

**LABORATORY GLASSWARE AND SCIENTIFIC AND
SURGICAL INSTRUMENTS**

HEARINGS

BEFORE THE

**SUBCOMMITTEE OF THE
COMMITTEE ON FINANCE
UNITED STATES SENATE**

**SIXTY-SIXTH CONGRESS
SECOND SESSION**

ON

H. R. 7785

**AN ACT TO PROVIDE REVENUE FOR THE GOVERNMENT, TO
ESTABLISH AND MAINTAIN IN THE UNITED STATES
THE MANUFACTURE OF LABORATORY GLASSWARE,
LABORATORY PORCELAIN WARE, OPTICAL GLASS,
SCIENTIFIC AND SURGICAL INSTRUMENTS**

—————
DECEMBER 12 AND 13, 1919
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H. R. 7785.

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Senator **THOMAS**.

LABORATORY GLASSWARE AND SCIENTIFIC AND SURGICAL INSTRUMENTS.

FRIDAY, DECEMBER 12, 1919.

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

The subcommittee met at 10 o'clock a. m., in committee room, Capitol, pursuant to call, Senator James E. Watson presiding.

Present: Senators Watson (chairman), Curtis, and Thomas.

Also present: Senator Frelinghuysen.

Senator WATSON. The subcommittee has met this morning for the purpose of hearing those appearing in relation to optical glass and chemical glassware.

State your name, business connection, and then proceed with your statement.

STATEMENT OF MR. CHESTER G. FISHER, PRESIDENT SCIENTIFIC MATERIALS CO., PITTSBURGH, PA.

Mr. FISHER. My name is Chester G. Fisher, and I am the president of the Scientific Materials Co., of Pittsburgh.

Several years ago this company went through a state of intensified preparation for war and the conversion and development of industries to meet that emergency. Some of the industries are capable of making nothing but materials used only in warfare, and these it would be uneconomic to maintain. There are other industries, however, which were developed to supply articles which are just as necessary to civil life as they were to the conduct of the military activity, and a great many of those articles were not made in this country before the war. We are now readjusting ourselves, this time to meet the peace-time conditions, and it seems quite clear the industries such as those mentioned in this bill, which make articles equally necessary to the peaceful pursuits of industry and happiness should not be thrown away simply because Germany says, "We are able and willing to give you the products of these industries again."

From the fact that these industries did not exist before the war, at the time the present tariff was enacted, it is obvious that the present tariff was drafted without any consideration of these industries; that is quite logical, since the industries were not here to be considered.

You, therefore, are not dealing with a question of tariff in the way that one is accustomed to hearing it spoken of. You are not reconsidering to-day any of the established industries, as would be the case

of a general tariff bill. You are considering for the first time a group of new industries which the country has just developed.

The sources of supply in Germany from which this country formerly secured such materials are again available, and they are offering their products, and the question is, Will we support our own industries and maintain our present independence? And this question must be answered now. Some time in the future when we might get around to a general tariff bill it will be entirely too late.

Even the man who might be a "dyed in the wool free trader at any price" must admit that for national efficiency and as a matter of fairness it is right to tell these workmen whether they are going to be given a fighting chance to maintain the industries they are now engaged in.

We will show by means of the men who are to follow that these new industries, making articles not produced before the war; that the present needs are being taken care of in a satisfactory way, and that with the assistance of this bill, H. R. 7785, these industries will be maintained; and, last, that it is in the public interest so to do.

In order to present this to you briefly and concisely we have selected from a long list of witnesses a man from each group involved in the bill, and that man is in every case, we think, the best authority on the subject in this country.

We expect that after the hearing of this case you will decide on the question of whether it is in the public interest; and we are prepared to show you why it will be so. The public is represented at this hearing by means of letters or personally from Dr. Herty, Dr. Parsons, Col. Reasoner, Mr. Parmelee, and Dr. McClung.

I wish to say that the firm that I am connected with maintains a general scientific apparatus and instrument supply business and purchases its products from the manufacturers who are to follow. Before the war we maintained a permanent purchasing office in Germany, where we bought all these articles, and if this bill is not passed we can reopen that office without financial loss, but it will be a pretty bitter pill to have to swallow. Please note that every article mentioned in this bill has competition in this country at the present time.

Senator CURTIS. You mean in the production of it?

Mr. FISHER. I mean there are two or more firms producing every article mentioned.

Senator CURTIS. That is what I mean.

Mr. FISHER. And by acting favorably on this bill there is no chance of creating a monopoly which might ask unduly high prices. Even if we ignore the foreign competition, which cannot be ignored because the provisions in this bill do not set up a barrier to importation. These rates only give these industries a fighting chance, and they will have to count on modern equipment, American labor saving schemes, Yankee efficiency, and a high quality article if they are going to keep in existence.

The different industries mentioned in this bill report the employment of 41,135 men to-day, against 11,240 before the war, an increase of about 300 per cent.

There has been spent in the development of these industries \$17,070,000.00.

There are three fundamental reasons why it is for the good of this country as a whole that this bill should be passed. First, the bill

eliminates a special class privilege; second, it is necessary to industrial independence; and, third, national defense requires it.

One hundred and thirty years ago the privilege of importing scientific apparatus free of all duty for scientific and educational purposes was granted. Inasmuch as that privilege was not extended to building material that goes to make up a scientific building, or the desks on which the worker works, or his chandelier or his radiator or anything else that is in the room, or to the man's clothing or his food, it is quite obvious to suppose that there must have been some reason for it at that time. Whether the action of allowing this material to come in duty free was, in the light of what has happened in the last four years, for the good of the country is debatable, but that conditions have changed in the last 130 years is certainly not debatable.

There has been a precedent established in withdrawing this duty-free privilege, when the best interests of the country were served in so doing.

Immediately after the Civil War conditions were such that it was advisable to withdraw this privilege and it was withdrawn from 1864 to 1870. The conditions which caused this privilege to be withdrawn after the Civil War are here again today, but this time accompanied by new and more important reasons why this special privilege should be eliminated.

Through the changing of conditions which have come about in the last 130 years we find that paragraph 573 of the tariff is operating in a way which favors one class of men and works a hardship to another class.

Senator WATSON. Mr. Fisher, do all these things come in free now?

Mr. FISHER. If they are imported for scientific or educational purposes they do.

Senator WATSON. All come free?

Mr. FISHER. Every one of them.

Senator WATSON. How did you establish these various rates—60 per cent ad valorem in the first clause—"glasswares and porcelain wares, laboratory apparatus, and other apparatus and appliances," etc., and how did you reach the conclusion that 60 per cent is sufficient protection?

Mr. FISHER. We are prepared to show that here today, and the men who are directly interested in each one of those industries have figures to present.

Senator WATSON. Have you figures on those things?

Mr. FISHER. Yes, sir.

Senator WATSON. All right.

Mr. FISHER. The Tariff Commission reports in answer to questions directed to universities, that the universities pass the material on to the students at varying prices. The material is paid for by the student, and we have, as a result, a special class of college men enjoying the special privilege which other students do not have. The boy who gets his knowledge of his selected means of making a living as an apprentice has no duty-free importation on his tools. The man who is not so fortunate as to have parents with sufficient means to send him to college and studies these very same subjects at home,

aided by a correspondence school course has to pay duty on everything he uses. With modern conditions and the correspondence school it is possible for a man to become a thoroughly prepared scientific man without attending a college. For instance, Mr. Thomas Edison, to-day our leading scientific man in this country, never attended a college. One correspondence school alone reported 9,904 students enrolled in studying chemistry. Every one of those men must pay duty on their tools. The correspondence schools are quite interested in eliminating this law, which discriminates against their own students. We now have a class of men employed in this country known as glass workers and instrument workers, and this group of men will be deprived of their employment if the instrument users of this country abandon them for those of Germany. In these days of social unrest, the best interests of this country will be served if we eliminate any class privilege, particularly so since the granting of that privilege works a hardship to another class of men. In the United States we have an organization called the American Chemical Society, which is composed of 14,000 of the leading chemists of the country. This organization came to the country's aid and carried on all the scientific work during the war, especially in the gas service. Now, just to let you gentlemen know the opinion of that body of chemists, they passed a resolution at a recent meeting, as follows:

After extended discussion the council expressed its opinion that the development of American-made glassware, chemicals, and chemical apparatus should be encouraged every way, and that for a reasonable period of years, at least, the present laws allowing duty-free importation to colleges, scientific, and educational institutions on chemicals and chemical apparatus, should be revoked.

The council also expressed its opinion that duty-free apparatus and chemicals has been a very effective form of foreign propaganda in creating in the mind of the youth of this country an impression of the superiority of such foreign-made material.

That, gentlemen, is the expression of the users of this stuff—men who have no interest in the manufacture.

Industrial independence is one of the greatest factors in this bill. Before the war the industries in this country were controlling the production of their plants with no thought to the origin of the apparatus and instruments used for that purpose. Imagine their surprise when the German imports were shut off and they could not get the laboratory instruments necessary to their operation. In those days I have known them to offer ten times the normal value of an instrument made only in Germany. Although the total value of such apparatus is very small, yet the importance of it is so great that the scientific apparatus and instrument industry has been referred to as the "master-key industry," not merely a key industry, but a "master key." It is well named, because the dye industry, which the President in his last message said should be protected, could not operate for a day without these control instruments. It is purely a chemical process carried on in the works instead of the laboratory, and the laboratory checks every move of it.

The textile industry, the leather industry, the iron and steel industry, the copper industry, the lead and zinc industry, the chemical industry, coke and by-product industry, the rubber industry, cement industry, petroleum industry, coke industry, cotton-oil industry, ex-

plosives industry, food-preserving industry, sugar industry, fertilizer industry, turpentine and rosin industry, and every other industry where metallurgy, bacteriology or chemistry is involved, relies on the use of scientific apparatus and instruments for its control.

It would be interesting to note here that a Pittsburg steel works reports that the entire cost of the chemical apparatus and instruments, with which a \$50,000,000 output was controlled, was \$4,200, or less than one one-hundredth of 1 per cent.

Although the bill protects directly and indirectly practically every industry in the United States, it does not stop there. The public health of the Nation is protected by means of the instruments used in the laboratories here in Washington, and in those of the State, county, and city health departments, and by providing the surgical instruments also necessary to public health.

It would be interesting for us to note right here how Germany is looking on the condition of affairs in the chemical-apparatus industries in this country to-day and what they propose to do. Fortunately, they have stated this very clearly in *Chemische Apparaten*, a German scientific magazine, on page 81 in volume 6. The abstract of this article appears in the November 20, 1919, number of *Chemical Abstracts*, and here is what the Germans say:

In order to lower the cost of production and to enable German manufacturers of chemical apparatus to compete in foreign markets, especially with American goods, the German Chemical Society has appointed a committee to examine all forms of apparatus and to select those most suitable, with a view of reducing to a minimum the number of types and sizes to be produced and to make parts of the same type interchangeable.

Germany made a declaration of war in 1914 and thought America would not fight. No doubt this declaration of an industrial war on the scientific apparatus industry of this country is made on the same assumption. I think they are going to be fooled again.

The disposition of this bill determines whether the United States will or will not maintain the present national independence in the industries controlled by these imports. If that independence is not maintained then the industries making these goods will have to be scattered and the workmen will have to find other employment, and we will then go back to Germany for our goods.

I think, in the light of what has happened in the last four years, that the master-key industry dare not ever again be intrusted to those beyond our boundaries. England had the same problem. The manufacturers of that country were promised that they would be given protection after the war as an inducement to them to develop those manufacturing facilities. England has kept her promise by establishing an embargo on the importation on such instruments.

The Americans exacted no such promises when the requirements of these instruments were imperative. They saw the need, they developed the facilities, and they trained the workmen to meet it, knowing full well that they would be absolutely dependent on a tariff bill such as you have before you, for their future existence. They simply relied on their true American instincts which told them if they went ahead and "made good" and supplied the country's need in its emergency, that you gentlemen would do the right thing by them.

One reason why this bill should be passed is in itself ample for prompt approval, and that is that the national defense requires it. Who does not remember Uncle Sam's appeal for the "loan of eyes for the Navy?"

We are told that Carl Zeiss in Germany had 75,000 pairs of field glasses all ready for the men who manned their submarines and field artillery.

Everyone is familiar with the fact that in modern warfare a piece of artillery is directed by sights and range finders and without these it is as helpless as an automobile without a steering wheel.

These are precision instruments which can not be made with any equipment or by any workmen save that equipment of those men now engaged in making scientific instruments. Just think of ever allowing ourselves to be caught again without any optical glass or facilities to make fire-control instruments. Also note that the Chemical Warfare Service, Engineer Corps, and Medical Corps must have scientific instruments as well as the Artillery, in order to function properly.

The Nation's facilities to make explosives is quite dependent on chemical apparatus and scientific instruments for their control. In England they had to commandeer such apparatus in order to equip their munitions factories.

The large explosive plant at Nitro, Va., was not able to operate until they found a maker of scientific instruments, who made for them powder dies accurate to one ten-thousandths of an inch. The use of precision instruments in time of war has been explained far better than I could by the War Department. This department sets forth very clearly the lack of facilities in this country, to make fire-control instruments for artillery at the beginning of the war and how such facilities have since been developed. It explains this in American Munitions, published by the War Department, compiled by Assistant Secretary Crowell at the request of Secretary Baker, who asked that the information be set forth briefly, nontechnically, and authoritatively. Secretary Crowell states in the introduction that all statements of facts in this book have been checked by the Statistics Branch of the General Staff.

In chapter 6 of that book on Sights and Fire Control Apparatus, he states, on page 139:

At the present time American manufacturers are in a position to make instruments of precision equal to the best European product, and the industry will continue, provided there is an adequate market for its product. Such a market will exist if the universities and commercial laboratories of the country will obtain scientific apparatus from American manufacturers rather than import it from abroad, as has heretofore been the custom.

Those are the exact words of Secretary Crowell about that situation.

The purpose of H. R. 7785 is to maintain, in the way suggested by the War Department, these precision instrument-making facilities, so necessary to the defense of our country in time of war.

No doubt you have found that most things, which we would like to keep standing for national defense, have an element of expense connected with them—standing Army, standing Navy, standing everything costs money, but H. R. 7785 provides a way to keep our

military instrument-making facilities standing with no expense to the Government, but with an increase in its revenue.

Thank you.

Senator FRELINGHUYSEN. What competition do you face in the manufacture of these articles?

Mr. FISHER. The competition to-day is local competition. We have competition among ourselves to begin with and therefore there will be no monopoly; and we have German and Japanese competition.

Senator FRELINGHUYSEN. I am referring to competition with foreign countries. What is the comparison of wages between Japan, Germany, and the United States?

Mr. FISHER. If you will permit me, some of the men who follow can answer that, because they have the data at their finger tips.

Senator FRELINGHUYSEN. What amount is invested in this industry?

Mr. FISHER. I can not tell you the total amount invested in the terms of this bill, but I have data from the hands of the men involved from which we find that there has been \$17,070,000 invested in the development of it—not the total—just the development.

Senator FRELINGHUYSEN. What is the value of the manufactured product?

Mr. FISHER. I have not figures on the total.

STATEMENT OF MR. JOHN B. O'BRIEN, VINELAND, N. J.

Senator WATSON. Where do you live, and what is your business?

Mr. O'BRIEN. I live at Vineland, N. J., and I am a glass blower by occupation.

Mr. Chairman, I just want to give my experience as a glass-worker who has come in contact with the competition of foreign-made goods in the glass industry, so far back as I can relate. Prior to 1910, in this chemical and laboratory glassware, there were very few shops employed in this country. I might state there were not over four shops, at the very most, in the United States working on chemical and laboratory glassware. The reason there were no more shops employed was due to foreign importation, so that the manufacturers were not justified in going into that line of ware. The workmen at that time were not proficient in the craft, for the simple reason there was not enough ware produced in this country to educate the workers in that line of work.

In 1910, in order to try to get that class of ware made in this country, we held a conference with our manufacturers and increased our output 20 per cent. That had its effect for a while, and for about three months we had steady work. But due to the increased production of the shops the orders the manufacturers could secure were filled, and the result was we dropped back in the same old rut. There were no orders, and we, as workers, thought we had gone as far as we possibly could, and we increased our days' work without any increase in wages, which was practically a reduction of 20 per cent. The glass industry, so far as the chemical and laboratory glass is concerned, stood still until 1914.

Senator WATSON. What was the reason for that, Mr. O'Brien—foreign competition?

Mr. O'BRIEN. Foreign competition; yes, sir; Senator.

Senator WATSON. Particularly from Germany?

Mr. O'BRIEN. Particularly from Germany and Austria. Our wages were at that time pretty low, and we did not feel justified in going any lower in our wages in order to try and compete with foreign-made goods.

Senator WATSON. What was the average wage paid at that time?

Mr. O'BRIEN. The average wage paid at that time was probably \$4.12.

Senator WATSON. And what was the German and Austrian wage at the same time?

Mr. O'BRIEN. I believe, according to the statement we had and figures, that it was \$1.25, according to their marks—5 marks, I believe, was their limit.

Senator WATSON. Making the same things you were making?

Mr. O'BRIEN. Making the same things we were making; yes, Senator.

Senator WATSON. How did you compete at all; how did you get into the market?

Mr. O'BRIEN. We did not have any market on that class of ware. The market stood still so far as production in this country was concerned. But in 1914, at the outbreak of war, the jobbers in this country had quite a supply. But due to the British fleet putting a blockade on the German imports into this country, the demand became great for this class of ware.

I might state that prior to that there was what I would term, from a worker's standpoint, a propaganda that was being spread throughout this country by the different professors of the universities, claiming that the workmen of this country were not proficient in making this line of ware and could not make it satisfactorily for the use for which it was required.

However, in 1914, as I have stated, the demand became so great that we got the orders, and we did not have enough practical men at that time to met the demands. But I knew we had workers in our organization in this country, if we were given the chance, that would produce these goods in competition with any foreign workmen.

The outbreak of the war gave us the opportunity. The orders became great and we were required to take men from other departments of the glass trade and educate them in this line of chemical and laboratory glass. How well we succeeded is on record now, because we do not now take our hats off to any foreign workers, so long as we get the chance, and the chance was given to us then.

Senator WATSON. Are you still in that same business?

Mr. O'BRIEN. I am still in that same business and have no other occupation.

Senator WATSON. What are the average wages paid now in these American factories making that product?

Mr. O'BRIEN. \$6.60.

Senator WATSON. And do you know the number of men employed in that particular industry?

Mr. O'BRIEN. At the present time I would judge—in this particular line?

Senator WATSON. That is what I mean.

Mr. O'BRIEN. Understand, prior to the war we had about 20 men blowing this glassware. At the present time our reports from our different local unions in different parts of the country show 800 men who are skilled workers, but the number employed at the present time, skilled and unskilled, is about 5,000.

Senator WATSON. Have you any idea what the German wage is?

Mr. O'BRIEN. At the present time?

Senator WATSON. Yes.

Mr. O'BRIEN. No; I could not tell that. Japan is our worst competitor.

Senator WATSON. I was going to come to Japan. What is she producing along this line and what does it cost to produce, so far as you know?

Mr. O'BRIEN. I could not really give you the figures from a workman's standpoint, or what the figures are on the market. But as I understand from the last report of the Department of Commerce, the wage is 53 cents to the highest paid workman—that was the male over 15 years of age. Then they had males under 15 years of age who are receiving 24 cents a day, and in the child labor they paid 20 cents over 15 years of age in a certain class of ware—that is, for the common labor—and 15 cents under 15 years. As I understand, that was yens, which is just about half of our money.

Senator WATSON. Mr. O'Brien, those youngsters could not do the work you are doing in this country?

Mr. O'BRIEN. Hardly.

Senator WATSON. They would not have the knowledge and skill.

Mr. O'BRIEN. Understand, that is child labor.

Senator WATSON. Of course, and you have no child labor at all?

Mr. O'BRIEN. Very few of them. I do not believe there are employed in this class of work—

Senator FRELINGHUYSEN (interposing). Mr. Chairman, in that connection, may I read a short letter from the Secretary of Commerce dwelling on that subject?

Senator WATSON. Certainly.

Senator FRELINGHUYSEN. It is addressed to Congressman Bacharach, and it is dated June 7, 1919:

My dear Congressman: Replying to your letter of June 5, I am happy to inform you that since writing you on the 4th, we have received some more recent information in regard to wages in Japan, and find that the wages for 1917 of the workers in glass manufacture are as given in the attached table.

It may also be of interest to you to know that there are 283 working-days in the year, and that the average number of working hours in a day is 11½.

From information which we have received, we are inclined to believe that wages in 1918 increased about 40 per cent over these figures, as a result of the rice riots of last summer, which are said to have been due to the great increase in the price of rice and other foodstuffs.

If there is any further information on the subject which you desire, it will be a pleasure to endeavor to secure it for you.

Very truly, yours,

WILLIAM REDFIELD, *Secretary*.

The table inclosed by the Secretary of Commerce is as follows:

| | | |
|---|---------|------|
| Wages of workers in glass manufacture for the year 1917 in Japan: | | |
| Number of working days in a year----- | | 283 |
| Number of working hours in a day----- | | 11.5 |
| Daily average wages-- | | |
| Over 15 years of age-- | | |
| Male ----- | cents-- | 87½ |
| Female ----- | do----- | 10½ |
| Under 15 years of age-- | | |
| Male ----- | do----- | 14 |
| Female ----- | do----- | 11 |
| Probable wages for 1919 in Japan: | | |
| Daily average wages-- | | |
| Over 15 years of age-- | | |
| Male ----- | cents-- | 53 |
| Female ----- | do----- | 24 |
| Under 15 years of age-- | | |
| Male ----- | do----- | 20 |
| Female ----- | do----- | 15 |

Senator THOMAS. Does the secretary give the Japanese rates of duty on this material?

