

**W**HEN you've finally got aboard, stacked your luggage and fumbled up your ticket for the conductor—did you ever suddenly realize there was something you intended to say and didn't, and that it's too important to leave till you can send a wire, any anyway it would be too long for a telegram if you could? If so, you may yet be able before you are dead to get out of the trouble by going to the telephone and talking right to the office at 45 miles an hour. How soon, is not for prophecy yet. But the initial experiment has been tried on a Canadian railway.

Always something new on a restless railway. Men still comparatively young have not to stretch their imaginations far to recall the differences in railroading to-day, and a score of years ago. They have seen the development of the modern sleeping car, the dining car, cafe cars, library cars, observation cars, the solid trains of steel construction, and the various improvements that have been the outcome of an ever growing desire of the people to journey from one point to another with the greatest speed and the acme of comfort.

Wireless telegraphy enables ships at sea to communicate with each other and with wireless stations on shore. Now it is established that it is possible to send or receive telephone messages on trains going at full speed, and apparently it is not a far step to the future when a passenger will be able to take down the receiver and converse with his office or with his residence. By letting the imagination run a little ahead we can picture a passenger on a fast express calling up a passenger in a coach ahead, or someone in a distant city and conversing just as freely as if the phone connections were between stationary points.

All this is foreshadowed by a test which took place recently of a train telephone system on the Canadian Government railways. The demonstration was given by the inventor Mr. W. W. MacFarlane, and was conducted in the presence of several railway officials. Every facility was given by the Canadian Government railways to

## TELEPHONING on a TRAIN

*Canada makes the First Practical Experiment in a scheme of which thousands have thought in many languages*

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assist Mr. MacFarlane in his interesting demonstration. The location chosen was a two mile stretch of double track between Moncton, N.B., and the suburban station of Humphreys. A special train consisting of a locomotive and combination car equipped with telephones was run back and forth several times while conversation was maintained between the telegraph office at Moncton and the operators on the train, specimen train orders being received and acknowledged. The circuit was also put through the Moncton city exchange to the general offices of the railway with satisfactory results.

The telephone installation consists of a metallic telephone circuit connected with the telegraph office, and strung on the pole line the entire length of the division to be operated, with drops at both ends of each block section running through conduits and connected to the rails which are bonded throughout and insulated at the end of each block. The connection between the wheels and the telephone in the cars or locomotive is established by a copper rod extending between the two trucks and bolted to the axle housings. Midway the rod is run through a metal box or cylinder which has exterior binding posts from which the wires are taken up through the floor of the car to the telephone instrument. In this cylinder is contained the "mystery" of the invention. The accompanying illustration shows how this connection is made.

These tests were of course only initial ones. Other demonstrations of more complete character are likely to follow on other lines and the value of this invention as a practical railway proposition may then be more fully determined. Meanwhile, it can be looked upon as a highly interesting experiment.

So, in a little while, when experimentation has established proper procedure, you'll be able, for a toll, to tell your wife what it was you were just about to say when the conductor called "All Aboard!" The only prospect that is at all perplexing, is as to the length of time the device will add to the fond adieux of a certain class of the community.

**O**F what value is the munitions business, essentially a war industry, to the Dominion of Canada as a permanent asset? This important question has been carefully considered by those who look into the future and study post-war problems. But to the layman—to the general public—the question has seemingly been a more or less unimportant one, and has too often been dismissed with the oft-repeated remark, "No war—no war industries."

This view, however, is not taken by the scientific experts of Canada. The other day, I ventured to remark to one of the Dominion's leading analytical scientists that with peace would come the cessation of many industries made necessary by the demands of war, and in the course of my conversation with him, I specifically mentioned the munitions industry.

"Do you mean by that that you consider the munitions business is merely a temporary industry, as far as Canada is concerned?" he asked.

"That seems to be the prevailing impression," I replied.

"Then the prevailing impression is entirely wrong in my opinion," was his answer. "For I believe that the munitions business will prove to be one of the greatest assets Canada has ever had."

I gave this expert's answer careful consideration, and with a view to learning more on the subject, I interviewed several of the leading engineers and chemists in Ottawa and Montreal. And, to my surprise, the consensus of opinion was exactly the same. These men of technical training were convinced that the munitions business was a permanent asset, and a valuable one. In this article, I endeavor to give the sum-total of their remarks and the reasons they advanced to prove their contention.

In the first place, to consider the munitions business in the light of a permanent asset, it must be divided into two parts—first, its value resulting from

## TALKING of MUNITIONS

*Shell-making will be a National Asset in this country long after the war is over*

B y J . M c A L L A N G A R D I N E R

the standardization of products, and second, its value resulting from the standardization of skill.

From the standardization of products point of view, it is a well-known fact that no component part of munitions, however insignificant, has been made or accepted on the old principle of "good enough." Every part has been supplied to drawing and specification, with rigid and expert examination, analysis and test before acceptance. I think that I am safe in saying that there is no industry in Canada which has been occupied in the manufacture of munitions but that has passed through a process of refinement which will leave it in a better condition when it returns to domestic pursuits after the war. A review of the great industries of the Dominion will show that there are very few which have not been actively contributing to the output of munitions. Industries such as the iron and steel, the metals and metal products, refractory materials and fuel, lumber and timber, leather, textiles, paper, chemicals and other minor industries have called into being processes and plant which could be adapted for munitions, and have also added new processes, new equipment and new skill where these were required.

In addition to the employment and adaptation of existing industries for munitions manufacture, entirely new industries have been brought into activity. The manufacture of munitions has given an abiding impetus to the mining and subsequent operations in the production of coal, iron, copper, nickel, zinc, molybdenum, antimony, aluminum and other metals.

The chemical industries have been accelerated by utilizing the waste product of the coke ovens for the

manufacture of high explosives. These waste products after the war will be turned, by ingenuity and skill, into valuable domestic products.

The electro-chemical industries, such as the refining of copper, zinc and lead have been initiated and will remain as a commercial asset. The electro-thermic processes

for the production of ferro-alloys, such as ferro-silicon, ferro-manganese, ferro-molybdenum, aluminum, magnesium and other metals, have produced standardized products. All these things are being carefully studied by Canada's technical experts, all of whom are preparing for the after-the-war period.

The training has been a costly one, and in some cases, it has been a bitter one, but it has all been done ungrudgingly and with great patience, and the result is Canada's gain—that the standardization of Canadian products to-day is greater than ever before.

The second point to be considered is the value of the munitions business as a permanent asset to Canada from the standardization of skill viewpoint. The widespread knowledge of the thousands of new processes, involving a scientific study of metals, the flow of material, and their physical, chemical and metallurgical values, has been such that one can hardly imagine it would have been possible for the universities and technical schools of Canada to have provided such instruction in the course of many years which has been crowded into practically a few months. Every workshop has been a school of training in standardizing its skill. Every factory in which steel is made and forged is now partly or fully equipped with the means for measuring temperatures and intelligently discovering the value of the material which is being used. In every workshop in the different provinces of Canada where shrapnel shells are being made, a scientific treatment of steel is known. There is hardly a town of any importance in which the use of precision instruments and gauges for the measurement of shells and their com-