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Bureau of Scientific and Industrial Research  
and  
School of Specific Industries  
of the  
Royal Canadian Institute

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PRESIDENTIAL ADDRESS

at Opening Meeting of Session of 1915

*Delivered Nov 6th 1915*

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by

President FRANK ARNOLDI, K.C.

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*Mr. in C.A.*

BUREAU OF SCIENTIFIC AND INDUSTRIAL RESEARCH  
and  
SCHOOL OF SPECIFIC INDUSTRIES  
of the  
ROYAL CANADIAN INSTITUTE

Francis M. Turner, Jr., B.A., Secretary

Office - 198 College Street

# THE ROYAL CANADIAN INSTITUTE.

## PRESIDENTIAL ADDRESS, 1915.

We meet here to-night to open the sixty-eighth Session of this Institute.

The activities of the past year have been necessarily confined by the commercial conditions which have prevailed, owing to the state of war that exists.

The greater part of the papers read at the meetings held during the last Session were upon subjects of very great interest in connection with warlike operations. The appreciation which was shown by the members and the public of these papers was very gratifying to the Council, and seemed to give earnest of an awakened interest in the proceedings of the Institute which has been worked for and anticipated for some time past.

You have before you the programme of papers to be read at the six meetings on each Saturday night from now until and including the 18th of December. A short consideration of the subjects embraced in that programme will awaken, I trust, a keen appreciation of the fact that the Institute is fulfilling its duty, not alone to its members, but to the public in general, in the most ample way.

One is frequently met in conversation with persons who do not take the trouble to inform themselves of the work of the Institute, that they are not drawn towards the meetings of the Institute by reason of the scientific character which many of the papers possess. We may place on record our sympathy for these individuals, merely adding that the compliment conveyed in their reason for want of interest is a tribute to the value of our work.

During the past year the Institute has had to mourn the death of several members:—

Thomas Langton . . . . .	died 1914
Dr. A. M. Rosebrugh . . . . .	“ “
James Bicknell . . . . .	“ “
E. W. Cox . . . . .	“ “
Dr. J. Galbraith . . . . .	“ “
Alexander Nairn . . . . .	“ “
D. R. Wilkie . . . . .	“ “
J. H. Mathieson, St. Mary's . . . . .	“ “
F. W. Kingstone . . . . .	“ “
The Hon. Mr. Justice Maclellan	died June 9, 1915.
Sir Sandford Fleming	died July 22, 1915.



We have to mourn also the death of Miss Logan, who since 1905 has officiated in the office of the Institute, looking after the assortment and distribution of the exchanges, the keeping of the records, and the carrying on of the correspondence under supervision, and much other detail work in connection with the Institute with signal industry and ability. Miss Logan had become a sort of universal directory as to all the interior economy of the Institute. All who had relations with her learned to respect her and remember her most kindly, and now that she is gone she is sadly missed.

In the death of Sir Sandford Fleming, the first Honorary President of the Institute, who may be regarded as its founder in the year 1848, not merely an outstanding pillar of the Institute, but one of our greatest public men has passed away.

Dr. Kennedy, associated with the Institute for a great many years as its President and as a member of the Council, has a paper prepared on the subject of Sir Sandford Fleming's demise, which I will ask him later to read, forbearing further comment myself.

When in November, 1914, it was my privilege to address you we met under the pressure of the first few months of the greatest war ever waged by man, cherishing in our inmost thought the hope which no one dared to express, that not a long time would elapse before the Allies would triumph and the strife cease. The year has passed with its anxieties, thrills and great griefs, and the people of the British Empire, far from realizing the hope we have mentioned, are in the stage of appreciating that the end is not yet, and that before it comes, and to bring that end about favourably to themselves, the sacrifices that the people of the Allies have made must be supplemented by all the sacrifices they are capable of making.

The calls made upon the spirit of sacrifice and endurance in the case of the people of Great Britain have been so contrary to their state of mind, social relations and mode of life moulded by a century of peace and of great commercial prosperity, that new conditions must hereafter prevail. We find that this is the common theme of the prominent writers and commentators of the time. These say that things can never again be in Great Britain as they were. A new order will prevail from the time peace is declared. It is even said that the political life of the nation will be changed in many respects. It would require much greater prescience than we are accustomed to meet to enter with certainty into a more particular enumeration of the new conditions arising and to arise.

