the second part of your business?

A This department was for all kinds of structural steel; for construction of houses, for building of wagons, building of rails and trucks for the cars.

Q I think that explains it sufficiently. A All kinds without making plates. We didn't make plates and we didn't make tubes.

Q Did you continue with that line of business in these two main divisions after the last war? A Yes. We developed very much the exportation of the first kind.

Q What, high grade tool steel? A Yes. We had world around places to sell this steel; in Europe pretty nearly in every country, and in South America, including China and Japan.

Q Did you derive your iron ore from the Saar territory? A No, the Saar territory has only coal.

Q You got your coal from the Saar territory?

A Yes.

Q Was that from your own coal mines? A No. The coal mines belonged at that time to the French State who had them for the time during which the Saar Territory was under the League of Nations.

Q Did the French Government have the right to receive

SECRET

CONTROL

CONTROL

Röchling

-5-

SECRET

the output of the Saar coal mines? A They had the right, with this restriction, that the local demand had to be fulfilled.

Q In other words, they could take off all production over and above the local demand? A That's it.

Q And part of the local demand would be yours?
A Was mine.

Q So you would get the coal for coking purposes and for the reduction of the iron ore right from your own Saar territory. A Yes.

Q Where would you get the iron ore? A The iron ore I got from Lorraine, France. It was very difficult at times to get enough iron ore so I had to find other things that I will tell you about later.

Q Was it also difficult to get coal or was it easy to get coal? A No, coal I got always the amount I needed and it was especially because the Saar coal mines did not wash the fine coal so they could not sell it anywhere else.

Q Now, when you speak of washing coal, Doctor, what do you mean? A This coal is clean from stones and slate.

Q In other words, non-combustible parts are removed?
A When I get it it is 30 to 32% and we reduce it to 5%.

Q You would buy unwashed coal. A Yes, we got it at that time. Later it is a little bit changed. The coal

SECRET

CONTROL

SECRET

CONTROL

Röchling

-6-

mines washed it.

Q During the period when the Saar was under the League of Nations, how much coal on the average would you use in a year? A We used about in the beginning fifty to sixty thousand tons a month and later on it was growing with the development of the working of our business.

Q The plebescite came in what year? A 1935.

Q How much coal were you using at that time?

A At that time it may be that it was perhaps seventy-five thousand tons.

Q Per month? A A month, of unwashed coal.

Q Now, can you give me the same information about iron ore, taking the beginning and taking the plebescite date? A Now, it comes something funny because I could not get enough iron ore. I had to try to find something else. There was an enormous stock of flue dust.

Q Flue dust? A The dust out of the blast furnaces. This was very fine stuff. It is such fine stuff that if you blow, it goes. So nobody knew how to handle this, and because I was in a big hurry, because I could not get enough iron ore in times when the business was good -- there were times when business was bad, I could get enough -- but good times I could not get enough. So I made studies how to use this flue dust. We had about three or four million tons of this flue dust in

SECRET

CONTROL

CONTROL

Röchling

-7-

SECRET

stock in Lorraine and this stock was always growing. And I found by hard working that when you melt this flue dust, not melt completely, only melt it so much, that it formed little masses, little grains and lumps.

Q That process you call agglomeration? A Yes, it is an American patent. It has been made first in America, this process.

Q Did you have a license to do it? A No, it was not any patent. I bought in one week all the stock.

Q The whole four million tons? A Four million tons of stock.

Q How did you move it? A By railroad car.

Q If it was so light how was it possible to move it, that it didn't just blow away? A Well, it was wet enough a long time, because about 15 or 20% water was in it, so it didn't blow when it was on the ground or in the car.

Q Had it been kept in the open like cinders? A Yes, it was open like cinders and in the same week I ordered installation to agglomerate this flue dust, and from that date I need not buy much iron ore because I had this great amount of this stuff.

Q What was the percentage of recoverable iron in this flue dust? A The flue dust had about 40% iron.

Q Forty per cent? A Yes. The iron ore had only thirty,

SECRET

CONTROL

SECRET

Röchling

CONTROL

-8-

Q I was just about to ask you what does that mean in terms of iron ore. That would be good iron ore?

A Yes, it would be good iron ore.

Q How long did that amount of flue dust last you?

A It lasted until the beginning of this war because I bought not only the stock. I bought also what was accumulating every day. I had at the beginning of this war one million tons of this flue dust on my stock.

Q At the same time you were using flue dust you were also using iron ore? A Yes, I needed also iron ore because the flue dust could not well agglomerate if one had not a little part of iron ore.

Q You had to mix the two? A One had to mix it.

Q In what ratio would you mix them? A About one-quarter or one-third of iron ore and the rest flue dust.

Q During this period, Doctor, about how much iron ore did you turn out in a year? A During this period of all kinds, not finished products but steel ingots, that was annually in the beginning about three hundred thousand tons and afterwards that went up to perhaps five hundred thousand tons a year.

Q How much was it at the time of the plebescite?

A About five hundred thousand tons.

Q How would that divide between the high grade steel and the other steel? A About one-fourth high

SECRET

CONTROL

CONTROL
Röchling

-9-

SECRET

grade steel; three-quarters of the other.

Q During this period did you hold any public office in the Saar Territory? A No. I have been a member of the Advisory Council. It was the representation of the population.

Q Representing them where? A In the League of Nations.

Q You were a representative to the League? A No, not to the League; to our Government, to the Commission.

Q The Commission was set up under the League?
A Set up under the League. The Commission consisted of five gentlemen. One was a Frenchman, one a Britisher, and two other nations, and one native of the Saar Territory.

Q Were you the native of the Saar Territory?
A No.

Q Who was that? A This was changing. It was first a gentleman, Dr. Hector who has been Mayor of the town of Saar Rue, but he had to resign because he has proved to have sworn falsely, and afterwards it was Mr. Kossmann.

Q In relation to the Commission and the people in the Saar, what position did you hold? A I was one of the leaders of the population. It was a funny thing. When the first war was to end, the French condemned me by court marshal to ten years prison, ten million francs fine and fifteen years forbidden to stay in France.

SECRET

CONTROL

SECRET

CONTROL
Röchling

-10-

Q You could not enter France for fifteen years?

A Yes. A brother of mine has been captured by the French and he got the same punishment.

Q Why did they impose that kind of sentence on you? A They charged me with robbery and because we had taken on the order of our Government machinery and machine tools to make shells and such things.

Q During the First World War? A During the first war, and now we were charged with robbery until it has been proven that all this had been done by the authority of our Government.

Q Then what happened? A Then my brother has been released and freed.

Q What happened to you? A But I have been charged because I had been condemned in absentia.

Q What did they do about your sentence when they found out, as you say, these things were done on the order of the Government? A Nothing.

Q They didn't lift the sentence? A No.

Q Did they ever succeed in carrying out any part of it? A A little part. About six hundred thousand francs they collected by the possibility that we had to get some money from France and they took it.

Q They wouldn't let you get it? A Yes, and by this fact I could not go to France and by this fact I had been directed immediately in opposition to France. You see,

SECRET

CONTROL

CONTROL

Röchling

-11-

SECRET

I told you yesterday that you can't change much what happens.

Q How were you chosen as a representative of the people? A By election.

Q What was your office called? A My office was Advisory Council of the Saar Territory.

Q How was the Council set up, by vote of the people? A By vote of the people.

Q Were there a number of parties? A Yes, a number of parties and it was about the same system as it was for the German Reichstag.

Q What was your party? A My party was first Liberal Volkspartie, and afterwards we took over the Democrats because we were too weak. Each was too weak, so we merged to get stronger. We made a fusion and we were the Deutsche Saarländischer Volkspartie. We were usually four members of the thirty members of the Advisory Council.

Q And your party elected four? A Yes.

Q What did you do as a member of the Advisory Council? A I had been leading the defense of the right of our Saar population against a lot of things which were not allowed under the Treaty but which had been done by our Government Commission.

Q Such as? A Such as they kept French soldiers; they kept French Military Police, both of which were not admitted by the Treaty of Versailles. In the Treaty of

SECRET

CONTROL

CONTROL

Röchling

-12-

SECRET

Versailles, there was only the local gendarmerie provided, and it lasted until 1930 until we came to the point which was set up in the Treaty of Versailles. Until 1930 we had French military in our country.

Q What would you do to express opposition to these conditions? A We made, nearly every session of the Council of the League of Nations we made petitions, petitions in which our grievances were told and we brought them over to Geneva and gave it to the different members.

Q Did you present the petitions yourself? A I was one of these members. I have been forty-four times at Geneva.

Q Did you seek anything else except the correction of these alleged violations of the Treaty? A Nothing else. We had only to keep our rights which were set up by the Treaty.

Q Were you during these years in close contact with various people in Germany? A In Germany? Yes, also. I had to work in Germany with every Government also.

Q In what connection did you have to do that work? A Essentially in the connection that we got help from Germany on various points. For instance, one point which was of very high importance for us was that Germany took over our production.

Q In other words, export into Germany? A Export into Germany. That was a big job.

SECRET

CONTROL

CONTROL

Röchling

-13-

SECRET

Q Wasn't it provided in the Treaty that you could export these duty free? A It was provided for five years but after these five years we had to pay taxes and these taxes would restrain absolutely our possibility to export.

Q What did you do about the taxes? A So from 1925, the 10th of January, it was the time the taxes had to be raised, I made an arrangement with Chancellor Luther, who was later Ambassador in Washington, I made an arrangement with him that he would give us credit for the amount of the taxes and he said, when we spoke of this, immediately; "A credit which never has to be paid."

Q In other words, the duties never were paid? They were charged but never collected? A Never collected. But with other people first it was collected and then after a certain time the French Government asked the German Government that nobody had to pay taxes for the importation of the Saar Territory to Germany.

Q Was that on all products including steel?
A All products.

Q Did Germany agree to that? A Germany agreed to that because it was in the long line what we needed. We are a German population and so Germany did a lot of such things for us.

Q How German was the population of the Saar?
A We had civilians under the Treaty, surely not more than two hundred.

SECRET

CONTROL

CONTROL

Röchling

-14-

SECRET

Q No. What was the percentage of German population in the Saar? A 99% perhaps.

Q During your forty-four visits to the League of Nations, did you ever urge upon the League that the Saar Territory be returned to Germany? A No. We told them always that when the vote would come that it would be an overwhelming majority for Germany.

Q Did you try to get them to anticipate the vote or advance the date of it? A No, there was no chance. We had to work only on the basis of the Treaty.

Q Which was for what? A Which was for fifteen years.

Q The period of fifteen years ran from 1920 --

A From the 10th of January, 1920.

Q Did you have difficulties with the French authorities as a result of your activities? A Oh, yes, I had lots of them, beginning with one I got one day in 1923, I think it was in the month of May. It was me forbidden to go through the occupied territories. That means the Rhineland. The French Government, the leading party in the Rhineland, has forbidden me to go through, and then it took eight months until this prohibition had been withdrawn by the French under the pressure of the League of Nations, and the pressure of the League of Nations has been activated by the English Government.

Q Why should the English Government have interceded?

CONTROL

SECRET

CONTROL

Röchling

-15-

SECRET

A That came from the fact that the French with the Belgians together had been going to the Ruhr. They went into the Ruhr in 1923 and England would not want to have this, and there have been funny things about this.

Q I still don't see why they should intercede for you to have the prohibition against your entering the Rhineland lifted. A So I could not go to Geneva.

Q Why should the British bother about it? A The British, they are always of our party.

Q In favor of your party? A In favor of our party.

Q Against the French? A Against the French.

Q What was the explanation for that? A The reason was that the French were beginning to be too mighty and to do too many things which were not quite in the long line of the understanding.

Q Such as going into the Ruhr? A Yes.

Q How did you know that? Did anybody in Britain tell you, any responsible person in Britain? A I had people in every party. I had people in very high positions.

Q Had you customers for your products in England? A Yes. We had for the high grade steel, we had a small society in England.

Q Was was the name of that? A It is the British Saar Steel Company.

Q Was that owned by your company? A Yes, it was owned by my company and we sold through this company our

SECRET

CONTROL

CONTROL

Röchling

-16-

products in England. The other steel we sold also to England but to English consumers.

Q You did not maintain your own company for that?

A No.

Q Did you also have contact with the British representatives or British delegates to the League of Nations in Geneva? A Yes. The first man I saw in Geneva, in August 1921, was Lord Alfred Balfour, the British Prime Minister.

Q Was that the first time you met him? A Yes.

Q You met him in 1921? A I saw his brother the year before.

Q But this was the first time you met Lord Balfour, in Geneva? A In Geneva.

Q What was the occasion for meeting him? A It was our first delegation to Geneva.

Q And thereafter what kind of relations did you have with the British delegates to Geneva? A It was always that I went over to see them and to give them the information which was necessary on our complaints. Often we get only the possibility to see them after the meeting, when the meeting has been finished. So at one time also I saw Edward Wood; that's the English Ambassador in the United States now.

Q Is that Lord Halifax? A Yes.

Q You say you had friends in the various English political parties? A It is perhaps better to say the

CONTROL

SECRET

SECRET

SECRET

people behind them.

Q Did you get to know them through your commercial dealings in Great Britain? A Commercial dealings and friends and different ways.

Q Did you visit England frequently? A Not very often. I have been perhaps two or three times in England.

Q Would these customers of yours come to visit you in Germany? A Yes, they came to see me. I have seen them also several times in Geneva. We met in different places.

Q So that you were able to keep pretty much up to date on British policy? A To keep up at that time; I had the feeling. Everybody doesn't tell you what is the line.

Q During the period of the League of Nations control over the Saar Territory, how many people did you employ in your plant in Volklingen? A In the end it was about five thousand. In the beginning it had been up to four thousand five hundred but afterwards, after 1924 I had to discharge a thousand men. I had too many. I took a lot of miners which had been thrown out by the French Government. I took them over.

Q Then it went up to about five thousand in 1935? A Yes.

Q What happened in 1935, Doctor, in relation to the government of the Saar Territory? A In 1935 in connection with the plebescite, the Saar Government had to go out.

SECRET

CONTROL

CONTROL

Röchling

-18-

SECRET

Q You had your plebescite? A We had our plebescite on the 13th of January, 1935.

Q And the Territory went how? A Went back to Germany with a majority of 91% of the voters.

Q Does that mean then that about 7 or 8% of the voters who according to your statement must have been German voted against going back to Germany? A Voted against going back to Germany was a lot of people who were separatists, a separatist movement.