Senator WATSON. That is, into this country?

Senator THOMAS. Their scale of protective duties.

Senator FRELINGHUYSEN. There is nothing here in regard to that.

Senator WATSON. The probabilities are that Japan, with those wages, would not need any.

Senator THOMAS. The probabilities are that Japan has a high protective duty.

Senator WATSON. I know she has on most things, and I wondered whether they required a duty on these products at those prices; however, there is no use wondering about it as we can find it out later on.

Senator FRELINGHUYSEN. May I ask Senator Thomas what relation that will have to this industry?

Senator THOMAS. I understand one of the claims for this enormous rate of duty is the difference in wage, and consequently the difference in cost of production. Nearly all these countries have protective duties—Germany, France, and others—and it is a matter of interest to me, to know in what respect those duties have affected wages in those countries.

Senator WATSON. The question is whether those duties on this particular product are revenue duties or protective duties, or what they are.

Senator THOMAS. The theory, as I understand it, of the protectionists in this country is that the duty should correspond largely to the difference in cost of production, which includes the wages, between the competing countries and our own. Consequently, I should think it to be an important subject.

Senator FRELINGHUYSEN. And that information can probably be obtained.

Senator THOMAS. Yes; I will secure it from the Treasury or Commerce Department.

Mr. O'BRIEN. Mr. Chairman, as I stated once before, the orders became great in this country and it compelled other concerns to go into this line of ware other than the Whitehall-Tatum Co.; for instance, there was the C. C. Wheaton Glass Co., Millville, N. J.; the International Glassware Co., at Millville, N. J.; the Kimball Glass Co., at

Vineland; the Vineland Flint Glass Co., of Vineland; Durand Koering Co., of Vineland; the Standard Glass, of Nowfield; H. C. Frye Glass Co., at Rochester, Pa.; the MacBoth-Evans Glass Co., which has built numerous factories throughout the country; the Corning Glass Co., at Corning, N. Y.; the Canton Glass Co., at Marion, Ind.; and several others which I can not just recollect.

Senator THOMAS. Did these companies which you mention spring into existence since the declaration of war by Germany?

Mr. O'BRIEN. They were old established firms, you understand, but never made this line of ware, and it required money to equip their plants for this class of ware.

The War Department uses a great deal of those articles, and we hold our annual conference with the manufacturers, when we make our agreement on wages and rules governing factories and when the demand became so great we simply threw aside our laws at that time, so far as the limited number of pieces were concerned, and the workers worked their full 8½ hours in order to get out those orders.

Senator THOMAS. Prior to that time, Mr. O'Brien, had not mechanical glass blowing very largely reduced the number of glass blowers previously used?

Mr. O'BRIEN. Not in this line of ware; that was in the bottle industry.

Senator THOMAS. You can not use mechanical glass blowing on these wares at all?

Mr. O'BRIEN. Not on this class of ware.

Senator WATSON. That is, to make test tubes and retorts?

Mr. O'BRIEN. You can not use any mechanical device to make them at all; they have got to be hand made altogether.

We simply went in there and got out as much production as it was possible to do, and in fact, when the labor shortage became so great they worked overtime. In fact, a number of our workmen had worked during the war 12 hours per day in order to get out the production which was absolutely necessary for the successful prosecution of the war. At that time we figured that after the war was over we were going to get some protection whereby we would be in position to hold this trade in those industries that we developed, because we figured we were supplying the needs of the country at that time and doing our part, even if not on the battlefields of Europe, yet were fighting in the industrial battlefields here and we wanted protection.

Just prior to the close of the war I had seen some samples of Japanese glassware which had been sent into this country. We did not pay much attention to it because we thought it consisted of just a few pieces. But after the armistice was signed it became a menace to us on the market, and I was instructed by our national office to try to make an investigation and see to what extent this ware was coming in. I knew the people in New York City who were importing it and I went to New York and purchased some ware last April. There is probably some of it here on exhibit. And I might say that the price I bought it for and had it delivered in Vineland was cheaper than what it cost us to manufacture; that is, the labor cost on it—I do not know what the overhead charges were—but the skilled labor and the boy help on what I had shipped to

Vineland was cheaper than the actual labor and the skilled labor on the shops at cost.

Since that time we have tried in every way to compete with the Japanese manufacturers, but it seems like we are up against a stone wall, and when this bill was introduced by Representative Bacharach we figure it was to go through both the House and the Senate without much opposition due to the fact that it was an industry that had been just developed in this country, and it is necessary that an industry like that must be maintained in this country by our own workers, otherwise there is no incentive for the workers to learn any trade like that where they have to spend years of the best part of their lives to learn the trade and then see it go to foreign countries.

I might state, that in addition to that, we have quite a number of our men who went into the service in France and who to-day are walking the streets here, due to the fact that this department is failing, due to the importation of foreign goods.

I will also say that the concern with which I am employed, the International Glass Co., at Vineland, N. J., is only running one-third capacity.

Senator THOMAS. What is the amount of our importations of this glassware?

Mr. O'BRIEN. That, Senator, I could not tell you. The only thing I can tell you is that the orders in the factory are depreciating.

Senator THOMAS. You have no first-hand information then, about the volume of importations into this country.

Mr. O'BRIEN. Only the quotations I see from the departments.

Senator THOMAS. You mean quotations of prices?

Mr. O'BRIEN. Prices; yes, sir; and the amount of ware they keep in stock.

Senator THOMAS. Is it your impression that American manufacturers, at this time, are selling their goods at a loss?

Mr. O'BRIEN. At a loss?

Senator THOMAS. Yes.

Mr. O'BRIEN. I could not tell you that, Senator; I do not know what their labor cost is.

Senator FRELINGHUYSEN. Mr. Chairman, the statement of Congressman Bacharach on that subject in his speech before the House contains an estimate of the value of chemical glassware before the war by two of the principal importers for the year 1913, as compiled by the United States Tariff Commission, which placed it from \$1,200,000 to \$1,500,000—

Senator THOMAS. That is, before the war.

Senator FRELINGHUYSEN (continuing to read):

Of these totals the value of merchandise imported free of duty for educational institutions the same year was from \$500,000 to \$800,000, or from 42 per cent to about 53 per cent.

In 1915 American factories and shops produced chemical glassware to the value of \$950,819, according to the report of the Tariff Commission, and in 1918 it was valued at \$2,865,774.

Senator THOMAS. That does not answer my question; that has reference to postwar.

Senator WATSON. His statement had reference to prewar conditions.

Senator FRELINGHUYSEN. Do you mean what has it been since the armistice?

Senator WATSON. In other words, what is it now?

Senator FRELINGHUYSEN. I would like to ask the witness this question: You spoke of the fact that many of the employees who went to war are without employment, due to competition. Where does the competition come from?

Mr. O'BRIEN. The only way I can answer that is to say we think it is foreign competition, mostly from Japan.

Senator FRELINGHUYSEN. In other words, Japan is competing with your industry.

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. By reason of the fact that the embargo of the war has lifted?

Mr. O'BRIEN. Yes, sir.

Senator THOMAS. According to the reports of the Tariff Commission for 1918, Japan's imports of lenses and other optical instruments, including spectacles, is \$24,000.

Senator WATSON. What does it say about glassware?

Senator THOMAS. Optical glass, England, \$200,000; France, \$71,285.

Senator FRELINGHUYSEN. This is entirely a different product, Senator Thomas.

Senator THOMAS. It may be, but that is the only information I have found this far on that subject.

Senator FRELINGHUYSEN. That is optical glass, and this is chemical and laboratory ware.

I regret I was not here when the committee convened. This bill I am handling for the Congressmen in the Senate and a good many of the industries interested are in my State. I am deeply interested in it, and I am very anxious that the committee should hear all of the witnesses who are present in Washington at the present time. They have come from many States in the Union and are here at your command, and I hope that whatever is done they will be given the opportunity during the day to be heard fully and completely.

Senator WATSON. Have you anything further, Mr. O'Brien?

Mr. O'BRIEN. I might state, Senator, that we find that free-duty clauses are the worst menace we have, so far as the laborers' viewpoint is concerned, for we find that from 43 to 52 per cent comes in under the free-duty clause. When you figure the amount that is made and approximately 50 per cent comes in under the free-duty clause, the proposition we are up against becomes easily seen, and that is the reason why we desire to have this legislation enacted if possible.

As the gentleman here stated there is no industry in the country where laboratories are connected with it that are not dependent on this glassware. Without this ware the instrument workers and the rest of them would not be able to do their work and we feel it is due to the American worker and the American manufacturer which have got to cooperate with each other, that something is done to protect this industry. If we get the protection we are asking for, which is absolutely necessary to protect us, then this country will never have to depend on any foreign country in the future for

instruments, such as you have exhibited here to-day. I believe that is due to us as workers engaged in an infant industry, and that we are entitled to it for the time we have put in and the patience and the way we have worked along with others in the past four years.

Senator FRELINGHUYSEN. Mr. O'Brien, you represent a class of employees who have specialized in this highly technical type of work or workmanship, do you not?

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. And the war created that emergency where we were prevented from obtaining this laboratory glass from Europe, when the war broke out.

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. And in order to carry on the work it was necessary that the American workmen learned how to make it.

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. And they did so?

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. And produced the necessary products?

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. And now the question is whether you are to be allowed to produce this type of material or product and capitalize what has been learned?

Mr. O'BRIEN. Yes, sir.

Senator FRELINGHUYSEN. These last industries in my state were closed before the war. They are running now; and are manufacturing this product. Are you going to allow them to continue, Mr. Chairman?

Senator THOMAS. Do you mean they were closed, Senator Frelinghuyesen, before the war with regard to this particular kind of manufacture or closed absolutely.

Senator FRELINGHUYSEN. They were closed, sir, because of the Underwood tariff taking the duty off of glassware and the competition from England, Japan, Austria, Belgium, and Germany had closed them.

Senator THOMAS. Then you say they were closed absolutely.

Senator FRELINGHUYSEN. They were closed absolutely.

Senator THOMAS. I notice that the Underwood bill—

Senator FRELINGHUYSEN (interposing). I say "absolutely." I know of two or three which were closed. Others were closing rapidly by reason of that legislation.

STATEMENT OF LIEUT. COL. MATHEW A. REASONER, MEDICAL CORPS, UNITED STATES ARMY.

Senator WATSON. Colonel, what are your duties?

Col. REASONER. I am the officer in charge of the Army Field Medical Supply Depot, Washington.

In addition to my testimony before the House committee, I would say that there is hardly a man present in the room that I did not make personal requests of during the period of the war for certain laboratory apparatus which it was necessary to have, I being the purchasing agent for the Medical Department for laboratory supplies. Many of them were not made in the United States, or have

not been made in the United States, but these men "came across" and produced laboratory supplies, equipment, and apparatus equal to—in many cases better than—that which we had previously secured; and because of that in July we were sending over laboratory apparatus in accordance with requisitions, and by the time of the armistice we had gotten up to the point where to-day we have the biggest collection of laboratory apparatus and supplies in the medical supply depot that has ever been brought together in the history of the Government.

Senator CURTIS. And you had a sufficient quantity supplied by these people?

Col. REASONER. We started in December, and by July it was coming in sufficient quantities to fill the requisitions, and by November the requisitions were filled on the other side.

Senator CURTIS. And in your judgment, from your experience with these men and with the industry, it should be given protection as recommended in this bill?

Col. REASONER. Col. Russell represents the using part of it. He is in charge of the infectious diseases and laboratories during the war, and he will speak from the view part of the users; I speak from the view part of the purchaser.

STATEMENT OF COL. F. F. RUSSELL, MEDICAL CORPS, ARMY MEDICAL SCHOOL, WASHINGTON, D. C.

Col. RUSSELL. I am now at the Army Medical School, in charge of the laboratories, and during the war I was in the Surgeon General's Office, in charge of all of the laboratories of the Army and of infectious diseases. Before the war I had been at the Army Medical School for some years. At that time we bought practically all our glassware and most of our chemicals and reagents in Germany. When the war broke out we had this acute shortage. We were unable to make these things. Col. Reasoner and other purchasing officers, by agreements with manufacturers, succeeded in gradually taking up one new thing after another, and at the present time we have most of the things that we need, and they are made in this country.

We also have worked from time to time, and are still working, for a standard supply table, our point of view being that nothing should go on that standard supply table for the Army unless that article could be made in the United States.

We are at a tremendous disadvantage if we can not get what we want here and war shut out the supply; and we eliminated from our chests that are sent into the field with troops everything that is made outside of the United States, and which we will not be able to get. At the present time we are working along very satisfactorily.

Senator WATSON. What of the products supplied by American industry?

Col. RUSSELL. Yes.

Senator CURTIS. You say you go without some supplies now? Could those with proper encouragement by legislation in the way of protection now be produced in this country?

Col. RUSSELL. As far as I know, I think they can. They have succeeded so far in producing better glassware than we ever got in Germany.

Senator CURTIS. You are not a purchasing agent?

Col. RUSSELL. I am not a purchasing agent; my only object is to have something that can be had.

Senator CURTIS. Are the articles produced in this country as good as those that you got from the old country?

Col. RUSSELL. Yes.

Senator CURTIS. Some of them are superior.

Col. RUSSELL. The Pyrex glassware, I think, is superior to anything we ever bought in Germany.

Senator CURTIS. How about durability?

Col. RUSSELL. It is more durable. Our dyes we had considerable trouble with, but they are improving as we are able to establish investigations; I think that the dye makers can meet our specifications. Our one trouble we have at the present time is that our old dyes were bought by trade-marks; there were no specifications.

Now, we are making specifications, and as those specifications are understood I think our manufacturers will be able to meet them; that is, they are meeting some, and I expect they will meet more. Our rare sugars are also being made in this country now, as well as the dyes.

We have taken the position that we can not afford to put anything into our supply table for the use of the Army unless that thing is attainable in the United States.

Senator CURTIS. And it is your opinion that with proper encouragement all the things needed could be made in this country.

Col. RUSSELL. Everything that we have taken up and gone to the manufacturers to produce has been produced or is now being worked upon.

Senator WATSON. Successfully?

Col. RUSSELL. Yes, sir.

Mr. FISHER. We have a man who is purely an outsider, who is in the position to speak for the industrial concerns of the country.

STATEMENT OF MR. H. C. PARMALEE, EDITOR OF THE CHEMICAL METALLURGICAL ENGINEERING MAGAZINE, NEW YORK CITY.

Mr. PARMALEE. In my position as editor I feel that I am quite familiar with conditions in the industry, although I have no direct interest either in the manufacture or consumption of the materials themselves. The principal thing I would like to call the committee's attention to is the national importance of the commodities that are mentioned in these bills.

Senator WATSON. I do not think you need to go into that, because we understand that. The only thing in the world we want to know—and we have some witnesses who are able to tell us that. We take it for granted that it is necessary to have these industries in the United States, and we want to support them in the United States. We want to know what tariff is necessary and why it is necessary, and that is all we want to know.

Mr. PARMALEE. On that, Mr. Chairman and gentlemen of the committee, I think the word of the Tariff Commission and the word

of these other gentlemen will be far more valuable than anything I can give.

Senator WATSON. We want the practical men who deal in these problems.

Mr. PARMALEE. That is all right, Senator.

Senator WATSON. But it is not necessary to be heard on anything on which we all agree.

Mr. PARMALEE. That is very fine, if you all agree on that.

Mr. FISHER. Senator, our idea in calling these disinterested men is to show that it is in the public interest.

Senator CURTIS. And not only that; we want to give you what you need.

Senator WATSON. We want to give you what you need and no more than you need.

Senator CURTIS. And we want to be able to defend what we give you.

STATEMENT OF MR. J. M. ROBERTS, OF CENTRAL SCIENTIFIC CO., OF CHICAGO, ILL., AND SECRETARY OF THE SCIENTIFIC APPARATUS MAKERS' ASSOCIATION.

Mr. ROBERTS. Mr. Chairman and gentlemen of the committee, the next subject is that of cost. The committee will appreciate in these days of economic unrest throughout the world that this is a rather difficult subject to approach. I will say that as a cardinal principle that you can not compare the rate per hour of the American workman with the rate per hour of the German or Japanese workman on account of, first, the increased efficiency of the American, and, second, the fact that we do more machine work and not so much hand. In comparing these costs I am going to take only a few of the instruments that were imported previous to the war and give our costs at that time as compared with the German.

Senator CURTIS. And can you give us the comparison with the Japanese.

Mr. ROBERTS. I am first taking up the scientific instruments and apparatus. A very popular scale or balance was formerly imported by some manufacturers and was used in large quantities. The "duty-free" cost that the educational institutions were entitled to on this balance laid down in Chicago was \$6. Of that 75 cents was expense of transportation, etc., which made the cost of the balance without any charges \$5.25. We are asking for 45 per cent duty on scientific instruments, which should be computed on \$5.25 and would make the average cost from abroad, duty paid, \$8.11. Our cost on the same balance during that time ran from \$8 to \$8.75.

Another instrument that we imported is what is known as a declination and inclination needle. It is a fine instrument for use in laboratories. The German cost, "duty free" laid down in Chicago was \$10. Our cost at that time ran \$13. Actual German cost, less expense, on duty-free basis, \$9; plus 45 per cent duty which we are asking, \$13.05.

Alternating-current apparatus formerly cost from Germany, "duty free," \$17.50. Our manufacturing cost was \$25. The actual German cost on duty-free basis, less transportation, was \$16, plus 45 per cent duty, equal to \$23.50.

We have another instrument which was supposed to be here, but failed to arrive, the Westphal balance. This balance includes a glass plummet, made by the glass manufacturers. We are now producing them complete in this country at \$13.50 to \$15. They were not made here previous to the war. The cost from Germany previous to the war was \$6. The present cost from Germany would, perhaps, run \$9, plus 45 per cent duty, which is \$14.50, as against the cost price \$13.50 to \$15.

Senator WATSON. Why do you say "perhaps"? Have you any idea about cost of production over there?

Mr. ROBERTS. Yes.

Senator WATSON. How did you find it out?

Mr. ROBERTS. We have a letter from a manufacturer of balances that states that his price to us has increased 60 per cent. The only thing that we are in doubt about is the transportation rate from Germany here. You know ocean rates are fluctuating these days.

Senator WATSON. Did you get anything like a definite statement from him as to the wages he paid his men?

Mr. ROBERTS. No, sir.

Senator CURTIS. Wages have increased over there from 40 to 60 per cent.

Senator WATSON. You got no definite statement about the increased cost of materials?

Mr. ROBERTS. Not in regard to labor or increased cost of materials. They are very careful not to say anything about that, and I have not anything personally.

Now, we come to the glassware section of the bill, for which we ask 60 per cent duty. The instrument section asks for 45 per cent.

In this connection I wish to state that the efficiency of the American glass blower is becoming greater, and we believe before long that we will have an increased output, due to labor-saving devices, that will enable us to compete on a majority of the things on the 60 per cent duty rate on scientific glass. The thing that is needed at the present time is a quick settlement of this matter and, of course, in favor of the American industries. Our workmen are becoming restless as they hear of the possibility that they will soon be in competition with the foreign goods. If we could stabilize the industry and be assured of protection for a period of years, the production would increase and the men would settle down and develop themselves into good instrument makers and glass blowers.

I have a number of pieces of apparatus before you, for example, the Meyers sulphur apparatus, made Vineland Scientific Co., according to their latest cost, October, 1919, was 90 cents; the Japanese price, "duty free," 58.8 cents, f. o. b. New York. Now, there has been a contention on account of the investigation conducted two years ago that 45 per cent should be the duty on this kind of glassware. So this cost is figured on the basis of 45 per cent duty, which makes the Japanese selling price with that duty 85 cents, while our cost is 90 cents. This shows we need the additional duty on that piece—or 60 per cent.

We have here a stopcock. I will read you the factory report on this piece.

Cost of the Kimble Glass Co., 2-mm. Gcister Stopcock, No. 8525, October, 1919.

| | |
|---|----------|
| Number at beginning of operations..... | 185 |
| Number at end of operations..... | 123 |
| Number lost in operations..... | 12 |
| Making barrels, 8½ hours, at 84 cents..... | \$2. 805 |
| Lehr labor, ½ hour, at 36 cents..... | . 18 |
| Drilling, 8½ hours, at 54 cents..... | 4. 50 |
| Stoppering, 10 hours, at 74 cents..... | 7. 40 |
| Stopper plugs, 10½ dozen, at 8 cents per dozen..... | . 82 |
| Washing and greasing, 1½ hours, at 18 cents..... | . 27 |
| | <hr/> |
| | 16. 065 |
| Total prime cost, each..... | . 13 |
| Material..... | . 08 |
| | <hr/> |
| Total cost of each..... | . 21 |
| Overhead..... | . 003 |
| | <hr/> |
| Total cost of each..... | . 273 |
| Japanese quote Nov. 28, 1910, duty free f. o. b. New York, \$0.173 plus 45 per cent..... | . 26 |

Going, again, to show that we need a 60 per cent duty.

Senator WATSON. Is that a very much used instrument?

Mr. ROBERTS. Yes, sir; it is a very much used instrument. It is used primarily in connecting up apparatus, also as parts of glass instruments.

Here we have it again and again [indicating]. Over there on that piece we have it again [referring to samples of glassware on committee table] and practically I should say 25 per cent of the laboratory apparatus needs stopcocks.

Take plain funnels, those on the table: First, the 2½-inch funnel. I will not go through the detailed cost as I did above. The total prime cost—

Senator WATSON (interposing). Yes; go through that.

Mr. ROBERTS. The detailed factory report?

Senator WATSON. That is just exactly what we want.