It is in the nature of things that there must be an incompatibility between pre-war thought and post-war thought. When peace returns

those who have not been affected by the war will expect the world to go back to its pleasures and frivolities; saturated with their past they will fail to apprehend what those who have been through the war are thinking. These latter will have the learning of their experience, which those who have not had the experience will fail to understand. The men with this experience will grow older, and assume a greater and greater position of authority in the world of thought. Their views must in the end prevail, and all may as well accept the fact that there is a new world opening before us to be essentially different from that which is behind us. Old ideas may live till they are eradicated, but eradicated they will be.

The new world with all its real happiness and prosperity, with all its seriousness and depth of purpose, with all its industry and self-sacrifice will assuredly appear, and the world of shams and failures will vanish away.

On the subject of national efficiency we already know this for certain, that whereas it has been found out by experience that in the past, whether from the long reign of peace or the enormous prosperity of the country, the means of national efficiency have been utterly neglected, the so called anti-militarism and deceiving pacifism which ruled the public mind not only blinded every one to the necessity for advancing in the application of science to the means for the protection and safety of the country, but stood in the way of necessary preparedness in the matter of munitions and men. It is also certain that the long continued prosperity and the commanding position which Great Britain enjoyed in the commerce of the world, bred in the people a false sense of security and a condition of complacency which made them content to plod along in the ways of former generations, accepting from Germany and other countries advanced in the application of the discoveries of science those things which such discoveries produced, without a thought that they should produce these things themselves.

The condition of the people in these respects was apathetic.

The people of Great Britain have at last been awakened. Experience since the war commenced has taught them that late as it is they cannot hope to succeed in this great contest unless they make part of their fighting force the same efficiency which their opponents have used to prepare their means for the tremendously aggressive campaign which they have waged, and are continuing to wage.

How have the experiences of the war found the people of Canada? What do they think of the lessons learned by the people of Great Britain?

The people of Canada have risen to the full height of their manhood and their duty as a British people in the matter of providing soldiers to aid in fighting for and preserving the British Empire. All praise to



Canada's sons who have so honourably responded to the call of the Empire. The rest of the people of Canada are doing their duty nobly for the Red Cross and the comforts of the soldiers at the front, in the hospitals, and on their return as ineffectives. There is, however, the business and social life of the country, what can we say of that? Is it not true that the people as a whole are conducting their business, their manufactures and their lives much as if nothing had happened—not looking for any radical changes as a result of the war, but waiting till it ceases with the expectation that things will go on as they did before. The immense expenditure on munitions of war now in progress in Canada must bring a degree of prosperity which it is difficult to measure—undoubtedly various prevailing conditions will bring into the country a large amount of money. The same will happen in the country to the south of us. Such conditions alone will not suffice to make the people of this country or of the United States permanently prosperous.

It is common knowledge to all that will learn that the United States has long since developed within itself a means of doing its manufacturing and trade in a great degree by large trade combinations such as in Canada we have not yet been able to rival. These combinations long since learned the necessity for applying the discoveries of science and scientific research to the betterment of their processes, the saving and utilization of by-product and waste, and the investigation of materials and processes for new products and new means of more economically producing products already known.

The war experience has shown them and the whole world how dependent they were upon Germany for many things which were the result of application of science and scientific research by the German people.

In the United States the result is already apparent in a vast advance in the opening of plants to manufacture many of the things required, and a multiplication and livening up of the means of scientific investigation to discover and to demonstrate the means and the result called for.

The people of Canada have made no move as yet in the direction above indicated: Nothing has been done to give value to the term "made in Canada" when our goods are so labelled.

The term "made in Germany" we all know has not among us the reputation of pointing to any superiority in the articles upon which it appears. The fact nevertheless is that hundreds of products "made in Germany" have been upon the markets of the world possessing a value actually due to the fact that they could be procured exclusively