Q Now, Doctor, what happened in your business between 1935 when the Saar Territory went back to Germany and 1939 when the Second World War broke out? A Our production was growing. We have been running up until 650,000 tons of steel a year.

Q You were producing 650,000 tons of steel a year? A In 1938.

Q Was that for armament? A No, it was nothing for armament.

Q Until the war? A Until the war we didn't make anything for armament.

Q How did this production divide between the fine tool steel and the other? A It was about the same as it was before, three-quarters of low grade steel and one-quarter for high grade.

Q And the high grade steel was being exported as

SECRET

CONTROL

CONTROL
Röchling

-19-

SECRET

well as being used locally in Germany? A It has been used locally in Germany but exported all over the world.

Q At this time were you making stainless steel?

A Stainless steel? Lots.

Q When did you first start making stainless steel?

A I think maybe about 1930.

Q You yourself did not invent the stainless steel process? A No, it was a patent of Krupp.

Q So you must have had to work out some arrangement?

A Patents from Krupp were not working in France any more. They had been finished.

Q Expired? A Expired, so I could sell it to France without duty.

Q You mean without paying Krupp anything? A Without paying Krupp anything.

Q Didn't you want to sell it elsewhere? A Afterwards when we could sell it again to Germany the patents expired in Germany.

Q So you never had to pay him anything. A We never had to pay anything, but the high grade patents, the best patents of Krupp I could not get, so we had a special invention of our own which came to the same result.

Q In other words, you produced the result of stainless steel by a different method? A By a different addition. Krupp uses nickel and chrome and we used manganese and chrome.

SECRET

CONTROL

CONTROL

Röchling

-20-

SECRET

Q Whose invention was that? A That was ours.

Q Did you take a patent on that? A Yes, we took a patent on that.

Q Did Krupp ever sue for patent infringement or anything like that? A No.

Q Now, you say that during the four years subsequent to the plebescite and before the commencement of the Second World War your production rose to this figure of 650,000 tons a year and yet none of it was being used for armament purposes. If that be so, what was it being used for?

A For instance, the low grade steel is for rails just the same as it was before.

Q Was Germany using that much low grade steel?

A You must take the situation as it is. Germany has been from that time a growing nation, at a rate of about 500,000 to 800,000 people a year. This growing nation needs more houses, needs more food, needs more clothes, needs more shoes, everything, and so by the fact that the nation is growing by itself, it gets growing the amount of iron.

Q Did most of the increase in your steel production in these years go to the domestic German market? A Perhaps 80% I think.

Q The balance went into increased export? A Increased export. But I must give you another scheme which is very interesting which proves the same thing, that it is not

SECRET

CONTROL

CONTROL
Röchling

-21-

SECRET

necessary to make enormous armaments to keep running all the life of a country. I entered in my business in 1895. Until the first war up to the end of 1913, Germany was growing by year 800,000 people. That means since nineteen years it was a little more than fifteen million and -- just a moment -- in the same nineteen years you have an immediate growing of the steel production a year of 800,000 tons.

Q About a ton a person? A Yes, that's funny. That proves exactly that it is not by preparing wars. It is only with increased population and increased wealth. If you take it for these four years, 1935 to 1939, there has been built autobahns which used an enormous quantity of steel. It is not only the bridges but it is steel that is the base of the roads. In the years before the first war there was a lot of armament. That's not true. In May 1914, at the beginning of the first war, I went to our War Minister, Mr. Von Falkenbein. He was chief of a corps in our country, and I begged him to give me the allowance to build a factory for making shells. He said, "Mr. Röchling, we have three factories of shells. They are too much for us. We have to shut down one." That was in May 1914.

Q Did your number of employees increase in these four years from 1935 to 1939? A From 5,000 to 11,000. To a large part it was due to the fact that my son had developed the finishing of steel.

SECRET

CONTROL

CONTROL

Röchling

-22-

SECRET

Q What do you mean by that? A First we made a lot of springs for the automobiles. We were the only furnisher of springs to Opel. We furnished to all the companies.

Q Is that what you mean by finishing steel?

A Yes, finishing.

Q During the period immediately before the plebescite in 1935 the Nazi party had come into power in Germany? A Yes, from the 30th of January, 1933.

Q And what happened to your party in the Saarland when the plebescite took place? A It was first before the plebescite. We dissolved all parties because we were sure that it would be better to make only one big party. This was the so-called German Front. It was believed that everybody who wanted the Saar Territory to go back to Germany would enter this German Front and no other party existed at that time.

Q Who suggested the setting up of that party?

A That was Gauleiter Burkel of the Palatinate. Burkel was pointed out by Hitler as the man who was necessary for the propaganda for the plebescite. He had been put in this place in perhaps June or July of 1934.

Q As between Hitler and Gauleiter Burkel, whom did you meet first? A I met first Hitler.

Q When did you first meet him? A In May, 1933.

Q Was that your first meeting with Hitler?

CONTROL

SECRET

CONTROL

Röchling

-23-

SECRET

A First meeting.

Q Where did that meeting take place? A In Berlin.

Q What was the occasion for it? A It was the occasion because there was now a new government in Germany and I had to have connection with every government.

Q In order to carry on your business? A To carry on my business of the Saar Territory.

Q What do you mean by that? A The leading of the people of the Saar Territory.

Q Leading them where? A Back to Germany.

Q Did Hitler summon you or did you ask Hitler for the meeting? A I asked to meet him.

Q How did you communicate with him? A I simply called by telephone to the secretary of Hitler and made the appointment.

Q Who was Hitler's secretary? A It was at that time Bruckner.

Q What took place at the meeting between you and Hitler? A I wanted to know him and to see how I could go with him further.

Q Go with him further? A Yes, and to get an idea what he wanted to do for Germany.

Q What did he tell you? A Well, he told me that he would be fighting communist; he would smash them, and he would come to the point that every German in Germany could have work. At that time we had seven million of men idle.

SECRET

CONTROL

CONTROL

Röschling

-24-

That was for me most interesting because everything depended on this question. Before I went to Hitler, I had seen Bruning at least a year before, when Bruning was Chancellor, and I had spoken with Bruning also to see what he could do to solve this question of idle men, and he didn't know how to do it.

Q Did Hitler convince you he knew how to do it?

A He was absolutely convinced that he would in not a very long time be able to bring all idle men to work.

Q How did he say he was going to do that?

A He didn't say it in large terms. He said, for instance, you see, we built now these autobahns.

Q Did he say at that time that he would be able to eliminate unemployment? A Yes, and it was not long later --

Q Did he say how he would do it? A No, not especially. But he said, "One way is this way, to build autobahns."

Q What did you say to him on this occasion?

A I finished before I went out, "You have now more power than Bismarck had. I hope you will make a uniform Germany, a Germany which does not consist of a lot of Bavarians and Wurtenbergs and so on and consists of a uniform Germany."

Q What did he say? A "Yes, I will do this", he said.

CONTROL

SECRET

SECRET

CONTROL

Röchling

-25-

SECRET

Q How long did your meeting last? A Half an hour.

Q What impression did you take away with you?

A That he meant what he said.

Q Was anybody else present? A No.

Q Did you see Burkel before you saw Hitler again?

A I think yes.

Q When did you see Burkel? A I think he was coming in the spring of 1934. He came to me in Volklingen and we were talking about the question of what one could do to make the working people happy. And I said, "The best way I see is to give everybody a house and a piece of garden." He said, "Well, that's a good idea to give him a roof on his home and to give him a garden on which he can get a lot of food." He had together with him at that time his substitute, Klaus Selzner.

Q Did he tell you or did you ask him why he had come to you? A No. We were speaking immediately about all questions of our population, about going back to Germany.

Q Had he called you for an appointment? A Yes, he had called me for an appointment.

Q Did he tell you whether or not he had been sent there by Hitler? A No.

Q Did he tell you what his position was in the Palatinate? A I knew it immediately. He was the Gauleiter, but at that time I had not so much knowledge

SECRET

CONTROL

CONTROL

Röchling

-26-

SECRET

what the Gauleiter meant.

Q You knew the Gauleiter was appointed by Hitler?

A Surely.

Q Had you and the rest of the German Front in the Saar Territory been taken into the Nazi party up to this point? A No, only very much later. I got my book of the party only in 1937.

Q Have you got that book with you, by the way?

A No.

Q Did you and Burkel arrive at any decisions in your meeting? A At that meeting I made the proposal -- I am not quite clear whether I made it or another one -- we came to the desire that I should try to convince the President of the Governing Commission that he would allow Burkel to come often to the Saar Territory.

Q For what purpose would that be? A To make arrangements for the plebescite.

Q And by arrangements do you mean among other things propaganda for it? A To make this a little bit together with the Governing Commission, but he didn't want it.

Q Who didn't want it? A Mr. Knox of the Governing Commission didn't want it. He would not permit it.

Q Did you tell Burkel that? A Sure. From that moment we were big fighting against Knox.

CONTROL

SECRET

CONTROL
Röchling

-27-

SECRET

Q Who were fighting against Knox, you and Burkel?

A It was more propaganda fighting.

Q Who engineered it? A The propaganda was made by Burkel.

Q How was it disseminated? A By radio and newspapers and everything.

Q Would Burkel supply it to you? A Surely.

Q What would you do with it, put it on the radio and in the newspapers? A No.

Q What would you do? A In this I had not much to do because other people did this.

Q You mean Burkel would give it to the other people in the Saar Territory? A Yes. This propaganda ought not to be the propaganda of Hermann Röchling.

Q Why was that? A Because I was a steel maker.

Q You would offend some of your customers?

A No, not that. It was the idea that a lot of Social Democrats and Communists would not follow if I was the man at the head. In our Advisory Council we had eleven Communists and Social Democrats.

Q When did this propaganda begin? A It began in the summer of 1934.

Q Was it carried on pretty constantly? A Yes, constantly.

Q Did Mr. Knox ever complain to you about it?

SECRET

A No, he was angry; very angry.

CONTROL

CONTROL

Röchling

-28-

SECRET

Q Did you see Burkelf frequently during this period? A Surely.

Q Where did you see him? A In Neustadt, in the Palatinate.

Q He would not come to the Saar Territory? A No.

Q How frequently would you say you saw Burkelf during this period? A Twice a month; perhaps four times a month.

Q Right up until the plebescite took place?

A Yes. We went to Rome together.

Q What was the purpose of that visit? A Different purposes. One purpose was that the Italians had the key on the commission which had to make to prepare for the plebescite.

Q You mean they had the chair? A Yes, they had the chair in this commission.

Q Were you trying to influence the chairman?

A Yes.

Q Was that just one visit to Rome? A It was one visit in the autumn of 1934; it was in November.

Q Just you and Burkelf went? A No, we had several people. We had also several Catholic people with us. They wanted to see the secretary of the Pope. He is now the Pope.

Q Did you see the Chairman of the Plebescite Commission? A Yes, but I had seen him also before and

SECRET

CONTROL

CONTROL
Rochling

-29-

SECRET

afterward in Geneva.

Q But you made this trip for the purpose of seeing him? A Yes.

Q Who was he? A I have forgotten the name. He is an Italian Count.

Q Did he agree to do anything for you? A Yes, he did.

Q What did he say he would do? A It was only to have a clear way to the plebescite and to prepare the way. For instance, what was very urgent was that an early date was named for the plebescite.

Q Early in the year 1935? A Yes, because the 10th of January fifteen years had been over. We had a big interest that not late after this date the plebescite be held, and that was one of the reasons why we spoke with the Italians.

Q Did you see Hitler a second time before the plebescite was held? A I have seen him in 1934 twice.

Q You saw him first in 1933? A Once in May 1933 and two times in 1934. The first time we were together with about a dozen people.

Q What kind of people? A They were political parties without the Communists; and the workmen's associations, the Christian Association of Workmen and the Social Democrats Association of Workmen.

SECRET

Q What was the occasion for that meeting?

CONTROL

CONTROL

Röchling

-30-

SECRET A We begged for this coming together because we wanted to have declarations from Hitler for the working population.

Q What kind of declarations? A What he would do for the working population.

Q You wanted him to state what his policy was?
A What his policy was on account of the working people.

Q Did he do it? A Yes, he did.

Q Did he give you a written statement? A Oh, no. He said only that he had proved already that he had been able to fulfill his promise to get everybody to work, pretty nearly everybody to work, and that he would come to the point when nobody would be idle in Germany. That was the main point.

Q Was that about all there was to this meeting?
A I don't remember that there was much else.

Q What was the next meeting in 1934? A The next meeting I can give you exactly the date. It was the 4th of August, 1934, because it was after the Roehm episode.

Q After the blood purge of June 30, 1934? A Yes.

Q Tell me about that, Doctor. Who called the meeting? A We asked for it.

Q Who are we? A The political parties.

Q In the Saarland? A Yes.

Q Wasn't there only one political party at this time? A There was only one political party but we had

CONTROL

SECRET

CONTROL
Röchling

-31-

ECRET

been always four or five gentlemen which made our business together.

Q And you asked for this meeting? A We asked for this meeting. The first point was this, when we came back to Germany we did not want the Saar Territory to be against Bavaria and Prussia. The Saar Territory had been before a part of Prussia and Bavaria and we didn't want it to be that way.

Q What did you want it to be? A We wanted that we stay together.

Q A separate state? A No, not a separate state. That it would be the beginning to make a new Germany; one Gauleiter with the Palatinate but we didn't want to come away from Prussia to get into Bavaria.

Q You were willing to joint up with the Palatinate?
A Yes.

Q What did Hitler say to that? A He said he could do it for the party, for the Nazi party, but he could not yet make it immediately a province, but that after a certain time he would do it.

Q Did you take up anything else at this meeting?
A No.

Q Was that all there was to the meeting? A We took other things up. The other question was I would have a canal from the Saar to the Rhineland and he agreed to make the plans but he didn't promise that the canal

ECRET

CONTROL

CONTROL
Röchling

-32-

would be built. It has not been built.

Q Anything else? A And we asked for a theatre, to get a theatre in Saarbrücken, and a radio station.

Q What did he say about that? A He agreed immediately.

Q Did he build them? A Yes, he did build them, a very nice theatre.

Q Was that built after the plebescite? A Yes; a very nice theatre.

Q Was there anything else taken up at this meeting?
A Nothing.

Q When was your next meeting with Hitler? A The next meeting with Hitler was in the spring of 1942.

Q In other words, you didn't see him from 1934 to 1942? A From 1934 to 1942.

Q After the meeting of August 4, 1934, you say you didn't see him again until 1942? A No, but he has been two times in Saarbrücken.