Kimble Glass Co. 2½-inch funnels, No. 7705, cost, October, 1919.

| | |
|--|----------|
| Number of pieces at beginning of operations..... | 2, 003 |
| Number of pieces at end of operations..... | 1, 883 |
| Number of pieces lost in operations..... | 120 |
| Blowing: | |
| 38 hours, at 80 cents..... | \$30. 40 |
| 38 hours, at 60 cents..... | 22. 80 |
| 31 hours, at 25 cents..... | 7. 05 |
| Sorting, 3½ hours, at 32 cents..... | 1. 12 |
| Cracking off, 14 hours, at 40 cents..... | 5. 60 |
| Sawing, 4 hours, at 40 cents..... | 1. 00 |
| Grinding, 38 hours, at 40 cents..... | 15. 20 |
| | <hr/> |
| Total prime cost..... | 84. 07 |
| Material..... | 22. 03 |
| | <hr/> |
| Total prime cost..... | 106. 70 |

22 · LABORATORY GLASSWARE, SURGICAL INSTRUMENTS, ETC.

| | |
|--|---------|
| Total prime cost, each..... | \$0.055 |
| Overhead | .017 |
| | <hr/> |
| | .072 |
| Package charge..... | .09 |
| | <hr/> |
| Total cost..... | .081 |
| Japanese quote, Nov. 28, 1919, duty free, f. o. b. New York, \$0.048, plus 45 per cent..... | .07 |
| Kimble Glass Co. cost..... | .08 |

Senator WATSON. Is that the labor cost now or before the war?

Mr. ROBERTS. It was in October of this year.

Senator WATSON. Right now?

Mr. ROBERTS. Yes, sir; the latest cost from the Kimble Glass Co., of Vineland, N. J., as compared with a Japanese selling price of \$0.048.

Senator WATSON. Where?

Mr. ROBERTS. That is laid down in New York.

Senator WATSON. That is laid down in New York?

Mr. ROBERTS. Yes, sir.

Senator WATSON. At what?

Mr. ROBERTS. \$0.048 duty free, plus 45 per cent duty would make their cost 7 cents. Our cost is \$0.081, showing again that we need 60 per cent to equalize.

Senator CURTIS. I thought that the breakage was pretty large. Could that be reduced by experience?

Mr. ROBERTS. There is always breakage in glassware.

Senator CURTIS. I know there is, but I wondered whether the breakage could be reduced by experience.

Mr. ROBERTS. I do not believe that the breakage is excessive.

Senator CURTIS. I do not know. It struck me so, as a man who knows nothing about it.

Senator WATSON. Are you a factory man yourself?

Mr. ROBERTS. I am an instrument manufacturer but not in glassware blown at furnace. I am a manufacturer of lamp-blown glassware which is a more delicate ware [indicating] but I am not a factory man on the ware that is made in the furnace. This [indicating] this is all made in the Vineland district; the lamp ware manufactured all over the country, and also at Vineland. The breakage on lamp-blown ware is higher than that indicated above.

We have another cost on a different sized funnel.

Senator WATSON. Let those be printed in the record.

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

Kimble Glass Co. cost 3/4-inch funnels, No. 7705, October, 1919.

| | |
|--|--------|
| Number pieces at beginning of operation..... | 517 |
| Number pieces at end of operation..... | 465 |
| | <hr/> |
| Number pieces lost in operation..... | 52 |
| Per cent of loss..... | 10½ |
| | <hr/> |
| Blowing: | |
| 11 hours, at 80 cents..... | \$8.80 |
| 11 hours, at 60 cents..... | 6.60 |
| 11 hours, at 25 cents..... | 2.75 |
| Sorting, 1 hour, at 82 cents..... | .82 |
| Cracking off, 4 hours, at 40 cents..... | 1.60 |

| | |
|--|---------------|
| Sewing, $\frac{3}{4}$ hour, at 40 cents..... | \$0. 30 |
| Grinding, 10 $\frac{1}{2}$ hours, at 40 cents..... | 6. 50 |
| Total prime cost..... | 26. 87 |
| Material..... | 12. 02 |
| | 38. 79 |
| Total prime cost each | . 085 |
| Overhead..... | . 025 |
| | . 110 |
| Package charge..... | . 009 |
| | . 110 |
| Cost each..... | . 110 |
| Japanese quote Nov. 28, 1910 (duty free) f. o. b. New York, \$0.075, plus 45 per cent..... | . 11 |
| Kimble Glass Co. cost..... | . 110 |

Kimble Glass Co. cost 250-cc. Squibbs. separatory funnel, October, 1910.

| | |
|---|--------------|
| Cost of blank..... | . 108 |
| Cost of stopcock plug..... | . 07 |
| Cost of top stopper..... | . 030 |
| Lamp room and grind labor..... | . 30 |
| Washing, inspection, and packing..... | . 08 |
| Total prime cost..... | . 588 |
| Overhead..... | . 117 |
| | . 705 |
| Total prime cost, each..... | . 705 |
| Japanese quoted Nov. 28, 1910, \$0.403 (duty free) f. o. b. New York, plus 45 per cent..... | . 67 |

Mr. ROBERTS. Showing again that the 45 per cent duty is not adequate and 60 per cent is necessary.

I will take some examples of other pieces of Japanese manufacture on which I have the cost.

Senator WATSON. Have you a definite knowledge of the amount of wages paid in the competing factories in Japan, factories making that estimate?

Mr. ROBERTS. No; I have not at present.

Senator WATSON. Nor in Germany—they make that sort of an instrument in Germany, do they?

Mr. ROBERTS. Yes; they make it in Germany.

Senator WATSON. You have not those?

Mr. ROBERTS. No. A tall-shaped round bottle, with a pour out, imported from Japan, duty free, will cost \$2.60; that is, f. o. b. Yokohama. If you add 60 per cent duty to that it will bring it up to \$4.10. Our cost of that here in this country is \$4.84. That leaves 74 cents for transportation, which is approximately what it would be.

Senator WATSON. You know under a ruling of the Railroad Administration the ocean freightage is absorbed; that is to say, they charge less under a ruling of the Railroad Administration for freight from San Francisco and Seattle to eastern United States on all imports than they charge for American goods of the same character, equal to ocean transportation. So that ocean transportation is absorbed on a great many articles under the ruling of the Railroad Administration, bringing into direct competition, without ocean freightage in the production of all those articles.

Mr. ROBERTS. I do not happen to have any drying tubes here, but it is a small U-shaped tube for drying gas. On one 10 inches high the f. o. b. Yokohama price is 8 cents, and 60 per cent duty would bring it up to 12.8 cents. Our factory cost at the present time is 12½ cents. Here is another form of drying tubes, 4-inch, present cost of Japanese, f. o. b. Yokohama is 6 cents, plus 60 per cent duty, would be 9.6 cents. Our cost is 9 cents.

Volumetric flasks: We have one type of it on the table with the stopper ground in. The following cost is on the same form without the stopper, but it will illustrate: Size, 250 cc., f. o. b. Yokohama price, 24 cents; plus 60 per cent duty is 38 cents. Our average cost is 35 cents. The same with the stopper ground in is 40 cents, plus 60 per cent equals 64 cents. Our price is 60 cents. These are typical of the cost. If the chairman desires any further data I will go through these lists.

The CHAIRMAN. Those you do not read can go into the record.

| | Japanese cost, f. o. b. New York, + 60 per cent duty. | American costs. |
|--|---|-----------------|
| Weighing bottles, 50 by 30 millimeters..... | \$0.2875 | \$0.30 |
| Weighing bottles, 50 by 40 millimeters..... | .4025 | .40 |
| Dropping bottles, 30 cubic centimeters..... | .2875 | .30 |
| Potash bulbs..... | 1.035 | 1.05 |
| Retorts, 60 cubic centimeters..... | .276 | .30 |
| Filtering flasks, 500 cubic centimeters..... | .322 | .33 |

Mr. ROBERTS. Showing that 60 per cent asked for is exactly what we must have.

There is another point I am sure you will be interested in, and that is the comparisons of the American selling prices at the present date as compared with 1914. We are both manufacturer and jobbers. We have in our catalogue, I suppose, from 10,000 to 12,000 items, some of our own manufacture, some bought in the Vineland district, some made in our lamp shop, and others purchased from various manufacturers.

We have a practice of keeping a record of our outgoing tonnage. We divide, for our own information, the volume of business done each month by the tonnage sent out, and in October of this year we had a very interesting experience. We had wondered how much our goods advanced on an average. It is practically impossible, with so many items, to get correct information by comparison of selling price of individual items. So we struck an average from the value of the tonnage, and we found that the advance in selling price of a ton over 1914 was between 65 and 66 per cent. Compare that with the advance in cost of wheat, cotton, Ford automobiles, and shoes, and you will find that the scientific instrument makers are not profiteering, because our costs have advanced in a less proportion than other things.

I have a letter here from Leeds & Northrup in regard to the matter of costs. The Leeds & Northrup Co. is held up as an example of efficiency in the instrument line. They claim that in 1916 they paid instrument makers 40 cents an hour, and in 1919 they paid them

81 cents an hour. They further state that unless provision is made at once for the protection of our industry it will suffer much greater competition than before the war, for the reason that all instrument factories in Europe were greatly extended to take care of war needs.

I will insert a portion of their letter in the record.

(The portion of the letter referred to submitted Mr. Roberts is here printed in full, as follows):

THE LEEDS & NORTHUP CO.,
4001 STENTON AVENUE,
Philadelphia, June 26, 1919.

Mr. WALTER R. EIMER,

Eimer & Amend,

Third Avenue, Eighteenth to Nineteenth Streets,

New York City.

DEAR SIR: Our firm, the Leeds & Northup Co., is the only firm of considerable size in the United States devoted to the manufacture of precision instruments for standardization measurements in heat, light, electricity, magnetism, temperature, and electrochemistry. We employ about 400 hands, and our present output is over \$1,000,000 per year. In 1914 it was \$143,000.

In Germany there are a number of manufacturers of similar lines, several of them employing many more hands than we do, the total number of employees in this class of work probably exceeding 10,000. In England and France the same condition exists.

Many of these foreign companies have agencies or branches in this country and have always been actively after the business of the educational institutions because the duty-free clause in the tariff law permits such educational institutions to import free of duty. There is thus created a false demand for foreign scientific instruments, for they are placed in the very institutions where they accomplish the most for foreign makers and affect us most adversely because our engineers and men of science are being trained in the use of foreign rather than American apparatus. As a result, when they go into industrial or research work, they are already biased in favor of foreign apparatus with which they are familiar.

Our standard of wages is high, having increased as follows: Instrument maker—1916, 40 cents per hour; 1919, 81 cents per hour. Apprentice, starting wages—1916, 8 cents per hour; 1919, 22 cents per hour.

In Germany, instrument makers received 18 cents per hour.

Unless provision is made at once for the protection of our industry it will suffer a much greater competition than before the war, for the reason that all instrument factories in Europe were greatly extended to take care of war needs and they now stand ready to very greatly increase their normal output. This may find a foreign outlet even at no profit in order to carry the already established increased overhead charges and keep the new and very large force of employees busy.

Next to munition making, perhaps, the scientific instrument business was the most expanded industry in Europe for war needs. As it is also a peace industry, it is the one line above all others that will try to find an outlet in the United States and South America. Experience has shown that the instrument business is the most vital of any for successful prosecution of war. The next war will be even more a war of applied science, and therefore any plan of preparedness must consider every means for protecting and fostering this industry.

We can only trail behind foreign efforts in the direction of research and scientific application unless we greatly encourage the production of scientific instruments in the United States. Nearly everything that our company produces is of direct use and absolutely essential to the prosecution of research work and the application of its results to industrial problems and processes.

For this reason, therefore, we earnestly request that the instrument business in this country be protected to a point where many more manufacturing concerns will feel that it is profitable for them to engage in such work. * * *

With foreign scientific instruments subject to duty of 45 per cent we can successfully compete with their product, although not on a basis of price equality. The advantage of location and our knowledge of trade conditions and requirements should offset any price disadvantages over and above such

import duty. We learned, during the war, to make certain articles, notably manganin and constantan, and transmitted freely such knowledge to American manufacturers. We hope that such material and instruments made therefrom will be protected from duty-free importation. * * *

Very truly, yours,

THE LEEDS & NORTHRUP Co.,
Per M. E. L., *President.*

Mr. ROBERTS. That applies to instruments and it also applies to scientific glassware, as you can not use an instrument without the glass to go with it; the two are connected together in many cases, and what Leeds & Northrup Co. have said in regard to instruments would apply and they would say the same in regard to instruments made of glass.

Representative BACHARACH. I want to say that considering the fact that four months in the summer have elapsed since this bill passed the House and was sent over to your committee, I have not had one single, solitary person connected with any college to say anything except that the duty should be added.

Senator CURTIS. Have any great number said that?

Representative BACHARACH. Yes; according to the Tariff Commission, which investigated this subject, a great many, 19 to 20 colleges.

Mr. ROBERTS. Gentlemen, in order to get down to concrete facts, two of the firms that are both dealers and manufacturers sent out a few letters to typical colleges and universities, in order to see how they felt about the importance of the industry and the withdrawal of the duty-free privilege. I have the replies here and I will put them in evidence, but I will not read all of them. The following is a summary: From Chicago we sent out the following questionnaire:

First. Do you believe the scientific apparatus industry is a key industry; that is, an industry producing apparatus controlling manufacturing processes?

So far I have received 20 answers; 19 answered in the affirmative and 1 in the negative.

Second. Do you think it is best for our country that we train our scientific students with apparatus of American manufacture?

To this I received 17 affirmative and 3 qualified answers, and in that qualification they said it would be well for the student to be acquainted with another type. They did not say not to produce it, but it might be well to broaden their view.

Senator WATSON. That is, the student ought to have the very great advantage of a German test tube instead of an American, to broaden his experience?

Mr. ROBERTS. Yes, sir.

Third. Do you believe that the presence of a highly developed scientific industry will foster scientific research in our country, as it has in Germany?

And, in explanation, Germany is always held up as an efficient nation on account of the technical training of so many of its people. Seventeen answered in the affirmative, and the same three qualified again.

Fourth. Do you believe that our manufacturing processes will be under better scientific control if this country is independent in the production of control instruments?

To that 16 answered in the affirmative and 4 qualified as to the ways of control.

Here comes this question, which is the most important one:

Fifth. Are you willing to waive the duty-free privilege in order to perpetuate the scientific-apparatus industry?

Seventeen answered in the affirmative, three qualified as to restrictions in price, and, I believe, one of those three said, "Well, if there is an instrument abroad, and if ours was not as good, it probably ought to be brought in."

Here are the schools which answered this: University of Michigan, seven departments, all affirmative; Michigan Agricultural College, the president wrote in the affirmative and then said it was a national duty to establish the scientific-apparatus industry in America and should be supported by every institution in the country; University of Cincinnati; Kansas Agricultural College, Manhattan, Kans.; Kansas State University at Lawrence; University of Missouri; University of Mississippi; Mississippi Agricultural College; Mellon Institute of Industrial Research, University of Pittsburgh; Minnesota Agricultural College; University of Oklahoma at Norman; Oklahoma Agricultural College at Stillwater; Tulane University at New Orleans; University of West Virginia at Morgantown.

In addition to the Chicago letter one was sent out from New York to the eastern section of the country, and, as it was more of a general letter, and it did not give these specific questions, but we can go through the letters received and pick out answers to the same questions in their general discussion.

In response 10 replies were received from the following institutions: Yale University School of Medicine; Massachusetts Institute of Technology, Cambridge, one department; Pennsylvania College at Gettysburg, Pa.; again, Massachusetts Institute of Technology, another department—the department of technical analysis; Columbia University, New York; Middlebury College, Middlebury, Vt.; Washington University, St. Louis; Pennsylvania State College; College of the City of New York; Boston University, School of Medicine. Of these nine answered in the affirmative and in the negative, 1.

In the questionnaire sent out by the chairman of the Tariff Commission to the members of the American Chemical Society (the questionnaire that Mr. Bacharach referred to), 17 were in favor of the repeal of duty free, 1 qualified, 1 said no, and 1 did not answer.

Representative BACHARACH. Will you not please insert the names of colleges?

Mr. ROBERTS. I have that in another point.

Representative BACHARACH. They are the largest colleges in the country?

Mr. ROBERTS. Yes, sir; I refer to the testimony of Mr. Sheridan, the special representative of the Tariff Commission. He gives the names of these colleges in the general questionnaire. These included Yale, Cornell, Pennsylvania University, Leland Stanford University, Illinois University, Pittsburgh University, University of Chicago, Washington and Lee University, University of Michigan, Washington University at St. Louis, Carnegie Institute, Rockefeller Institute, Bureau of Chemistry here in Washington, Bureau of Standards, Washington Hygiene Laboratory, Geophysical Laboratory, and Pratt Institute, Brooklyn.

In the report by the Tariff Commission on scientific instruments Leland Stanford University and University of California were quoted as being opposed to the abolition of the duty free. I have a telegram this morning from Mr. Hartley, of the Braum Corporation, Los Angeles. I wired him to interview the heads of Leland Stanford and the University of California and see who gave the information to the commission. Mr. Hartley wires as follows:

We have promises of some energetic forceful telegrams and letters from those in authority both of Stanford and the University of California strongly in favor of repeal of duty-free law. These telegrams and letters should go forward within the next 24 hours. We hope to have similar letters to send from the universities near Los Angeles.

Senator WATSON (reading):

May I express my own view that the present system of free entry of such instruments should be continued. It seems to me that every possible handicap should be removed from our educational institutions. The present financial burdens of our universities and educational institutions in general are almost overpowering with the increase in general expenses, and this is coming at a time when the necessity for education of the best type is more pressing than ever before in history. (President Leland Stanford University, July 18, 1919.)

Representative BACHARACH. That is David Starr Jordan.

Mr. ROBERTS. I have several letters I could read you. There is one here especially from Dr. Freas, of Columbia University, that I would be glad to read if you want to hear it on this subject.

Senator WATSON. Is it along the same line?

Mr. ROBERTS. It is in regard to duty free.

Senator WATSON. He is in favor of its repeal?

Mr. ROBERTS. He is in favor of its repeal, and he gives some very strong points.

Senator WATSON. Read it then, sure.

Mr. ROBERTS (reading):

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK,
DEPARTMENT OF CHEMISTRY,
December 10, 1919.

Mr. WALTER EIMER,

Fifteenth Street and Third Avenue, New York City.

DEAR Mr. EIMER: With reference to my position on the question of duty-free importation for colleges and universities, I would like to make the following statements:

1. I would consider any industry closely associated with science as a key industry, that is, it is an industry, while in itself it may be comparatively small, it has a great influence over other industries. The things that one does train to do other related things more easily, and if men are untrained in these key industries, they will naturally be very limited in their ability to branch out when an emergency arises.

2. In case of difficulties with foreign countries, it is almost necessary for a country to be self-sustaining, and if a nation is handicapped in the key industries it will be handicapped in those large industries which are necessary for defense. Therefore it is a self-evident fact that any country that wishes to be self-sustaining in case of emergency should cultivate its scientific industries or key industries in times of peace.

3. There can be no question but that the research work of this country has been greatly hampered during years of peace as well as in times of war because of our lack of men who are qualified to work as instrument makers, glassblowers, skilled mechanics, etc. Scientists engaged in research and especially research chemists can not progress in a satisfactory manner if they are dependent entirely upon foreign aid, whether in times of peace or war. New ideas in research, to be effective, must be carried to conclusion as rapidly as possible. In other words, to be effective one must "strike while the iron is

hot," and if the apparatus and equipment and chemicals to be used must be imported from a foreign source, much delay and confusion result and little real progress is made. Any one who has given but slight attention to the development of industry can readily see that this is true. It seems almost impossible for success in pottery work to be obtained outside of Trenton or East Liverpool. The scientist or investigator will succeed in the best manner when he is surrounded by men working along the same lines as himself.

4. The necessity for college and universities to make the sacrifice of their privilege of duty-free importation is almost self-evident. No one realizes more clearly than I do that the colleges need the money that is saved by duty-free importation. But the American people must come to the support of their colleges and universities in such a way that these paltry benefits will be of no consideration. The total amount of money that has been saved in all the colleges in the past 50 years was probably spent in errors in one week by the chemical industry during the war. Therefore it seems that the colleges should not be asked to make this sacrifice except indirectly, and that the country should in some manner back them up as a whole. This point should not come in the way of retarding the growth of American industry.

5. The recent war having prevented importation from foreign countries to a large extent, has given the Americans an opportunity of showing what can be done. Two things stand out preeminently as indication of what Americans can do in case of emergency. I refer to the glassware known as Pyrex and the porcelain ware known as Coors porcelain. Before the war these products were almost entirely imported, and when the emergency for manufacturing them arose American capital and ingenuity were at hand, so that to-day we have products that are in one case unquestionably better than anything we have ever imported and the other case equally good. There can hardly be any doubt in our minds that with time many lines would also be developed with the same degree of success. It must be remembered that these things were developed at a time when there was an immense demand for skilled help of all kinds for work in munition industries.

6. It undoubtedly does have a bad effect upon the young men of the colleges to see much of the things with which they work come from foreign countries. It produces a feeling that we are unable mentally to cope with other people and the feeling is aroused that the foreigner is in some way superior. This is drilled unconsciously into the minds of the young men and they retain this impression to some extent all their lives. This has always been noticeably true when talking with all the men who have been trained in the use of foreign-made instruments. For instance, one trained to use electrical instruments might find that most electrical instruments in use are made in this country and thus gain the belief that we excel in electrical instruments and therefore excel in our ideas of theory and electricity. Unconsciously the reverse has been made in the use of scientific apparatus, because most of it has been produced in other countries. Therefore, as a process of Americanization, I think that the apparatus should be produced in this country.

