

## SCIENCE AND TECHNOLOGY IN THE SECOND WORLD WAR



Photo: Veterans Affairs Canada

**INTRODUCTION**

The Second World War was a conflict that saw a great deal of scientific and technical innovation. The war was a battle of scientific minds as well as of bullets and bombs and the wartime research programs came up with many important developments to help give the Allies an advantage in the struggle. As with many other aspects of the Allied war effort, Canada played an important role.

Much of the research found civilian uses after the war and has helped shape today's modern world. Whenever you heat food in a microwave oven or use washer fluid to clear off a car windshield, to name just two examples, you can credit the groundbreaking work done by Canadian scientists during the Second World War.

**RESEARCH AND DEVELOPMENT**

Canada was a great centre of wartime research. The National Research Council, the armed forces, and various Crown corporations undertook research in weapons, atomic energy, radar, nutrition, medicine and other areas which both helped win the battle and improved the life and well-being of people in the years that followed.

Extensive research on magnetism was conducted to learn how to 'degauss' (or demagnetize) the hulls of ships to protect them from some types of mines and to detect submerged submarines. This research would pay dividends after the war as a means to detect bodies of ore from the air for mining purposes.

The Canadian Anti-Acoustic Torpedo (CAT) gear was developed as a counter-measure to enemy acoustic torpedoes. This invention is credited with saving many ships from torpedo attacks.

The technique of cathodic protection of ships' hulls against salt water corrosion (a technology that is still in use today and has saved millions of dollars in ship

damage) developed from work done in Canada during the war.

Anti-fog windshield fluids, developed for service vehicles, were a Canadian invention.

The first patent for artificial fur arose out of Canadian work in developing improved Arctic clothing for the military.

Canadian companies and scientists played a leading role in the development of synthetic rubber. Although a completely synthetic rubber was still not developed by war's end, a fully satisfactory product was in production that was 90% made from wheat derivatives.

A technique developed by prolific Canadian scientist and inventor George Klein provided a means of testing and quantifying snow conditions. He also developed aiming systems for artillery and anti-submarine mortars and carried out research on high velocity projectiles and their fuses. As well, he developed an anti-roll stabilizer for an anti-submarine weapon.

Nuclear energy research initiated in Montreal led to the development of the Chalk River atomic energy facilities and the eventual development of the CANDU nuclear power generator by the Atomic Energy Commission.

Ionospheric 'sounding stations', installed during the war to help predict optimum frequencies for long distance communications and for direction finding against enemy submarines, led directly to the development after the war of the Alouette satellite, Canada's entry into satellite technology.

The National Research Council pioneered the use of nylon for parachutes.

Electro-thermal de-icers for aircraft propellers were developed by Canadian scientists, an invention to improve the safety of air travel that is still in use today.



In response to food shortages in Britain, the National Research Council developed successful processes to manufacture better powdered eggs, powdered milk and preserved bacon. These helped solve some of the problems of food transportation and led to the development of some of the powdered and condensed foods still in use today.

## RADAR

During the war's early years, Britain essentially passed all microwave radar development over to Canada. Canadian scientists developed the 'Plan Position Indicator', still in use today. Canada provided some 9,000 radar sets (worth hundreds of millions of dollars) to the Allies. At one stage of the war, the National Research Council built and installed submarine detection radar in the St. Lawrence River in just seven days.

Early on, Canada had established specialized electronics training initiatives to meet the need for skilled scientists and technicians that forward-thinking leaders realized the new technologically-oriented war would demand. As a result, our country produced a large number of people skilled in electronics during the war, people who helped meet the great need in Britain for electronics technicians. Indeed, many of the radar personnel who worked on large British warships were Canadian.

## MEDICAL DEVELOPMENTS 1939-1945

Canadian researchers carried out studies on seasickness and motion sickness. This research led to the development of drugs to help cope with these ailments.

Important contributions were made to the development and improvements in production of penicillin. Canadian

scientists overcame the problems which had stood in the way of mass production of the life-saving drug.

Blood serum, in great demand to help the large number of people injured in the war, was made available as a result of work done by Dr. C.H. Best of the University of Toronto.

The Banting Institute also built the first decompression chamber in North America, built a human centrifuge, invented the "Anti-G-suit" which is still used by pilots of high performance aircraft, made improvements to aircrew equipment like oxygen masks, and conducted research into the effects of fatigue and cold.

Research on night vision led to red lighting being adopted by the Royal Canadian Navy, the Royal Navy, and for some aircraft with the United States Navy.

It is interesting to note that many of the Canadians who made such important contributions to the scientific war effort were generally quite young. In 1944 and 1945, the 300 National Research Council staff who were working on radar research had an average age of about 26. It is evident that Canadian youth, when they put their mind to it, can work wonders.

## THE LEGACY

Remembering and reflecting on the significance of the many contributions Canadians made, including those who participated in wartime scientific research, during the Second World War is important. The research and discoveries made during this pivotal time in history still live on in much of the technology we use daily. To learn more about Canada's role in the Second World War; please visit the Veterans Affairs Canada Web site at [www.vac-acc.gc.ca](http://www.vac-acc.gc.ca) or call 1-877-604-8469 toll-free.

