

OUR WAR PROBLEMS.

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any other country on the face of the globe. We have some 35,000 miles of railway for a population of about eight million people.

A most interesting and valuable report on this problem was prepared by Mr. W. F. Tye, one of our members, who is also a member of the American Society of Civil Engineers. He presented his report in the shape of a paper read before one of the semi-monthly meetings of the Canadian society at Montreal. We did with it as we do with all of our papers,—printed it and distributed three or four thousand copies to our members, in addition to which Mr. Tye himself had printed and distributed about three thousand copies; so that as a result, before this debate comes off in parliament the people as a whole will have been well informed as to the existing conditions in regard to our railways and as to the possible methods of solution suggested through this paper.

Engineers in Canada have been called upon to advise and take certain part in the solution of many of the great war problems that we are now facing.

When we speak of Canada as it is to-day and of Canada as we hope it will be in the near future, it is impossible to disassociate the subject from Canada's part in the war, and as your chairman has seen fit to include my name in the program to speak on "War problems," I would like to approach the subject in that way, and particularly from the standpoint of the part which has been played by Canada.

War to-day is a matter of science. We can all look back to the times when we grumbled a great deal at being forced to read the history of how certain of the ancient armies went out to battle each other with battle-axe or broad-sword, or following on down through the more modern stories of war, but none of our studies have given us any appreciation of the change which has taken place in the conduct of war in the last few years.

The appliances used in connection with war nowadays are wholly a matter of engineering science. Whether it is a question of air-craft, submarines, high explosives, guns, projectiles, rifles, "tanks," or motor power, or particular kind of trenches and protective works; through the whole list you will notice that the engineering profession in some branch comes into play. Beginning with high explosives, you know the change which has taken place through the investigations of chemical engineers, until to-day the explosives used in warfare differ entirely from those used fifty years ago.

In the matter of guns: to-day the methods used in manufacturing guns (I mean when I speak of "guns," of course, artillery), are based upon different principles, and their use is entirely different from previous wars. Our modern rifles are entirely different and hundreds of new mechanical appliances are being used, so that it may be claimed that war to-day brings into play a greater number of engineering activities than was ever dreamed of in past wars. As a consequence, throughout all the armies of all the warring nations the engineer is playing a very prominent part.

As president of the Canadian Society of Civil Engineers, I am proud of the fact that we are putting up in our home building a roll of honor of the men in the engineering society in Canada who have gone to the front. That roll will comprise over 700 names. We are putting it up in the main hall of our building with a proper inscription, containing the name and rank of every man who responded to the call. Unfortunately, already we

are having to signify many of the names on that roll with a golden star, showing that these men have made the supreme sacrifice for the good of the country and their profession.

When we came to the great demand for guns and munitions resulting from the changed method of warfare, very few people knew anything about it outside of Germany or France. Great Britain knew little about it and on this continent we knew nothing about it. You have in the United States, government arsenals that make munitions for your own guns, but they were not the character of munitions used in Europe. They would have been useless in the character of campaigns carried on there now, and therefore both in the United States and Canada in the effort to meet the demand it was necessary to originate entirely new methods, and the success met with is largely due to the way in which the mechanical engineers responded to the call, and took charge very largely of the installations in the munition plants which sprang up almost over night. As a result, in Canada to-day we have some four hundred thousand people engaged in the manufacture of munitions, largely of explosive munitions. We have had to create an entirely new equipment, but we have been able to get to that stage that with the marvelous expansion in Great Britain in the same lines, it looks as if in the near future we will be able to manufacture most of our own munitions. May I suggest to you, gentlemen, that the mechanical, civil and chemical engineering societies of the United States should put their services to-day at the call of your government?

In conclusion, gentlemen, the attempt to speak to you of the war problems is, of course, a very big undertaking. I have only in a very disconnected way attempted to tell how the profession that we are all proud to belong to has played its part. Some of the most important actual service done by men at the front has been done by men of the engineering profession.

Finally, I would say to you that the war is bound to affect you as it has us. It is bound to affect you as citizens; it is bound to affect your profession. There is no doubt but that following the war there is going to be a great demand for engineering experience the world over. Great Britain has suffered an immense loss in men, ships, material and wealth, but her shores have not been invaded nor are they likely to be. On the continent of Europe, the destruction is beyond human comprehension; and in connection with rehabilitation of these countries, engineers will be greatly in demand. In Russia, the opportunities after the war are going to be very marked. Russia is a marvelous country. The new government will probably follow a much more progressive policy and do much to extend the development of that country. There are Russian commissions now looking after industrial construction, dock installation, elevator construction, along the most detailed lines of costs, and supplies of material, which, if carried out, will involve an expenditure of many million dollars. Then, in France and Belgium there will be great openings for engineers, and it is reasonable to suppose that the engineering professions of the country who take part in the war will have the first call. We think that the men of the engineering profession in Canada who responded to the call of duty are going to have the first call in a professional way in the rehabilitation of these countries.

The largest octagon ingot mould which has ever been cast in America, and perhaps in the world, has recently been made by the Bethlehem Steel Company. It is said to weigh nearly 140 tons.