Fred Heath and the Invention that Changed the World

by Alex Mair (Civil '48)

It's been called the invention that changed the world, it's been called one of the greatest scientific breakthroughs of this century, and it's been called the invention that won the Second World War. We're talking about what is conventionally known as radar, and a major part of that story began right here at the University of Alberta, in 1938, when a young man by the name of Fred Heath graduated with a degree in Applied Science, Electrical Engineering.

Fred Heath was down at MIT doing some post-graduate work when he was recruited by the National Research Council in Ottawa to work on the development of something called radar. Heath recalls the story, "The British had developed the magnatron, which would produce very high power, and eventually the Americans were getting involved at MIT, and a group of us were working in the radiation lab at MIT on the radar project. There were three engineers and three technicians who were sent down from Ottawa to work on that development. We produced an engineering prototype of the unit to be used on night fighters. It was demonstrated for the Royal Air Force. There were test flights staged with the equipment upon which I had worked, and it was found to be very satisfactory. It was decided to install it in the RAF night fighter, the Beaufighter."

Fred Heath worked on the project in Britain from the middle of June 1941 until September of that same year. He returned to Canada, and shortly after that the Japanese attacked Pearl Harbour. From that point on, the whole picture changed drastically.

The first installations were in aircraft. This was the micro-wave equipment, but there had been earlier work done on ground installations, operating on lower frequencies. After the installation had been made in the aircraft, work began on an expanded development at MIT involving the use of radar to control anti-aircraft guns. The American prototype had an automatic arrangement to follow the target aircraft, and at the same time in Ottawa they were working on an anti-aircraft radar that was manually controlled, with which they were able to follow the target manually. Both systems had about the same accuracy, Heath recalls.

National Aviation Museum of Canada

Two pilots and their torpedo-laden Beaufighter.

After finishing his degree program in Electrical Engineering in 1938, the young and enthusiastic Heath went off to MIT as a graduate student to pursue post-graduate studies for two years. He then went to work for the National Research Council, and it was while he was in Ottawa that he was sent back to MIT, as part of the radar development team.

After his distinguished work in the area of radar development during World War II, he continued to work in the same field for a number of years. He spent 25 years with Canadian General Electric in Toronto.

Fred Heath, now retired, lives in Toronto. His voice warms as he recalls some of the people with whom he worked, and the fascination he felt for his work. He has a very low-key approach to his part in the whole dramatic story, but after talking with Mr Heath the listener comes away impressed with the importance of the work with which he was involved.

There is a marvellous book entitled *The Invention That Changed the World*, by award-winning author Robert Buderi. The author explores, in great detail, the scientific aspect of the development of radar. Writing about the early development of the radar concept, the author mentions a physicist called I Ramsay. Buderi goes on to say, "Close on Ramsay's heels, anxious to show off the lab's prototype airborne interception system, came Taffy Bowen, Dale Corson, and Fred Heath. The resourceful Heath, an engineer borrowed from Canada's National Research Council, rode shotgun on 600 pounds worth of radar equipment flown up to Montreal by Eastern Airlines, then transferred to a Liberator for the trans-Atlantic haul. Heath's job was to reinstall the radar in a Boeing 247-D shipped over earlier in June as deck cargo."

When we think of the role played by radar in today's world, it's more than a little breathtaking to consider the part played by a graduate in Electrical Engineering right here at the University of Alberta.

Technological heroes are where you find them, and we find one of them in Fred Heath.

Alex Mair, who graduated from our civil engineering program in 1948, is a popular writer and broadcaster based in Edmonton. His stories about engineering history will appear in each issue of the UofA Engineer.