7. There are just two counterirritants to be referred to this whole matter. I refer to the labor situation and the manufacturers' attitude. If our laborers in this country get to the point where they will not try to produce or try to develop industry in a satisfactory manner, it is almost certain that the foreigner, regardless of tariff laws, will be able to furnish us goods in the way of scientific apparatus and chemicals, as well as along other lines.

The other drawback referred to is the fact that many manufacturers do not attempt to produce things that are up to the highest standard. For instance, many manufacturers expect the scientist to use glassware that is in every way poorly designed, and there can be no doubt in my mind but that in some cases the user of apparatus would rather pay for apparatus produced in foreign markets, even if the duty be three times the normal rate, rather than use the product of the American manufacturer.

Yours, very truly,

THOS. B. FREAS,
Associate Professor of Chemistry.

Senator WATSON. Who wrote that letter?

Mr. ROBERTS. That is from Dr. Thomas B. Freas, who is associate professor of chemistry of Columbia College and has to do with all of the buying.

Here is a letter I would like to read.

Senator WATSON. How long is it?

Mr. ROBERTS. Two pages, double space. This from Prof. Baskerville, of the College of the City of New York.

Having been requested to express an opinion in re H. R. 7785, I beg leave to make the following statement:

1. The manufacture of laboratory glassware, porcelain ware, optical glass, scientific instruments and apparatus having been undertaken by Americans during the World War to meet an emergency demand at home, adequate appreciation is due them after the war.

2. As an independent Democrat in politics I believe in tariff for revenue only. As an American above everything else I believe also in protecting American industry, especially during the early stages of development of a particular industry. I equally believe that the extent of the protection should be in proportion to the necessity of the same. Necessity is here used as meaning just pay for labor and proper profit for capital invested and risk involved. I assume the figures given in the report accompanying this bill are those decided upon by qualified experts in such matters (to which I make no pretensions).

3. As director of laboratories I have imported articles many thousands of dollars in value, because they could not at the time be had "made in the United States" or could be bought cheaper elsewhere, especially when imported duty free. Most of the articles were made in Germany, and in their use with students unfortunately went an insidious propaganda injurious to American ability and prestige, particularly where there were many students of recently foreign origin. In placing our orders during the current year preference has been given American-made goods, even if the prices quoted in competitive bids on foreign-made articles were slightly lower. I have given instructions to follow the same practice during 1920 and purpose continuing it, unless ordered to do otherwise by those whose authority is superior to mine.

4. "Americanism" should be preached and practiced in every institution of learning in the United States. We should not again allow ourselves to be duped by insidious propaganda. Further, if it cost the institutions of learning some money to safeguard their students from this propaganda, it will be more than worth it. I am not sure, however, that it will cost more in the end; for while the individual student may pay more for his apparatus and chemicals, the money goes back to our own people in labor and profits. Their taxes support many of the institutions, while these and others are being more and more generously endowed by American men and women of means.

5. Discriminatory authority should be given the Treasury Department to lay a small duty (for revenue only) on unusual and special apparatus and chemicals not made in our country or likely to be made here, except at abnormal expense, thus reducing the cost somewhat of extraordinary research, which at best involves heavy expenditures. The exercise of such discriminatory powers should be more in accord with the spirit and purpose of the laws, rather than by literal interpretation of words. Real research of the highest type would not be seriously hampered by such duties, for the spirit of big investigation is so strong in our country now that it will go forward anyhow.

6. Fundamentally I believe that one great outgrowth of the World War will be more education all over the world. That will mean better hygiene, better living conditions, more provision for entertainment and enjoyment of the higher things of life. Labor will consequently be better paid in some countries and perhaps less in a very few. The tendency will be toward more uniformity of pay, based upon actual productivity, hence I believe that all duties should be reasonably flexible, the elasticity being under the control of a commission (Tariff Commission, if you please) of properly paid experts of the highest qualifications and integrity, as free from political influence as the highest court of our land.

7. I am convinced that it is an obligation on the part of the colleges and universities now to forego the duty-free privilege that the manufacturers may build up the American industries referred to. These industries will be needing properly trained men from these institutions. I am also firm in my expectation that, as the colleges and universities and industries are getting closer and closer together in our country, the manufacturers will do their part for the institutions of learning and research of all kinds.

CHAS. BASKERVILLE,
Professor of Chemistry and Director of Laboratories,
College of the City of New York.

SHOREHAM HOTEL,
H STREET NORTHWEST, AT FIFTEENTH,
WASHINGTON, June 5, 1919.

I beg to acknowledge receipt of your letter of June 4, inclosing copies of H. R. 8734 and H. R. 8735, the first in reference to optical glass, and the second in reference to chemical glassware. I am entirely in accord with any steps that may be taken to assist in the manufacture of certain essential industries developed in this country during the war, as there covered by these two bills.

I would like to inquire, however, why these two lines are maintained rather than the whole subject of scientific instruments. The scientific industry has heretofore been confined to foreign countries. It is claimed by many that the importation of this class of instruments free from duty when purchased by educational and other instruments be prevented the building up of the scientific industry in this country. Optical glasses and chemical glassware are merely two important cases of which there are many.

S. A. STRATTON.

CAMBRIDGE, December 8, 1919.

Mr. W. R. EIMER,
Eimer & Amend.

DEAR SIR: Replying to your letter of the 4th instant, I would say that I am most heartily in favor of the use of American-made apparatus and supplies. I have arrived at this opinion, after many years' consideration, for the following reasons:

(1) America should be self-sustained and self-supporting. Research and testing lie at the foundation of all industries—warlike or peaceful; this should never again be crippled for the lack of material for testing its products.

(2) Let us, as a means of promoting American science, work with American apparatus, American chemicals, American compendia books—all the products of American brains. Foreign materials are in many cases excellent, but we can equal or surpass them if we will.

(3) Difficulties of ordering and obtaining goods made 4,000 miles away, and particularly through a third party. Apparatus made here can be quickly obtained and sent back if not as represented or to specifications.

(4) Judging from American surgical instruments and small tools, chemical apparatus will be standardized, simplified, better adapted for its purposes, when our manufacturers do devote their energies to its production.

By all means, support the American supply makers to the fullest extent.

Yours, very truly,

AUGUSTUS H. GILL,
*Department of Technical Analysis,
Massachusetts Institute of Technology.*

MELLON INSTITUTE OF INDUSTRIAL RESEARCH,
UNIVERSITY OF PITTSBURGH,
December 9, 1919.

SCIENTIFIC MATERIALS Co.,
709 Forbes Street, Pittsburgh, Pa.

DEAR SIR: I am in receipt of your letter of the 5th instant. I was present at the meeting of the council of the American Chemical Society at which the question of the stand of that society in the matter of duty-free importation of scientific apparatus was determined. I spoke at that time strongly in favor of having no duty-free privileges to educational institutions in this regard. While the aggregate cost to the whole country of the foregoing duty-free privilege would be very considerable, the additional individual cost to each student is so small as to be no hardship on the student. Furthermore, if one leaves out the advantages in exchange which may continue for some time in favor of this country I doubt whether most foreign manufacturers of scientific apparatus will be much cheaper than the American-manufactured articles. If the duty-free privilege is cut off, the volume of business ought to enable the American manufacturers and jobbers to sell at a lower price than at present. I am certainly in favor of giving them every chance to try the experiment and if after a period of years it develops that they are charging prices which indicate that

there are undue profits then I would be in favor of going back to duty-free importation; but if they are willing to give the buyer the benefit of lower prices, due to increased volume, then certainly the industries should be protected.

Yours, truly,

R. F. BACON, *Director.*

THE PENNSYLVANIA STATE COLLEGE,
State College, Pa., December 8, 1919.

EIMER & AMEND,
New York City.

GENTLEMEN: Regarding the purchase of scientific apparatus and chemicals in the near future I may say that the policy of this college, so far as it is within my power to control it, will be in accordance with the following points:

1. We shall purchase American-made apparatus, chemicals, and all other equipment of American dealers, so far as the goods can be had.

2. We shall purchase by importation only those articles which can be had in no other way.

We hope that you, as dealers, will exert your energy in the direction of supporting the infant American scientific industry, started since 1914, and not abandon it in favor of the German and Japanese market.

Yours, very truly,

G. G. POND,
Dean, for the President.

WASHINGTON UNIVERSITY,
St. Louis, December 6, 1919.

WALTER R. EIMER,
New York City.

DEAR SIR: I am in receipt of your communication of December 4 concerning the purchase by educational institutions of foreign materials.

Most distinctly I wish to go on record as being in favor of supporting our own American scientific apparatus industries. I wish to state that I am of the opinion that the American colleges and universities should not purchase from the German or Japanese markets. I find that the American goods are all that can be expected of them. And I wish that you would consider me as going on record as against the purchase of German materials, and I hope that steps will be taken to prevent colleges and universities from importing German and Japanese ware.

Very truly, yours,

L. McMASTER,
Professor of Chemistry.

WEST VIRGINIA UNIVERSITY,
Morgantown, W. Va., December 11, 1919.

SCIENTIFIC MATERIALS Co.,
Pittsburgh, Pa.

GENTLEMEN: I have read with much interest your letter of December 5, concerning continued support of American manufacturers of scientific apparatus, and my answer is "Yes" to all of your five questions.

I have no doubt it will be necessary to waive the duty-free privilege, in order to perpetuate the scientific apparatus industry, as I am confident that everyone concerned will be glad to do this in order to make this country independent of all other countries.

I note your mention of a possible invasion of Jap stuff, none of which has ever gotten past my approval and never will.

Very truly, yours,

B. H. HILE,
Professor of Chemistry.

MIDDLEBURY COLLEGE,
Middlebury, Vt., December 8, 1919.

Mr. WALTER R. EIMER,
New York City.

DEAR SIR: In answer to your letter of December 4 regarding support of the American scientific industry.

This department is very well satisfied with American-made glassware and porcelain and we plan to support American-made products in every possible way, not only in our orders but in the classroom as well. We do not plan to make any importations from either Germany or Japan, nor will we use products from either of these countries if we know it. In the future all orders will be placed with the understanding that American-made apparatus only will be accepted. The same statements apply to chemicals.

I hope that the findings of your meeting will be published in the journals of the various scientific publications.

Yours, very truly,

ARTHUR R. DAVIS,
Acting Head Department of Chemistry.

MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE,
Agricultural College, Miss., December 8, 1919.

THE CENTRAL SCIENTIFIC Co., Chicago, Ill.

DEAR SIR: In reply to your letter with reference to the support of the American apparatus industries, it seems scarcely necessary to write you that we are heartily in favor of giving our new industries every possible help.

The position in which we found ourselves on the opening of hostilities was very unfortunate, and I believe that scientific men in this country will not fail to encourage in every way they can American manufacturers who have developed such excellent wares. We must expect American goods to cost more for the present, but the question involved is not one of money alone.

Regardless of what others may do with reference to the privilege of duty-free importation, we do not ourselves (in so far as we can control the situation here) expect to import anything from the Central Empire. I should be glad to see Congress abridge the right of free-duty importation until American manufacturers can maintain themselves. If this is done, it will then rest with our own manufacturers to supply their products at reasonable profits only. I believe that they will do this, and I believe that we ought to stand behind them.

Trusting that you will scarcely receive a dissenting voice with reference to the support of our own manufacturers, I am,

Very truly, yours,

W. F. HAND, *State Chemist.*

Mr. ROBERTS. The total number of institutions interviewed from the three sources indicated above were 50—in favor of the repeal, 43; qualified, 4, and in their qualification they did not say no; 2 said no; and 1 did not answer.

I have some information in regard to the cost per student, and I first am going to give my own experience when I was in school and then quote from two universities. When I was in school at the University of Chicago, 1894-1896, it was the method there to buy tickets from which portions would be cut off as we got supplies from the storeroom. It cost me \$5 in nine months for the breakage of apparatus that I could not turn back. That was supposed to be on the duty-free basis. If it was on duty-free basis and the 60 per cent duty was added, it would have cost me \$3 more a year.

At Georgetown University here in Washington they find as follows for the year 1919: To outfit a student desk in the laboratory costs about \$25 a year. Of this amount about \$15 goes for the consumption

of chemicals, and \$10 covers the cost of glassware, rubber tubing, etc., and the student is charged at the end of the year for breakage, which averages \$3 to \$4. That is not much, and add 60 per cent and you will see the increased cost is \$2.40 per year.

George Washington University in this city charges a breakage fee of \$10 at the beginning of the term. The average cost of breakage per student is \$5 per year, and the remainder of the fee is remitted to the student. The additional charge, if this cost was on duty-free basis, would be only \$3 per year.

There is another peculiar instance—you take Columbia University, the University of the City of New York, Chicago University, and the University of Wisconsin at Madison, where they have so many students in chemical departments this year that they can not accommodate them, and all of them use duty-paid prices because they can not get the others, and the attendance is larger than ever, showing the increased cost had not kept students from the courses.

Senator WATSON. The committee will now rise until 10 o'clock to-morrow morning, when we will meet in this same room.

(Thereupon, at 12.20 o'clock p. m., the subcommittee adjourned to meet at 10 o'clock a. m. to-morrow, Saturday, December 13, 1910.)

LABORATORY GLASSWARE AND SCIENTIFIC AND SURGICAL INSTRUMENTS.

SATURDAY, DECEMBER 13, 1919.

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

The subcommittee met, pursuant to adjournment, at 10 o'clock, a. m., in committee room, Capitol, Senator James E. Watson, presiding.

Present: Senators Watson (chairman), Curtis, and Thomas.

Also present: Senator Frelighuysen.

Senator WATSON. We will proceed, gentlemen. Who is the next witness?

Mr. FISHER. Dr. McClung.

Senator WATSON. Proceed with your statement, Doctor, if you care to make one.

STATEMENT OF DR. C. E. McCLUNG, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.

Dr. McCLUNG. I shall be very brief. These gentlemen have asked me to express the opinion of a laboratory man with regard to the protection of manufacturers of scientific instruments in this country.

If you view it in a narrow way, of course, the laboratories would like to get all they can for their money, because the universities are in a desperate situation now. But we can not separate the interests of one class from another and can not advance in one science without the support of other sciences, and if we have good instruments we travel more rapidly. If we use the instruments of other countries we have the ideas of other countries, and it is to the interest of all that we should have our own manufacturers to support us. When I was at the University of Kansas I bought American-made microscopes when they were not anything like as good as those of German manufacture, simply because I felt we ought to build up our own manufactures in this country. I think in general that the laboratory men all feel the same way about it.

We make as good microscopes in this country now as are made anywhere. They were not nearly so good when the manufacturer started, simply because they had not had an opportunity to build up their business.

Senator WATSON. You are not afraid of the duty-free repeal?

Dr. McCLUNG. Not at all.

Senator WATSON. And are you convinced that these instruments and others of like character that you are using in laboratories and otherwise in your research work are just as good as those made in other countries?

Dr. McCLUNG. Every bit as good. We can make anything in this country that we have a chance to make. Unless there are some questions that you desire to ask me, that is all I care to say.

Senator WATSON. I think that covers the ground.

Mr. FISHER. Mr. Chairman, Mr. Lewis G. Wilson, of Precision Thermometer Co., of Philadelphia, was unable to be here. He has however, sent some information to Senator Penrose on the subject, and inasmuch as he is not here to-day I should like to have this inserted in the record.

Senator WATSON. Very well; that will be printed in the record. (The matter referred to is here printed in full, as follows:)

PHILADELPHIA, PA., December 10, 1919.

HON. BOIES PENROSE,

Chairman Finance Committee, United States Senate,
Senate Office Building, Washington, D. C.

DEAR SIR: The importance of the above-mentioned bill is, of course, obvious to you on general principles as an old-line protectionist and supporter of American industries, nevertheless, the bill has a significance entirely aside from any theory of industry protection against foreign competition. The natural and ultimate net result of the duty-free clause in previous tariff bills was that when the United States entered the war the most serious handicap which they encountered was the lack of development of the scientific industry in this country. It was only by the most superhuman endeavor that the situation was even partly met, but under the spur of this endeavor the scientific instrument industry has actually been established in the United States in very much the nature of an infant industry, except in certain special lines.

The President and the Congress have recommended that certain legislation be accomplished in regard to certain industries which have been classified as "key industries"—these are, of course, largely in the chemical field. It is a simple statement of fact, however, that there was no key industry that did not depend upon the instrument-making industry, and without which the results accomplished by the so-called "key industries" would have been impossible. In an article which was published by the historical division of the Philadelphia district office of the Ordnance Department of the Army in the Philadelphia Press of September 5, 1919, the officials of this division not only conceded that the instrument industry was the "key industry," but went further than this and indorsed the characterization of the instrument industry as the "master key of the key industries."

In the writer's opinion, this one fact in itself should be sufficient to insure the passage of H. R. 7785. The particular article in question (of which a reprint is herewith inclosed) pertained directly to this company, but this company is by no means the largest of the companies now engaged in instrument making and merely typifies the industry, so that the term "master key" applies even more truly to the industry as a whole than to any one unit such as ourselves. We earnestly suggest that this article be presented to the consideration of the committee and placed on record. We would particularly call your attention to the matter of artillery parts in the first column, and to the acute situation existing at explosives plant C at Nitro, W. Va., mentioned in the second column, both of which situations were relieved by instrument makers and instrument makers only. In fact, it was only the scientific instrument maker who made possible the testing of guns and ammunition, measuring of muzzle velocity, and all of those factors which enter into fire control, without which artillery is useless.

If there is to be a scheme of self-sustained and self-sufficient defense from the country's own resources, it is vital, from a strictly American and national point of view (regardless of the welfare of the infant instrument industry), that the duty-free clause be eliminated and that a duty be imposed that will

make it impossible for the Germans to again control the supply of instruments used in this country to the extent that they did before the war.

It might be mentioned that in Philadelphia alone there are at least seven instrument-making establishments, and, including the smaller shops, even more than this.

Yours, very truly,

PRECISION THERMOMETER & INSTRUMENT CO.,
LEWIS G. WILSON.

[An unsolicited article published by the Historical Division of the Ordnance Department, United States Army, from information in their official archives, Philadelphia Press, Wednesday, Sept. 6, 1910.]

PHILADELPHIA FIRM PROVED THE MASTER KEY OF THE KEY INDUSTRIES—IN-VALUABLE WAR SERVICES RENDERED BY THE 'PRECISION THERMOMETER & INSTRUMENT CO.—SMALL THINGS, BUT VITAL—MARVELS ACCOMPLISHED BY EMPLOYEES WHO WORKED IN THREE SHIFTS.

(How Philadelphia accomplished the herculean labor of producing more than \$2,000,000,000 worth of war materials within a short space of time, more than one-sixth of the amount produced by the entire Nation, is told in the series of articles of which this is the twenty-fourth. The articles are accurate in every respect, having been attested by the Ordnance Department, to which they were submitted.)

The turnover from American standards of measurements to the metric system used by the French called for intensive engineering, thought, and application. Philadelphia manufacturers know the story only too well. The change from inches to centimeters meant new tools, new tolerances prescribed, new limit gauges, etc. Under the drawings submitted by the French our American drills, reamers, taps, and dies were useless. They could not function to produce results in accordance with the French specifications. That we did accomplish the seemingly impossible (considering time limit and the stressful urgency) is amply and happily proven by the results accomplished as depicted in these daily stories.

The "man on the street" possibly appreciates to some extent the larger and more spectacular achievements of the Ordnance Department and of those manufacturers who were able to accomplish the large and spectacular things. It is doubtful, however, that the average man realizes on how small a thing the large things sometimes depend.

Instrument making, as compared with locomotive building, the construction of battleships or huge pieces of artillery, is a small thing and the total amount of money invested in instrument-making shops in the United States would seem small when compared with the invested capital of a single one of the larger corporations who were in position to do the Herculean tasks which the exigencies of war demanded. Nevertheless, the war proved, beyond argument, that instrument making was not merely a key industry in the sense that the term is now used, but that it is the master-key of the key industries.

The Precision Thermometer & Instrument Co., of Philadelphia, began the struggle to establish an instrument-making business in the face of foreign competition in 1910. It was uphill work and there were many things it was impossible to undertake in the face of conditions then existing. Before the war was dreamed of, however, they had demonstrated that they could build certain special instruments such as stadimeters, illuminated dial peloruses, and other instruments for the Bureau of Navigation of the Navy Department, temperature-measuring instruments for the Bureau of Steam Engineering, Navy Department, barometers for the Signal Corps of the Army, and other classes of instrument making in addition to their regular line of industrial thermometers. A nucleus of skilled instrument makers was formed in the shop, by means of which the company was afterwards able to render services which at that time had not even entered the imagination.

Scarcely anything was done for the Ordnance Department that did not depend either directly or indirectly upon the instrument makers. Perhaps it is pertinent to state at the present time that Uncle Sam started to build new guns before there was any definite public information or action pointing toward our participation in the war. Nevertheless, the big steel companies

were building guns. It was found that the breech and firing mechanisms of the guns required, for instance, certain special forms of springs of the finest tempered steel. There were large corporations whose exclusive business was the manufacture of springs, but it ultimately transpired that after going from pillar to post the country over the only sort of a shop that could properly turn out the particular springs required was not a spring shop but an instrument shop. The parts were small, were of many different shapes, were required to stand specific stress tests, had to be accurately machined to given dimensions within a plus or minus tolerances of half a thousandth of an inch, and had to be absolutely interchangeable, so that if any spring should wear out or break during use or action a duplicate part could be immediately put in place without a moment's delay or difficulty.

BIG GUNS AWAITED SPRINGS.

