BLETCHLEY PARK CODE BREAKING

by Peter Lamb and David Whitehead

In the Spring (19th April 2001) a coach trip involving both the Retired Professional Engineer's Club and ourselves is being organized to Bletchley Park, near Milton Keynes.

Many of you will not be aware of the great interest of engineers in particular to what went on at Bletchley Park during the War, which was then known as Station "X". If you have read Robert Harris's book "Enigma", you will have gamed an impression of what it was like in those times. The buildings, which remain, are largely unchanged with their wartime aura of secrecy still intact and unchanged despite being used as a training college in recent times. In the grounds of the Victorian Mansion are still the single story brick and wooden huts, where the code-breaking was carried out. Also the ornamental lake with ducks and the tennis courts are there, built at Churchill's insistence to provide recreation for the "inmates".
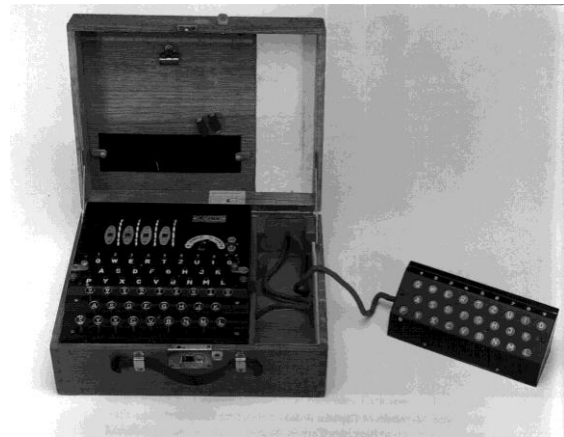

BLETCHLEY PARK MANSION

The importance of the work carried out at Bletchley Park, which at the time was known to a very few only as "Ultra", can be gauged by the estimate that it shortened the duration of the War by up two years. However it was so secret that only four men knew the full scope of the operation there.

What was this all about, you may ask? Chiefly breaking the Enigma Codes devised by the German Armed Forces. Ciphers were tapped out on machines, which resembled typewriters, in order to send messages to remote locations in code. Initially there were three wheels to vary the settings and the sender and receiver machines had to be set in exactly the same way. Before the War, Intelligence Services from many countries listened to these signals. The Polish and French Secret Services had broken the original Enigma codes, and the original code-breaking machines were designed by Polish Cryptanalysts, which made a ticking noise and were nicknamed "bombes". When the German Forces walked into Poland, the Polish Cryptanalysts moved to France sheltered by the French Secret Service.
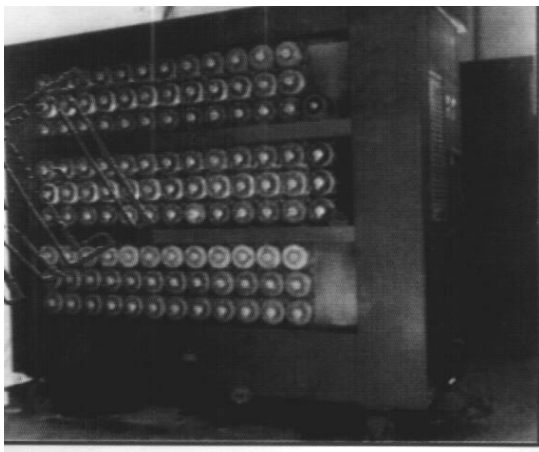

ENIGMA MACHINE

At the start of the War, young mathematical graduates were recruited from the Universities for the cryptographic work and as time went on thousands of young men and women from the armed services came to operate and maintain the equipment.

Alan Turing was the leading mathematical genius at Bletchley Park. However before the fall of Dunkirk, in January 1940 Turing was sent to France to have a meeting with the Polish Cryptanalysts and he brought back with him a replica Enigma Machine. He would have seen their "bombes", and was given considerable advice on how to break the Enigma Code. On his return, the Enigma Research Team at Bletchley were able to break

the Enigma Code and Turing went on to design with others the British code breaking electro-mechanical machines, which were called "bombes" as well. British machines were of a completely different design and were made by the British Tabulating Machine Co.

Later still the "Colossus" was designed as a more advanced decoding machine, which is reputed to be the World's first programmable electronic computer. It was developed to break the "Fish" ciphers used by the German High Command, using Lorenz ciphering machines, which were more complicated than the Enigma Machines. Colossus was developed and built under the direction of T.H. Flowers at the Post Office Engineering Department Research Station at Dollis Hill. About ten of these units, which each occupied a whole room saw service mainly at Bletchley Park. Nearly all were scrapped after the War, but one or more may have been retained at GCHQ, until destruction in the 1950's. Very few details exist of its construction - a few photographs and in the memories of the now elderly veterans involved.

