

RESEARCH WORK WILL BENEFIT CANADA

The Co-operation of the Universities and the Government —Manufacturers Are Interested in Efforts

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Canada has now reached a point in its development when the need of more initiative and of more organization in dealing with its opportunities, has become clear. On all sides we have the adaptable men who can follow when others lead, and the men who are not slow to appreciate and to carry into effect the discoveries and inventions of others, but, at this juncture, we also want in large numbers the men who can themselves originate new ideas. Simultaneously with our rapid commercial development, there should be continuous investigations among the raw products of the country, not merely to obtain new material of value to our manufacturers, but also to find new and better methods of treatment and new combinations which will more economically adapt to the manufacturers' purposes raw material already familiar to them, whilst, in connection with all industrial establishments, we want to find ways of commercially utilizing all by-products and waste. Nature has been prodigal with opportunities which it has given us in the country's physical features, its climate, its minerals, and its forest products, and in the favorable position afforded, by both land and sea, for trade relations with the rest of the world. Have we taken even a moderate advantage of these opportunities?

Judged by the part hitherto taken by the country in its exports to British and foreign markets, and by the literature circulated abroad to attract immigration, Canada appears, to the outside world, chiefly as an agricultural country. Viewed however in our own home markets, agriculture is now largely overshadowed by manufactures. The position is peculiar, because although the area devoted to the plough has, during many years past, been on the constant increase, the return per acre has continued to be much below what it could have been were cultivation on scientific lines everywhere carried out. Hitherto, however, the energies of the manufacturers have been almost exclusively expended in developing the home market.

Present War Forced Opportunity.

Only in a comparatively limited way, outside of food products, have they entered the foreign field, and then chiefly where the articles exported were, like lumber, pulp for making paper, and unrefined ingots, more or less in the rough state. But the present war has given rise to a change, which must, in the future, greatly extend the outlook for business of the Canadian manufacturer. With the extensive British, French and Russian orders for not only war munitions, army equipment and army food supplies, but also locomotives, railway cars, and other railway material and large enquiries from commercial interests elsewhere, the possibilities of the future have dawned on the manufacturer here. The war has not only been his opportunity for entering on the foreign trade on a considerable scale, but has been his education in the methods of securing and retaining this trade, and his introduction to foreign merchants as well as governments. That he will stay in the foreign trade, and that in the future he will have this foreign as well as the home market for the products of his works, is a certainty. This means more as well as enlarged industrial establishments, especially in those sections of the country where cheap water power and favorable water transportation to the seaboard are available.

In stretching out for this foreign trade, competition from foreign countries has to be kept in view, and hence, it becomes a question of price, quality and the adaptation of the product to the foreign needs and tastes. Thus, in the selection of the raw material, and in the various processes, whether mechanical or chemical, involved in the treatment of this raw material until its final output as a finished product, the newest ideas must be brought into play. It is here where research work becomes not only valuable but essential. The manufacturer who discovers a new and cheaper raw material adapted to his purposes, or chemical combinations which facilitate his methods of treatment, or mechanical appliances which lessen manual labor, has an advantage over other manufacturers in the same line whether at home or abroad.

The conditions attending the present war in Europe have stimulated invention and discovery. Probably at no time previous to this war has human ingenuity in Great Britain, France, Germany and the United States been taxed to such an extent in making to a greater degree the forces of the water, the air and the land tributary to the commercial requirements of men and to the war demands of nations, and in producing mechanical devices and chemical combinations, needed to meet the changing conditions arising from deficiencies in raw material, and from new hostile war contrivances. And these inventions and discoveries which have been developed by the war, will, after the war is over, remain for the benefit of the manufacturers and be applied by them in numerous ways to facilitate their interests.

All this points to the encouragement of research work in Canada. But few of our manufacturing establishments have the laboratories and special experts needed for such research work. Hence, it is satisfactory to know that three important universities—Toronto, McGill and Queen's—whose chemical and physics laboratories are extensive and well equipped for, at least, commencing the work, have agreed to co-operate with the Dominion government in research work for the benefit of the manufacturing, mining and agricultural and forestry interests of the Dominion.

Learn from the Enemy.

Some valuable research work has been done by each of these universities, but it has been carried out under the disadvantage of lack of funds and some lack of encouragement. In the government service, some research work has also been carried out. It will be therefore necessary to evolve a plan under which there will be co-ordination in work between the universities and the government departments. The subject is still under advisement, but it has been pointed out that it would give vigor and popularity to the universities themselves, if they would, in this way, work in with the industrial and business life of the country. Germany on the other hand, affords an illustration of the advantage to the country at large. There, the government directly encouraged research at certain universities many years ago, and it is claimed that the trade and commerce of that country owe much of their great development in recent years to the work done at these universities, and to the trained experts in chemical and physical science who in large numbers have emanated from their laboratories. Similar special experts, available for our Canadian industrial establishments, it will be one of the objects of the Canadian universities' laboratories to train in connection with their research work.

CANADIAN PACIFIC RAILWAY TRAFFIC

"The annual statement of the Canadian Pacific Railway is in some respects the most unsatisfactory that has been submitted for a number of years past. The shrinkage in the gross earnings of the railway system, compared with the previous year, of \$31,000,000 is very marked, indeed," said Sir Thomas Shaughnessy when addressing the shareholders at the annual meeting. "It is in excess of the entire gross earnings in the year 1901, but the fact that, notwithstanding this great falling off in revenue, the regular dividend was earned is unquestionable evidence of foresight and wisdom in having made such expenditures during the past ten or twelve years as to enable the company to make a saving in the working expenses representing such a substantial offset to the loss of gross revenue."

"The physical condition of the Canadian Pacific property has never been better than it is at this time, the reduction in the cost of maintenance of way for the year being due largely to a favorable winter and to the fact that works of betterment, chargeable in considerable part to working expenses, were completed before unfavorable business conditions appeared, and the additional facilities for the conduct of the company's business provided by expenditures made it possible for the company to handle the traffic more expeditiously and economically. As an illustration, the number of tons of freight traffic hauled one mile in the year covered by the report was 82 per cent. greater than in 1905, but it required only 17 per cent. additional train miles to perform the service. Improved gradients, double tracks, better terminal facilities, larger locomotives and cars enabled the company to earn \$3.17 per freight train mile in the last year, as against \$1.93 in 1905, an improvement of 64 per cent., although there had been a substantial reduction of freight rates in the meantime."