Q He was in Saarbrücken twice? A Yes.

Q Did you meet him? A No.

Q What were the two occasions? A The first occasion was when the Saar Territory has been taken over to Germany; that was I think on the 30th of March, 1935. Well, I had not been admitted at this taking over.

Q Why? A I don't know.

SECRET

SECRET

CONTROL

CONTROL

-33-

SECRET

Q They didn't ask you to be there? A Burkel didn't want it.

Q Why didn't he want it? A After that he has not been very nice to me.

Q When was the next time Hitler was there? A The next time was in December of 1938.

Q What was that occasion? A It was the occasion of the inauguration of the theatre.

Q That he had promised in 1934? A Yes.

Q Did you see him then? A No.

Q You were not present then? A I was in the theatre but I didn't see him.

Q In order to have gotten into the theatre on that occasion you had to have an invitation. A Yes.

Q Who issued the invitations? A Gauleiter Burkel, but the seat was in a certain place.

Q You didn't speak to Hitler then? A No.

Q What happened to your relations with Burkel?

A They were a little bit frozen at the time.

Q Why? A He said since that time things against me.

Q What kind of things did he say against you?

A I heard it most and I felt it. He didn't want me to get too big. This was changed afterwards when Lorraine was with us, in 1940. Perhaps I could give another

SECRET

CONTROL

CONTROL

Röchling

-34-

SECRET

explanation. In the election between Hindenburg and Hitler --

Q When was that? A In 1932 -- I had been speaking twice in big assemblies for Hindenburg, one in Trier and one in Ludwigshaven, and perhaps this was the reason that Burkel was against me. I liked very much Hindenburg.

Q At what point was the German Front party or group of parties in the Saar Territory taken over into the Nazi party? A Well, it was thought that it would come immediately after the returning but it lasted several years.

Q When did it finally happen? A Finally I got my book at the end of 1937.

Q That's your membership book? A Yes.

Q Did the other people get their books about the same time? A Some earlier, some later.

Q Didn't you have to contribute to the party even before that? A Yes, surely, even though you were not a member. Everybody did.

Q Did you hold office in the party? A No.

Q Just membership? A Just membership. Burkel would not have liked this.

Q You say your next meeting with Hitler was in 1942? A Yes.

Q Do you remember the date of the meeting?

A It must have been in the month of April.

CONTROL

SECRET

CONTROL
Rochling

-35-

SECRET

Q Did he call you to the meeting? A Yes, he called me together with Speer.

Q You and Hitler and Speer were together, just the three of you? A Just the three.

Q What happened at the meeting? A Hitler asked me first what was the maximum output of steel, what I believed one could make in Germany and the surrounding territories.

Q Occupied territories? A Occupied territories. I told him I believed the United States would make about seventy to eighty million tons of steel; that England presumably made ten million; and that Russia one couldn't say how much it was. I told him that in the first war the Allies made about three times the quantity of steel which we made. We made in Germany, together with Austria, about fifteen to sixteen million tons of steel. Instead the United States made in the beginning about thirty-five million tons and afterwards forty-five million tons.

Q Did you tell him how much you thought Germany and the occupied territories could make? A No. I said one must try to come to a figure of about forty million tons.

Q You said that? A I said one had to try it. Surely it was the maximum that could be done in a reasonable time.

Q What did he say? A He said, "What can we do"

SECRET

CONTROL

CONTROL
Röchling

-36-

SECRET

for this?" I said, "First increase the production of coal because without coal one can't do anything, and if one wanted to lead the iron people, who are very difficult to handle, the men who had to do this must have the right to give orders and these orders had to be fulfilled", and he agreed. He said, "Quite true; it is necessary", and then we went away.

Q That was all there was to the meeting? A It had been a lunch, the usual lunch.

Q Was anything decided at the meeting? A No, it seemed not but it was really decided that I got the job.

Q What job did you get? A I got the job to rule or to lead the iron industry in Germany as President of the Reichsvereinigung Eisen, and also the deputy for the occupied territories, to lead the men who had the iron industry in the occupied territories.

Q You got both jobs? A Yes.

Q How long after this meeting among Hitler and Speer and yourself was it made known to you that you had these two jobs? A About a month after.

Q How was it made known to you? A It was made known to me by Mr. Speer who told me that Hitler agreed. It is much more complicated. I had been nominated not by Speer at that time but by Mr. Funk.

Q Minister of Economics? A Yes, Minister of Economics, because this Reichsvereinigung Eisen depended

SECRET

CONTROL

CONTROL

Röchling

-37-

SECRET

on Funk but at the same time there was a ring for the iron. This ring depended on Speer.

Q What did Funk nominate you for? A He nominated me for Reichsvereinigung iron, and at the same time I got the same job on the nomination of Speer from the ring.

Q From the ring, which was the same thing?

A Practically the same thing. It was not quite the same. In the ring was not included, for instance, the producing of iron ore, and the Reichsvereinigung Eisen included the whole thing. It also included the heating of iron.

Q In other words, the Reichsvereinigung Eisen was the larger of the two and it was in connection with the Reichsvereinigung Eisen that Funk nominated you and in connection with the ring that Speer nominated you? A Yes, but after all it was put together under Speer.

Q Who put it together under Speer? A Hitler.

Q Was it Speer who told you you were appointed to this position? A Yes.

Q Was that for both Germany and the occupied territories? A For the occupied territories I had to be nominated separately by Goering.

Q Where? A I had been visiting him in Karenschalle, his home, and we talked about it for half an hour or three quarters of an hour and then he nominated me.

Q Did he say what he wanted you to do? A He asked me what I thought about different things and we had

SECRET

CONTROL

CONTROL
Rochling

-38-

been speaking also about the Hermann Goeringwerke.

Q Did Goering at that time agree to nominate you?

A Yes.

Q And he subsequently did nominate you? A Yes.

Q And that piece of paper lying on the table is a photostat of your appointment, is that right? A Yes.

Q Signed by Goering? A Yes.

Q And dated what date? A The 18th of June, 1942.

Q What conversation did you have with Goering about the Hermann Goeringwerke? A There were always some difficulties with the Hermann Goeringwerke.

Q What kind of work was it? A It was a big iron and steel plant which had been built up on the lean low grade iron ore in the neighborhood of Brunswick. It was so that the production costs were higher than the selling price.

Q What was the principal reason for this? A Well, it was new. It was not completed; several processes which were introduced were expensive.

Q Expensive in terms of coke consumption? A Coke consumption and also handling, but, of course, it was a complete new work and my experience is that a new work is always more expensive for the beginning, especially if you have to bring all labor to this place.

Q Did they have to import labor for it? A From every part of Germany, also from Russia and all kinds of places.

CONTROL

SECRET

SECRET

CONTROL

Röchling

-39-

SECRET

Q When was it started? A It was started right in the beginning of this war, in the month of October, 1939.

Q Why did they have to import workers? A They had not enough workers in this part of the country.

Q Continue with the discussion you had with Goering about this. A I said I would try to come on a rule which would solve this question. I said it was quite clear that for the moment there was no possibility that it could be right with the prices of other works, but it was not necessary, and we had to find out how these higher costs could be paid. I thought we would find some way that the overhead charges would be taken up by the whole iron industry. Goering heard it but he didn't say anything. But afterwards the managing director of the Hermann Goeringwerke found another way. He got some money immediately from the Finance Minister.

Q To take care of the overhead? A Yes.

Q Did you make a study of the production cost problem? A I tried to do it but he would not give me any possibility.

Q Who would not? A The director.

Q Did you subsequently do any more work in connection with the Hermann Goeringwerke? A No, not at that time. But before it has been built up, at the birth of the Hermann Goeringwerke I have been in a certain way connected with it.

SECRET

CONTROL

CONTROL

Röchling

-40-

RET

Q How were you connected with it? A I have been fighting always, at the time of 1935 and 1936, I have been fighting by publicity, by writing articles, surveys -- we had to use our own lean ore to make iron because to be wholly dependent on the importation seemed to me too dangerous. So I came often together with Mr. Pleiger, later the managing director of Hermann Goeringwerke, and we talked very often about this question. And one day he asked me whether Herman Brassert of America would be able to build a big plant on this lean ore basis. I agreed immediately and told him I thought he would be the only man available for this purpose, because all the other German directors of big iron works said it could not be done on a commercial basis. And then he asked me to bring him together with Brassert. We went over to London.

Q You and Pleiger? A Pleiger and I and we saw Brassert, and they had also a big iron work which he had built up.

Q Brassert had built it? A Brassert had built up in England for the same kind of lean ore.

Q Was it working? A Of course, it was very bad lean ore but it was very successful.

Q What happened? A Then Brassert had got the order to build up the Hermann Goeringwerke, and he made up the Brassert Company in Berlin, the German Brassert Company, and there were a lot of engineers, and after his

CRET

CONTROL

CONTROL
Rolling

-41-

plant the Hermann Goeringwerke was built.

SECRET

Q That's how the Werke was built? A Yes.

Q Was it successful? A In a large scale it was successful but it was not finished.

Q You say when it started working the cost of production was higher than the selling price? A Yes.

Q Was that because of the overhead you were mentioning? A It was because of a lot of things. The overhead charges were very expensive because it has been built in a big hurry and not everything was the cheapest price for the structure and so on.

Q Did you supply the steel for the structure?

A Not at all.

Q You had no interest in it? A Not at all.

Q Why was it not completed? A The beginning was about in 1936, in the month of August it has been started, and in three years it was not possible to get it completely ready. There was too much to do.

Q Did they abandon it? A No, no. They have been building twelve blast furnaces. In October 1939 there were only two blast furnaces finished.

Q Did they ever complete more than two? A Yes, now I think there have been running twelve and they built still more.

Q You say it was not finished. What do you mean by that? A It was not finished on account of the rolling mills.

SECRET

CONTROL

CONTROL
Röchling

-42-

SECRET

Q Did you have anything further to do with it beyond getting Mr. Brassert interested in it and trying to solve this overhead problem? A No.

Q You had nothing to do with production? A I had only to lead them in a certain way but it was very difficult to get along with them, very difficult.

Q Did you see Hitler again after your meeting in April, 1942? A Yes.

Q When was that? A Probably in the month of August, 1942.

Q Did he send for you? A Yes. He would have us together.

Q Who were at the meeting? A Hitler wanted to see us together with Speer and we were with the three Presidents of the Reichsvereinigung Eisen. I was the First President; Dr. Rohland was the Second; and Alfred Krupp von Bohlen was the Third.

Q When you speak of three Presidents, do you mean you were the President and these two were your assistants? A My assistants. Together with us was Mr. Pleiger, who was the President of the Reichsvereinigung Kohlen.

Q That's the coal union? A The coal union. We had to speak now the question over together with Hitler and Speer how to make more steel.

Q Who raised that question? A Hitler.

SECRET

CONTROL

CONTROL
Röchling

-43-

SECRET

Q What did he say? A He wanted to know once more how we could come to the point to make more steel.

Q Did you tell him anything? A I told him again the same thing, more coal. Therefore Mr. Pleiger was there.

Q What did Pleiger say? A He said he needed so much coal for other things. He needed coal for the railroads, for gasoline and for all other things.

Q What was the upshot of the meeting? A The upshot was that he had to raise the production.

Q Who had to raise production? A Pleiger had to raise the production of coal.

Q To give you more coal? A To give me more coal.

Q Did you produce more steel? A Yes, we came up to in 1943, we came not to forty million but near thirty-six million.

Q In 1943? A Yes.

Q The production of steel was thirty-six million tons? A Not far from thirty-six million.

Q Between thirty-five and thirty-six million?

A Yes. The production we had in one month was three million two hundred fifty thousand tons.

Q What month was that? A I think it was March of 1943.

Q Are these production figures that you mentioned for Germany and the occupied territories? A Germany and the occupied territories.

SECRET

CONTROL

CONTROL
Röschling

-44-

SECRET

Q Would you, in your capacity as the head of the steel production, visit the different plants from time to time? A I think I visited a good deal which I didn't know before.

Q You visited a good many places you didn't know before? A I didn't know before. I used to know pretty nearly every iron work in Europe except Russia and Poland, and there were a lot of them which I didn't see for a long time, so I visited all the iron works in France, all the iron works in Belgium, and I have visited the iron works in Czecho-Slovakia.

Q Did you visit any in Russia? A It was too far for me and immediately I said no, I don't want this. Mr. Pleiger did this.

Q To what extent did the steel production increase? A It increased from 1942 to 1943 at least twenty million tons. Only in Germany it was increased; the occupied territories did not increase.

Q How much coal would have been used in 1943 producing almost 36 million tons of steel? A It was nearly a ton.

Q You were telling me yesterday that it takes about a ton of coal to produce a ton of iron? A That's another job. You make steel with two methods. One method is only on the blast method but by using pig iron. You use pig iron and make of this pig iron completely. That's the Thomas process. The other process is the open hearth process.

CONTROL

CRET

CONTROL
Röchling

-45-

SECRET

There you use usually only 1/5 of pig iron and 4/5 of scrap. So to make this steel you need much less coal because you need only one ton of coal for 1-5 and for the rest you need only smelting coal.

Q To bring it up to the melting point? A Yes. But if you take altogether it is so, to make one ton of steel including the rolling mill and all this, you need then about one ton of coal.

Q So that in 1943 the consumption of coal must have been about 36 million tons? A Yes.

Q How much of that would be supplied by Germany do you suppose? A We made about 30 million tons of steel in Germany and the rest was made in the occupied territories, including Czecho-Slovakia.

Q Of the coal used in producing that much steel, how much came from Germany? A All the coal for the 30 million tons.

Q About 30 million tons of coal? A Yes.

Q By Germany you mean what? A Germany was meant all Germany including Lorraine and Luxembourg.

Q And Austria? A And Austria.

Q And by the occupied countries you mean all the others under German control? A Yes.

Q In addition to the low grade domestic ore of Germany and the ore which was obtainable from Lorraine and Luxembourg and from the occupied territories, where else

SECRET

CONTROL

CONTROL
Röchling

-46-

SECRET

did Germany get iron ore from? A From Sweden.

Q Any other place? A A little bit from Spain.

Q Not much from Spain? A In Spain we got in 1943 600,000 tons.

Q Of iron ore? A Iron ore.

Q What grade ore was that? A About 45 or 50%.

Q About how much did you get from Sweden? A From Sweden we got in 1943 between 8 and 9 million tons.

Q What grade ore was that? A 60 or 65%.

Q What was your normal peace time importation of iron ore from Sweden? A It was a little bit higher. I think it was 9 million tons.

