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THE NATIONAL RESEARCH COUNCIL OF CANADA

The First Forty Years

Late in 1916, the Government of Canada established the Honorary Advisory Council for Scientific and Industrial Research, now known under the short title "National Research Council".

In 1917, the National Research Council -- at first an advisory body of eleven men responsible to a committee of six Cabinet Ministers -- began by making a survey of Canada's scientific resources. This inventory showed that industrial research, at that time, was practically non-existent in Canada, and that the national supply of research men, capable of independent investigation, was entirely inadequate. The universities were almost completely absorbed in undergraduate work, the overloaded teachers had little time for research, and scholarships for graduate work were lacking. Hence at that time, most of Canada's postgraduate students went to foreign universities and many of them did not come back.

With a great sense of urgency, the Council set up a system of scholarships to assist students in their postgraduate training, and a system of grants to professors to stimulate research in Canadian universities. More than 2,100 students have held Council scholarships and a similar number of very able students have been employed as research assistants by the professors who have received Council grants. Today, the Council's "alumni" occupy many of the senior scientific positions across Canada. These policies were so soundly based and so successful that they are still an important part of the Council's activities.

In the same year, 1917, the Council began to co-ordinate research programmes of a national character by means of the associate committee mechanism. The procedure is simple but very effective. When a main problem arises the Council calls together all the leading persons in Canada who are working on the problem or who are particularly qualified to offer advice because of special training or experience. Their first duty is to review the present state of knowledge on that problem both in Canada and abroad. They then draft a specific research programme for Canada. This eliminates any duplication of effort. These men serve without salary, and there are normally about 25 to 30 of these associate committees in operation at any one time.

When these activities were running smoothly, the Council gradually became convinced that it would be quite impossible to fulfil its obligations to industry unless it were also provided with its own laboratory facilities.

Eight years later, in 1925, the Council began laboratory work on a small scale. Large-scale research began in 1932 when a central laboratory was opened on Sussex Drive in Ottawa. This laboratory housed four divisions, which at that time were called Physics and Engineering, Biology and Agriculture, Chemistry, and Research Information.

During the depression little expansion was possible, but in 1936 the Division of Mechanical Engineering was established and in 1939 a new building site was acquired -- of 130 acres -- on the Montreal Road near Ottawa. (This site now comprises 400 acres).

During these years a nucleus of highly trained specialists in all the main fields of science was built up. When the time came, these men became leaders in directing Canada's war research. The wartime demands were enormous and a ten-fold expansion had to be -- and was -- achieved.

When war broke, the Council had one laboratory in operation. During the war, 21 other laboratories were established, from Halifax to Vancouver. The Council operates temporary laboratories for cold weather work at Lake Louise, Jasper, Edmonton, and Saskatoon. The Council built an explosives experimental establishment at Valcartier that has since become part of a Service organization. For the Atomic Energy Project, the Council equipped large laboratories in Montreal and created a permanent establishment at Chalk River. The Council built sizable radar laboratories near Ottawa, a cold weather station in Winnipeg for testing jet engines, naval research stations on both coasts, and, on the Montreal Road, four miles east of Ottawa, a permanent group of nine buildings and wind tunnels for aeronautical and engineering research.

At the outbreak of the war, practically every laboratory in Canada offered its facilities to the Government. By means of the Council's associate committee mechanism, these people were welded into an informal but highly effective association. Twenty major committees with nearly 100 sub-committees directed and controlled the scientific programmes in as many broad fields of war research. These included committees on naval, army, aviation, and general medical research; and on chemical warfare, explosives, ballistics, aeronautical engineering, aerial photography, soil mechanics, petroleum, synthetic rubber, and substitute fuels. There were also more highly secret committees on atomic energy, invasion problems, and so forth.

Liaison offices were set up in London, Washington and Ottawa for the free flow of information on the secret projects being worked upon in the three countries. Senior members of NRC staff also served on various defence committees to integrate scientific work with service needs, and NRC was named as the research establishment for all three of the Armed Services. In the end, Canada's scientific resources were mobilized as effectively as those in any other country.

By 1940, NRC was engaged in almost every field of war research, and peacetime operations had been reduced to a minimum. There were scores of major achievements: in medicine, in aeronautical engineering, in the chemistry of supplies and substitutes, in biological warfare, in tropicalization of equipment for use in jungles, in protective clothing, in nutrition, in packaging and transportation of foods, in atomic energy -- to say nothing of innumerable devices such as predictors, gun sights, chronographs, sound ranging, and anti-mine and anti-submarine equipment.