in Germany, or that their quality by reason of efficiency of process or manufacture could not be rivalled in cheapness outside of Germany. It is stated in publications on the subject that the German products exclusively manufactured by them from coal tar and kindred sources number upwards of thirteen hundred. The manufacturing premises of that great firm of the Badische Anilin u. Soda Fabrik occupies alone a mile and a half of the bank of the Rhine, while a great many other parent sources have been exploited by them also, resulting in hundreds of products. In relation to this subject the amateur character of the information which I possess compels me to leave further details to those more intimately and practically acquainted with such matters. The whole of this great German trade has been by the occurrences of the past fifteen months thrown open to all the countries in the world. Deprived of it, Germany's great sources of wealth are suspended. It must be remembered that the scientific institutions, the laboratories, the manufactories, and the commercial equipment of Germany will not be destroyed, and it depends upon the means taken by the rest of the world to meet a resumption of German aggressive commercialism to see whether the suspension of her special trade will be converted into its permanent loss. Before the time arrives for Germany's attempts at commercial recovery, the other countries of the world must take care to establish and prepare to maintain the production of those articles, commodities and things which form the exclusive trade of Germany. They must be ready to withstand the aggressive power which German manufacturers and German science and efficiency will be able to exercise by flooding their markets with these products with which local manufacturers may find it impossible to compete, unless steps have been taken to meet such an emergency. Mere protective duties will not suffice for this purpose. There must be real live business energy in the commercial manufacturing world directed to the preservation of its interests. The people of the British Empire must understand that there will be this great commercial war to carry on with Germany, that it will call for all the resources, all the intelligence, all the learning, and all the assistance that can be derived by these means from scientific and industrial research and personal enterprise on the part of its people to wage the combat. It will be an Empire war. Great Britain itself is not equal to the emergency; she must have the assistance of all her dominions and dependencies. Canada must step in. Here we have the resources in nature, in men, in learning and opportunity to take a large and important part among the forces required for the contest. England has already taken steps forward in the matter, which you will no doubt hear of from some of the speakers here to-night. While we



are waiting we are endangering our interests, endangering our commercial future. We should spring at the great business opportunities which are presented to us. The Government of Canada for its part, we trust, will immediately step in and follow the lead of England in this respect. We have the right to expect that Governmental efforts will be immediately supplemented by the successful support of the Bureau of Scientific and Industrial Research which we are now promoting to deal with the private commercial aspects of the campaign, and as well to participate in and to promote the general commercial success of Canada's enterprises and manufactures.

The Royal Canadian Institute has acted in the direction indicated by the institution of a "Bureau of Scientific and Industrial Research and School of Specific Industries", following upon the advocacy of such a course set forth in the publications of the Institute, and particularly the "Red Pamphlet" issued in 1914.

This Bureau, as promised, is modelled on the Mellon Institute at Pittsburg, of which much has already been said in the "Red Pamphlet," and in addresses delivered in the Institute. The Bureau is already in operation and meeting, through its secretary, such persons and corporations as should or may require to have its aid. The investigations which the Bureau may be called upon or be employed to make, it will place in the most efficient hands to be found for the particular purpose in view at one of the universities under such conditions as may be necessary. In particular cases it may be necessary for the Bureau itself to make the research, for which means will in this particular case have to be provided by endowment by the applicant for the research. The conditions of research will in each case be the subject of an agreement with the applicant similar to that form of agreement ratified by use at the Mellon Institute. You will at once ask how the Institute has provided the means for the maintenance of the Bureau—even the initial means necessary to meet the preliminary expenses of launching it. My answer is that the Institute has not been able to provide the means required. The members and the public are to be asked to provide the means which are required, to the amount of about \$10,000, which will set the work going satisfactorily, and enable us during the first year to provide for the future, in case (unlike the Institute at Pittsburg) we do not find ourselves visited by benefactors like the Brothers Mellon to provide one half million for a laboratory for the Bureau and another half million for its permanent endowment.

A committee has been formed for the purpose of collecting the means required, consisting of the following governors of the Bureau, *i.e.*: Prof. J. C. McLennan, Frank Arnoldi, J. B. Tyrrell, Dr. Field, W. B. Tindall, Prof. A. B. Macallum, and the Secretary-Treasurer F. M. Turner.