Q In other words, it was higher in peace time than war time? A Surely.

Q How does it happen you didn't take more in war than peace? A It was a question of transportation and it was also a question of paying.

Q How did you pay for it in war time? A We paid by furnishing coal and finished iron. It was a balance between iron ore and coal and finished iron.

Q Did you get a product called wolfram from Spain? A Yes.

Q What is that used for? A That is for tool steel especially.

Q It is a metal? A A metal.

SECRET

CONTROL

CONTROL
Hochling

-47-

SECRET

Q Does Spain produce it? A Yes. We produce it in Spain. We had there a lot of small pits for this ore.

Q Germans owned pits in Spain? A Yes.

Q Is Spain the principal source of it? A No, the principal source is China, and before the war we had a lot of supplies from China, and we got also a little bit by U boats.

Q From where? A From China.

Q During the war? A During the war.

Q You say the U boats during the war brought small quantities of wolfram from China? A From China.

Q Until when? A The last came now to England this U boat with a thousand tons.

Q Of wolfram? A Not only wolfram. A thousand tons came after the armistice was ending with such things; wolfram and a little bit probably of rubber.

Q Picked up in China? A Yes.

Q Who in China would be selling wolfram and other materials to Germany? A The Japs.

Q From Japanese occupied China? A Yes. Before the war we got it from China direct.

Q What part does wolfram play in the manufacture of tool steel? What is its effect? A The effect is to make a high speed steel.

Q What do you mean by high speed steel? A High speed steel is still which can be used for cutting other steel at high speeds. But we reduced largely during the

SECRET

CONTROL

CONTROL
Rochling

-48-

war the percentage of wolfram needed.

Q You say during the war you reduced the percentage of wolfram needed for high speed steel? A Yes.

Q Did you get just as good results? A Nearly.

Q How did you manage to effect that reduction?

A By new processes.

Q What new process? What was it? A We increased the percentage of vanadium and this vanadium we could get by a process which has been invented by my factory.

Q You could get the vanadium you needed? A We could get enough vanadium to be able to replace three-quarters of the wolfram.

Q Before the war what was the normal percentage of wolfram? A 18% of wolfram.

Q What was it reduced to? A 3 to 4%.

Q What was the normal percentage of vanadium?

A 1/10 of 1%.

Q What was that increased to? A To 4 or 5%.

Q Vanadium is a metal too? A It is a metal too.

It is an alloy.

Q Of what? A An alloy of steel.

Q Steel and what? A Steel and vanadium would give the steel other qualities.

Q What quality does vanadium give steel? A It gives the quality of making very fine cores, very small cell structure.

CONTROL

CRET

CONTROL
Rechning

-49-

SECRET

Q That would be a very fine grade of steel?

A Yes. I am very proud of the possibility to make it. We had worked for years.

Q Vanadium itself is something that is mined in an ore, is that right? A Yes. It is mostly combined with iron ore. For instance, in the Swedish ore it is present. In the ore of Lorraine it is present.

Q In the high grade ores? A Also in the low grade ores.

Q Is it present in some of the German ores?

A Yes. Also in the ore of the Hermann Goeringwerke.

Q You say in your factory you developed a process for increasing the production of vanadium? A To get it out from the pig iron.

Q Hadn't that been done before? A Before vanadium came from South Africa.

Q I thought you said it came also from Swedish ore?

A But nobody used it.

Q You knew it was there but you didn't bother separating it? A Nobody knew how to separate it.

Q Is that what you discovered? A Yes.

Q How did you do it? A It was very simple.

If you oxidize -- if you send air through the molten pig iron, through the pig iron stream, then you oxidize first the silicum and vanadium. They have the biggest tendency of taking off the oxygen.

SECRET

CONTROL

CONTROL
Röchling

-50-

SECRET

Q The oxygen will take them out? A Yes. So we get slag and with this slag we made vanadium.

Q Then the slag would contain the vanadium? A Yes.

Q How do you get the vanadium from the slag?

A That is a chemical process; by working together salt, nitrium chlorate and wash it off by water. This process has been worked all over Europe to take off the vanadium.

Q Under your supervision? A Under my supervision.

Q When was it first introduced? A It has been introduced at my factory about 1936. We needed vanadium for our high grade steel. Therefore I made it for myself.

Q When was it put into widespread use? A Already in Germany in 1938 or 1939.

Q Has it been used in America at all? A No, I don't believe so. I don't know anything about that. Brassert has seen it in my factory but I don't know whether it has been used during the war in America.

Q Is it commercially feasible to do it? A Oh, sure. It depends what are the costs.

Q Did you find you could do it at a profit? A Yes.

Q Could you produce vanadium by this process as cheaply as you could buy it from South Africa? A Well, at that time we could make things meet. Afterwards there was no chance.

Q Afterwards you had no choice, but before that you could compare the two costs. Were they about the same?

A It would do.

CONTROL

SECRET

SECRET

Q Do you remember telling me yesterday, Dr. Röchling, that one of the principal difficulties in the working of these lean ores was the enormous amount of coke consumption in relation to the total amount of pig iron produced? A Yes.

Q And that you had evolved a process by which the coke consumption was reduced? Do you remember talking to me about that? A Yes. I have evolved a process to reduce the consumption of coal with our lean ore coming from Lorraine. This lean ore, I have remembered that in my youth I had seen that the old furnace men cut the pieces of ore in hammering. They had long hammers and they cut it this way. After, this had been all forgotten and I, in my struggle of life that I had to compete with other people under better conditions, I found it was necessary to cut down the consumption of coke.

Q How did you do that? A I took a crusher, a small crusher first and crushed the ore into small pieces and put them, a certain amount of it, in the blast furnace.

Q With coke? A With coke. The furnace got very hot in a moment; much too hot, so it proved I had too much coke. I reduced the amount of coke and always crushing the ore, and I found out that I could reduce the amount of coke by 15%.

Q When was this? A This was in 1926.

Q Does that mean by reducing it 15% it no longer took roughly a ton of coke to produce a ton of steel?

SECRET

CONTROL

Röchling **CONTROL**

-52-

SECRET
A Yes, it was so.

Q It took less than a ton. A Afterwards when I had this agglomerated flue dust, what we spoke about before, with the small ore, then I had reduced sometimes the coal consumption up to 25%. At times I had other methods. I had the lowest coke consumption in Europe.

Q During the period before the war? A Yes, essentially in the period of 1930.

Q Did you keep that consumption low? A No, I could not keep it.

Q Why couldn't you? A Well, at the time I had a lot of opportunities which I didn't have later. For example, I had a lot of scrap I could use in blast furnaces.

Q When Germany was at war and was very hard up for coal because of the demands of troop movements and sending coal to Sweden, and so forth, which you have described in relating your meeting with Speer and Hitler, did you try to employ this process again? A Yes.

Q What was the result? A The result was, I was building in eight iron and steel works fifteen plants to crush the iron ore, and also some installations to agglomerate the fine ore.

Q All in Germany? A In lorraine and Luxembourg.

Q As well as in Germany? A Just in those two places and in Westphalia some have been built but not quite that type. I took there one type for every installation.

SECRET **CONTROL**

CONTROL

-53-

SECRET

Q Did they go into production? A It was first to have gone into production in September of last year.

Q Did it go into production? A No. There came the entrance of the Allied troops.

Q Just to be sure that I have the picture accurately, none of these plants which were designed to employ the low consumption of coke process ever did get into production? A No, not yet.

Q But you did employ the process successfully in your own plant? A In my own plant and it has been employed in three other plants in the Saar Territory and I showed every month to all these gentlemen the coke consumption in those four plants.

Q To the other steel men under your jurisdiction?
A Yes.

Q One of the ingredients necessary in the making of steel is manganese? A Yes.

Q Where is that ordinarily imported from? A Ordinarily manganese came from Russia, the Caucasus.

Q It was not found in Germany? A Only on a very little scale in Siegerland, in the south of Westphalia.

Q But not in sufficient quantities to support your steel industry? A Only in small quantities.

Q When the war came was Germany still importing manganese from Russia? A When the war came Russia furnished us in the first years, up to 1941, manganese ore.

SECRET

CONTROL

CONTROL
Röchling

-54-

SECRET

Q When Germany invaded Russia, did she overrun and occupy the part which produces manganese? A It was not that part in the Caucasus but another part which gave also manganese ore, not far from Kiev.

Q Did you travel into that part at all? A No.

Q Sooner or later the Germans were expelled from that part? A Yes, and from this moment it was necessary to cut down the consumption of manganese very much.

Q Now, what part does manganese play in the making of steel? A Manganese has two different qualities. One is the taking of the oxygen in the steel, and the other one is as an alloy to give certain qualities.

Q What qualities? A Perhaps to make it harder and increase its tensile strength, but we have proved that our ideas were not just right.

Q You mean you found out that manganese was not necessary? A Was not as necessary as we thought before.

Q In making steel ordinarily, how much manganese was used? A If you take soft steel we had usually about half a percent of manganese in the steel. We could easily reduce this below the half.

Q What do you mean by soft steel? What is that used for? A All kinds of structural steel or plates.

Q How much below one half of one percent manganese were you able to reduce it for soft steel? A We have reduced it to .18%.

CONTROL

SECRET

CONTROL

Röchling

-55-

SECRET

Q Instead of .5 it was .18? A Yes.

Q What was the normal use in hard steel? A In hard steel usually 1%. We reduced this in many parts to 1/2%. We have cut down the amount from the very beginning, from the times before the war we have reduced the consumption to about 40%.

Q Of what it used to be? A Of what it used to be.

Q In other words, even before the war broke out it was down to 40% of what it had been? A No, not so. Before the war we had reduced it perhaps to 70% and after the war we have reduced it to 40%.

Q To 40% of what it had been? A Yes.

Q By the use of what substitutes were you able to do that? A There are different things. The first thing is by eliminating the sulphur.

Q How do you do that? A By adding soda.

Q To the molten iron? A To the molten iron; soda.

Q What is the effect of the soda on the sulphur in the molten iron? A The soda takes up the sulphur and gives a slag which which is going off.

Q If you don't do that, what happens to the Manganese? A Then the manganese takes a quantity of sulphur and builds manganese sulphate which stays in the steel.

Q In other words, if you add manganese to the molten iron, is that how you do it? A Yes.

SECRET

CONTROL

CONTROL
Höchling

-56-

ECRET

Q But without soda the manganese combines with the sulphur to form manganese sulphate and stays in the steel?

A Yes.

Q But if you add soda, the soda takes out the sulphur and it goes off as slag and you have a pure steel?

A Yes.

Q So by this process the manganese does not waste itself on the sulphur? A No, it does not waste on the sulphur.

Q Now, what is the other way it was reduced?

A The other way was to use other metals like aluminum or even coal to take off the oxygen of the iron before adding the manganese.

Q At what point in the process would you introduce the other metal such as aluminum or coal? A When the steel is finished nearly. Just as the pig iron has been transformed into steel.

Q You say you would add these other metals only in the last step in the process, just before the manganese was added? A Yes.

Q And that therefore manganese itself is something which is added only just as the steel is being made?

A It is preserved from being oxydized.

Q In other words, if you didn't add these other metals, what would happen to the manganese? It would be oxydized? A It would be oxydized and would just burn up.

ECRET

CONTROL

CONTROL

-57-

SECRET

Q And would not enter into the steel? A Would not enter into the steel. All over Europe they have been working this way.

Q How long has this process been in use? A From November or December, 1943, all through 1944.

Q This particular process? A Yes.

Q Who developed that? A Together with four or five steel makers, I did it.

Q You said before that, going back into some years before the war, you reduced the consumption of manganese by -- A 30%.

Q How was that done? A That is simply done by showing a lot of people my process to add soda.

Q The first process was the soda process to take out the sulphur; the second process was to add aluminum or coal to take out oxygen. A And when I showed all these people this process, they have been trying to divide my patent, but I got it anyhow.

Q They tried to prevent you from getting a patent? A Yes.

Q But you got it? A I got it anyhow.

Q Has anybody in the United States been licensed to use this patent? A I have made an arrangement with Brassert. Brassert had some processes and we made an exchange. Brassert gave me all he had for Europe and I gave him all I had for England and the States. I think

SECRET

CONTROL

CONTROL
Recording

-58-

SECRET

you have worked on this basis in the States because you had lack of manganese also.

Q Does Brassert know anything about this second step in the process which you say you developed in 1943?

A No.

Q Have you taken out a patent on that? A We did it but we could not make anything because there are too many people. I didn't follow it.

Q You used this process? A I used this process but I didn't make a patent.

Q As a matter of fact, in your position as head of the steel industry you had to make it available to all of them? A Yes, and I was not alone. There were five or six people and we wanted everybody to take it up.

Q Did all the different steel plants take it up? A All of them. There was none which did not.

Q At the end of the war, that is, this year, did Germany have on hand any stock pile of manganese? A Yes, a little. We saved a lot of things. We had a stock pile for a year consumption.

Q A year ahead? A Yes.

Q How much would that be in terms of tons? A That's difficult to say.

Q Wouldn't you know what a year's production of steel would call for in terms of manganese? A We had more than 100,000 tons of manganese.

Q What about wolfram? A Wolfram we had also for

SECRET

CONTROL

CONTROL
Roehling

-59-

SECRET

almost a year.

Q How much would that be? A I don't know the figure.

Q Where would these things be stock piled in Germany? A A lot of places; everywhere.

Q In Saarbrucken, for example? A Everywhere we made steel. Everybody had to give the figures of his stock pile every month, so we had every month a balance sheet.

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EXAMINATION CONTINUED ON

20 JUNE 1945

Q Doctor, you were telling me earlier today, were you not, that you wanted to add a couple of items to the statement you had given me last week and that one of these related to another visit you had with Hitler?

A Yes. In the month of December, 1942, we were there invited three gentlemen.

Q Who were they? A Dr. Rohland; he was my Vice President in the union of the iron industry. And Mr. Fleiger; he is the President for the coal. Hitler asked us --

Q Did Hitler summon you to the meeting? A Yes, Hitler invited us.

Q Where was it held? A It was held in the headquarters in East Prussia.

SECRET

CONTROL

CONTROL
Röchling

-60-

Q Was anybody else present except the three of you and Hitler? A Only we three.

Q Will you tell me what he said on that occasion?
A He said the question arose how far he could go back in the Donitz Basin without losing important outfits, or important supplies in the coal and iron industry.

Q The Donitz Basin was in Russia, isn't that so?
A In Russia, east of the Dnieper River.