The Precision Thermometer & Instrument Co. started manufacturing these springs in 1916, and had not been informed officially what they were for. They did know, because they had been told, that great difficulty had been experienced, and that no satisfactory springs had been obtained, and they undertook to make them and succeeded. After Gen. Pershing had put his troops into action he informed the Government that what he needed most, and first, and must have, were 75-millimeter guns. The Ordnance Department informed the Precision Thermometer & Instrument Co. that these springs were parts of the 75's, and that the Bethlehem Steel Co. was behind the Ordnance Department's schedule of deliveries because they were waiting for springs. Four days after this information was imparted spring production was ahead of the schedule and stayed ahead of it until the end of the war. You could put a dozen of these small parts in your vest pocket, but it required skill, patience, specially designed tools, and specially trained men to make them, and they were made to the extent of many thousands in this instrument shop in Philadelphia.

Speaking of guns brings to mind another important matter. One of the final acceptance tests on all gun and ammunition of whatever caliber is the so-called chronograph test for muzzle velocity. In other words, the velocity of a projectile as it leaves the muzzle of a gun must be accurately measured. A given type of shell of a given size fired from a standard gun of corresponding size must have a uniform muzzle velocity to make fire control possible; without this uniformity, the elaborate mechanism of the gun sight would be worthless, the range finders and all the mathematics that enter into the control of gunfire, especially indirect fire, would be of little value. The chronograph is an instrument for measuring the muzzle velocity of a projectile. Some of these instruments had been made in France and England; a few of old design had been made in this country. The War Department was making its own in the Frankford Arsenal instrument shop. American explosives manufacturers were making powder for the Allies before Uncle Sam started to fight. French, English, or German instruments were not available.

PRODUCED IMPROVED CHRONOGRAPH.

The Precision Thermometer & Instrument Co. decided that it would make chronographs. The cooperation of the ballistic experts of the Du Pont Co. was readily obtained, because Du Ponts needed these instruments in their business and had not succeeded in obtaining accurate ones in America. A little team work resulted in the production in Philadelphia of improved muzzle velocity instruments, by means of which not only greater accuracy but greater speed in running tests were attained than ever before.

When the United States entered the war—in fact, if it is not a secret, before we entered the war—the Government started to expand the Government proving grounds. This meant an increase in the instrument equipment and the Frankford Arsenal instrument shop was by that time too busy with other things, so that the Government had to depend upon private enterprise. It was found by the firing of comparative tests with all known or available makes of chronographs that the only instrument that gave accurate results with standard ammunition and standard guns on a standard range had come out of the shop of the Precision Thermometer & Instrument Co., of Philadelphia. The Ordnance Department therefore discarded the old Frankford Arsenal type and specified chronographs of this make. The company was called on the long-distance telephone from Washington and asked what they could do to

help. The men in the shop were interviewed. They proved to be 100 per cent American and agreed to work all the overtime that human endurance could stand. The first lot of chronographs were ready for delivery to the proving grounds almost before the contracts had been signed.

The company equipped the Sandy Hook Proving Grounds, the Aberdeen Proving Grounds (the largest in the world), the Nitro and Old Hickory powder plants, the American ordnance base in France, the big-gun range at Panama, the inspection division, the Erie Proving Ground, and the Springfield Armory, as well as the private ranges of the Du Pont Co., Peters Cartridge Co., Aetna Explosives, Western Cartridge Co., and others with muzzle velocity instruments, turning out about 100 complete units of equipment, besides many spares and accessory instruments, and completing all the requirements that the Ordnance Department had outlined in this branch of work before the armistice was signed. This was not one of the spectacular things that made an impression on the public mind, but it was one of those things without which neither guns nor ammunition could be supplied to the troops.

STARTED \$50,000,000 PLANT.

Another brief anecdote will illustrate the sense in which the instrument-making industry is a master key:

The public at large now know something about the huge smokeless powder plant at Nitro, W. Va. The smokeless powder grains as turned out for any given size and type of shell must have a definite burning rate in order that a definite charge of powder may have a definite predetermined explosive force, which, of course, is one of the factors in obtaining the required uniformity of muzzle velocity essential to fire control. This rate of burning is determined by the size of the grain of powder, the number and size of the perforations in it, as well as by its chemical composition. This forming of the grains to the required size must be done with the most minute accuracy, and is done by forcing the powder in a plastic state through specially constructed dies. The tolerances allowed in the construction of the dies were very fine, on some parts being plus or minus one ten-thousandth part of an inch.

On the Friday before Labor Day, 1918, an Army officer and a Government inspector walked into the shop of the Precision Thermometer & Instrument Co. and told them that the Nitro powder plant, which cost \$50,000,000, was finished and ready to run, and that 30,000 men were there ready to go to work, and that the plant could not turn out a pound of powder because nobody had yet succeeded in making satisfactory powder dies. All the company had before it were the blue prints. Special tools, jigs and gauges had to be made. Special composition steel had to be obtained.

The company started on the job that day; they worked the next three days, Saturday, Sunday, and Labor Day, 12-hour shifts, without even stopping to eat, on the finest and most difficult kind of work. On the Tuesday after Labor Day the inspector inspected and accepted the tools, jigs and gauges, the special composition steel had been obtained, some from Chicago, some from New York, and some from Philadelphia, through the cooperation of the Midvale Co. and the telegraph companies. On the 15th of September, practically two weeks after the proposition was put before the instrument makers, the first lot of dies were inspected, they were all accepted, sent to Nitro by special messenger and on the 16th of September, Nitro was making powder. Many hundred additional dies were made in the next few weeks. A 75-millimeter powder die isn't much larger than man's thumb when assembled complete. There is nothing spectacular about it, it didn't run into carload lots or millions of money, but they couldn't make powder without them and it was an instrument shop in Philadelphia that met the situation and solved the difficulty.

The big powder plant at Old Hickory, near Nashville, Tenn., also had to fall back on the instrument shop. In the nitrating of cotton or wood pulp, temperature is a very important factor. To measure the temperature in a nitrator required the construction of specially designed thermometers. The Precision Co. was asked if it could supply the nitrator thermometers for the Old Hickory plant; they could and they did. When the order was placed the raw material was not in hand nor even in sight, but the complete equipment of nitrator thermometers, from glass blowing to the calibrating and graduating, as well as the making of the special steel and silver casings, was finished, tested, and shipped to Old Hickory just 31 days after the Government engineers asked if the company could do the work.

THERMOMETERS AT \$600 EACH.

In the nitrating department of one of the largest powder makers, chemical conditions were such that no thermometers that had been designed up to that time were suitable for the purpose. Instruments were specially designed to meet this requirement, and it was necessary that the casings and fittings be made of pure silver; sterling silver was not good enough. The silver had to be at least 93 per cent fine. These thermometers were successfully made, however, by the Precision Co., and were so totally different from the layman's conception of a thermometer that it is hard to convey a description of them without going into technical details. They cost about \$600 apiece to make, but they paid for themselves, and the Precision Thermometer & Instrument Co. kept the powder makers supplied with them throughout the period of demand.

In fact, there was scarcely any process employed in the manufacture of supplies for the Ordnance Department which did not require the use of thermometers for control at some stage. This held good all the way from smokeless powder to soldiers' campaign hats.

When the supervisory and control laboratory of the Ordnance Department was established in Philadelphia, it was found that the various stations which came under its direction were having difficulties in making correct temperature measurements. The chief of the laboratory asked the Precision Co. to help them out in this matter, as a result of which the company produced and supplied to the laboratory a number of series of extremely accurate thermometers, against which as standards the other thermometers in the service were checked up and standardized, and the trouble which had been experienced thereby eliminated. These instruments were used for innumerable purposes, from testing the flash points of oil to the determination of the melting point of T. N. T.

They also supplied many special thermometers that were used in tempering the steel for rifles, guns, and shells.

Another service which this company was able to perform and which it succeeded in doing only after considerable risk and expense, was to manufacture in Philadelphia and supply where needed thermometers for the measurement of very low temperatures. The so-called Toluol thermometer, for measuring temperatures to 95° below centigrade, and the Pentane thermometer, for measuring temperatures as low as 200° below centigrade (which is equivalent to 328° below zero Fahrenheit), had never before been made in America. Pentane is dangerous stuff to handle, and the Precision Co. had to discover through its own initiative the technique of their manufacture, as no one in America knew how to do it. After two weeks of experiment and research, they were able to supply all that were required and have some left over for souvenirs.

Certain manufacturers of shrapnel shells had great difficulty in accurately graduating the time-train rings of the fuses. The Precision Co. made master gauges for this purpose, and there was not more trouble. There is a certain part of a shrapnel fuse known as the base charge. In the shell factories these charges were loaded by hand by girls; it took a girl about 90 seconds to load a fuse. The Precision Thermometer & Instrument Co. built machines for the shell makers, by means of which one girl could load 16 fuses in 60 seconds. They also built special machines for the Government for testing primers. Just before the close of the war a new instrument was invented by experts of the Ordnance Department for testing the recoil of guns. The instrument was termed a velocimeter, because of the record that the company had made in building the instruments required by the Government for measuring muzzle velocity, the velocimeter job was intrusted to them; the details of design were perfected in their shop, and while these instruments were scarcely started when the armistice was signed, they have since been completed and delivered.

It was extremely important to test the hardness of steel used in making shells, projectiles, and Liberty motors. Many hundreds of microscopes were made in this Philadelphia shop for the manufacturers who were making the hardness testing machines, of which the microscope was an integral part.

Before the war the chemical laboratories in this country were mainly dependent upon Germany for the special types of thermometers used in laboratory work. The war both cut off the German supply and created a vastly increased demand for such thermometers. The Precision Co. also went into this, trained a special force of employes in the work, and thermometers of this type literally issued forth in a constant stream, running into thousands and thousands of instruments.

The word "thermometer" does not mean very much to the layman, but the temperature-measuring instruments that are used for technical and engineering

purposes are very different affairs from the layman's conception. During the war the Precision Co. turned out about a thousand different types of thermometers for almost as many purposes; for instance, certain special types are used in the Navy Department by the Bureau of Steam Engineering. Many times war vessels would have been delayed in sailing from navy yards or shipbuilding plants if the company had not worked day and night to provide the necessary steam engineering equipment of specially designed thermometers.

One of the big supply houses in Philadelphia took an order from a locomotive works making shells for a micrometer of a somewhat unusual character, and then found themselves in a predicament because there wasn't such a micrometer to be had in the United States, and the corporations who regularly make micrometers couldn't supply it. The official of the supply house, who had taken the order, happened to mention it to a representative of the Precision Co., and it had then been burning his fingers for about four months; one week later the Precision Co. delivered the micrometer.

Mr. FISHER. Mr. Pilling has decided that rather than take your time he will submit a prepared statement.

STATEMENT OF MR. CHARLES J. PILLING, OF THE GEORGE E. PILLING CO., PHILADELPHIA, PA.

Mr. PILLING. The recent European war revealed astounding conditions regarding the supply of surgical instruments, for in time of war surgical instruments are as vitally necessary as ammunition.

Mr. Crowell, the Assistant Secretary of War and Director of Munitions, made the following statement: "Before 1914 four-fourths of all the surgical instruments used in the United States were imported from Germany."

The tariff for many years was only 45 per cent, then in October, 1913, it was reduced to 20 per cent and for a few months during 1914 importations came into the United States at the new (present) tariff of 20 per cent.

Many new agencies of German makers were opened and flourished here.

Of course, the beginning of the European war temporarily stopped these importations, otherwise the industry would have been dead as a door nail in another 12 months.

Germany, in the surgical instrument line, is congratulating herself because she has, while destroying industrial France and Belgium, kept intact her surgical instrument factories as well as all of her special machinery, dies, tools, and other facilities for making surgical instruments, and already is soliciting business from the American dealers, and German-made instruments are now arriving here in large quantities.

The official records of the United States Department of Justice show the dastardly, inhuman, underhanded methods of Germany's supercriminals used against the United States in her endeavors to destroy the honest efforts of the American skill to produce the medical and surgical supplies needed so urgently for the equipment of our Army of 4,000,000 men, and the 211,000 graves of American soldiers in France and the United States probably would have been multiplied many times had the United States entered the war at the time of the sinking of the Lusitania for it would have been utterly impossible to have supplied our large Army with the needed surgical instruments on such short notice.

Now regarding Japanese competition. A large part of the cost of surgical instruments consists of labor. It will be seen that with

Japan's wages so much lower than ours that the foreign wage must be the foundation on which a just tariff is built.

Col. C. R. Darnall, executive officer of the Surgeon General of the United States Army, who did wonderful work during the war as supply officer of the medical and surgical supplies, says: "At the outbreak of the war the situation as far as surgical instruments were concerned was very serious." In his statement before the Ways and Means Committee a few weeks ago he emphasized that because of the small number of surgical instrument manufacturers in the United States when we entered war, the War Department was put to great distress.

Mr. Sovatkin has, I believe, samples of surgical instruments made in Germany, Japan, and the United States, showing comparative figures of cost, and I will ask him to show these to you.

STATEMENT OF MR. E. J. SOVATKIN, REPRESENTING J. SKLAR MANUFACTURING CO., BROOKLYN, N. Y.

Senator WATSON. Mr. Sovatkin, what company are you connected with?

Mr. SOVATKIN. The J. Sklar Manufacturing Co., of Brooklyn, N. Y., manufacturers of surgical instruments.

I have here a letter from a representative of the consumers and retailers in this country, the president of the American Surgical Trade Association, which is the retailers' association of the country, addressed to Senator Penrose. I would like to have that go into the record.

Senator WATSON. Very well.

Mr. SOVATKIN. I have also two telegrams here from people out West on the same proposition.

Senator WATSON. Let them be inserted in the record.

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

AMERICAN SURGICAL TRADE ASSOCIATION, (INC.),
Richmond, Va., December 10, 1919.

Hon. BOBES PENROSE,

Chairman, Finance Committee, United States Senate,
Washington, D. C.

SIR: I understand that there is now before the Finance Committee bill H. R. 7785 on which it is hoped that there will be an early hearing. As president of the American Retail Surgical Trade Association and as a representative dealer in surgical instruments, I would respectfully urge that the industry be protected for this country by a favorable report on this bill.

I call to your attention that as dealers we can make a profit on whatever class of goods we handle, whether German, Japanese, or American make, but for safety of the people of this country and the absolute necessity of surgical instruments for the Army and Navy during the time of war, it is necessary that some measure of protection be given the American manufacturers of these goods; or if not, this industry will sink back to its 1914 impotency in a very short time after normal trade relations are again established.

My firm had placed a prewar order with one of the largest German importers in this country, and lately they offered to restate the order and make pretty fair deliveries at prices below, or certainly not any higher, than what we would have to pay for American-made goods. The scarcity of surgical instruments during the war was appalling, and dealers, institutions, and surgeons were terribly handicapped, as the American manufacturers had responded nobly to the call of the Government; and if it had not been for the fact that they had a few years' start between the time of the shutting off of German compe-

tion and when this country entered the war, our Army and Navy would have indeed been in a very sad predicament, and would have meant the loss of thousands of lives because of the inability to secure the necessary instruments. Not only this, but it would have almost destroyed the morale of our men to know that they were going into battle with the knowledge of the fact that if they were maimed or mutilated the surgeons would not have instruments to take care of the necessary operations.

Some cheap Japanese instruments came into this country during the period of the war, which helped to tide over conditions to some extent; but the loyal American dealers, rather than handle this cheaply-made, competitive stuff or to push the American manufacturers for deliveries when they were so sorely pressed by the Government, allowed their clientele to go without goods. We ourselves had the privilege of equipping a Red Cross hospital unit, one of the best that went abroad, and we had to get many of the instruments needed from England, as the manufacturers on this side were so pushed with direct Government orders. Millions of dollars have been invested in the development of this industry during the war period, and thousands of men have been trained to make instruments. This infant industry ought to receive the same consideration as dyestuffs.

We refer you to Hon. Claude Swanson, Senator from Virginia who knows our firm and our position in this matter.

I hope that you will not fail to give this bill your most vigorous support and bring about an early hearing on same.

Yours, very truly,

ROBT. E. ANDERSON,
Vice President and Secretary Powers & Anderson (Inc.).

CHICAGO, ILL., December 11, 1919.

Mr. E. SOVATKIN,
Hotel Shoreham, Washington, D. C.:

Sorry I could not come; the very existence of our industry depends upon favorable report of bill H. R. 7785. Failure would spell ruin to the entire surgical-instrument industry, a few importers excepted.

H. CARSTENS MFG. Co.

CHICAGO, ILL., December 11, 1919.

E. J. SOVATKIN,
Hotel Shoreham, Washington, D. C.:

As you are on the premises, we wish that you would take up with the Senate Finance Committee and request that bill H. R. 7785 be reported favorably by the committee. The surgical-instrument industry is in a deplorable state, and immediate steps are necessary, as German and Japanese made goods are flooding the market. The Japanese situation is extremely bad.

WESTERN INSTRUMENT Co.

Mr. SOVATKIN (indicating a lot of surgical instruments displayed on the committee table). These instruments that you see before you here in these green rolls are just a few of the thousands of patterns of instruments made in this country that were not made here before 1914. A great many of these instruments are being made in Japan. In this other roll are instruments that are made in Japan, received here by a firm in Philadelphia—Pilling & Co. For instance, here is a Japanese instrument and here is the American-made instrument. They are both exactly alike; you could hardly tell them apart.

There is some talk about the Japanese not making their goods right. Well, they can make them right; they are pretty good imitators.

Here is a forceps, known as the Jones haemostat. Haemostatic forceps are used in every kind of major operation. That instrument is used to close off the blood vessels; as they cut they have to clamp

off every blood vessel. In some operations they have to use as many as 100 of them. There is a Japanese Jones forcep right here. You can compare them. You see, they can finish those goods pretty well.

Their cost of labor on the same article is about one-tenth of what ours is here.

Senator WATSON. That is the big consideration with us here.

Senator CURTIS. Take that up in your own way.

Mr. SOVATKIN. I have some figures here. The head of our firm was in Germany at the time the war broke out. He sailed from America in May, 1914. He went there in order to establish connections for the purchase of such instruments as prior to that time we had been making here, but were obliged to discontinue because of the reduction of the tariff in the act of 1913, which reduced the duty from 45 per cent to 20 per cent. Of course that made it impossible for us to continue the manufacture of those goods which we had been making prior to that time.

Then in 1918 Mr. Sklar made a trip to Japan to study conditions there to see what we would be up against. So these figures on Japanese costs that I have here are not hearsay; they are figures that have been studied by the head of our firm.

Senator THOMAS. I have just come in. Are you discussing now the costs of labor or costs per unit of production?

Mr. SOVATKIN. The cost of production of these goods.

Senator THOMAS. That is, the labor cost and the other costs, without regard to the rate of pay of labor?

Mr. SOVATKIN. Of course, we have to take that into consideration—

Senator THOMAS. Certainly, but what I mean is this. Suppose two men working at 50 cents a day have a certain output as against one man working at \$5 a day here.

Mr. SOVATKIN. You mean as far as the efficiency of the labor is concerned?

Senator THOMAS. Yes; the labor costs of production as determined by the cost of the article?

Mr. SOVATKIN. Well, Senator, in the making of these instruments between 80 and 85 per cent of the cost of production is labor cost.

Senator THOMAS. Then it would be very easy to determine the labor cost of a given article?

Mr. SOVATKIN. We have our records for the American labor cost, because we are producing the goods here and know what it costs to produce them. We have no way of telling the exact labor cost of the goods in Germany, although we know what their wages were in 1914. We know what wages were paid in Japan in 1918, but we do not know what they are to-day. That is how we can get our comparative figures.

I do not want to go into the matter of how essential this industry is to the civil population and to the Army and Navy, because I covered that in the hearing before the Ways and Means Committee and you gentlemen are already acquainted with it. You know you could not operate on a man for appendicitis unless you had the instruments to do it with. Imagine one of your family having an attack of appendicitis and the doctor saying: "I can not operate on him because I have not the instruments." That would be the condition here in case our supply is cut off and we have no industry in this

country. And it is the opinion of surgical-instrument people in this country that one year from now, if some measure of tariff legislation is not enacted to protect the industry, we will be out of business and have no industry in this country.

Senator THOMAS. To what extent has your production fallen off up to this time?

Mr. SOVATKIN. Senator, within the past two months we have received more cancellations and had more goods returned by American dealers than in the preceding five years, and that is due to the fact that within the past two months there was a shipment of surgical instruments received from Germany by an importer in New York and spread all over the country. None of those instruments is stamped "Made in Germany," because the Treasury Department has waived its previous decision, and so those goods are perhaps being sold as American-made goods. That accounts for the cancellations we are getting to-day. So we are already feeling the effects of German competition, which some people say is not here yet.

I have here a series of letters from German manufacturers. The first one is dated July 17, from a very prominent manufacturer. He says:

Please take notice that the advance is from 250 to 275 per cent over prewar prices.

Following that is one dated September 9, from the same manufacturer, in which he says that all prices have now advanced 350 per cent.

Senator WATSON. How do you account for that?

Mr. SOVATKIN. I am going to come to that in a moment, Senator. Here is another one, dated October 8, from the same district, showing an advance of from 450 to 500 per cent.

Then comes one dated October 15, in which that same manufacturer announces an advance of from 700 to 750 per cent. This is very interesting, and I would like to read a few words:

All instruments cost now about 700 to 750 per cent more than before the war. You understand the cheaper our mark the higher the prices.

Senator THOMAS. And that statement right there, in my judgment, is the principal source of trouble of the business in the United States.

Mr. SOVATKIN. You see, their cost of production is perhaps a little higher, based on the gold standard, than it was before the war, and they are raising their prices just enough to cover the falling off of the value of the mark; but it is a fallacy to say that they have raised their prices from 700 to 750 per cent, because they have not. Their mark is worth just a small fraction of what it was.

Senator THOMAS. Every fall of the rate of exchange operates as a bounty on exports from the country.

Mr. SOVATKIN. But we have goods on the way from Germany now.

Senator THOMAS. Of course, and they will continue to come. You can put 500 per cent tariff on a great many articles, and if the mark continues to fall that bounty will continue to operate.