A word or two is necessary as to the field which the Bureau will seek to fill. The commercial world and its industries necessarily require the advantage of scientific and industrial research as the universities give it for educational purposes and the advancement of the public interests in every way. A general scheme for scientific and industrial research utilizing the universities, a Government Commission backing up the universities may well be called upon to undertake. Into this field the work of the Bureau will largely extend, but the commercial world and its industries require in addition something of a different kind. The individual factors, the corporations, the partnerships, the individuals carrying on manufactures and enterprises require scientific and industrial research in their individual spheres and for their individual benefit. This work to a large extent the universities may find means to do. The selection of the best instrumentality, whether in a university or in the Bureau itself, or otherwise, for any particular investigation contemplated, necessarily calls for a competent body, capable and organized, to put forth the necessary propaganda and to provide a selecting body with machinery adapted for the negotiation with the applicant, the proper choice of the investigator, and the making of the agreement for a Fellowship, or other form of endowment of the investigation between the applicant on the one hand and the proposed investigator on the other. It is self-evident that the instructional functions of the universities and their trust for the general public prevent their taking upon them these functions of the Bureau of Scientific and Industrial Research, which, however, in its investigations, will necessarily depend largely upon and ask for the assistance of the universities wherever it is available.

In view of the action of the British Government in calling to their assistance the great scientists and scientific manufacturers of Great Britain to aid in the application of science to the production of efficient munitions of war, your Council in its name, and in the name of the members of the Institute, by letter to the Prime Minister of Canada, has placed the services of the Institute, its Council, its Bureau, and the use of its Library unreservedly at the command of the Government of Canada for the same purpose. It is hoped that they may be as fully availed of as they will be freely given.

Although, apart from the special demands we have alluded to for the employment of scientific methods and research, the war does not seem to have retarded scientific progress generally.

Necessity has created calls throughout the world which have been answered by new applications of known scientific principles, and by new discoveries and inventions, more particularly in the warring coun-

tries. There is evidence of much progress of this kind in Germany, and although the knowledge of it is withheld as much as possible from the rest of the world, it has been furnished in many ways. We may instance the wonderful advance in the construction of submarines up to the point of the so-called super submarine capable of prolonged voyages never dreamt of for such craft prior to the war. The same thing may be said of air craft of all kinds.

England and France we know have also made immense advances in the construction of their submarines and air craft, so much so indeed as to outclass the Germans, and in addition have produced scientific means and machines which have practically defeated and stopped Germany's submarine warfare against the Allies, and in the air have more than met every device of the enemy.

Further instances in this direction some of those present will no doubt take the opportunity to tell us about.

We have so far spoken of the effect of the war upon the people of the British Empire. Let us for a moment ask ourselves what the effect is now upon the nations of the civilized world—what it may be after peace is declared.

Before the war there had been for a century growing stronger among the nations, outwardly at least, a strong sympathy for humanity; the standard of national honour was high, and no insult to a country could exceed that of doubting the good faith of its government or its observance of its treaty obligations.

These conditions were shown by the growth of influential peace parties in the chief nations of Europe and America, who spread their propaganda for the settlement of all international disputes without war by means of convention or by arbitration till within recent years the Tribunal of the Hague was erected for the trial and determination of what may be designated international law suits to be brought before it. The relations between the nations had developed what might be said to amount to a code of international law which was added to by agreements entered into by the Powers at the Hague, and later by the Treaty of London so far as that Convention was adopted.

All this structure was built upon the good faith of the nations. The world thought good faith a safe security for the fulfilment of the obligations of Treaties and international law.

What was to be done with a Power which did not abide by its obligations in these respects was not provided for. In the nature of things it could not be provided for and was not discussed till the circumstances attending the war brought a suggestion for the formation of a con-



federacy of the Powers to enforce the observance of national treaties and obligations.

Probably this suggestion will be unearthed by posterity as one of the curiosities of this age of the world. What is to be hoped for is that when German Militarism shall have been crushed the horrors of what has occurred will operate in the minds of all nations automatically to produce such unity of thought and action among them as will enable them to overawe on the part of any country any effort to make war or in case of necessity by force of arms punish or restrain the offending nations.

We live in a time when the whole structure which we have referred to for the preservation of peace has been utterly repudiated by Germany and Austria. Their action has made itself evident that there is no means of preserving peace or the sanctity of treaty obligations, or enforcing submission to international law, when a nation thinks itself strong enough to defy the opinion and the arms of the other nations of the world. On the basis of German "kultur" international obligations stand only for those who are not strong enough to repudiate them. The honour of the Central Powers has been cast in the mire. While the other nations of the world hold to the sacredness of treaty obligations, the mandates of international law, and the dictates of humanity, these are all repudiated by Germany and Austria. Their creed is such that they will not acknowledge, much less voluntarily expiate, the wrongs which they have perpetrated against God and man, by bringing on the war indeed—but a thousand times more so by the ruthless, wanton and cruel way in which it has been waged in the invaded countries. The other nations of the earth cannot submit to the rule of national license which Germany and Austria have set up.