Q From what you say I gather he wanted to know how far he could retreat without endangering supplies.
A Yes.

Q Of what? A Of coal and steel.

Q Were you getting coal and iron ore from Russia at that time? A We got at that time between 20 and 30 thousand tons a day of coal, and iron ore we got several hundred thousand tons a month, and manganese ore from the Nikopol, west from Kiev.

Q Did the manganese and iron ore come from the same section? A It is near together; not far as bases from Russia.

Q Were they in the same general vicinity? A Perhaps a distance of 50 kilometers.

Q What do you call the place from which you got the iron ore? A Krivoi Rog.

Q Where did you get the coal from, Doctor?
A From the Donitz Basin. On manganese, we got about a

SECRET

SECRET

CONTROL

CONTROL
Röchling

-61-

~~SECRET~~ hundred thousand tons of manganese a year.

Q You mean from this particular area? A From this particular area.

Q Did you fabricate steel in Russia or were these raw materials brought into Germany? A It was intended to fabricate steel in Russia at a scale of about 200 to 300,000 tons a year.

Q Did you ever get around to doing that? A No, it was all moonshine.

Q In the meanwhile, what was done with the manganese, iron ore and coal? A The coal was supplied for the railroads and for a lot of small factories which were working for the army.

Q Situated where? A In Russia.

Q What about the iron ore and manganese? A The iron ore and manganese went to Germany.

Q In other words, the coal was used, so to speak, on the spot? A On the spot.

Q The iron ore and manganese were brought into Germany? A Yes.

Q What kind of iron ore was it in terms of quality? A Oh, it is iron ore of about 50%.

Q That's good, isn't it? A Good. It is not so very easy to handle. It is not so very different from the iron ore of Lake Superior.

~~SECRET~~

CONTROL

CONTROL
Röchling

-62-

SECRET

Q When you say it is not so easy to handle --

A It was not the composition which was difficult, but the structure.

Q You mean you could not break it down so easily?

A Yes, it was much finer.

Q Going back to some of the things we were talking about the other day, in order to work it was it necessary to agglomerate it with coke? A Yes, it was necessary to screen it; separate it.

Q According to sizes, you mean? A According to sizes. And much of it was fine, and this fine had to be agglomerated and therefore this was difficult because in Upper Silesia we had only very little agglomerating power.

Q And that was where you worked this Russian iron ore, in Upper Silesia? A Upper Silesia and also in Czecho-Slovakia. Witkowitz used it and at Trzinietz, near Teschen, where the Polish troops entered yesterday.

Q Was the last mentioned place, Teschen, in Czecho-Slovakia? A Yes. There we had agglomerative capacities, not very big, but it was a good job because this iron ore could be placed instead of Swedish iron ore.

Q Which would cut down on your transportation problem? A Yes, and we could give the Swedish to Westphalia, to the Ruhr.

Q Dr. Röchling, getting back to this meeting with Hitler, what did you or the other two gentlemen tell him?

SECRET

CONTROL

CONTROL

Röchling

-63-

ECRET

A It was especially Mr. Pleiger who was talking. He showed on a map that one could go back about 400 to 500 kilometers without interfering with the ore production which was essential. By this going back one would have lost only the anthracite, very good anthracite, but it didn't interest us.

Q You didn't use anthracite in steel making?

A We didn't use it neither in steel making nor railroad transportation nor factories.

Q You used all bituminous coal? A All bituminous. This anthracite has been sent other times to America, I think to Canada. It was very fine coal.

Q It had very little ash content? A Very little ash, 2 or 3%.

Q Did you agree with the statements of Pleiger?

A I had nothing to say because it was not my department. As far as it concerned the iron industry, it was believed to stand under me but I never was acting there.

Q Where? A In Russia.

Q Did you say anything at all at this meeting? A No.

Q What did Hitler say in reply to Pleiger's remarks?

A He was very interested.

Q Did he say he would do anything? A He was very interested to know exactly how the situation would be in the report of the coal situation.

ECRET

CONTROL

CONTROL
Röschling

-64-

SECRET

Q This was in December, 1942? A 1942.

Q Was there around that time a retreat to the extent indicated as safe by Pleiger? A Yes, surely.

Q Was it a retreat limited to about the distance that Pleiger said was safe? A At that time, surely.

Q How soon after this meeting was the retreat?

A I think in the month of January, 1943; four or six weeks later.

Q Do you recall telling me this morning, Doctor, about a process which you say was developed by you or by people working for you having to do with the transformation of soft steel into hard steel? A Yes.

Q Will you tell me about that, please? A We found out in connection with the saving of manganese, which I told you last time, we had to save manganese. At the same time in the question of being able to make more work with our steel, we knew the quantity of our steel was limited and could not be extended even if you had not air aggression, and therefore I was always pledging for using higher grade steel for all kinds of construction.

Q How would that follow, what you have just said?

A If one uses higher grade steel instead of soft steel, one can spare considerable amounts of steel.

Q That's because of what difference in quality?

A Difference in tensile strength.

CONTROL

SECRET

CONTROL

Röchling

-65-

SECRET

Q What is the tensile strength of soft steel?

A It is about 36 to 40 kilograms a square millimeter.

Q What is the tensile strength of hard steel?

A Medium quality which we could make out of soft steel was between 60 to 70 kilograms per square millimeter.

In using this process, if we could do so, we could spare for a lot of things about 25% of steel.

Q In other words, because of the increased tensile strength of the hard steel for structural purposes you would need less steel in total, is that right? A Yes.

Q And the total would be roughly 25% less, is that right? A That's right.

Q Now, where was this process of making hard steel for structural purposes out of soft steel developed?

A In my factory at Völklingen.

Q By people working under you? A Under me and together with me.

Q When was the process worked out? A We began in the spring of 1944.

Q Suppose you tell me in your own words and as fully as you can just what you did and what the results were? A Well, we hardened it; we made soft steel hard.

Q Did you start out with ingots of steel? A No, it was hardened at the finish.

Q All in a continuous process? A At the end of the process.

SECRET

CONTROL

CONTROL
ROLLING

-66-

SECRET

Q Would you take the normal process of making soft steel and carry it through all its steps? A All its steps.

Q And before you poured you would do something else which would make hard steel? A Yes.

Q What was that something different? A It is something new.

Q What was it? A We dipped it in water in a certain way.

Q What was was that? A To harden it.

Q That doesn't explain it to me. A It is so completely new that it is difficult to give a real explanation for this effect.

Q Have you taken out a patent on it? A Yes.

Q So that in order to get a patent you had to describe it sufficiently so they would know it was not something old. A Everybody could make it now but it was not the only thing. We could change the quality.

Q Suppose you tell me what you do with this.
A We could make different qualities.

Q Take any quality you are making. You carry your steel through the normal soft steel process and you want to make it into hard steel. What qualities do you have to consider? A The first quality was to make a quality with high tensile strength and also very high point of elasticity. The tensile strength is the

SECRET

CONTROL

CONTROL
Rochling

-67-

SECRET

moment when it breaks completely. The other moment is if you go to a certain point and go back again, it goes back to its earlier size.

Q You had one quality to establish which was tensile strength, and another was elasticity? A Elasticity was much higher than soft steel. Soft steel has about 22 kilogram per square millimeter elastic point, and here we came 36 to 40.

Q For the hard steel? A For the hard steel.

Q What is the ratio in ordinary hard steel for elasticity? A You can only compare with this kind of medium hard steel, not the best steel. The best steel, for instance, if you take it to make springs, in springs you have 160 kilogram and you have 110 and 120.

Q So you don't compare the two? A It is not to be compared. But it is for all kinds of structural steel that it is a great advantage.

Q You still haven't told me what you would do to the soft steel in this continuous process to turn it into hard steel containing, among other things, these qualities of tensile strength and elasticity. You said you would dip it in water, but that doesn't mean too much to me. Suppose you describe the process to me, just what you did with the steel to produce these qualities. A Well, we put it after the rolling mill in water at a certain temperature.

Q What temperature would the water be? A The

SECRET

CONTROL

SECRET

CONTROL
Röschling

-68-

temperature is not to exceed 50 degrees centigrade.

Q Would you keep it there for any length of time?

A We let it go through and when it comes out it has this kind of quality.

Q How long would it be in the water? A Five minutes, perhaps. It depends on the size. If you had a thin size, then it needs less time than if you have a big size.

Q This would be in liquid form when it went into the water? A No. You can take rail, girders, I beams.

Q Would it be white hot but not melting? A Not melting but hot, at a certain temperature.

Q In a general way, what is the physical difference between soft steel and hard steel? Is it only in these qualities of tensile strength and elasticity? A Tensile strength and elasticity; also (indicating with hands).

Q Malleability, workability? A Yes. We have a method to try steel by hammering it. Soft steel cracks immediately but hard steel cracks only after so many kilogram meters.

Q So many kilograms and so many meters? Is that like what we speak of as foot pounds when you speak of kilogram meters? A Yes, foot pounds is the same thing.

Q In other words, the pressure point or shock point of hard steel is much higher than that of soft steel and the shock point is the point at which it will smash?

SECRET

CONTROL

CONTROL

-69-

SECRET

A Yes. But now it is still another question. If you make, for instance, screws; if you make the threads or something like that, you need steel which gives only very small pieces. Steel as I described it gives very long pieces if you cut it. If you cut it with a knife or tool you get long threads, but you want little pieces.

Q What kind of steel is that? A It was usually the steel containing about .15% to .20% of sulphur.

Q Are there any other physical differences between hard steel and soft steel? A No.

Q What are the chemical differences between them?

A The chemical difference is with hard steel you have from .40% to .60% carbon and you have .50% to .80% manganese; you have .20 to .30% silicium, and as little phosphorus and sulphur as possible.

Q That's in hard steel? A Hard steel. Now in soft steel the carbon is .12% and between .20 to .25% manganese and no silicium.

Q What about phosphorus and sulphur? A Phosphorus and sulphur also as little as possible.

Q Are you telling me you can take soft steel and simply by passing it through water at about 50 degrees centigrade for about five minutes change its chemical composition from the soft steel composition as you have described it to the hard steel composition as you have described it? The mere putting it through water does that?

SECRET

CONTROL

CONTROL

-70-

A I cool it by water. It comes from the heat, from the rolling mill and it is simply dropped in the cold water.

Q But at the point it is dropped in the cold water it is ordinary soft steel, is that right? A Yes.

Q If nothing else happened at that point it would be soft steel? A If it is only cooled slightly it would be soft steel.

Q But this quick cooling makes it hard steel? A Makes it hard steel.

Q There is nothing else to it? A Some points. The temperature of the steel is essential.

Q What temperature does it have to be at when it is introduced into the water? A 850 centigrade.

Q What is the melting point of steel? A 1200 to 1250.

Q Anything else you have to control? A No, only this is essential.

Q When it comes out of the water does it have these changed manganese contents? A No. The manganese is from the beginning in it. Soft steel contains only so little manganese.

Q I know that, but you are telling me here on the left where this pen is is a bar of soft steel and you have told me it has so much manganese and so much carbon, no silicium and some small quantity of phosphorus and sulphur. A Yes.

CONTROL

SECRET

SECRET

CONTROL

Röchling

-71-

SECRET

Q And here where this pen is on the right is a bar of hard steel and it has so much manganese and so much carbon and so much silicium and a little phosphorus and sulphur. Now, as I follow your description, this bar of soft steel on the left becomes this bar of hard steel on the right by the simple process of controlling its temperature when it comes from the rolling mill and controlling the temperature of the water in which it is put, is that right? A That's right.

Q If I follow your description correctly, this bar of hard steel now has an entirely different percentage ratio of carbon and manganese from what it was when it was a piece of soft steel? A No. The moment when the hard steel leaves the open hearth furnace, then it is hard steel.

Q You say the bar of hard steel which has resulted from this cooling and dipping in water process does not have the same chemical qualities as hard steel in the ordinary sense of the term? A No.

Q In other words, the mere dipping of it in water or controlling the temperature would not add to the manganese content? A Not at all.

Q Does it have the physical qualities? A The physical qualities.

Q Without possessing the chemical qualities?

A This was the reason why we did it. We needed to spare

SECRET

CONTROL

CONTROL
Röchling

-72-

SECRET

manganese. We needed to come to the point where we could save steel.

Q As a result of this process, which you tell me involves controlling the temperature of the soft steel and also controlling the temperature of the water in which it is placed and the length of time it is in the water, which you said was about five minutes -- A About that. It depends on the thickness of the steel.

Q -- you get a thing which used to be soft steel but now has the physical qualities of hard steel without having the chemical composition? A Without having the chemical composition.

Q It retains the chemical composition of soft steel? A Yes.

Q As a result of doing that, what savings do you make in the various ingredients that go into making hard steel? A For instance, in making poles for getting electricity, we used only 75% of the amount which we --

Q Amount of what? A Of steel, which we would have needed if we had used soft steel.

Q That would mean then, for example, a saving of 25% of iron ore? A Of complete iron, complete steel work, all the labor working on it.

Q What about the amount of manganese used? A In the amount of manganese it would be about 25%.

Q There would be an overall saving of about 25%?

SECRET

CONTROL

A Overall saving of about 25%.

SECRET

Q Is this a process which has been heretofore used at all? By heretofore I mean prior to last year. A We began to use it.

Q Has anybody else to your knowledge used it before? A No, it never has been used.

Q It would be possible then to make lighter construction, would it not? A Yes, lighter construction.

Q Because if you increase the tensile strength, you can get the same result with less steel? A Yes. For instance, we have a coal mine in Aix-La-Chapelle together with the French people, and there we have an enormous earth pressure so we could not stand with usual ways.

Q By shoring up the walls of the mine? A Shoring up the walls of the mine. The pressure was too high. So they had to find new ways and we did it by using, instead of soft steel, we used then hard steel.

Q Of this kind you described? A First of the hard tool steel, steel of about 60 to 70 kilograms per square millimeter tensile strength.

Q Then what did you do after that? A After this time we were able to keep up the most tunnels.

Q Did you ever use in this particular mining operation any structural steel made by this process you have just described? A We were just beginning to do it.

SECRET

Q Did you use any at all? A Not yet.

CONTROL

CONTROL

Röchling

-74-

SECRET

Q What have you used this kind of steel for?

A Especially for this construction for making poles for electricity.

Q Did you tell me you also used it for shell casings? A That's another way. It is not quite the same. We used it for making shells with a steel which is also made by dipping in water. You can change the temperature of the steel by dipping. If I change the point at which I dip it, I change the nature of the steel so for shells it breaks into little pieces.

