

Public Service Work in a Canadian University

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The particular public service which is being performed by the Antitoxin Laboratory of the University of Toronto, is the preparation of public health biological products.

Previous to May, 1914, with the exception of smallpox and typhoid vaccine, none of the weapons with which the physician is armed in his fight against contagious or communicable diseases, were prepared in Canada. The matter was frequently discussed, and various medical organizations had urged on the Federal Government the desirability of undertaking the preparation of these biological products, including diphtheria and tetanus antitoxin, anti-meningitis serum, anti-rabic vaccine or the Pasteur treatment, as well as smallpox vaccine for country wide distribution, free, or at a nominal cost. No action, however, was taken until 1914.

During the winter of 1914 the writer with the very cordial and hearty co-operation of Sir Edmund Osler, chairman of the Medical section of the Commission of Conservation and a Governor of the University of Toronto, undertook to establish a laboratory in the University of Toronto where these products could be prepared and distributed at cost. In May, 1914, the laboratory was formally opened. At that time very modest and very limited accommodation was available but better times were to come.

It may be wondered why it was desirable to establish such a laboratory if these products could be freely imported from the Mother Country or from the United States. The important reasons were three in number. The first of these was, that no country in the world of the size of Canada is without laboratories for the purpose. Secondly, the supply of a given product at any time might be insufficient and difficult to obtain; the outbreak of war in August, 1914, and the consequent great shortage of Tetanus (lockjaw) serum, illustrated this point. And finally there was the strongest reason of all, the economic reason.

The preparation of these substances requires the services of especially trained experts versed in the methods of immunity. Few such men are obtainable. Then the equipment of laboratories, stables, etc., is costly and the profits of producers, middlemen and retailers meant that the antitoxin when purchased by the ultimate consumer was expensive, very expensive. To illustrate: diphtheria is a disease, the ravages of which are felt mostly amongst the classes of our people who have least money with which to purchase medical supplies. A child in such a family is taken ill with diphtheria, the father goes to a nearby drug-store to buy the diphtheria antitoxin which the doctor has ordered, he requires a dose of five thousand units, he is asked to pay from three to five dollars for this. He is unable to do so, and he either buys a smaller dose of, say one thousand units, at a dollar, or he waits until next day with the hope that the child will then be better and he will not need to buy antitoxin at all. Next day the child is worse and eventually dies, even though given antitoxin. The delay has been fatal. The child should have been given as large a dose as possible, at the very earliest moment after the disease was diagnosed. The entire success of treating diphtheria with antitoxin depends upon the early use of large doses. The use of diphtheria antitoxin in this way in New York State, has reduced the death rate, from diphtheria, from 99 per 100,000 in 1894 to 20 per 100,000 in 1914. The remedy was at hand, but was not always available as has just been pointed out.

It is true that the larger municipalities and hospitals were able to obtain special rates from the manufacturers, that is to say, those who were best able to pay were charged the least, and conversely, those whose need was often the greatest and whose purposes were slim, were not so favored. Immediately the Antitoxin Laboratory began the distribution of its products, a dose of diphtheria antitoxin was made available for thirty-five cents; which previously had cost one dollar, and the dose which had been sold for from three to five dollars could be purchased for one dollar and half. The enterprise at once received every encouragement from several provincial and municipal Boards of Health. The first of these was the Provincial Board of Health of Ontario, which through its Chief Officer of Health Major J. W. S. McCullough,

arranged for distribution through all local boards of health in Ontario of various antitoxins and serums, at these greatly reduced prices. Dr. M. M. Seymour, Commissioner of Health for Saskatchewan, and Dr. W. H. Hattie, Provincial Health Officer of Nova Scotia, did likewise for their provinces. Several other provincial and local Boards of Health announced their intention of supporting the Laboratory, and soon the movement became national in scope. The Colony of Newfoundland though outside the Dominion of Canada, is in "the sphere of influence" of the Antitoxin Laboratory, and for two years past all diphtheria antitoxin used in that far away island has come from the Antitoxin Laboratory of the University of Toronto.

Meanwhile with the outbreak of war the work of the Antitoxin Laboratory was greatly increased. As has already been pointed out, soon after war was declared there was a great shortage in the world's supply of tetanus antitoxin. This was due to the fact that enormous quantities were required in the Western theatre of war. Within the first three months of the war, there were a great many deaths amongst the wounded from lockjaw. The medical authorities of the various armies decided that in future all wounded men were to receive a protective dose of tetanus serum. Immediately there was a cessation in the number of cases of tetanus observed and deaths from this dread disease, amongst those treated, became a rarity. To accomplish this, enormous quantities of tetanus antitoxin were required, and an acute shortage soon occurred.

At this juncture, in the early spring of 1915, the Canadian Red Cross Society had been urgently requested to obtain ten thousand doses of the Antitoxin and to send this amount to France. They endeavored to do so and found that the lowest price at which the serum could be obtained from any manufacturer in the United States was one dollar and twenty-five cents a package. This came to the attention of the Antitoxin Laboratory. At once arrangements were made with a large municipal public health laboratory in the United States to obtain the much needed supply for the Red Cross Society. It was found that for the price of sixty-five cents each, the ten thousand packages could be obtained. This saved the Red Cross approximately one-half the amount they proposed to spend.

This incident focussed the attention of the Laboratory on the necessity, if at all possible, of at once undertaking the preparation of this serum. A member of the Board of Governors of the University of Toronto, Col. A. E. Gooderham, who is also a member of the executive of the Canadian Red Cross Society, at once offered to equip a laboratory for the purpose of producing tetanus antitoxin. At the same time, the Department of Militia and Defence agreed to make a grant of five thousand dollars on the condition that the entire output of the antitoxin should be available for the use of the Department, if they required it. The Antitoxin Laboratory gladly agreed to this and went further and promised to supply tetanus antitoxin at approximately cost price. The special laboratory was at once established under the immediate direction of Dr. R. D. Defries, and for over one year has been preparing and sending to France all the tetanus antitoxin required for the use of the Canadian Expeditionary Force, at a price lower than the lowest cut price quoted by any American manufacturer of tetanus antitoxin. Since the Laboratory began this work over fifty thousand packages have been sent overseas.

Canada now has an institution which is comparable in the scope of its activities to the Pasteur Institute, Paris; the Lister Institute, London; and the Research Laboratories of the Health Department of New York City. These all derive a large part of their support from the preparation and sale of public health biological products, which are supplied to Boards of Health at low cost. The proceeds, above the amount actually required to run the Laboratories, are used to further research in Preventive Medicine. As soon as the war is over this is to be done in the Antitoxin Laboratory of the University of Toronto. At present all the energies of the Laboratory are being bent in the direction of war-work, since this is the first duty of every loyal Britisher to-day.