Mr. SOVATKIN. Senator, if you put 1,000 per cent duty on these goods and the mark does not fall you will not be putting a barrier around this industry. There are thousands of patterns of these instruments.

Senator THOMAS. That may be, but the serious trouble in commercial affairs to-day, I think, is this rapid fall of exchange. Years ago we tried to show that the fall in exchange value of silver operated in precisely that way. The establishment of the great iron and steel works in Hankau, China, was due almost entirely to that fact. And unless something is done by the cooperative power of our financial institutions and the Government to steady this exchange, the manufacturing and farming interests and producing interests generally in this country are going to suffer very severely. I noticed in this morning's paper an account of the cancellation of the shipment of 10,000,000 cigarettes, and another of \$500,000 worth of hooks and eyes.

Senator WATSON. They can not buy; that is all.

Senator THOMAS. But they can sell; whatever they can produce they can sell. They can sell on a gold basis here, and the exchange will reimburse them there. That is one of the serious situations that confront this country.

Mr. SOVATKIN. Here is a letter, dated November 12, from a concern in Germany. This was received by us on December 8. It announces an advance of 850 per cent. You see, as the mark goes down up goes their price. And it is going to work the reverse way; when the mark goes up the price is going to fall. They have to have a certain profit over and above their costs. When I mentioned the German pre-war prices I took it for granted that those prices netted them a profit—that their cost of production was lower than their selling price to us—because they had been in the business for about 40 years and they would not have continued, particularly when they had no competition in this country, to sell goods below cost.

Senator THOMAS. Are these letters which you are reading from letters issued by German houses to their domestic trade or to the foreign trade?

Mr. SOVATKIN. You see, the firm of which I am a member, has been manufacturing surgical instruments since 1892, but we also imported German-made surgical instruments, and our business in the imported line grew all the time, while our manufacturing business went down. It took a sudden drop when the new tariff act of October, 1913, put the tariff down to 20 per cent. Then the head of our firm went to Germany to arrange to make those goods in Germany. Those were particularly the soft metal lines, which had never before been imported from Germany. For the first time in the history of this country the largest manufacturer of soft metal goods in Germany opened a sales agency in New York early in 1914.

Senator THOMAS. Can you furnish the committee with a statement of your sales of manufactured goods from 1913, yearly, to the present time?

Mr. SOVATKIN. Yes, sir. I could not give you that to-day.

Senator THOMAS. I understand that.

Mr. SOVATKIN. This letter that I just mentioned speaks of a list of instruments which they say can be delivered immediately—"in the wink of an eye," the German expression is.

Senator WATSON. Senator Thomas asked you a moment ago if that was a letter sent out by that concern to their domestic trade or to customers in the United States?

Mr. SOVATKIN. That is addressed to our firm here.

Senator THOMAS. The prices they quote are for such articles as you may want to buy?

Mr. SOVATKIN. Yes; such articles as we bought from them prior to 1914. A great many of them are articles which we are now manufacturing in this country and are not interested in importing if we may be permitted to continue manufacturing here. But that is up to you gentlemen.

Senator FRELINGHUYSEN. How does the German steel compare with the steel used in American manufacture to-day? Are the instruments just as good?

Mr. SOVATKIN. We are using in America the same grade of steel for the making of these instruments as they use in Germany. The steel varies from 45-point to 110-point carbon. Cutting instruments would have to have steel running between 95 and 110-point carbon. A blunt instrument would require anywhere from 45 to 70 point carbon.

I am going to give you the costs on a few of these instruments which are used throughout the country, staple instruments used all the time, which were formerly made in Germany and are now being made here. They are still being made in Germany and also in Japan.

Here is one called Gluck's rib shear. Every surgeon knows what that is. It is used for resection of a rib in case of empyema of the pleural cavity. The German prewar price on this was 27 marks per dozen. Figuring the mark at about 24 cents plus 20 per cent duty, packing, and transportation charges, made the cost of that, laid down in this country, \$9.45 per dozen.

As to the present German price, I take that same 27 marks and add to that 850 per cent, which is the rate quoted in this letter. Then figuring the mark as of its value on the day when he mailed that letter, November 12, which was 4 cents, and adding 60 per cent duty and packing and transportation charges, the cost of that in the United States to-day is \$18.05. But remember that is 60 per cent duty, not 20 per cent, as it was in the prewar days.

The price of that same article in Japan is 21 yen per dozen.

Senator WATSON. How much is that?

Mr. SOVATKIN. A yen is about 50 cents, and that has not depreciated any. It has increased; I think it is about 54 cents now. Adding 60 per cent duty to that, and transportation and packing charges, it makes \$18.48 per dozen.

Here is the American cost on that: Steel, \$2.24 per dozen; forging and trimming, \$1.44; milling operations, 24 cents; bench work, filing, and fitting—that is hand labor—\$7.80; grinding and polishing, which are the finishing operations and hand labor, \$5.30 per dozen; hurdening and tempering, 36 cents per dozen; nickel plating, buffing, and assembling, \$2.16, making a total of \$19.54 per dozen as the present cost of that article.

That is one article; do you want me to read these others in the same way?

Senator WATSON. Can you tell the average wage paid in your factory as compared with the average wage paid in either Germany or Japan in the same line of activity?

Mr. SOVATKIN. The wages in Germany in 1914 were from 20 to 80 marks per week. That was the average wage paid to the mechanics in the industry.

Senator THOMAS. What are they now?

Mr. SOVATKIN. I do not know; I have no way of knowing.

In Japan in 1918 they were paid anywhere from 60 sen, which is 30 cents, to 2 yen, which is about a dollar in our money, per day.

The wages of our American mechanics employed in this industry to-day range from 60 cents to \$1 per hour, working 48 hours a week.

Senator THOMAS. Then our rate is about 500 per cent, on the average, higher than the average in Japan?

Mr. SOVATKIN. Yes; of course; but our workmen, we must admit, are a little more efficient than the Japanese, and they work shorter hours.

Senator THOMAS. Precisely.

Mr. SOVATKIN. There is no question about that. I would not stand before you gentlemen and tell you our workmen are not more efficient. They are, and they are capable of turning out any kind of surgical instrument that was ever made in any part of the world.

Senator THOMAS. I do not know anything about Japanese labor, but I know that one American miner is worth five or six Mexican miners.

Mr. SOVATKIN. I do not know anything about Mexican labor.

Senator THOMAS. Of course, I know nothing about the efficiency of the Japanese labor.

Mr. SOVATKIN. I do know something about the efficiency of the Japanese, because the head of our firm was in Japan last year and studied those very things, to find out whether it was going to pay us to expand in the industry and invest our money in it.

Senator THOMAS. That is what I would like to hear you on.

Mr. SOVATKIN. I have a report here on labor conditions in Japan. I can put it in the record if you would like, but it covers practically what I have said about their wages.

Senator WATSON. Put it in the record.

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

There are no American manufacturers of surgical instruments in Japan and very little foreign capital invested there in any manufacturing enterprises. However, there is a marked reduction in the former very strong antagonism of the Japanese people against concerns with either all foreign or mixed native and foreign capital establishing themselves there in the manufacturing business, particularly if the industry is new and promises a large increase in exports, but there is a long rough road yet to travel before foreigners can establish a business in Japan and enjoy anything like equal privileges with the native concerns.

The surgical-instrument business in Japan, up to about two years ago, was very small, either for domestic use or export, and the exports were principally to China, with a very limited amount to India, therefore, the number of manufacturers and skilled workers in the line was very small. They were all very quick to realize the advantage which the opportunity presented, and most of the managers and foremen, as well as many of the skilled workmen, set themselves up as manufacturers with a few simple tools, such as an anvil and hammers, a few files, a charcoal furnace, some of which used an ordinary hand fan for power blast, installed in their homes, blossomed forth into very primitive manufacturers of surgical instruments. This sudden expansion of business made necessary the employment of large numbers of unskilled workers who knew absolutely nothing about the business; what instruments they were trying to make, for what purpose they were to be used, what imperfections of shape and finish to avoid, nor did they know how to properly temper them.

The result has been an enormous amount of trouble and loss for everyone connected with the business of handling their product. Rejection, due to imperfections, have until recently ranged from 50 per cent to 80 per cent. Now, some of the more enterprising have enlarged their plants, or built new ones, installed drop forges, electric power for drilling, grinding, polishing, etc., and with gas ovens for tempering, have made the beginning for turning out fairly good instruments. Their product has been greatly improved in quality, but there is much to be desired before it will be equal to the American-made article. The rejections are now only about 10 per cent to 25 per cent. Given a little time, the Japanese will produce instruments of the common type that will be in every way satisfactory.

It is impossible to ascertain accurately how many workers are engaged in the business, but the estimates of those who should know are from 2,000 to 3,000, including women and boys. The wage for women range from 80 sen to 50 sen per day. Skilled workmen 2 yen to 3 yen per day, and the boy apprentices usually receive two kimonos and caps, two pair of clogs, and in some instances, their board together with a few yen per year for pocket money.

In the larger shops they work 10 hours per day, 7 days per week. The 1st and 15th of each month are holidays, which with other holidays leaves about 320 working days per year. The workers in the small home shops with from 1 to 4 employees work from 10 to 14 hours per day. Only the forging, filing, and tempering are done in most of the shops. The nickeling, polishing, and finishing are done in special plants engaged in that business. From the latter the product is returned to the various makers, who deliver the goods to the original purchaser, unless offered a higher price by another dealer, in which case the higher offer is usually accepted, and the original purchaser must wait until another lot of goods can be made up for his order.

The largest shop visited employed 18 workmen, but the proprietor had large contracts, and after drop forging the instruments, would sublet the rough finishing to shops equipped to do that kind of work only.

The high cost of living and scarcity of labor problem has invaded Japan as well as the rest of the world. The working classes have demanded and received by comparison tremendous wage increases, particularly those of the mechanic and tinker class. Four years ago a good general tinker received 60 sen per day. Now he receives yen 3.60 per day, or 600 per cent increase, and they are very scarce at that price.

The machinery used in most of the factories and machine shops, especially the smaller ones, is very crude and man power is used wherever possible. Even in the larger and better equipped shops, where man power is not used, electricity which is very plentiful is generally installed. Hand filing is the substitute for emery wheels, as the wheels have to be imported they are, therefore, very expensive, and just now very scarce in Japan.

The percentage of rejections previously referred to does not include those made by the maker before delivering the goods to the buyer, but only to the rejections on inspection by the exporter. Practically everything manufactured in Japan for export must be very carefully inspected before shipping. This arises from the fact that the greater part of the goods exported are not in general use by the Japanese, and as their scheme of life runs along such radically different lines, they can not be expected to produce goods equal in quality and finish to the American article, but given the time, equipped with the machinery, and the right kind of raw material they will overcome that defect.

A. E. SOULES.

Mr. SOVATKIN. Here is a Banes-Rougeur forceps, used for cutting off bone. That is used in lots of operations. The prewar German price on that is 36 marks per dozen, plus 20 per cent duty, packing, and transportation charges, makes the price f. o. b. New York \$12.60 per dozen.

The present German price; that is, adding this 850 per cent which they are quoting us—figuring the mark at its value on November 12, which was 4 cents, plus 60 per cent duty, transportation and packing, is \$24.60 per dozen.

The price in Japan is 27 yen per dozen, plus 60 per cent duty, transportation and packing charges, making that \$18.82 per dozen f. o. b. New York.

The American cost is as follows: Steel, \$1.85; forging and trimming operations, \$1.44; bench work, filing, and fitting, which is hand labor, \$10.85; hardening and tempering, 48 cents; grinding and polishing, finishing operations, hand labor, \$0.90; nickel plating, buffing, and assembling, \$2.29; making a total of \$23.31 per dozen.

Now, after going over these figures—this 850 per cent proposition added to the prewar price, adding the 60 per cent duty as against the 20 per cent duty in prewar times, or existing to-day for that matter, I find that the present price f. o. b. New York on the German article would be just about double what it was in 1914. It is just a matter of arithmetic.

So for these other instruments I am going to mention I will take the prewar German price in marks, figure its cost f. o. b. New York, with 20 per cent duty, and just double that to give you the present price with the 850 per cent added to it and the 60 per cent duty added.

Here is an instrument known as the Goodell uterine dilator, an instrument very largely used throughout the country in gynecological operations. The prewar German price on that was 57 marks per dozen. The present price on that would figure \$35.90. The other price figured down to dollars would be \$19.95, and the present price is \$39.90, which is just about double. The American cost of labor alone in that article is \$33 a dozen.

Another instrument is the Mayo's abdominal retractor, an instrument to separate the walls of the abdomen and hold them apart while the surgeon is operating on the inside. On that retractor the German prewar price was 88 marks a dozen, laid down f. o. b. New York, which is about \$23.80. The price to-day, with the 60 per cent duty would be about \$47.60. The American cost of production of this instrument is \$42 a dozen.

Another thing is the Jansen Middleton septum punch. That instrument is used to cut away the nasal septum. Here is the way the instrument has to work. [Illustrating.] It must be a very well-made instrument in order to operate efficiently. The German prewar price on that was 129 marks, costing laid down here \$45.15. The present price, figured on the same basis as I have figured the other costs, would be \$90.80. The American cost of production of that is \$85 a dozen.

I want to say to you gentlemen that there are 47 cases of German surgical instruments already landed and distributed throughout the country. I have information of a shipment of over 100 cases on the way here; in fact, they are probably in the New York Customhouse now.

Senator WATSON. How many instruments are there in a case?

Mr. SOVATKIN. You could very well pack into a normal sized case \$2,000 worth of surgical instruments. Take a little roll like this. That roll right there contains probably \$200 worth of surgical instruments, so you can see how many you could pack into one case.

Senator WATSON. How many establishments in the United States are now making these surgical instruments?

Mr. SOVATKIN. I figured up the other day that there were about 95 concerns in the United States making these instruments.

Senator WATSON. And making them efficiently?

Mr. SOVATKIN. Well, I cannot answer for all of them, Senator. The firms I am acquainted with in the East, who have spent lots of money during this war to make instruments for the Government, are making them very efficiently. That is, they are employing every kind of modern machinery that can possibly be used in producing these goods.

Senator THOMAS. Is that their exclusive business, or are they engaged in other kinds of business?

Mr. SOVATKIN. There is the firm of George P. Pilling & Sons Co., who are exclusively a surgical instrument manufacturing concern.

Senator WATSON. Where are they located?

Mr. SOVATKIN. In Philadelphia. The E. Schmidt Co., of Indianapolis, Ind., makes some of the finest surgical instruments in the world.

Senator THOMAS. You have mentioned two. What proportion of those engaged in the business are exclusively engaged in the manufacture of surgical instruments?

Mr. SOVATKIN. I should say that there are probably 50 concerns in the United States engaged exclusively in the manufacture of surgical instruments.

Senator THOMAS. Fifty out of 95?

Mr. SOVATKIN. Yes; about half of them.

Senator THOMAS. Are you exporting any of these goods?

Mr. SOVATKIN. No, sir.

Senator THOMAS. Have you no export trade at all?

Mr. SOVATKIN. None, except that we ship some goods to Canada and some to Cuba and the Philippines, if you call that exporting. We can not ship much into Canada, because they are importing duty free from England, and always did from Germany, so our business there can not be very much.

As to these goods that are on their way from Germany—there are large quantities of them, I know. We have some shipments on the way to us from Germany, which were ordered in 1914. There is no question of their being able to manufacture over there, because here is a list of goods right here that they are ready to deliver.

We have one very prominent importer of German-made surgical instruments whose agents are traveling around the country right now. I have a letter here—I do not care to have it go in the record, because it is written to me in confidence, but I would like to have you read that, Senator.

Senator WATSON. You mean they are trading with us right now?

Mr. SOVATKIN. Yes. They did not have to wait for the treaty of peace to be signed to come over here; they have always been here. One of the most active German propagandists in this country, mentioned by Mr. Palmer in his report to Congress, is the head of the greatest surgical instrument house in the world, and they are located in New York City. Mr. Palmer's report will tell you who he is; I do not have to mention his name.

So our industry was pretty well tied up with the German propaganda system. Our graduating medical students got to believe that if you wanted to know anything about surgery or surgical instru-

ments you had to go to Germany and take a postgraduate course. Why, the greatest surgeons in the world are right up here in Rochester, Minn.—the Drs. Mayos, recognized all over the world. And we are making instruments that are very satisfactory.

Senator WATSON. There were no instruments of that kind that came into this country during the war?

Mr. SOVATKIN. Not only that, but we manufactured thousands of patterns that were never made here before.

Senator WATSON. You had no competition during the war, of course?

Mr. SOVATKIN. We had no competition, because the English Navy shut off Germany.

Senator WATSON. I understand that, but were there any indirect importations? Did the goods go around through Canada or Mexico or anywhere else?

Mr. SOVATKIN. German goods? I do not know, sir.

Senator WATSON. Did any of them come from Japan during the war?

Mr. SOVATKIN. Yes, sir; lots of them, and they are coming in here now from Japan—big quantities of them. And they say over there that if the price they are quoting is too high to cut out the American manufacture they will quote them a little lower.

As far as the Germans are concerned, their agents are traveling around the country offering to make prompt deliveries of surgical instruments from Germany. This one letter here tells of the agent of one of the German importers offering delivery within three months at 20 per cent below the American price. He does not quote a price; he just says "20 per cent below the American price." If we cut our price in half he will go below that 20 per cent, I suppose, because they want to see this instrument industry destroyed in this country.

Senator WATSON. That is the dumping proposition?

Mr. SOVATKIN. Not only the dumping proposition; but it is a matter of national defense, sir.

Senator WATSON. I am talking about their policy being the dumping policy—dumping goods in here to put you out of business?

Mr. SOVATKIN. If you want to call that dumping; yes, sir. It is a matter of putting us out of business; that is what it means.

Senator THOMAS. Do you manufacture dental instruments?

Mr. SOVATKIN. We manufacture some dental instruments; we are not recognized as large dental instrument manufacturers.

Senator THOMAS. The S. S. White Co. is an old established institution of that sort?

Mr. SOVATKIN. The S. S. White Co. is recognized as one of the oldest and best established houses in the country. I can not answer for them.

Mr. PILLING. They are very large manufacturers of teeth.

Mr. SOVATKIN. Are there any questions you gentlemen would like to ask me on this?

Senator WATSON. I do not care to ask you anything further.

Mr. SOVATKIN. I have been in this business, I might say for your information, for 18 years. It is the only business I know.

Senator WATSON. How could you manufacture and maintain your business before the war in competition with the Germans?

Mr. SOVATKIN. I will explain that. First of all, we confined ourselves mainly to the making of what are called soft-metal instruments; that is, instruments made of brass, German or liberty silver, sterling silver, aluminum, bronze, etc., and on those goods prior to the tariff act of October, 1913, we had no competition from Germany. That kept us alive.

Besides that, you perhaps understand how these instruments are invented and why there are so many different patterns. Every surgeon has a different idea of the technique of an operation. He may be working with a certain kind of haemostat, and he finds that if it were a quarter of an inch longer or had a different curve he could do a better operation. So he will go to an instrument maker and have one made according to his ideas.

Senator THOMAS. Did I understand you to say just now that there were no importations of German surgical instruments prior to 1913?

Mr. SOVATKIN. There were very few importations prior to 1913 of soft-metal surgical instruments, but 80 per cent of the instruments used in this country prior to 1914 came from Germany. That you will find in this book, America's Munitions, published by the War Department.

Senator THOMAS. How many of these 95 companies that you have mentioned were organized since the declaration of war by Germany against France in August, 1914?

Mr. SOVATKIN. I could not tell you the exact number; quite a few, however.

Senator THOMAS. The majority of them?

Mr. SOVATKIN. No; I think the majority of them have been in business in this country right along, but perhaps confining themselves to other lines. During the war the need for surgical instruments was so urgent that the medical department called on about 300 manufacturers of jewelry and hardware. Disston & Co., of Philadelphia, were making bone gougers and chisels, as that was in a way allied to their regular line. Gorham & Co., of New York, were making surgical instruments, and so were Tiffany, Webster, and others.

Mr. PILLING. The Singer Sewing Machine Co.

Mr. SOVATKIN. The Singer Sewing Machine Co. were making surgeons' needles for the first time in this country. The only needles we had were imported from England, and they could produce enough there to supply their own army, and they only allowed us to import just a few. So we got the Singer Sewing Machine Co. to make surgeons' needles.

We got a large jewelry manufacturing company of Providence, R. I., to make surgeons' needles, and they expected to stay in the business, but as soon as this German competition started to come in here they just sold out at public auction in Providence.

Senator THOMAS. Do you mean they have gone out of business?

Mr. SOVATKIN. They have gone out of business; yes, sir.

Senator THOMAS. They have wound up their business completely?

Mr. SOVATKIN. The surgical-instrument end of their business; yes, sir. They are one of the largest manufacturers of jewelry in the country, and they equipped a whole plant for making surgical instruments, built up an organization, and spent thousands of dollars for machinery which could not be converted to other uses. They just sold them for scrap.

Senator FRELINGHUYSEN. Have you furnished the committee with a list of industries in this country manufacturing surgical instruments?

Mr. SOVATKIN. A list of the names? I could do that, sir; I have them.

Senator FRELINGHUYSEN. And also the amount of the product turned out by them?

Mr. SOVATKIN. No; I have not given those figures. I have not compiled them.

Senator FRELINGHUYSEN. What does the industry amount to in the United States? What is the value of surgical instruments sold every year to the public in America?

Mr. SOVATKIN. It is pretty hard for us to get those figures, because you see prior to 1914 80 per cent of the instruments were imported from Germany, and instruments at that time, according to our tariff schedules, did not have a separate classification, so we have no records. They were covered by that basket clause in the steel schedule.