Q Changing the temperature of the iron or the water? A The iron, and the water it is better to have it as cold as possible.

Q Before you were describing the transformation from soft structural steel to hard structural steel, you said you kept the temperature of the steel at 850 degrees centigrade and introduced it into the water at about 50 degrees centigrade and kept it for about five minutes? A Yes.

Q In making these fragmentation shells what are the relative temperatures? What is the temperature of the steel, for example? A It goes down to 650 for the steel.

Q And what temperature for the water? A 10 or 20 degrees centigrade. The colder the better.

Q How long do you keep it in the water? A Until

SECRET

CONTROL

CONTROL

-75-

SECRET

it gets really cold, not even five minutes. So you get the shells so that they are brittle without changing the tensile strength. You change not the tensile strength and you don't change the point of elasticity.

Q What do you change then? A You change only the shock point.

Q Assuming that is so, when the shell is fired from the cannon, what prevents it from breaking into fragments right then and there under the shock of its original discharge? A It is essential that the point of elasticity be high enough otherwise it will explode in the gun.

Q Is this process whereby the physical properties of hard steel are imparted to soft steel almost exclusively a process of treating the steel at a certain temperature with water at a certain other temperature? A Yes.

Q Is there anything more to the process than that? A Well, for the shells you can gain at least 15% of steel.

Q You mean you save 15% steel? A Yes.

Q And in the structural steel you save about 25%? A Yes.

Q What explains the difference in the saving? A The difference in saving is that the hard steel you need for the shells is steel which has holes in the top of the ingot and so you must cut about 25% to get rid of these holes.

SECRET

CONTROL

CONTROL

Röchling

-76-

Q To get rid of the imperfections? A To get rid of the imperfections.

Q What change does this process make? A On the soft steel you have not these holes, only little ones which don't harm. These little holes weld easily during the rolling mill process.

Q What is in the holes? A It is mostly carbonic oxide.

Q Does the rolling mill process -- A You can easily weld it.

Q And get rid of the slight imperfections?

A Absolutely rid of it. Instead of the other holes these are holes which contain slag and other impurities which prevent welding.

Q You mean in the hard steel? A Yes.

Q In the original hard steel process? A Yes.

In the original hard steel process the steel contains holes and these holes are slag and other impurities which prevent the welding of this steel and these holes are right in the middle of the ingot.

Q In the hard steel? A Yes. And now you have just this point in the middle where you get the blow of the powder so it is absolutely necessary that this hole is avoided completely.

Q Otherwise the shell would blow up in the gun?

A Absolutely.

CONTROL

SECRET

SECRET

CONTROL

Röchling

-77-

SECRET

Q One thing I would like to get a little more clearly in my mind is this. Is there anything more involved in this process than what you have told me?

A Nothing else.

Q That's the way to do it? A Nothing else.

Q Doctor, you were telling me earlier and off the record in a general way about coal, do you recall that, about different types of coal, and so forth, and you were telling me there were so many kinds of coal?

A Peat for the youngest coal, brown coal, then flaming coal, then bituminous coal, and anthracite.

Q Out of which of these categories of coal is coking coal? A Only the bituminous coal.

Q Am I correct in my understanding that coking coal is necessary in the reduction of iron ore? A In the production of coke, and coke is necessary to produce pig iron from iron ore. You can use also anthracite. They used it in time in America. In England they use it at Glasgow still.

Q Why is it of the different kinds of coal, bituminous is the one used to produce coke? A All the other kinds of coal, if you heat it in a room which is completely closed so air can't touch the coal, you take out the volatile matter. If you lose the volatile matter then all the other kinds of coal are falling into dust.

Q Except bituminous? A Except bituminous.

SECRET

CONTROL

CONTROL
Röchling

-78-

SECRET
Q What happens to bituminous coal? A It becomes coke, into masses of coke.

Q Coke then is just bituminous coal with the volatile matter driven off by heat? A Yes. The more volatile matters the bituminous coal contains, coke gets splintery.

Q So if you have bituminous coal which contains much volatile matter, the coke is not much good? A Not so good as, for instance, coal containing 24% to 28% of volatile matter.

Q Can you tell by looking at bituminous coal whether or not it has a high volatile content or not? A No, only by testing.

Q So that in the production of pig iron, the factor of coke production is something which is absolutely essential? A Essential.

Q And consequently if you were looking for economies in the consumption of coke, you would want to start with some variation of the coke making process, isn't that so? A Yes.

Q Did you make any such experiments? A Yes. Essentially here in this part we hadnot enough good coking coal to make enough coke for all our needs.

Q So what did you do? A We had not enough good coking coal for all the coke ovens in Lorraine and in Mart et Moselle. In these coke ovens we were able to

CONTROL

SECRET

CONTROL
Rochling

-79-

SECRET

make about 100,000 tons a month. Now, it was so that there was a certain amount of flaming coal available in the neighborhood of the iron works of Lorraine. There are coal mines which produce only flaming coal.

Q Now, what does flaming coal look like to the eye? A This coal looks the same as all other kinds of coal.

Q It is not the same to the eye, for example, as anthracite? A No, anthracite is quite different.

Q And it is not the same as peat or brown coal? A No, it looks like bituminous.

Q Is it true you could not tell by simply looking at flaming coal whether it was flaming or bituminous? A We knew very well that Lorraine flaming coal would not make coke.

Q If I had a pailful of bituminous coal and a pailful of flaming coal, could you tell by looking at them which was which? A No, you would have to test it first.

Q Wherein is flaming coal different from bituminous coal? A The difference is that the fine coal of both of flaming coal and bituminous coal give different quality of coke.

Q You have described the quality of coke which bituminous coal yields. Will you describe the quality of coke which flaming coal yields? A The quality of flaming

SECRET

CONTROL

Röchling

-80-

CONTROL

coal gives a lot of coke powder.

ECRET

Q Why is that, Doctor? A Because there is no agglutination power.

Q That means the power to form masses? A Yes, form coke masses. Now, it is also so that we found out that essentially the fine coal of the flaming coal had not this agglutination power.

Q What do you mean by fine coal? A The powdery coal which came out of the mine.

Q It is that which does not have the agglutination power? A Yes.

Q What is wrong with using coke lacking in this agglutination power? A You can't use it at all.

Q Why is that? A Because it blows up the flue and does not burn.

Q Did you then make any experiments in the use of this flaming coal coke? A Yes, we made experiments.

Q What did you do? A And found out that the lumps, the big pieces of coal --

Q What kind of coal? A Of the flaming coal, the big pieces of flaming coal had better agglutination power than the fine coal.

Q Therefore what did you do? A Therefore we took these big pieces and medium size pieces and crushed them fine.

Q Into a powder? A Into a powder and mixed them with coal which had very big agglutinating power.

CONTROL

ECRET

CONTROL

Röchling

-81-

ECRET

Q What kind of coal was that? A It was also coking coal.

Q Bituminous? A Bituminous coal, but we used bituminous coal with less than 20% of volatile matter.

Q Did you also powder the bituminous coal?
A It was powdered already.

Q You used powdered bituminous coal containing less than 20% volatile matter and combined it with powdered flaming coal? A Containing 36% volatile matter, and completely mixed up.

Q Did you have a machine for that? A There are everywhere machines to do that, and then we took from 65 to 60% of this coking coal, low grade coking coal, and 35 to 40% of this flaming coal.

Q Is coking coal with 20% or less volatile matter considered low grade coking coal? A Low grade coking coal.

Q What is high grade coking coal? A 24 to 26 to 28%.

Q You combined these two? How did you treat them? Did you put them in a coking oven? A Put them in a coking oven, and if you stamp the coal by hammering, it becomes better. That is a well known method to work on coking coal with much volatile matter.

Q You mean you would stamp it before it went into the oven? A Before we put it in the coking oven.

Q What is the effect of it? A To make big cake

ECRET

CONTROL

CONTROL

Röchling

-82-

SECRET

out of it the size of the oven and put it in the oven.

Q Would it come out that way? A It comes out in bigger lumps, better coke.

Q The retention of that lumpiness is important in connection with the reduction of the iron ore, is that correct? A Certainly. So we were able to run the coke ovens, not at full speed but sometimes at full speed.

Q In this way you were able to stretch out your supply of coking coal considerably farther, isn't that so? A It was both the supply of the coking coal and we could use not coking coal for coking coal. First we used low grade coking coal and then non-coking coal with it and these two together gave a medium which was suitable.

Q What was the quality of the coke produced? A The quality was a little less than the good Westphalian coke and other coke from the north of France.

Q Does that mean you had to use more of it to produce the same result? A A little.

Q About how much? A About 5%.

Q Is this a process just recently developed?

A The French had worked a little bit on this line but it was not cleared up right how it had to be done.

Q Who perfected it? A My chief of the coke business.

Q Who was he, Doctor? A Doctor Hoffmann.

Q Is he still alive? A Yes.

CONTROL

SECRET

SECRET

Q Where is he? A Völklingen Saar.

Q Did you take out a patent on it? A No. I don't think it would be anything for you in the States.

Q By the way, on the other process -- A Because you have enough coking coal.

Q -- for making hard steel out of soft, do you recall your patent number on that? A I can't say it.

Q It was granted in 1944? A We have applied for it.

Q It has not been granted? A No, we applied for it.

Q One other item, Doctor. You told me this morning, I believe, that you wanted to add a reference to two other brief meetings you had with Hitler, is that right? A Yes, it was two meetings on music evenings.

Q What occasions were those? A It was an occasion of the Winter Help work, in 1938 and 1939.

Q Concerts? A Yes.

Q Where were they given? A In Berlin, in the Reichschancellery.

Q Were you invited by Hitler? A Yes.

Q Did you see him on each occasion? A Yes, but only for a minute.

Q Was the 1939 one in the fall of that year?

A In the spring of 1939.

Q So that both of these took place before the war?

A Yes.

SECRET

CONTROL

SECRET

CONTROL

Röchling

-84-

Q Did you discuss anything with him on those occasions? A Well, at the first one I asked him how it would be with my canal from the Saar to the Rhine.

Q What did he say? A He said he must speak with the Reichsverkehr Minister.

Q Who was that? A Dorp Mueller.

Q Did you ever get the canal built? A No.

Q Did you ever talk to Dorp Mueller? A Yes, but he was not fond of it.

- - - - -
EXAMINATION CONTINUED ON

5 JULY 1945

Q Doctor, the last time we were talking on the record I asked you about the subject of wolfram, do you remember that? A Yes, I remember.

Q And you said that some wolfram came to Germany from Spain, is that correct? A Yes, that's right.

Q And that the mines from which this wolfram came were German owned? A Yes, German owned.

Q Do you know who in Germany owned these wolfram mines? A Surely. That's Bergassessor Sohl, Direktor der Vereinigte Stahlwerke, Dusseldorf.

Q Is Herr Sohl still alive? A I don't know that anything has happened to him.

Q Was there anyone else in Germany who owned wolfram mines in Spain? A No.

CONTROL

SECRET

CONTROL
Röchling

-85-

SECRET

Q Do you know where these mines are located?

A I don't know. I believe in the north of Spain but I don't know it.

Q Do you know how they were called, whether they were known as such-and-such mines? A Not the slightest idea. I knew only that we got them.

Q Now, Doctor, do you remember yesterday telling me in an off the record talk about a process that you say you have been working on since you have been in custody having to do with the production of steel from steel scrap?

A Yes.

Q Will you now tell me for the record in detail the process as you described it to me yesterday? A Well, it was an old idea from me to use cupola to melt scrap. We heard that in the States it had been done already, but all can't use it because the great fault with the cupola is a furnace giving continuously a certain amount of pig iron and sometimes something else but the steel plants existing are all operating discontinuously. So only in very big plants of open hearth furnaces one could use this cupola if there was a large number of open hearth furnaces.

Q Which would be the only way you could create this continuous process? A Yes, create this nearly continuous process.

Q Now, is the process that you have been working on designed to make possible the continuous fabrication of steel from scrap even where it is not connected with

SECRET

CONTROL

CONTROL
Röchling

-86-

SECRET

large installations? A Yes. This is a scheme which can be worked on a very small basis. You can put it in the country where a certain amount of scrap is coming so the scrap being delivered in this area could be made again into useful steel in the place.

Q Now, normally in the production of steel from scrap iron or from scrap steel is any other metal mixed with the scrap in the first instance? A Yes, usually in the open hearth furnace one puts 25% of pig iron, mostly pig iron without phosphorous, of which we have a lack in Germany, together to melt them.

Q With 75% scrap? A With 75% scrap.

Q Does your process differ from this? A Yes.

Q In what respect? A In my process I can do it without pig iron and can do it with pig iron and can do it with pig iron without phosphorous and with big pron with phosphorous, so that any given situation on the kind of raw material can be met.

Q In how small amounts can you operate under this new process? A You can work on 100 tons daily.

Q Production of 100 tons daily? A Production of 100 tons daily.

Q How does that compare with the traditional method of making steel from scrap? A Well, the normal plants of German open hearth steel plants give about four or 500 tons a day. We have also such which give more but here you can go from 100 to 400 tons a day.

SECRET

CONTROL

CONTROL
Rochling

-87-

SECRET

Q With the same installation? A With the same installation, practically the same installation.

Q Now, Doctor, you have handed me four sheets of paper which for purposes of identification I have marked on the reverse side of each respectively pages 1, 2, 3 and 4, and you have told me, have you not, that these pages represent a diagram of the process we were talking about yesterday?

A These pages are sketches. I am sorry they were not so good as I wanted because I had not even a rubber gum.

Q Taking these pages in order, will you describe the process with reference to the sketches? A The first one is cupola.

Q What does that consist of, Doctor? A The cupola is to melt the scrap and to melt it with all kinds of fuel.

Q Taking the sketch on page one, what is this piece along the top with boxes and criss-cross lines? A On the top it is a crane.

Q What is the crane used for? A The crane is an old construction of mine; when I was a young fellow, 47 years ago, I used it first to fill the blast furnace and after I made this construction I stated (sic) now during this war that on a big number of installations in France and Belgium this still had been adopted.

Q What does the crane carry? A The crane carries a hopper or basket which is attached to the crane and is filled downstairs on the level with scrap.

SECRET

CONTROL

CONTROL

Röchling

-88-

SECRET

Q What is done with the hopper when it is raised by the crane? A It is raised by the crane and put right on the top of the cupola and it is put so on the bell.

Q This little part in the middle is the bell?
A Yes. It is placed over the bell so the scrap is dropped into the furnace.

Q So that the sides of the hopper open up, is that right? A Yes, it goes down.

