

The war is an immense work of cold, calculated programme. Let us draw an analogy. A building contractor, let us say, determines to carry out a piece of work in a certain time. He calls his superintendent and explains what is to be done and when it is to be finished. The superintendent, in turn, calls his foreman and the various interests to whom he looks for co-operation and assistance. The materials are ordered. The laborers and artisans start their work—and the work is completed according to the wishes of the master mind. It is all a matter of mature forethought and cold calculation. There is nothing of accident or haphazard trust-to-luck haste. It is all carefully thought out ahead. The proceedings in the war are quite analagous, only on a stupendous scale. Nothing happens by chance. The constant care is to be in readiness at the necessary or appointed time. I would not modify my analogy, but would point out that Germany stands in the position of a contractor with an organization complete and ready, while the Allies have to be likened to one who may be without an organization and have to build it up. King Albert, the Belgian engineers, the engineers of France, and the British Navy were partly prepared, or we should not have the privilege of discussing the subject this evening.

There was one at least of the Canadian engineers who specially prepared himself in his spare hours for the service of his country in time of need. The reference is to Lt.-Colonel Charles H. Mitchell, General Staff Officer in charge of the Intelligence Department of the Canadian Army Corps in France. In a card recently received from him, he says:—

"The nice feature about my work is that after all it's pretty much the same in its type as consulting engineering—in fact, is the same if you substitute the Huns for the forces of nature." And in a letter just received, he says:—

"It is strange, and yet very fortunate, what an analogy there is between this work and my own professional work at home. The general character of the work, life and thought is similar, the assistants similar and one's activities are quite the same—office work, reports, analysis, correspondence, direction of investigations, deductions, maps, outside tours of inspection, constant telephone activity—all the same if you substitute the enemy for the forces of nature. There is a difference, though. It is seven days a week from 9 a.m. until 11 p.m. Our headquarters are in the Hotel De Ville of this little city (about 12,000 people normally), and it is really quiet and peaceful if one gets used to the passing to and fro of thousands of men and hundreds of motor lorries, motor cars, wagons, and so on, in the day, and the recent aeroplane activity by the enemy, in which he has been dropping bombs on various parts of the town, railway station, flying aerodrome locality, and not forgetting the cemetery. I had the misfortune last Sunday to lose one of my best draftsmen, killed on the street on his way to a noonday meal."

Canada is to be congratulated on the special services required of her soldiers. Like Sir Percival Girouard, Colonel Ramsay, of the C.P.R., has been called to the front with a corps of railway constructors, every man a specialist in a particular branch of railway construction. He has since been followed by a second corps, and now other engineering parties are being called for to render special services at the front. One of the most unique of these parties is one armed with broadaxes, and recently inspected by His Royal High-

ness in this city. In Flanders we can see them performing their task fearlessly and faithfully. Under the fire of the enemy they unflinchingly construct their bridges and prepare their highways. With tireless energy they minister to the needs and convenience of the men in the trenches. Anywhere, everywhere, their services are required, and the special skill stands them in good stead, for it must be remembered that in these bodies of men are artisans of all classes. Among the classes required by an engineer corps are bricklayers, carpenters, draftsmen, mechanics, masons, wheelwrights, shoemakers, clerks, drivers, chauffeurs, saddlers, plumbers and tailors.

The Canadian Society of Civil Engineers has nearly five hundred of its members on the field of honor, and some have made the supreme sacrifice. The whole of the struggle is not on the battle-fields, nor, indeed, in Europe. Soldiers must not be without ammunition. At the outbreak of the war nobody in Canada knew how to make ammunition on a commercial scale. Metal manufacturing industries were paralyzed by the interruption of normal conditions. The Allies needed shells. The Canadian manufacturers in a body rose to the occasion and transformed the shops of the Dominion into shell factories. The speed with which this transformation was accomplished probably stands without a parallel in the history of manufacturing. The Government appointed as the head of a commission an engineer whose knowledge of the machine shops of Canada had been gained from a lifetime in the work, following his father, and in a few months the shops of Canada had learned their lesson and were exporting shells to the Allies. In recognition of his services Alexander Bertram was knighted by His Majesty King George at the New Year.

The celerity with which new methods, new processes and accurate measurements were put into practice is a standing monument to the skill of Canadian manufacturing engineers. To illustrate, by a few figures, the transformation which has taken place in one shop alone. Prior to the war this engineering firm employed about twelve hundred men and had a daily output valued at about \$30,000. To-day, the employees number five thousand men and the value of the daily output is \$200,000. It is a significant fact that the president of the Canadian Society of Civil Engineers, as well as two of the immediate past-presidents, are all, directly or indirectly, engaged in the manufacture of ammunition.

Naturally, from the present conditions in Canada we pass to the thought of the future. When the war is over and when German militarism will have been crushed, what of Canada? Already a new word has been coined in the United States, "preparedness." President Wilson recently said: "There may come a time when I cannot preserve both the honor and the peace of the United States," and the outcome of this movement has been the appointment of a consulting board of specially chosen engineers, composed principally of the representatives from the five foremost engineering institutions of the United States, the American Society of Civil Engineers, the American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Mining Engineers and the American Chemical Society. Its immediate work will be to make an inventory of the facts necessary to be known to the army and navy relating to the resources of the nation for the supply of munitions of war in case of need. The French Republic has organized a similar civilian board, and has raised it to the dignity of a ministry, "Le Ministère des Inven-