However a Trust has been set up to rescue the Park from threatened redevelopment and with the aim of restoring many of the features of the Wartime activities. A working reconstruction of the Colossus equipment is being built under the direction of Tony Sale, the Trust's Director.

A TURING BOMBE

In wartime, the function of the Park was disguised in a number of ways. There were no radio masts, since German radio transmissions were intercepted at listening stations around the Country, many of them on the coasts. Messages were relayed to the Park by teleprinter or dispatch rider. The existence of such a large workforce was disguised by placing Army and Air Force bases in the area.

It is remarkable that the Germans never realized that their codes had been broken, which is surprising, when as many as 3,000 Enigma and even more important Fish messages were decoded each day.

The working environment for the staff there was pretty primitive. The concrete hut 11A was dubbed the "hell hole" by the Wrens, who worked there, because of the poor ventilation and the heat being created by the decoding equipment. The all important card-index library, which enabled fragmentary messages to be pieced together, were stored in old shoeboxes.

At a maximum twelve thousand men and women were involved in the whole operation, drawn in equal numbers from the armed services and civilian life with women outnumbering men by eight to one. The desirable qualification for a cryptographer was a Mathematics Degree and/or an ability to solve crosswords quickly. For all concerned the ability to "keep your mouth shut" was essential. By the end of the War the capacity of the Park had been greatly exceeded and two outstations had been built to accommodate the hundreds of Bombes, including those transferred from the Park. Each outstation was staffed by about a thousand Wrens and eighty RAF Technicians with hardly a civilian to be seen.

One well-known decoder was Lord Jenkins, then a young Army Captain, who was involved in decoding the Fish traffic. Another expert was the late Professor Harry Hinsley, who worked m Hut 8 where the German Naval Traffic was handled. He and his team decoded messages from Admiral Donitz to and from the U-Boats, thus helping to win the Battle of the Atlantic, After the War he went on to become the Master of St. John's College, Cambridge and compiled the official history "British Intelligence in the Second World War".

In 1942 another later recruit was Professor Donald Mitchie, 18 years old and only just out of school. He was transferred from the Intelligence School in Bedford to Bletchley Park at 48 hours notice. He was immediately put on the task of interpreting the so-called "Fish" traffic, which was the communications between the German High Command and its Field Commanders, including Berlin to Paris, Berlin to Oslo and Berlin to Tunis. He together with Max Newman, Jack Good and electronics experts devised a machine called "Heath Robinson". This machine used punched paper tape loops running on a system of pulleys and electronic sensing equipment with lots of valves. It proved suitable for operational use, but paved the way for the development of the successful Colossus equipment.

ALAN TURING

To talk about Bletchley Park without more details of the leading cryptanalyst, Alan Turing, would be a grave omission. Mitchie and Turing became firm friends due to their common interest in chess. Turing, the older man, had gained a reputation in academic circles before the War for solving some great mathematical challenges of the time. He had tremendous ideas and unlimited mental energy, but also many and varied eccentricities, which fortunately did not distract his colleagues from recognizing his considerable intellectual abilities. One of his problems unfortunately was that he was gay, a term not used in those days and something which did not fit in with the culture of the day. After the War his brilliance was brought to bear in designing computers at Manchester University. At the time, the work was covered by the Official Secrets' Act, and therefore involved MI5, who unfairly hounded him over his male relationships ending tragically with his suicide.

One of our members, David Whitehead, retired CEGB, was recruited from GPO Telephones in 1942 to work on "Bombes"- He was one of only five civilians who worked at an associated site, Eastcote Out-station installing, maintaining and eventually destroying twelve "Cobra" Bombes employing electronic techniques. They were developed to help break the North Atlantic U-Boat ciphers, which utilised 4 rotor Enigma machines instead of the 3 rotor machines used by the other German Services.

The Mansion, which you will see, was largely created by its owner between 1883 and 1926, Sir Herbert Leon, financier and MP, who extended it and embellished it during his lifetime in florid styles from Gothic through Tudor to Dutch Baroque. The Museum consists of the main Mansion and the Huts. The main exhibits in the latter are the "Cryptography Trail" starting from the radio interception station, the code breaking procedures, the Bombe Rebuild Project and the Colossus equipment, rebuilt by Tony Sale and some keen Trust members with a little more than 8 photographs and brains racked for memories. Information about Bletchley Park is so scarce that Tony Sale has even been to America, where he unearthed declassified documents on Colossus and the Turing Bombe. The Public Records Office at Kew has also yielded some previously hidden details. In addition to the cryptography exhibits, there are displays of the World War II military vehicles, aircraft recovery and computer history.