Q And the scrap then falls into the chamber of the cupola? A Into the cupola.

Q Where does it come to rest? A It comes to rest on the bottom.

Q What indicates the bottom? In this area where I have written bottom? A Yes.

Q What is the next step? A You can use every kind of fuel. You can work with coke as it is usual until now putting the coke through the hopper.

Q On top of the scrap? A On top of the scrap, mixed in several layers.

Q In other words, you would have first a layer of scrap -- A First a layer of coke and then a layer of scrap; then a layer of coke, and so forth.

Q Until you fill up the whole cupola? A Until you fill it up so it is heated and when this is very hot it begins to come air in it.

Q You mean the air is fed into the chamber where the coke is burned? A Where the coke is burned by the

SECRET

CONTROL

CONTROL

-89-

air. It comes in here and burns the coke.

SECRET

Q Does the air come from this chamber on the right-hand side in which the figure 5.50 is indicated? A Yes, it comes first by a recuperator.

Q The air first comes from the recuperator in the left-hand corner? A Which is heated by the waste gas and the waste heat of the cupola.

Q Does it travel around into this chamber marked 5.50? A Yes. There are three of these chambers.

Q Where does it travel from there? A From there it is going through these pipes into the furnace.

Q Where the layers of coke and scrap are? A Yes. This is different from usual.

Q What is the purpose of having the air first in the recuperator? What happens to it there? A It is heated to about 500 to 600 centigrades.

Q What is the purpose of heating it? A The heating has the sense to save fuel.

Q To increase the temperature in the cupola?
A To increase the temperature in the cupola and saving at the same time fuel. You lose heat anyhow.

Q Now, in the very first instance when you are just getting the thing started, how is it ignited? How do you get the fire going when you just have the thing charged up? A Put wood in it.

Q You start it with wood? A With wood and then coke.

SECRET

CONTROL

CONTROL
Röchling

-90-

SECRET

Q And the burning in the cupola heats the air in the recuperator and it passes through these chambers on the right? A Yes, which are electrically heated.

Q What is the purpose of having them electrically heated? A The recuperator is not apt to heat very high because it is made of steel and this kind of steel, I have been the first one to put such a recuperator. I know exactly how far one can go with it. We have worked it for more than ten years.

Q When the air comes from the recuperator, it is at about 600 degrees centigrade? A 500 to 600.

Q And it passes into these chambers? A So I can come to a temperature of 700 centigrade.

Q Through this electric heating? A Yes.

Q And it then passes from the chambers into the cupola at about 750? A At about 700 degrees centigrade.

Q The purpose of that you have said is to save the consumption of fuel in creating the heat within the cupola? A Yes, and to have a very high temperature of the metal.

Q You were about to tell me a minute ago how this process so far described differs from the normal way of reducing scrap. A The normal way is with the cupola, but the cupola is constructed with straight sides so you have to give the blast directly from the side.

Q Instead of having these diagonal sides it would have straight up and down sides? A It has a great dis-

SECRET

CONTROL

advantage that you burn always the lining of the cupola.

ECRET

Q Which is made of brick? A Of brick. It does not last long. It lasts for two or three days only, if you are working continuously. As I did it, also the first one using hot blast for many years, you must put in water cooled jackets and this water cooled jacket is turning all this. The molten matter comes down and drops on this copper jacket and then turn easily.

Q What happens in this case? How about the walls of the cupola, do they last longer? A They will last because they are protected here. I put here water and let the water run only down.

Q On the diagonal sides? A Yes, on the outside, and I protect this part (describing the diagonal sides of the cupola near the bottom). I protect this so this can't burn and if this cannot burn, the lining cannot burn.

Q Because it is cooled off at that point? A At the right point, and it is cooled by the most simple way possible, to give only water in this place and this water is running down here and is cooling also here.

Q Running down the side of the cupola to the bottom? A So I have cooled the whole part in the most simple, efficient way which is possible.

Q And the cooling is at these diagonal sides and partly straight sides in the bottom chamber of the cupola where the blast of heated air is introduced, is that right?

A That's right.

ECRET

CONTROL

CONTROL
Röchling

-92-

SECRET

Q What is the life of the straight sides? A It could be for a year.

Q As contrasted with a week with the old one?

A Yes. I have cupolas that had been working with these water cooled jackets -- water cooled forms, it is not a jacket -- for twenty years and they lasted for years. This scheme to make this was an idea which came from Geheimrat Mathesius, the father of Mr. Mathesius of the Illinois Steel Company. This idea was designed by Mr. Mathesius for blast furnaces. I adopted it for this purpose.

Q Is that all that takes place with respect to the first page of the diagram? A No.

Q Will you continue with your description of the process? A Instead of using coke you can use now coal. You see, you can put fine, dust coal in that and let it burn so you get here a heat of about 2,000 centigrades.

Q In other words, you take these two columns on the extreme left and right-hand sides -- A There are only two shown. There are six of these introducing all around the cupola.

Q And into them you can introduce finely ground coal? A Yes.

Q Does that mix with the blast of hot air? A Yes.

Q Does the hot air ignite the coal? A Immediately.

Q What is the effect of that? A This gives an enormous temperature here in this part.

SECRET

CONTROL

CONTROL

Röchling

-93-

SECRET

Q What is the result and advantage of that? A It is a double one. The first one is that the molten metal which is below in the part marked bottom, the hearth of the furnace, will be superheated. In a usual cupola you get about 1300 centigrades, which is very high.

Q What is the temperature here? A I think 1400; perhaps even 1500. I can't say it exactly but 1400 I am sure.

Q The fine coal which is introduced through these six columns is in addition to the coke? A No, it is instead of part of the coke. Perhaps 80% of the coke I can replace by using fine coal.

Q In addition to the increase in temperature, is there any advantage in terms of saving involved in this? A Yes. If you burn coke with high temperature blast you get most carbonic oxygen. Here you get in the most part carbonic acid.

Q What is the difference? A The difference is if you burn one kilogram of coke only to carbonic oxygen, it gives 2400 calories. In burning it to carbonic acid, you get 8,000 calories, so the chance to get a much higher temperature is better than in any other case.

Q The molten metal comes to the bottom of the cupola, is that right? A Yes, comes to the bottom of the cupola.

Q What happens at that point? A First, I wanted to have not only molten scrap because I need in my second

SECRET

CONTROL

Röchling

-94-

CONTROL

process --

SECRET

Q Referring to page two. A -- I need a certain amount of carbon already is here to take off the sulphur.

Q You need a certain amount of carbon mixed in the molten metal? A Yes, to take off sulphur.

Q How do you achieve the carbon in the molten metal by this process? A There are two possibilities. One possibility is to give a certain amount of coke on the top, say for instance, 2 or 3%. The second possibility, which is not shown here because it is quite new and you must not put all new things at once, is to put here on the side --

Q On the left-hand side? A On the left-hand side, also a tube containing coal, nuggets of coal; or you can take small coke; you can take soft coke; you can take even coke which is produced by the gas works, and heat them by letting go a stream of gas through this part and let it go back into the cupola.

Q So that a stream of heated gas would come from the bottom of the cupola, pass through the coal, and back into the cupola again? A Back into the cupola again in order to heat this coal to a very high heat. So it will go down and fall into the metal and it will be dissolved by the metal.

Q So you have either one of these two methods. You add a little coke to the top and let it drop down into the metal or you have coal heated on the side, on the left, which drops into the metal? A Yes.

SECRET

CONTROL

CONTROL

Röchling

-95-

SECRET

Q What is the effect of that? A The effect is that first the metal containing about 2% of carbon is not so quick solid.

Q It remains liquid longer? A It remains liquid longer, also at lower temperature.

Q In other words, you can keep it in a fluid state using less heat? A Even if in the moment the temperature would lower a little bit. The second thing is you cannot take off sulphur by the usual or ordinary way from soft steel.

Q You can or cannot? A You cannot. On the other hand, it is easy to take it off if you have a certain amount of carbon in it.

Q At this point, Doctor, have we finished with page one of the sketch? A Yes.

Q I have one question to ask you with respect to page one, and that is, over on the lower left-hand side you have a circular piece, an outer circle and an inner circle, and two parallel columns leading toward the cupola.

A That is wrong. I didn't have an eraser. (Eraser obtained and correction made.) This is the same thing that is shown on the other side but only it comes from a second chamber.

Q That is just to mark the entrance of another blast of heated air from another heating chamber? In other words, each place where you have a column through which this fine coal is introduced, you have a heating chamber

SECRET

CONTROL

CONTROL

Röchling

-96-

through which the heated air is introduced? A Yes. Here it is shown how the fine coal is filled up on the column on the right.

SECRET

Q Referring to page two in the sketches, Doctor, will you continue your description of the process? What happens to the molten metal now? A The molten metal is flowing continuously by this system of a fox.

Q You are referring to this pipe, sort of dog leg shape, to the left of the diagram on page two. Why do you have this peculiar shaped pipe? A This peculiar shape is to avoid any slag. Only the metal is going out; the slag stays in.

Q To get the molten metal up this first leg of the pipe you have to force it up because it is heavy? A Yes, it is heavy. There has to be a certain level of the metal which must be at least as high as the top of the joint so never any slag can go through.

Q Because the slag will float on the top and act as an automatic trap? A Yes.

Q The metal then flows into what chamber, this chamber called soda? A In a soda fox. It is the same system only on this side is soda and on this side is pig iron and here below is pig iron.

Q The chamber which says R.E. is pig iron? A Yes, raw eisen.

Q Or molten metal, flows into this chamber which says soda? A Yes, and passes through the soda and goes

SECRET

CONTROL

SECRET

up in the other chamber and goes --

Q Where the pig iron is? A Where the pig iron is.

Q What happens there? A It is filled up so it can go out here.

Q What happens in the soda chamber? A The sulphur is going completely out.

Q When it passes through the soda that removes the sulphur? A Yes.

Q What is the chemical byproduct resulting from the combination of the sulphur and soda? A It gives slag which can be used for different things. We use it for making phosphate.

Q For fertilizer? A Together with phosphates in a special process. It must be molten, together with phosphates.

Q Where is the slag drawn off in this case?
A The soda comes in first from this little apparatus, heating apparatus.

Q Referring to an octagonal box at the upper left-hand part of the diagram. Is that a heating apparatus?
A It is a heating apparatus which is turning and it gets its heat from the inside of the cupola.

Q To heat the soda? A Simply a small tube.

Q This little tube to the left of the octagonal box comes from the cupola and carries the heat? A It is the cupola, a continuation of it.

Q What happens to the soda? A Now comes a difficult solution. It was very difficult. I must enter

SECRET

CONTROL

CONTROL

Röchling

-98-

SECRET

now the soda inside because I will get it out here on the right-hand.

Q In other words, you have to introduce the soda into this compartment? A And I have only a space for the little tube and soda must go in. The soda is fine. If I could put it in vertically, the transportation would be easy but I have no opening, so I had to do it diagonally with a tube which is rotating.

Q This tube in the middle of the diagonal tube?

A It gets its movement from the soda furnace.

Q Your heat is introduced through this pipe running horizontally on the left-hand side of the octagonal soda furnace and the soda itself is introduced through this tube leading into the soda furnace because the soda furnace itself rotates? A Yes, and it gets from here wheels with teeth put against the side of the soda furnace.

Q What is the purpose of the wheels with teeth placed against the octagonal sides? A To take off the rotation.

Q It is like the drive shaft in an automobile, the rotation of the soda furnace is translated to the rotation of this feeding tube? A To give the rotation of the feeding tube.

Q Why does it have to rotate? A Because if I put it only so the soda would not flow.

Q Why does the soda furnace itself have to

SECRET

CONTROL

CONTROL
ROCKING

-99-

SECRET

rotate? A It has to rotate because you have the heat above, to get the heat really on the soda.

Q What happens to the soda after that heating process? A It is going through this tube on the right, but it is not going on the top; it is going on the basis.

Q Clear to the bottom of the chamber marked soda? A Not the bottom. It is above the level of the pig. It is above the pig so you have always the fresh soda on the place where you have the least sulphur in the pig.

Q In other words, the pig iron flows into this chamber marked soda and rises to a certain level and the soda is introduced at a point just above the level of the pig iron. What happens to the soda at that point?

A I have always soda without sulphur at the place where the pig iron has the least amount of sulphur.

Q Which is at the top surface? A Yes, at this point. Here comes in the pig iron with sulphur.

Q What happens to it in the process of dropping into the soda chamber? A The sulphur is going on the soda and it builds nitrium sulphite. The pig iron is dropped through the soda and in this way it loses the sulphur.

Q You have your soda chamber practically filled with molten soda? A Completely filled.

Q At the time the pig iron is introduced in it? A Yes, and taken off completely to the pig iron chamber.

Q If you have the soda chamber completely filled and you pour some molten metal into it, obviously something

SECRET

CONTROL

CONTROL
Röchling

-100-

has to go off. What happens then? A The sulphur is going off.

SECRET

Q If you say this soda chamber is like a glass filled with water, if you pour more water into it, it is going to spill over. Here you have the chamber filled with molten soda and you pour molten metal into it, something is going to spill over. A This molten metal will come there out.

Q And fresh soda is coming in? A Yes, and then the used soda is going away.

Q How do you take the used soda away? A You make here a tube. It is an easy thing.

Q Is the used soda the so-called nitrium sulphite? A Yes. It is going away in the tube so I have always continuously moving away the soda which is consumed.

Q So you have at least three things happening continuously. You have a flowing in of molten metal and out of pig iron; a flowing in of fresh molten soda and a flowing out of used soda in the form of nitrium sulphite? A Yes. But it is not finished.

Q Doctor, what are the specific gravities of soda and pig iron? A Soda may have -- I don't know it exactly -- about a specific gravity of 2; pig iron has 6.9.

Q If that is the case, and pig iron is roughly about three and a half times as heavy as soda, what prevents the pig iron in this chamber on the right marked R.E. from backing up on the process and dislodging the soda? A You need the same weight in the first chamber as in the second chamber.

SECRET

CONTROL

SECRET

Q Which explains why your soda chamber is much bigger than your pig iron chamber? A Yes.

Q What happens next, Doctor? A Perhaps there is something necessary to be said. This soda fox is put on wheels so one can push it away. This is necessary because not always will last this flow. It has to be repaired from time to time.

Q You mean this flow pipe connecting the cupola with the soda fox breaks down every once in a while?

A Maybe, or it could be it is clogged up.