The industry in this country was naturally small. During this war we developed along the line of instruments required by the Government. We are not making all the patterns of instruments that the surgeons demand of us. We do not know whether we ought to go into it or not; it depends on you gentlemen whether we do it or not. But we can within a very short time, with our present organizations and our "know how," and our will to make the stuff, make everything that is needed in this country in the way of surgical instruments.

Senator WATSON. Are these Japanese instruments made of the same material?

Mr. SOVATKIN. Yes, sir.

Senator WATSON. The same as these American instruments?

Mr. SOVATKIN. They have to import that steel, perhaps, from England or the United States.

Senator WATSON. Who is the next witness?

Mr. FISHER. Mr. COORS.

STATEMENT OF MR. H. F. COORS, OF THE HEROLD CHINA & POTTERY CO., GOLDEN, COLO.

Senator WATSON. Have you anything to say in addition to what you gave before the House committee? It is not necessary to repeat what you covered there.

Mr. COORS. There is one letter here that I would like to read.

Senator WATSON. What establishment are you connected with?

Mr. COORS. The Herold China & Pottery Co., of Golden, Colo., manufacturers of chemical porcelain. This porcelain is essential in the laboratory control of industry. I would like to give a little of the previous history of the development of this industry in this country.

Previous to August, 1914, chemical porcelain was imported almost exclusively from Germany and Austria. The Konigliche Porzellan-Manufaktur, which was founded in 1750, purchased by the Emperor of Germany in 1765, and owned by the former Emperor of Germany, William II, had practically a monopoly of the American market.

To-day chemical and scientific porcelain is produced by the Herold China & Pottery Co. of Golden, Colo.—this company is engaged solely in the manufacture of chemical porcelain—the Ohio Pottery Co., of Zanesville, Ohio, and the Guernsey Earthenware Co., of Cambridge, Ohio.

A detailed history of the development of the Herold China & Pottery Co., with which I am associated, will probably not be of interest in this place, but is, however, in brief, as follows:

At Golden, Colo., 12 miles west of Denver, there was, until December 31, 1914, one of the largest breweries in the State, known as the A. Coors B. & M. Co. The buildings and equipment are still in existence, but prohibition put an end to the operation of this plant. Located in the same town at that time was a small pottery which had been fostered by the above company and which had failed.

The closing of the brewery on December 31, 1914, brought with it a realization that some new venture on the part of the brewing company was necessary. Therefore, on January 8, 1915, the pottery works were reopened. The plant was small, with a handful of employees who had had scant experience in the making of pottery. The management and other executive heads had but little knowledge of the ceramics. In August, 1914, the manufacture of chemical porcelain was undertaken, and for the first time in the United States an industry producing chemical porcelain commercially was launched, an industry producing a commodity which requires a specialized knowledge and technique in the various stages of its manufacture.

In 1914, 144 pieces of chemical porcelain were shipped; in 1918, 1,347,235 pieces. When the armistice was signed, every need, I believe, of the American chemist as it relates to chemical porcelain could be supplied by American porcelain manufacturers. In our own plant, after five years of effort and manufacture, we were able to produce 300 different shapes and sizes, every piece of which is, according to the testimony of many well-known chemists with whom I have talked, the equal of the Royal Berlin porcelain, which was the set standard in the United States prior to August, 1914.

(At this point the hearing was suspended for 10 minutes to permit members of the subcommittee to respond to a call of the Senate.)

Mr. Coors. Here is where we stand out there. In 1914 the State went dry, and we started this porcelain business. We were the first people to manufacture chemical porcelain commercially in this country. As you well know, Colorado is not primarily a manufacturing State; we are limited in our manufactures out there. Unless we get this protection measure we are done.

Senator WATSON. Tell us why, just quickly. Why is that so?

Mr. Coors. The average wage paid to porcelain makers is \$4 a day. In 1916 the potters in Japan received 34 cents a day for an 11½-hour day.

Senator CURTIS. What does the higher-grade laborer get there?

Mr. Coors. The chemical porcelain industry is the highest-grade industry there is.

Senator CURTIS. My recollection is that when I was over there their highest wage in the pottery industry was 80 cents a day. I went through three of those factories and made some inquiry. The lowest they paid was to children, about 5 cents a day in our money.

Mr. COORS. I have taken my figures from an official Japanese publication, Eighteenth Financial and Economic Annual, of Japan, 1918. The Department of Finance, Tokyo. Printed by the Government Printing Office. Since then I have been told the wages have gone up 40 per cent. Of course 40 per cent added to their former wages does not mean much.

Here is another thing that has been brought out in this testimony. Japanese porcelain can be shipped from Japan to the Atlantic seaboard cheaper than we can ship from Colorado to the Atlantic seaboard.

Mr. PILLING. Will you please say that again?

Mr. COORS. Japanese porcelain can be shipped to the Atlantic seaboard cheaper than we can ship it from Colorado to the Atlantic seaboard.

Mr. PILLING. You mean they can ship it cheaper from San Francisco to New York than you can ship from Colorado to New York?

Mr. COORS. Yes.

Senator THOMAS. That is nothing new; that is not peculiar to this stuff.

Senator WATSON. That is on account of the long and short haul.

Mr. COORS. Those are the new rates, in effect May 29, 1919.

Senator THOMAS. There is a down grade from Denver to Galveston, and yet it costs more to ship anything from Denver to Galveston than it does to haul things up grade from Galveston to Denver. We have been laboring under that sort of situation ever since I have lived in Colorado, and I went there in 1871.

Senator WATSON. We are helping that situation in our railroad bill, Senator. We are giving you some relief.

Senator THOMAS. I hope so. It is impossible for the conditions there to be worse.

Mr. COORS. Here is one letter that I would like to read:

THE MINT OF THE UNITED STATES AT DENVER,
MELTER AND REFINERS' DEPARTMENT.
January 23, 1919.

Hon. THOMAS ANNEAR,
Superintendent United States Mint, Denver.

Sir: Prior to the year 1914 all porous clay cells used in our refinery, and as well all porcelain ware and earthenware tanks, were imported from Germany. In that year, owing to a very great deterioration in quality, a large increase in price, and our desire to get away from the necessity of purchasing German-made goods, we began experimenting with different substances in an effort to produce something to take the place of the German clay cells.

We succeeded in devising a wood cell for temporary purposes, but it was not satisfactory for permanent use.

Contemporaneously with our experiments, and at our request, the Herold China & Pottery Co., of Golden, Colo., began experimentation upon the manufacture of porous clay cells, and after many trials succeeded in producing a cell of a quality superior to any German cell ever used. In purchasing the German cells we were limited to a stock size, which was a little too small for our use. The Golden factory (Coors, United States of America) make any size we desire, and we have used its cells exclusively ever since.

In our laboratory we use the Herold Co.'s chemical porcelain ware and find it equal if not superior to the best royal Berlin ware.

The said company at the present time is experimenting with the manufacture of large-size porcelain tanks for our gold-cell work. These goods are indispensably necessary in the operations of our electrolytic refinery.

Respectfully submitted.

JAMES W. MILBOM,
Superintendent Melter & Refiners' Department.

Senator WATSON. Was there any of this chemical porcelain made in the United States before the war?

Mr. Coors. No, sir. Prior to August, 1914, there had been some research work done here, but nothing made commercially.

Senator WATSON. Of course, they were making porcelain in the United States for other purposes?

Mr. Coors. Yes; for dinner ware, etc.

Senator WATSON. What is the difference between the two kinds?

Mr. Coors. This porcelain is known as a hard porcelain. It has to be resistant to the action of acids and alkalis and stand sudden changes of temperature.

Senator WATSON. And in that respect it is more difficult to make?

Mr. Coors. It is very much more difficult to make and much more expensive.

Senator WATSON. Does it require a peculiar sort of raw material to make this?

Mr. Coors. We have to have a peculiar sort of raw material; yes, sir—highly refractory clays.

Senator WATSON. Is it a shale?

Mr. Coors. It is a combination of black silica or shale and kaolin.

Senator WATSON. You find that in large quantities in Colorado, do you?

Mr. Coors. Yes, sir; it is found in Colorado in large quantities.

Senator WATSON. How many of these institutions have sprung up in this country?

Mr. Coors. There are just three of us in this country.

Senator WATSON. Where are they?

Mr. Coors. Two in Ohio and one in Colorado.

Senator WATSON. Do you know the capital invested and the labor employed?

Mr. Coors. In our own plant we have a capital investment of about \$125,000. We employ about 80 people. Regarding the other factories, we manufacture, as I say, chemical porcelain exclusively; the other two plants manufacture principally fireproof cooking utensils.

Senator WATSON. Is there a demand for this product in the United States?

Mr. Coors. There certainly is; yes, sir.

Senator WATSON. Where is that demand?

Mr. Coors. The demand is in the steel industry, the dye industry—practically every industrial concern uses it in its research laboratories for laboratory control and also in the chemical laboratories of universities and colleges.

Senator WATSON. Do you know the quantity imported from Germany and Japan, say, in 1913?

Mr. Coors. I do not believe there was any imported from Japan previous to that time; they have gone into it since the war. Regarding the amount imported from other countries, it has been estimated to be as much as \$500,000. Mr. Fisher may have some information on that.

Senator WATSON. Do you feel that if the American manufacturers had this protection they could satisfy the American demand in a short time?

Mr. Coors. Oh, yes; there is no doubt about that.

(The witness submitted certain additional data, which are here printed in full, as follows:)

COMPARISON POTTERS' WAGES PER DAY, UNITED STATES AND JAPAN.

Ohio Pottery Co., average, \$4.

Guernsey Earthenware, men, \$5.20; women, \$1.80; average, \$3.58.

Herold China & Pottery Co., men, \$4.15; women \$1.47; average, \$2.80.

Average daily wage paid in United States, \$3.48.

Average daily wage paid in Japan, \$0.34.

Figures for Japan secured from "Eighteenth Financial and Economic Annual of Japan, 1918. The Department of Finance, Tokyo. Printed by the Government Printing Office."

Since 1910 Japanese wages are reported to have increased 40 per cent.

The hours of work in Japan are 11½ per day; in the United States 8 hours per day, which, based on the above figures, means a ratio of 12 to 1 without taking into consideration the difference in the actual number of working hours.

EFFICIENCY OF JAPANESE LABOR AS COMPARED WITH AMERICAN.

See copy of letter marked "Exhibit A."

FIRST APPEARANCE OF JAPANESE COMPETITION.

See copy of letter marked "Exhibit B."

TARIFF REVISION DOWNWARD.

The reduction of freight rates from the Pacific coast to the Atlantic seaboard on foreign imports acts as tariff revision downward. New rates effective May 20, 1910.

Carloads (per 100 pounds):

Old rates----- \$1.87

New rates----- 1.50

Rate from Golden, Colo.----- 1.055

Less than car loads (per 100 pounds):

Old rates----- 2.70

New rates----- 2.00

Rate from Golden, Colo.----- 2.48

Mr. Fordnoy, chairman of the Ways and Means Committee, in his speech on the "Railroads" before the House, on Saturday, July 26, made special reference to this discrimination and its effect on the chemical porcelain industry of this country.

ATTITUDE OF EDUCATIONAL INSTITUTIONS.

I wish to quote from an article by Thomas B. Freas, department of chemistry, Columbia University, and W. L. Estabrook, department of chemistry, College of the City of New York, on page 418 of the May 2, 1910, issue of Science, new series, Volume XLIX, No. 1270:

"Apparently there is no great opposition to the law on the part of institutions that have been accustomed to duty-free importation, and naturally no commercial firm that has made use of duty-paid materials before will oppose it.

"As a matter of fact, many American firms make materials that are equal, if not superior, in many ways to the imported goods. Coors porcelain, made by the Herold China & Pottery Co., of Golden, Colo.; Pyrex glass of the Corning Glass Co., of Corning, N. Y.; the Nonsol glass manufactured by Whittall, Tatum & Co., at Milville, N. J.; the especially fine physical control of the Kimble Glass Co. at Vineland, N. J., and the production of fine special apparatus by Elmer & Amend, of New York City—all show what can be done in this country in an emergency. If these conditions continue to be fostered, we may in time lead the world in the production of scientific things. Certainly interest in this subject is growing, and a movement is now on foot to interest manufacturers, jobbers, and buyers in the possible publication of a journal devoted to chemical apparatus."

In conclusion, I would like to suggest that the art, as applied to scientific apparatus, is better than the article. The knowledge of how to produce is

infinitely more important and valuable than the thing produced. The skill we now possess—which can not be taken away from us—will continue to exert itself toward the production of chemical porcelain, provided you help to foster our interests.

If we wish to preserve the strength and impregnability of American production, we must direct the growth within our own country of the wide and varied catalogue of our industries and sciences. We must develop and train the creative faculties of our own country instead of those of foreign lands.

EXHIBIT A.

MAY 10, 1910.

Mr. HERMAN F. COORS,
The Herold China and Pottery Co., Golden, Colo.

DEAR SIR: I am not surprised to learn by your letter of the 10th instant that the Herold China and Pottery Co. are finding it difficult, in fact practically impossible, to sell their product at a profit in this country, against similar goods imported into the United States from Japan, and I have long held the opinion that this Government should recognize the predicament of the American porcelain manufacturers by establishing a suitable protective tariff, as otherwise the industry, such as your company is engaged in, is bound to perish.

With abundant labor at approximately one-tenth the cost of American labor and additional assistance from their Government in favored ocean freight tariffs for subsidized Japanese steamers, together with a big market in the United States for their goods, the porcelain industry in Japan has become a substantial one, and is a most evident fact to even the casual traveler in that country.

It is commonly believed here that Japanese labor is inefficient, in other words, that one American laborer is a fair equivalent of three Japanese laborers, but after doing business for many years in the Orient I consider such a comparison to be emphatically erroneous and that the difference is practically nothing. For instance, several associates and myself are to-day profitably operating two low-grade mines in Japan, neither of which could be operated in this country because of the high cost of labor here, and the explanation is that miners there are costing the equivalent of 50 cents per day as against \$4.50 to \$5 demanded in Colorado.

The same situation prevails in other lines of industry and I should imagine applies even more stringently to the manufacture of porcelain ware at which the Japanese are particularly adept. Consequently I can readily appreciate the strenuous task that confronts your company.

If I can be of assistance in any way kindly let me know.

Yours, faithfully,

H. E. COLLEMAN.

EXHIBIT B.

SAN FRANCISCO, CALIF., December 8, 1910.

HEROLD CHINA AND POTTERY CO.,
Golden, Colo.

GENTLEMEN: We come in contact with considerable competition on porcelain ware, duty free importation.

We recently quoted on a large quantity of porcelain that was to be supplied to one of the universities and figured on supplying Coors ware. On making a careful investigation, as to why this order was not placed with us, we ascertained that the order had been placed with one of our competitors on the basis of supplying Japanese porcelain, duty free.

Of course, in supplying this porcelain on the duty-free basis there is an item of 50 per cent duty saved, and the figures we submitted were entirely out of line.

It appeals to us that possibly you could make us some concession on this, where we know when entering our quotation, that it is necessary to quote against duty-free competition.

Please let us have your views.

Yours, very truly,

BRAUN-KNECHT-HEIMANN CO.

STATEMENT OF MR. H. N. OTT, REPRESENTING THE SPENCER
LENS CO., BUFFALO, N. Y.

Mr. OTT. Gentlemen, my testimony will be very brief, I am simply representing the optical glass. As you all know, no optical glass was made in this country prior to 1914.

Senator WATSON. None at all?

Mr. OTT. None at all, excepting a little in an experimental way. Macbeth-Evans had experimented with it, and exhibited a little of it at the World's Fair in Chicago, but they gave it up. They spent about \$30,000 on it and quit.

Senator WATSON. When you speak of optical glass, do you mean the glass that goes into a pair of spectacles?

Mr. OTT. Yes; in a general way; optical glass is anything that is used for optical purposes.

Senator WATSON. For microscopes?

Mr. OTT. Microscopes, telescopes, photographic lenses, cystoscopes, laryngoscopes, and allied instruments.

Senator WATSON. Do you mean that before the war we did not make any of the glass that goes into spectacles?

Mr. OTT. It was all imported.

Senator THOMAS. For microscopes too?

Mr. OTT. Yes, sir; for microscopes too. The American Optical Co. imported from England. Bausch & Lomb imported from Germany. Practically all the other firms imported from Germany and France.

Senator THOMAS. My recollection is that the tariff commission's report on optical glass mentions the old established manufacture of microscopes as being an exception to the general rule. I gathered the impression that they produced the glass for microscopes before the war.

Mr. OTT. No; that is wrong, Senator. The fact is, the glass that goes into microscopes is the most critical optical glass made, and there was none made in this country before that time. I have been in the microscope business for 20 years and I think I know what has been going on.

The war caught us in a terrible dilemma. On the 16th of September, 1914, I sailed to England to pick up all the optical glass I could of all kinds that we could possibly use.

Senator WATSON. We remember how they sent out all over the country for all the opera glasses and all that sort of thing.

Mr. OTT. Yes; they could not get enough.

I came back from England, and I went to Macbeth-Evans, and other firms, asking them to make optical glass, but in view of the comparatively small amount used and the fact that there was no protection on it, we got no response whatever. So we started in to experiment by ourselves. We put up a little furnace and went at it.

Senator WATSON. In what year was that?

Mr. OTT. In the summer of 1915. We could not get a man who knew anything about it, and so we went at it without the man and we made some glass, but it was not usable. I myself worked at nights stirring glass, but we failed.

We finally got hold of a man who knew something about it, and by discarding all of this former investment in the experimental fur-

naco and putting up a building for the purpose, going out into a suburb of Buffalo where we could get natural gas, with the aid of this Belgian who had succeeded somewhat, we succeeded in making a little glass that we could use.

Then the Bureau of Standards and the Geophysical Laboratory of the Carnegie Institution came to our rescue and sent some scientists to help us out. After they came we succeeded in making optical glass which could be used for all of our instruments and which was sorely needed, as you all know, for instruments during that time, and we are continuing to make it. We have succeeded in making optical glass as good if not better than we ever imported. We can make it in the quantities that are needed, and there is no question about the quality or the quantity that we can make.

Senator WATSON. Are you the only person engaged in making it?

Mr. ORR. No, sir. The Bausch & Lomb Optical Co., of Rochester, N. Y., are also making optical glass. The Pittsburgh Plate Glass Co. were induced by the Eastman Kodak Co. to experiment in making optical glass, and then the Government took hold of it and helped them, and they made high-grade optical glass for photographic lenses, telescopes, etc.

Senator WATSON. Do you mean that the glass used in photographic lenses was also imported?

Mr. ORR. Yes, sir; every bit of it was imported. The Pittsburgh Plate Glass Co. have given up making this high-grade optical glass, but are continuing the making of spectacle lens glass. The Corning Glass Co. are making some spectacle lens glass, I understand.

Senator WATSON. Briefly, what is the difference in the cost of production? What is the differential between this country and other countries? What is the difference in cost between what we are producing and what they are producing of a similar kind in Germany or any other competing country?

Mr. ORR. I know nothing about costs in Germany or in France. I can judge from their quotations. In my testimony before the Ways and Means Committee I testified that we had been offered optical glass from England running from \$1.50 to \$3.50 per pound, depending upon the kind of glass. In October of this year we got quotations of \$1 a pound in place of the \$1.50 and of \$1.60 in place of the glass quoted at \$2.60, six months ago. Our prices were then just about in the proportion that 45 per cent would save us.

Senator WATSON. I notice that you ask for 45 per cent ad valorem. On what do you base that?

Mr. ORR. Forty-five per cent then would just about have saved us. Forty-five per cent now will just about save us, because these prices that we got from England six months ago had a tinge of war prices in them yet, and our costs were also along that line. During the last six months we have reduced our costs to just about the proportion of the reduced offerings.

Senator WATSON. In what way have you reduced your cost?

Mr. ORR. In the first place, by quantity production, and then we have been able to save more glass and to break fewer pots. Every time we make a pot of optical glass we destroy a \$50 pot. Many times we destroy a \$50 pot and get nothing for it. It breaks in the furnace before we put all the batch in it, and sometimes it breaks after we have it filled with a \$300 batch.

Senator WATSON. Can any of that be reclaimed?

Mr. OTT. No; none that leaks out into the furnace can be reclaimed.

Senator WATSON. It is a total loss?

Mr. OTT. Yes, sir. Then, too, in this high-grade optical glass we are pleased if we get 25 per cent of good glass out of a pot. The pot is allowed to cool with the glass in it, and as it cools it breaks up more or less, and after it is cooled we have to break it still more. The result is very rough irregular chunks, which are examined very carefully for any stræ and any stones or bubbles that may happen to be in it.

Then that glass that we have selected is brought up to a plastic condition and molded into a rectangular slab. The edges of that slab are polished, and it is carefully examined through these polished edges for any imperfections. If we find no imperfections we then break it up into smaller pieces and mold it to the exact size and shape of the blank from which we wish to grind the lens.

In all those processes there is an element of loss.

Senator WATSON. It is a very complicated system of manufacture?

Mr. OTT. Yes, sir.

The glass on which I have been quoting prices per pound is quoted in those slabs with the edges polished, as I told you.

Senator WATSON. What wages do you pay, Mr. Ott?

Mr. OTT. We pay on an average about 70 cents an hour for the glass people. We have 66 people in our glass factory. Bausch & Lomb and ourselves are the only people who are now making this high-grade optical glass. The two of us are capable of supplying the demand, because the demand is not great so far as quantity is concerned under peaceful conditions.

Spectacle lens glass is made differently.

Senator WATSON. Are you making that?

Mr. OTT. No; not yet.

Senator WATSON. Does that still have to be imported from Germany?

Mr. OTT. No, sir; we can supply it. The Pittsburgh Plate Glass Co. and the Corning Co. can supply all that is necessary in this country.