In quietness and confidence let us await the victory of the nations who are fighting for truth and justice against the powers of hell let loose by Germany.

The conflict involves an issue of life and death for all that gives real worth to human existence—for all civilization, all progress, all morality, all liberty worthy of those august names.

It will be a long fight, doubtless a fight in which our enemy will shrink from no atrocities, but it will be a fight to the finish. The commonest considerations of prudence make this certain.

The stern judgment of the old Roman patriot upon the great foe of his country was "Delenda est Carthago". As stern a resolution is on the lips of all true lovers of their country and of mankind be they English, or French, Russian, Italian, Japanese, and I do not hesitate to add American. German militarism must be utterly destroyed and the



monstrous creation of blood and iron be overthrown. Such is the plainest dictate of the instinct of self preservation. It is also the plainest dictate of justice. Germany must be paid that she has deserved and a reckoning be had also personally with the pillagers, assassins, and murderers who have carried out her pitiless campaign. Germany must be put in a position that never again shall she have the ability to rise to defy the world as she has done.

We must not ignore, in dwelling on these matters, the difficulties that stand in the way of attaining such results. No falsehood, no artifice, no crime, no consideration, moral or otherwise, no baseness stands for one moment between Germany and the objects she seeks to attain. Even now she is feeling the public of the other nations on the possibility of peace on some terms to save her face. The greatest danger to be met is that the Allies may allow themselves to be bluffed into a premature and inconclusive peace.

The Allies hold the winning position and all that is necessary is to stand fast together sternly mindful of the fact that it is not the German armies alone that are to be met, but in addition the vast secret influence and power possessed by Germany in that great number of its people, and of its agents and spies resident in the countries of the Allies and in the United States, combined with the strength and ramifications of German financial interests throughout the world, more particularly in England and the United States. The significant fact may be pointed out, viz., that in England the public trustee has been appointed the custodian of property to the amount of upwards of one hundred million pounds sterling belonging to alien enemies. The agents and protagonists of high finance will not lose sight of these facts, and their machinations must be sternly faced.

With all the craving of the public for information it is yet true that little is known outside of those in high places of the inner history of the war. We are with difficulty able to learn a fraction of the happenings from day to day. Political action, diplomatic action affecting these happenings and the relations of the nations are as to nearly everything a sealed book. So it seems from the light of the past it must be.

On this subject Prof. Webster in his inaugural address before the University of Edinburgh in 1914 said:

"You will look in vain for the books which can teach Englishmen the connection of their own country with the political life of the continent during the nineteenth century. Such books cannot be improvised on the spur of the moment in the midst of a national crisis. Few will dispute that the study of our diplomatic history in the past century

is of real and immediate importance to-day. Yet the work has scarcely been begun. There is, for example, as yet no adequate record of the part England played in the great reconstruction of Europe after the Napoleonic Wars. Neither Canning nor Palmerston is known to us, except by loose and inadequate records."

After our day the history of the momentous times in which we live will be written. We must be content with the fragments of history in the making which fall to us in the meantime, and from day to day carry our hopes and disappointments as they come with such fortitude as we may.

"None of us are prepared to suppose anything so unscientific as that the Allies are decadent and the Germans superhuman, or that all goes well with them yonder while all goes ill with the Allies. Let us try to conceive that a war is a slow and hazardous shifting of unequal values. Let us recognize that, as this war is vaster in itself than all the campaigns and battles of two centuries put together, a decisive transformation of values must not be looked for suddenly. We cannot expect to achieve in teens of months success such as our forefathers could only gain in teens of years. Reflecting that in the case of the British people never were the parties, the Kingdom and the Empire united as now, and that never before had we forces so great and gallant, or Allies so determined and powerful. Let us not look on the dark side, which is that never before had we so powerful an enemy. Let us be calm in the confidence of ultimate success, as British patriots put up with postponement patiently, with the certain conviction that the longer the war goes on the worse and more lasting will the ruin of Germany be, and the wider the influence of Great Britain in the vast changed future now to come."

FRANK ARNOLDI,  
*President.*