Q So your soda fox is a portable arrangement on wheels? A Yes, so one can work on it. It is necessary to put those apparatus close together because you must not lose any centigrade of the high metal.

Q You cannot afford to lose the heat because you have to keep it continuously flowing? A Not only continuously flowing; you need also the heat inside in the next step.

Q Now, what is the next step after the soda fox, Doctor? A After the soda fox it comes now to the continuously making steel.

Q Let me ask you at this point, Doctor, does the molten pig iron flow from the chamber marked R.E. across the tube at the top of it into this chamber with three open spaces in it on the right-hand side? A Two spaces.

SECRET

CONTROL

CONTROL
Röchling

-102-

SECRET
Q The pig iron flows from the soda fox into this chamber on the right, is that correct? A Yes.

Q It goes to the bottom of the chamber, being heavy? A Yes. It goes on the bottom of the chamber

Q Will you take it on from that point?

A Now, in this chamber it is burned the coal and all other alloys like manganese, silicium.

Q What do you mean burned? A It is oxydized.

Q Where is your fire in this chamber? A The fire is in the steel; the heat is in the steel, but from below comes air which is pressed by these two bottoms. It is heated air.

Q What temperature? A Over 700 centigrades.

Q And it is passed up through the molten pig iron? A Through the molten pig iron and it is done by the Bessemer process or the basic Bessemer process.

Q What is the effect of the introduction of the heated air into the molten pig iron? A Until now one makes it only with cold air.

Q Up until this time it used to be cold air?

A Absolutely only cold air.

Q And this process is with heated air? A That's the first time they have used heated air for this process, thus saving enormous heat.

Q Is that the only advantage? A Yes, a big advantage. It is so until now you can only work in the

SECRET

CONTROL

CONTROL**SECRET**

acid Bessemer process, pig iron which contains at least 1 to 2% of silicium. The silicium gives the heating power to the iron to make steel out of it, or in the basic process you can use it only if you have at least 1.8% of phosphorous. The phosphorous gives the heating. Now, I will use here pig iron without silicium and without phosphorous, or with very little, only the normal impurities; so I must add another heat and I use it by first heating the blast.

Q Which goes into the molten metal? A Yes, but I heat it on the second hand by introducing above the level of the metal, above I introduce, like I did it in the cupola, I introduce fine coal.

Q Through this tube on the left? A Through this tube on the left and give high heated air from the heating system.

Q Is this air all heated from the cupola? A No, it is separately heated. It is heated first by this apparatus, also a recuperator.

Q This apparatus on the top here with a lot of lines in it? A Yes. They are two recuperators first.

Q The air is heated there? A The air is heated there.

Q What process of heating is that, by electricity? A No. This is by using the waste temperature of the blowing apparatus.

Q Referring to page three. A On the end of the

SECRET**CONTROL**

Röchling

-104-

SECRET

frischtrommel, the oxydizing apparatus. Here on the end I have an enormous waste heat. Inside you have about 2,000 centigrades and you use only a certain amount of this heat, a small amount. If you lose perhaps 200 centigrades of this 2,000, you have 1800 and this 1800 comes in here through the recuperators. There is now put in the air with two atmospheres in one.

Q What do you mean by two atmospheres? What does that mean? A Pressure of two atmospheres.

Q It is under twice the normal atmospheric pressure? A Yes.

Q Air is introduced into the recuperators at twice the normal atmospheric pressure? A In one recuperator, the second one. The second one is the recuperator which furnishes the air below.

Q For the blast below the metal? A Here I need two atmospheres. Here I need only 1/10 of atmosphere.

Q That's in the first recuperator the blast from which joins with the coal coming from above? A Yes, so I have two different systems. I need two different systems. I can't use this high pressure for this coal system, so it is necessary to divide this into two parts and it is divided into two parts recuperator and two parts electrically heated.

Q Referring to page three. In other words, there are two chambers in which the air is heated, is that right? A Yes.

SECRET

CONTROL

Röchling

-105

SECRET

Q And from one of these chambers the air goes in above the molten metal and from the other at double atmospheric pressure it goes in below? A Yes.

Q Referring to page three. The air in these two chambers, did you say, is heated from the exhaust heat from the oxydizing apparatus? A In the two recuperators which are heated by the escaping heat of the oxydizing apparatus.

Q Isn't it heated in these chambers? A It is superheated by electricity.

Q Tell me, what is the oxydizing apparatus used for? A The oxydizing apparatus is used to get the old coal out.

Q To burn the coal out of the molten metal? A To burn the coal out of the molten metal, to oxydize all the impurities.

Q Is that what is done here in this chamber on page two? A Yes.

Q Having reference to page two, the purpose of the use of the blast of air from underneath and from above is to oxydize the metal? A Yes.

Q The oxydizing does what things? You say it is to get rid of the impurities. A It takes away all substances which are not good for good steel.

Q Such as? A Phosphorous, silicium, and it takes also away manganese which has to be added afterwards again.

Q Do you recover it when it is taken out? A No, it is lost.

SECRET

CONTROL

CONTROL
Röchling

-106-

SECRET

Q What happens to the coal, which is introduced above? A It is burned above the bath and because the blast going through the bath is throwing always the bath up and then the metal comes in contact with this heat, so it is overheated very easily. This is the first time that one makes this combination in an open hearth furnace. If the bath is too cold, the only way is to give some pig iron hematit, that is pig iron without phosphorous, or basic iron. You call the other kind basic iron. Basic iron is the usual iron you use in the States for addition to the open hearth furnace. You have to put this in the molten metal and by the fact that there is a certain amount of coal in it which burns, the both is coming in cooking.

Q The temperature rises? A It is bubbling, and only by this bubbling it is possible to get a higher heat in the open hearth furnace.

Q But this way you get it by introducing the coal above? A The open hearth furnaces introduce the very high heated gas above but it does not work below in the bath inside because there is slag on the top and it heats the slag but not the metal.

Q So how do you overcome that? A To overcome it in the open hearth furnace they put the pig iron in it to make bubbles.

Q How do you overcome it? A By the blast of heated air from below.

CONTROL

SECRET

CONTROL
Rochling

-107-

ECRET

Q Now, the air or heated gas in this chamber is drawn off? A It is drawn off in this flue.

Q Ordinarily that would be wasted? A Yes.

Q What happens to it in your process? A I use it in these recuperators.

Q In other words, it goes back into the recuperators?

A Through the recuperators and it goes here.

Q In passing through the recuperators what is its effect? A It heats the air which is going the other way.

Q The waste gas travels around the recuperators, is that right? A Yes.

Q Heats the air inside and then passes off as waste matter, is that right? A Yes.

Q Meantime the air which has been heated in the two recuperators goes into these superheating chambers?

A That's right.

Q On page three. And the air from the superheating chambers finally passes either above or under the molten metal, is that right? A That's right.

Q With the different atmospheric pressures?

A Yes. Now, on page four I have shown --

Q Is page four a side view of page three? A Yes, but it is a little bit changed.

Q Instead of having two chambers what do you have?

A The chambers on page three are a little too small, so I have taken two long chambers and put them on each side.

In the middle is the recuperator chamber and you see here

ECRET

CONTROL

CONTROL
Röchling

-108-

is the waste and it comes up here to this recuperator chamber.

Q This center circle in the three circles is what, a recuperator? A It represents two recuperators one behind the other.

Q The little holes represent what? A The little holes represent the tubes through which is going the waste heat.

Q Which in turn is heating the air in the recuperator? A Yes.

Q And then flows out as waste? A Yes.

Q Now, the two circles respectively to the left and right of the recuperators in this diagram are what? A The superheating chambers.

Q What is this main circular apparatus underneath, a side view of what? A A side view of this chamber where the molten metal is. This total apparatus must be joined on an axis.

Q By the entire apparatus you mean this one you have been describing? A The total chamber turns on an axis because when this bottom is burned the iron could run through.

Q Why is that advantageous to have it rotating? A It is rotating only if in case of an emergency or in the case where this bottom is used.

Q In other words, you can keep it from flowing out if you want to? A Yes.

Q But normally it is not turning on the axis?

CONTROL

SECRET

SECRET

CONTROL

-109-

SECRET

A No, it is standing stationary.

Q And the molten metal flows out of the bottom?

A No, no. It flows out at the lower right-hand corner of the chamber again by this dog leg process.

Q That's to prevent the slag from coming out?

A Yes.

Q On page four what is that 10 Tons? A That means if I turn this thing -- you have an enormous weight on this side -- to keep this weight I put a counterweight. This counterweight is sitting on the ground but when you turn it, it is going up. This wheel is fixed on the upper right-hand corner.

Q That's to keep the apparatus in balance, to keep it from tumbling over? A Yes.

Q How is this entire chamber fixed to the ground?

A It is put on rollers which are fixed and it is on the ground.

Q You say then with respect to page four that the tendency of the two superheating chambers and the recuperators would be to pull the apparatus over to one side if you did not have this counterweight? A Yes.

Q Doctor, when the molten metal which has been purified in the way you have described it flows out of the heating chamber here on page three in the lower right-hand corner through this dog leg lead pipe, what kind of container does it go into? A It goes now in a small ladle which can be turned.

SECRET

CONTROL

SECRET

Q Can be tipped over? A Can be tipped over. It is going in the middle of this ladle so when you turn it now it comes here an opening which lets it go out.

Q Where does it lead into, a form? A You can lead it now in the old fashioned methods for ingots, quite as usual. You can put them on a car and fill it from the top. Or one can do other things.. You can, for instance, put it into molds which are put on 45 centigrades^(sic), except that the molds are vertical. You can put them at 45 degrees and if I let it go in, it goes in not so quickly that it will drop.

Q This is a slower pouring? A But to avoid that everything is burning here because the molds are pig iron and you keep turning the molds on a longitudinal axis.

Q What is the advantage of that? A The advantage is I get always a new part of the mold together with the molten steel and I can avoid the pig iron being immediately consumed.

Q The steel would immediately burn up the pig iron? A Make it melt immediately, but if I turn it, it keeps cooling it. Another advantage is if you take, for instance, soda water and open it, if you put it upright, it fumes over bubbling; if you put it at a 45 degree angle, the gas can escape. The gas in the steel and also in the mold, the air can escape.

Q Suppose it does not escape? A It does.

CONTROL

SECRET

SECRET

Q If it didn't, would that be a disadvantage?

A That would be a disadvantage. That's the advantage of this process.

Q You say the straight up and down process is the way they have always done it? A Yes, as we do it now.

Q How does it happen it does not melt the pig iron? A It does not come immediately against the pig iron. For instance, if you have this and you pour it here, so it touches the sides and it burns.

Q What is the difference in the straight up and down mold, is there a lining in it? A No. When it is straight up and down, you pour in the middle and it does not heat the sides until it comes up and it is cooling all the time. Another advantage is I can cool this mold when I turn it with water.

Q How do you do that? A By playing water on the outside. And another advantage which will probably be the biggest one is that if you pour straight up and down, then the molten metal gets solid from the outside and this has the disadvantage that there is a segregation of certain steel parts which contain more phosphorous, more sulphurs, and so on, and this steel is in the middle.

Q The steel with the more impurities? A Is in the middle, and it is accumulated in the middle. It is very disagreeable.

Q That would weaken the steel? A It weakens the steel. We have always a certain point at which a good

SECRET

CONTROL

CONTROL

Röchling

-112-

deal of soft steel has these segretations which are very disagreeable. Here it is so that I have always the same temperature.

Q So there is no segregation? A Probably not. It is not quite sure. It could be uniform but I am not quite sure. You see what happens if you put the mold flat. Then you must turn the mold at high speed and then you get tubes.

Q But it is the same principle? A Yes.

Q After the metal is poured into the molds as you have described it, the next step is to send it to the rolling mill? A Yes, to push them out after they are solid and give them to the rolling mill.

Q How do you get the solid steel out of the pig iron mold? A They are not welded together. The solid steel is contracting so it comes out as it cools; it pulls away. The molds are constructed with sloping sides so if you lower a little bit, the steel falls out.

Q What do you figure are the advantages of this process you have been describing to me this morning of making steel out of scrap over the normal method of making steel out of scrap? A The first advantage is that you don't need an enormous investment.

Q In what? A In the plant.

Q Why is that? A Because the whole room you need is about 25 by 25 meters.

CONTROL

SECRET

SECRET

CONTROL
Röchling

-113-

SECRET

Q Whereas normally what are the dimensions?

A There is no comparison; much bigger than that. And here you are able to make very cheap, also small quantities.

Q You have told me before why you can make small quantities and we have that in the record earlier. How is it you make it cheaper? What are the savings? A The savings are first about probably 40% of the amount of coal which is used actually in the open hearth furnace. Second saving is you don't need any pig iron which costs usually 20 to 30% more per ton than scrap. That means if you avoid 25% of it, that would be 5 to 7.50 marks per ton saving. Then you are able to put this installation in a country where there is a certain amount of scrap always available, so you gain the cost of transportation, transporting the scrap to the steel plants, and instead of this you transport only the 15% of coal. You save the transport of 100% and spend 15% for coal.

Q In other words, the only thing you have to transport is the coal? A That's right.

Q You already have the scrap on hand. A Yes.

Q How long would it take to set up an installation like this? A Under present conditions in Germany less than a year.

Q Under peace time conditions? A Half a year.

Q Does it matter, Doctor, what kind of scrap is used in this process? A One can use all kinds of

SECRET

CONTROL

CONTROL
Röchling

-114-

scrap. I have here a very big hearth in the cupola (referring to page one) in which I can let an enormous amount of pig iron. So if I have very changeable scrap, it will be normal size in this molten metal, so I can have always coming out from different sorts of scrap one normal size metal.

Q What do you mean by normal size metal? A Always the same. I need for my process not much change in the composition. It must be for a certain time, six, eight or ten hours the same.

Q You can use any kind of scrap provided for a certain period of time you use the same kind of scrap?

A Yes. I cannot begin to make analysis of the scrap. It is impossible, so I must melt it down.

Q Weren't you telling me a minute ago the molten metal, which is the result of reducing the scrap, must for any six or eight hour period be about the same? A Yes.

Q So that you would have to be careful to put into the cupola in the first instance pretty much the same kind of scrap? A As far as I can by seeing it.

Q Otherwise you just have to take your chances?

A You have to take your chances because if I see different kinds of scrap, I put a big quantity of molten metal in the cupola so by mixture of the different kinds of scrap, I would get one quality of steel. You can use also oil instead of coal for heating the cupola.

Q Is the open hearth method the normal method for producing steel from scrap? A Yes.

CONTROL

SECRET

SECRET