Canada's connection with radar started in March, 1939, when an NRC scientist went to England on the invitation of the Air Ministry and was given full information about the top secret device for detecting aircraft. On his return, he brought a few men together, but little money could be obtained for the work and progress was slow until war broke out in September. During 1940, the first operational set on this side of the Atlantic was part of the defence works of Halifax. From then on, progress was rapid: the Council group had 300 men by late 1941. Research Enterprises Limited, among other vital activities, built the sets and, by the end of the war, Canada had designed over 30 types of equipment, and the war-time production had a gross value of over $300 million. Most of this equipment was developed in the Council's radio laboratory.

Canada made no pretence of covering the entire radar field but, in co-operation with her British and United States Allies, undertook certain specific tasks for the common pool. The Canadian effort, of course, was not as large as that of the other two countries but it was an important contribution. Canada-made radar gear was used to defend the Panama Zone in 1942, Canada designed and made all equipment used to protect its own shores and the Gulf of St. Lawrence, Canada designed most of the gun-laying anti-aircraft sets that defended the cities of the United Kingdom during the last part of the war, and Canada provided the Commonwealth's navies with two of the most important types of radar gear used in the last years of the war.

Civilian scientists operated with front line troops from the battle of El Alamein to the end of the war. A Council scientist was on the Rodney during her successful battle with the Bismarck. Council scientists were in the front lines in New Guinea, checking up on equipment under tropical conditions; on bombing raids over enemy territory; in the fighting zones in Europe, Australia, Burma, and North Africa -- in addition to working with new and untried explosives, lethal gases, poisonous substances, and spending many hours in experimental aircraft looking for the dangerous icing conditions that normal aircraft avoid as one of the greatest dangers in aviation.

Just as the Canadian Corps during the First World War established Canada for the first time as a significant military power, Canadian scientists during the Second World War won recognition for Canada in the field of science.

After the Second World War, most of the military research -- still necessary in an uneasy world -- was transferred to the then newly organized Defence Research Board of Canada. They took over the defence laboratories that the Council had operated at Valcartier, Halifax, Ottawa, and elsewhere.

In 1946, the Division of Medical Research was established to administer the Council's grants in this important field. This division grew out of the excellent work done by the Associate Committee on Medical Research during the war.

In 1947, the Division of Building Research was formed to study problems of construction and to act as the research wing of the Central Mortgage and Housing Corporation. Radio research, which grew from a small group in 1939 to a large branch, was associated with electrical engineering laboratories and, in 1947, the Radio and Electrical Engineering Division was established.

In 1948, the Prairie Regional Laboratory -- largely an outgrowth of the work of the Division of Applied Biology -- was set up on the campus of the University of Saskatchewan in Saskatoon. The Atlantic Regional Laboratory, opened in 1952, is on the campus of Dalhousie University in Halifax.

The largest wartime undertaking was the Atomic Energy Project. It began in 1942 as a secret laboratory in a wing of the University of Montreal and was transferred to the new site at Chalk River by 1946. In the years following, as a result of the sale and distribution of isotopes for use in industry and medicine, the Project began to assume the role of an industrial enterprise. In 1952, a new Crown company was formed, called Atomic Energy of Canada Limited.

In 1952, the Division of Chemistry was divided into the Division of Pure Chemistry and the Division of Applied Chemistry; and similarly, in 1955, the Division of Physics was divided into the Division of Pure Physics and the Division of Applied Physics.

At the present time, Canadian industries have grown to the point where many of them have established research laboratories and the amount of research done by industry for itself is fast becoming as great here as it is in older industrial countries. In a very short time, at the present rate of increase, the expenditure of industry on research should equal that of the Federal Government.

Much of the work done in the NRC laboratories is of a type that would be too expensive to be undertaken by any one university or indeed handled by any one industry. A good example of this is the development of Atomic Energy of Canada Limited, which, for the first ten years of its existence, was sponsored by the National Research Council before it was set up as a separate Crown company. The use of atomic energy is only now beginning to be applied by industry. A good deal of work is also devoted to problems of national interest, in which the co-operation of industries, federal and provincial agencies and other bodies must be sought.

Although the greater proportion of the work in the laboratories is of an applied nature, it is vital to a research organization that a considerable amount of purely fundamental work should be undertaken. This is done, in all divisions, but particularly in the fields of physics, chemistry and biology. Many of the Council's pure scientists are authorities in their specialized areas of research.

It is essential for the welfare of Canadian science as a whole that the strong position of the Council's laboratories be maintained to provide leadership in scientific fields and to provide a flow of top-ranking scientists from the laboratories to the universities and to industry.

The long-term problem facing the Council today is fundamentally the same as it was forty years ago -- to assist in building up in Canada a first-rate body of scientists and engineers adequate for the expanding development of the country. No better way of doing this has been found than a programme of scholarships and grants. The Council's current programme for this purpose is in the neighbourhood of $3.5 million per year.

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