Senator WATSON. Are they doing so?

Mr. OTT. No; I do not think so. I think the American Optical Co. are still importing from England, but I am not sure.

Senator WATSON. Where did we get that glass during the war?

Mr. OTT. Well, luckily, both Bausch & Lomb and the American Optical Co. had a tremendous stock, and Bausch & Lomb soon got to where they could make glass that would do for spectacles, but would not do for the high-grade work, so they pulled through.

The spectacle lens glass is rolled out like plate glass, and polished, so they do not have the expense of the pot, breaking the pot every time, and all that.

But the one reason why we ought to foster the spectacle lens glass business, from the public's standpoint aside from a business standpoint, is the fact that there is a latent condition which can quickly be converted into this high-grade optical glass for range finders and telescopes and that sort of thing.

Senator WATSON. And for scientific purposes?

Mr. OTT. Yes, sir.

Then, too, of course, no optical glass made in this country means that we are absolutely dependent on some foreigners for our microscopes and these instruments upon which our public health depends. It means that we are dependent so far as our Army and Navy are concerned. It means that we are dependent for our spectacles and all that, and we can not afford to be dependent. Fortunately, we have been remarkably successful; we have succeeded in two years in developing glass that is equal to the European glass, on which they have spent 20 years. To be sure, we had their foundation to begin on.

There is no use protecting the optical glass if you do not protect the instruments in which it goes, because the instruments are made in this country. On the other hand, many of the optical instruments are also necessary for or are a part of a lot of these scientific instruments. For instance, the people who make these surgical instruments must have microscopes in their laboratories and other optical instruments for testing their steel and all that.

Senator WATSON. So there is an interdependent relation?

Mr. OTT. Yes. I presume that is enough for the optical glass.

I want to say a word on this duty-free importation business. I was a college professor before I got into this business. I see it from both sides, and I want to make a plea for the duty-free clause in this bill.

When I graduated at the university I thought that there was no science in this country; that we did not have anything in this country, and that we had to go to Germany for it. I thought we had to go to Germany for our scientific instruments, and I even refused to try to take an advanced degree in an American university because I thought I wanted to go to Germany for that. Now, just that insidious propaganda has been going on in our college laboratories all this time, and I tell you, gentlemen, it is time we were educating our boys on American instruments and American ideas.

Furthermore, the Tariff Commission stated that from \$500,000 to \$800,000 worth of apparatus was imported a year free of duty. Well, let us take \$700,000 for a fair average and let us take the highest per cent that is asked for in this bill—60 per cent. It costs our boys and girls \$420,000. If there are 420,000 students going to colleges and high schools which are affected by this, it means a dollar apiece for American education. We can not afford to save a dollar for each one of our boys to educate them on foreign propaganda.

Senator THOMAS. The Tariff Commission, if I remember rightly, says that it costs a good deal more than that per scholar.

Senator WATSON. All of the 400,000, of course, would not take the chemistry course.

Mr. OTT. That is the point, of course.

Mr. FISHER. We had evidence yesterday from the colleges themselves, stating actually what it was, and it was considerably less than the Tariff Commission said.

Senator WATSON. I will say, Senator, we had quite a bit of testimony yesterday from the colleges themselves.

Mr. FISHER. It was an average of about \$2.40 a year, the average per month being the price of a package of cigarettes or a nut sundae.

Mr. OTT. We want to lead in these things, and the scientific instruments are at the bottom of our commercial and social advancement, strange as that may seem to you.

Mr. FISHER. We have one more witness—Dr. Herty.

STATEMENT OF DR. CHARLES H. HERTY, EDITOR OF THE JOURNAL OF INDUSTRIAL AND ENGINEERING CHEMISTRY, NEW YORK, N. Y.

Senator THOMAS. Doctor, you testified before the Ways and Means Committee of the House?

Dr. HERTY. I was going to say, gentlemen, that my testimony was given with all possible emphasis before the committee last June, and I shall not try to cover that ground to-day at all. But there are one or two new side lights that have developed since that time.

Senator CURTIS. And you have been over to the other side, too, since that time?

Dr. HERTY. Yes; and came back with intensified convictions.

I would like to point out in the first place where my interest in this thing arose. I was president of the American Chemical Society at the time we first began the effort to stir up the country about this duty-free importation business and the necessity of having these industries in our own midst. I appointed the first committee of chemists that went to work upon that subject. In that position I was in close touch with men from every section of the country, both in the industry and in the educational institutions.

The work I was doing in that line led to my present position. Since that time I have been doing this, gentlemen—I have been trying, through editorial utterances to stir up every citizen of this country to what this situation means, and to persuade our chemists, for instance, to stop the gap; in other words, to act as a protective measure themselves, through voluntary patriotic action and by other steps, for our American producers pending the final determination of this question by Congress, in a firm belief that Congress would see that these industries were protected as soon as they could get to it. I am happy to say—and I think these gentlemen here in the room will say, that the campaign that chemists have been carrying on has brought forth results to a very large extent, that they have stood by their home industries even at expense to themselves.

Now, we have had gatherings of our chemists, and you will find in these House hearings the resolutions passed. I know of no vote that ever went through the council of the American Chemical Society with more deep feeling than this. Let me read that to you once more:

The council also expresses its opinion that duty-free importation of apparatus and chemicals has been a very effective form of foreign propaganda in creating in the minds of the youth of this country an impression of the superiority of such foreign-made material.

About this question of student expense, I read in the Congressional Record the debate on this Bacharach bill in the House, and I was extremely interested, as I had not seen those figures submitted by the Tariff Commission of \$13 and some cents per student for expense. I noticed particularly in reading Mr. Kitchin's speech that he used that figure very strongly.

Now, I happen to have been for 11 years prior to 1916 professor of chemistry in the University of North Carolina, and all questions of finances in the department went through my hands. I have not the figures right at hand, because I have not had time to get up anything on this matter, but I know that we had between 300 and 400 students in our various chemistry courses, and I remember distinctly that when our income from what the students paid in for breakage rose to \$600 we were amazed. So I should like, Mr. Chairman, if it is not out of order, to telegraph to the head of the department of chemistry of that same institution to-day, asking him what was the average cost per student last year. I noticed when Mr. Roberts testified yesterday that he did not have that university included in his list.

Senator WATSON. Very well. Of course, there are many conditions that enter into that laboratory cost.

Dr. HERRY. Oh, yes. But \$1.50 a man was a high figure for us, I know. If there had been a \$13 figure down there, there would have been a riot on the campus.

Here is a thought I want to leave with the committee: I think the best answer to the argument in favor of saving the poor student expense is, What effect has that embargo on apparatus brought about by the war had on the attendance of students in our courses? I know from reports that have come in to me since I came back that the chemical laboratories are not only full and overflowing but they are turning men away. The professors at Columbia tell me that. A professor at Syracuse University wrote me last week that he had 651 men in his first-year course in chemistry. The Massachusetts Institute of Technology is overflowing. It is the same way in Chicago. They wrote me from North Carolina that they were overflowing there. In other words, it has not kept the students out of courses in chemistry; they are going into it much heavier than before.

Another thought that I want to leave is this: Even if you leave this duty-free importation clause in here, and even with the low valuation of the mark at the present time—and it is a remarkably low value—I do not believe that the Germans are going to put stuff in here dirt cheap. They can do it, of course. I do not know of anything that was more impressive to me than when I paid my hotel bill at Coblenz.

Mr. Chairman, I had a very nice single room there—it had no bath. Do you know what I paid in American coinage for that room with breakfast the next morning, when the mark was 4 cents. I paid 30 cents. The bill was 7½ marks, and I got a room and breakfast for 30 cents.

Senator THOMAS. I think you are perfectly right in your conclusion that the Germans are not going to sacrifice anything unless they are going to gain by it.

Dr. HERRY. But they have a margin there on which they can come in and put the price down just far enough to kill the business. It is the same way in dyes, gentlemen. I did not bring that point up the other day, but I wish I had put it in the record. I know well enough from what I heard over there that they expect to do it.

Senator THOMAS. It is the rate of exchange that we have got to look after.

Dr. HERTY. It is a very powerful factor.

Some people have said to me, "Why don't you let up on these Germans and give them a chance to get their exchange reestablished, and let the balance of trade work out some of these things?" My point is this: I, as an American citizen, from my point of view, am not willing to put into the hands of a man I have got to meet in industrial war a knife to cut my throat with. Let us give him food and things of that kind, but if he gets possession of scientific supplies he has got control over our country, because these things are the tools of the trade.

We are talking about building up the dye industry and the chemical industry. If you gentlemen were building a house would you employ carpenters and buy your brick and everything, and then say to the carpenters, "We may be able to get some tools for you, but we can not be sure"? Why do we give them the tools that chemists have got to work with?

In this pamphlet... information concerning scientific... a great surprise... a quotation from... University... pamphlet came into my hand... Hursday... wrote to Dr. Lenhe... University of Wisconsin... sentiment of the men... to give an answer that I could publicly...

In reply to...avor of De... that the...

That is, ...otation...

was sent out... during the summer... in accord with this statu...

There is one... to take into consideration... have no doubt that there are... exists in... want duty-free importation. I... to... my journal. I have no doubt that... who want duty-free importation. But the... size is that the purchasing agent takes a rather... at the matter. He is not necessarily a permanent officer. He has to make the best showing he can. He is not the man that is training the minds and educating the youth of this country. I would rather have the point of view of the professor who has got these boys under him than that of the purchasing agent, who is looking at it as a cold-blooded business proposition, thinking how he can stretch his appropriation to the limit and continue himself in office.

I am going to conclude with only one word. I was a teacher, and even in 1916 knew some of these new products that were coming out, but that experience was limited, because they were young then. But I want to say this, on the testimony of men I have heard in every branch of chemistry, both in the industrial field and the educational field, that the manufacturers of this country have made good. They have made that porcelain right there, equal to anything that ever came out of Berlin, according to the testimony of chemists from all over this country. This chemical glassware made in this country at the present time is just as good as ever came out of Germany. And so it goes right through the list. You asked the question whether

they would be able eventually to supply the American market. I think they are able right now. Is not that true, Mr. Coors?

Mr. COORS. We certainly are.

Dr. HERTY. This is not a thing that has got to be developed; they have already done it and they are doing it to-day. But they are right between two grindstones—Japan on the one side, with porcelain ware—and I should not be surprised if they came in with glassware, under the conditions which you have described—and on the other hand, Germany, with over 50 per cent of their product on an absolutely free-trade basis.

Senator CURTIS. Besides the freight rates?

Dr. HERTY. The freight rates from the west. I know, because I went into that with Mr. Coors last year. A great part of his output is used in the East, where there are so many more men in colleges.

Senator THOMAS. We have a peculiar freight situation there. We make a lot of sugar there, and we can ship it into Omaha cheaper than we can get it in Denver from the mills 10 miles away.

Dr. HERTY. After all, these industries are small industries; the capital invested is not great. But the importance of the product is tremendous, and the greatest importance is the effect of foreign material, right in front of a boy every day when he works, on his spirit of self-reliance and American independence. One reason I am glad to testify here is that as a professor for 10 years in North Carolina and 12 years in Georgia I was guilty of crippling that spirit. I thought it was fine to get our stuff from abroad. I am trying now to make up for my shirking in the past in that respect, to make every American boy feel proud and have the confidence that American can do these things, because they are the men we have got to look to in the future to carry on this great work for our country.

Mr. FISHER. Mr. Chairman, we came down here with grips full of data, but we are going to spare you that. We brought it for fear there might be some opposition, but we take it you do not need it. There has not been one voice of opposition raised in your hearings, either in the House or in the Senate. If there had been we would have been here longer. Every scientific paper in the United States has come out advocating the passage of this bill. They have mentioned Mr. Bacharach's name in connection with it. Mr. Bacharach told us in your presence yesterday that he has yet to receive his first letter of protest against it. That is remarkable; he might have had two or three from the men who had not woken up, but he did not even get them.

So that if these hearings are to be taken as evidence in the case we certainly have not had any opposition at all, and we are agreeably surprised, because we thought there never was a question raised in the United States that somebody did not object to.

Dr. HERTY. May I add one further word in expression of the hope that the Senate will act quickly as possible on this matter? In the dye business, for instance, we have a measure of control through the War Trade Board and the license plan until Congress acts, but these gentlemen are exposed, and have been exposed to risk ever since the embargo was lifted.

Senator THOMAS. I want to say I have not yet been able to find anything in this hearing or in the House hearing that gives me any satisfactory knowledge regarding the difference in the cost of pro-

duction. The testimony is very positive as the percentages, but so far we have had—I speak for myself—no enlightenment upon that fundamental proposition. I am not a tariff man, I know it is important to take care of certain industries, but the Republican theory of protection has always been, or at least has recently been, based upon the proposition of the difference in cost of production here and abroad. Now, you gentlemen have not given me any information on that point.

Dr. HERTY. Senator, have you looked over Mr. Coors's figures on costs in the House hearings?

Senator THOMAS. Yes; I have seen them.

Dr. HERTY. I went over that with him carefully last year.

Mr. ROBERTS. I placed on file yesterday some detailed factory costs.

Senator THOMAS. I will read that. I have not read all the evidence. I was not able to be here yesterday, because I am pretty busy on another subcommittee. But I do not want you gentlemen, after what this gentleman said, to go away with the idea that you have convinced everybody on this committee because you have not.

Mr. ROBERTS. If there is any question you would like to ask in regard to costs I would like to answer it.

Senator THOMAS. I do not want to go away with the impression that you have a unanimous committee. O course, I am in the minority and can not speak for the other members of the committee.

Senator WATSON. What did you think of the statement on the surgical instrument proposition?

Senator THOMAS. Oh, if that means anything it is that your 60 per cent as against Japan will not do you any good whatever.

Mr. SOVATKIN. It will do us good on some of the lines. We do not want a duty that will keep out all surgical instruments.

Senator THOMAS. That may be, but you have told us what ones you want to keep out and what ones you do not.

Senator WATSON. He said he could not give the present German wages, because he did not know what they were.

Mr. SOVATKIN. I can give you the wages in Germany in 1914. I have given you the prices in Germany in 1914 and the present prices.

Senator THOMAS. That was five years ago.

Mr. SOVATKIN. I have given you the prices to-day. I have the quotations as recently as November 12.

Senator THOMAS. My impression is that what these industries all need is a rigid system of license, until we can get the information that we need before we legislate on such important matters. I am satisfied that a really good, rigid license system—

Senator WATSON. There is no such thing as a good, rigid license system.

Senator THOMAS. We can get it.

Mr. SOVATKIN. By the time you get that through our industry will be as dead as a doornail.

Senator THOMAS. And by the time you get this through it may be dead.

Mr. SOVATKIN. If we do not get this through shortly we will be dead; we will be out of business.

Senator THOMAS. You understand, in the Senate we can not get anywhere without unanimous consent. I have been trying to get a

decent cloture ever since I have been here, but have not succeeded. As a consequence, those that expect immediate action by the Senate on any matter that is urgent are very likely to be disappointed.

Mr. COORS. This question of costs was brought up before the Ways and Means Committee. I went to the Tariff Commission and said, "What is the cost in Japan?" They are supposed to have this information; I was led to understand that. I asked them the cost per unit of making chemical porcelain in Japan. They said they did not know. Where are we going to get that information?

Senator THOMAS. But you do know that it is more than 60 per cent. I do not think that 60 per cent will be of any benefit whatever as against Japan.

Mr. JOHN DOUGLASS (of the Fred Haslam Co., Brooklyn, N. Y.). Mr. Chairman, may I answer a question that was asked Mr. Sovatkin? You asked how the industry lived before the war. He was speaking of surgical instruments. The nucleus of this industry lived in Brooklyn, N. Y.—most of it—and it was fostered by the United States Navy, because they said that they would have American goods only, and they were our customers. That maintained the nucleus of the industry.

Senator THOMAS. You still have that, have you not?

Mr. DOUGLASS. Yes; we still have that.

(Letters received from Dr. Herty and Mr. Eimer after hearings closed are here printed in full, as follows:)

EIMER & AMEND,
THIRD AVENUE, EIGHTEENTH TO NINETEENTH STREETS,
New York City, December 19, 1919.

HON. JAMES E. WATSON,
United States Senate, Washington, D. C.

MY DEAR SIR: Inclosed please find the original telegram sent to me by Prof. L. J. Stabler, head of chemistry department, University of Southern California. Also a signed copy of a letter which Prof. Edmund O'Neill, director of chemical laboratories of the University of California sent to the Senators of California. There is also a copy of a letter herewith sent to Mr. J. A. Hartley, of the Braun Corporation, of Los Angeles, Calif., which is a report of the investigations made for him by the Braun-Knecht Helmann Co., of San Francisco.

The above are very valuable documents since they absolutely refute the opinion expressed in the report submitted by the United States Tariff Commission in their bulletin concerning scientific instruments.

The University of California is going to investigate by what right a letter was written in the name of the department of chemistry, giving the views as expressed on page 35 of the above-mentioned bulletin on scientific instruments.

If it is not too late, could the above information be incorporated into the records of the hearings?

Respectfully,

WALTER R. EIMER,
Chairman Association of Scientific Apparatus Makers
of United States of America.

[Telegram.]

LOS ANGELES, CALIF., December 12, 1919.

WALTER EIMER,
205 Third Avenue, New York:

I am convinced that the duty of loyal Americans is to support those key industries which are absolutely essential to the future national welfare of this country. As a measure of protection to these industries I am in favor of the elimination of the duty-free privilege formerly extended to the universities.

PROF. LAIRD J. STABLER,
Head of Chemistry Department, University of Southern California.

DECEMBER 8, 1919.

The BRAUN CORPORATION,
Los Angeles, Calif.
(Attention Mr. J. A. Hartley.)

GENTLEMEN: Dr. R. E. Swain, dean of the chemistry department at Stanford University, has written the chairman of the Chemical Commission, to two other eastern parties, and to the president of the Stanford University, putting himself on record as unreservedly in favor of the repeal of the law permitting the free importation of apparatus for educational institutions. He also assured me that he would write United States Senators Johnson and Phelan, not later than last Saturday, urging the repeal.

I have hopes that President Wilbur, also of Stanford, will take steps to put himself on record as favoring the repeal, and may have the information during the day.

Prof. Edmund O'Neill, dean of the chemistry department at the University of California, wrote to the California Senators on Saturday, beseeching them to use their best efforts to have the duty-free law repealed.

I have succeeded in having the matter brought before a meeting of the board of regents of the University of California. The repeal will be advocated by Mr. R. G. Sproule, comptroller, Prof. O'Neill, and Dr. Musgrave.

The latter gentleman is the biggest man in the West and one of the big men of the United States in the medical school and hospital game. I think you can feel assured that telegrams will go forward to our United States Senators from the board of regents and President Barrows.

Is it possible for you to obtain for us, or loan us, another copy of that booklet in which some of the faculty of different institutions expressed themselves as opposed to the repeal of the duty-free law? I have mislaid the copy sent us, and the "higher ups" of both institutions want to see it, that they may learn who is responsible for giving out the impression that foreign-made apparatus was preferable.

Very truly, yours,

BRAUN-KNECHT HEIMANN Co.

UNIVERSITY OF CALIFORNIA,
December 8, 1919.

MY DEAR SIR: I am informed that there is a movement on foot in Congress to repeal the present law permitting importation of scientific apparatus and materials for use in scientific institutions to be imported free of duty. I think that the present law should be repealed. While it may be to the immediate financial advantage of institutions of learning to import "duty free," in the long run it would be detrimental.

During the period of the war, when importations practically ceased, American manufacturers took up the making of scientific apparatus and chemicals and have attained great success. It is now possible to obtain almost everything used in chemical laboratories from American manufacturers. The quality of these materials has been improved, during this comparatively short period, so that in many instances we are getting better materials than were formerly imported.

It is of the utmost importance that this manufacturing be kept up, not only in the interest of the country as a whole, but for our individual interests. It is highly desirable to be able to obtain apparatus and materials promptly. Formerly it meant great delay in corresponding with European manufacturers.

The only advantage that the present law gives to scientific institutions is that in many cases we could obtain material cheaper, but even this advantage is disappearing. As American manufacturers improve their methods, the prices come down. But even the advantage of a somewhat greater economy is far outbalanced by the ability to obtain materials from American manufacturers and the encouragement of establishing and developing enterprises of this character.

Our individual policy in the past has been to purchase from the American manufacturers whenever it is possible, and now, when there is an opportunity of making this practice more general, I think there should be no hesitation in

adopting it. It would be a pity and a wrong to destroy these industries that have begun to develop and promise to be industries of relatively large magnitude. I am,

Very truly,

EDMOND O'NEILL,
*Director Chemical Laboratories,
 University of California.*

The Hon. J. D. PHELAN,
Washington, D. C.

THE JOURNAL OF INDUSTRIAL AND ENGINEERING CHEMISTRY,
New York, December 15, 1919.

Hon. JAMES E. WATSON,
United States Senate, Washington, D. C.

My DEAR SENATOR WATSON: In response to my request you were good enough last week at the hearings on H. R. 7785 to allow me to insert later in the record the average cost of breakage of chemical glassware, porcelain, etc., as shown by records in the department of chemistry at the University of North Carolina, of which department I was head for 11 years previous to 1917.

Immediately after the committee adjourned, I wired to Dr. F. P. Venable, the present head of that department at the University of North Carolina, Chapel Hill, N. C., and asked him to wire me the average breakage bill per chemical laboratory student during the last university year. I am just in receipt of a telegram from Dr. Venable which reads as follows:

"Average breakage per student, 1918-19, \$12."

Thanking you for your courtesy, I am,

Very sincerely, yours,

CHAS. H. HERTY, *Editor.*

(Thereupon, at 11.15 o'clock a. m., the subcommittee adjourned to meet at the call of the chairman.)