History Coursework Year 10

'Why was Bletchley Park able to break the German Enigma Codes?'

The Enigma machine was a complicated machine that looked like typewriter, inside a wooden box. It had two keyboards, one to type in the message, and one to display the decoded message. It also consisted of 5 rotors (later increased to make it more secure), and 10 plugs to set up the machine. The rotors each contained 26 letters (the alphabet).

To use the machine, both the sender and the recipient had to set their machines the exact same way, using the plugs and rotors. Using the codebook, 3 of the 5 rotors were set, for example "N.J.A". And the ten different plugs were placed into the sockets, for example Plug 3 was put in sockets B and C. These settings were changed at least once a day once the war had begun.

After the machine was set, the sender could then type in his message, and receive it on the higher keyboard as a cipher. This cipher was then sent to the recipient by morse code. The recipient then typed the cipher into his machine (set exactly the same way), and received the decoded message on the higher keyboard.

The enigma machine was so complicated that there was 159 million million million different possibilities. Breaking the Enigma codes was not going to be easy. To do so, they needed technology, good luck, different individuals, German mistakes and the help provided by the poles.

Britain and her allies first understood the problem posed by the Enigma machine in 1931. A German spy called Thilo Schmidt was turned by the French, and allowed them to photograph stolen Enigma operating manuals. However no progress could be made, as British and French cryptanalysts could not even begin to try and break it.

The real progress came with a great deal of help from the poles. Britain and France handed over the details they had obtained, to the Polish Cipher Bureau. Due to their closer links to the German engineering industry, the Poles managed to reconstruct an Enigma Machine, complete with internal wiring. These replicas were then handed to the British along with important information gained by Rejewski and his colleagues in 1939. Now that the Allies and Bletchley Park had a replica to work on, they at least had a chance of breaking the codes. This co-operation between Britain and Poland greatly increased the chance of success.

Mistakes made by the Germans also played a great part in breaking the Enigma. Bletchley Park benefited greatly from clues provided by the German Operators and the Enigma Machine itself. The most important mistakes made by the Germans were due to the carelessness and laziness of German Operators. They became lazy; as they had got it into their heads that the Enigma Codes were 'unbreakable'. This led them to make silly mistakes by not following the rules properly. For example, German operators sometimes sent the same message by Enigma and also by a simpler code. This allowed Bletchley Park to compare the two, and work out the settings for the day. They also provided clues when operators began their messages with a standard introduction, e.g. "To all Units". This also could also be used to work out the settings.

John Herivel, a 21-year-old mathematician, used these mistakes made by the Germans as a base for his ingenious idea. He attempted to exploit these mistakes by trying to imagine a German enigma operator's daily routine. He assumed that the operators would not be too careful when sending messages, as they believed that the machine was unbreakable.

Herivel thought that the German operators might send the three letters that they could see when the lid of the Enigma machine was closed, instead of a random message. If this were true, the settings for the day would be given away. Herivel's idea was ingenious and was greeted by great enthusiasm. However, it did not work at first, as there were too few messages sent in February and March 1940. Although after the invasion of Denmark and Norway, the method became more successful as there was a great increase in the number of messages sent each day. This made it easier, as there was a greater chance of finding similar messages.

Alan Turing was another man who is known for his great individual effort to breaking the Enigma codes. He was the creator of the 'bombes'. They were electric machines that tried to speed up the decoding of messages by going through all of the possible combinations of an Enigma machine. Each of these 'bombes' contained 30 cylinders, each of these representing an Enigma wheel. This meant that a 'bombes' could look at 10 different Enigma variations. A 'crib' (a clue) would be fed into the machine to try and find a possible message. Once the 'bombes' thought it had found a pattern, it would then be typed into an Enigma machine to see if it produced a German message. The 'bombes' were a vital development in the battle against Enigma, as they saved a great deal of time.

The 'bombes' were just the beginning of the new technology to be produced at Bletchley Park. A new machine nicknamed the 'Robinson' was also made in 1943 by Max Newman. The machine looked for patterns in a vast number of random data.

However, although this machine sped up the process of cracking the codes, it did have a few faults. For example; Robinson needed a lot of people to run it and the paper that it used also tended to tear.

In 1942, a young telephone engineer named Tommy Flowers came to the conclusion that Robinson would never overcome its problems. Therefore, with the help of his colleagues, he developed the 'Colossus'. It was the first ever programmable computer. It did the same job as Robinson, yet it did it much faster and without the use of paper tapes.

One example of Bletchley Park cracking an Enigma code was when they broke the 'Dolphin' code in 1941. The cracking of the naval Enigma code – 'Dolphin', came about as a result of hard work, great ingenuity, as well as good luck. An important development in cracking the 'Dolphin' was the capture of Codebooks. A German vessel was captured off Norway, and on it were the Codebooks for February 1941. This let the Allies read all German messages in that time period. Bletchley Park also benefited from a bit of good luck when the Germans helped the code breakers by sending several messages by Enigma and in other codes.

However, the main breakthrough in cracking the 'Dolphin' came when Harry Hinsley, an intelligence officer, discovered that German weather ships also carried codebooks. When two were captured, they provided codebooks for June and July. Using all theses clues as well as other methods, Bletchley Park was able to crack the 'Dolphin' in July 1941 and continued to break its codes until the end of the war.

There were many reasons why Bletchley Park was able to break the Enigma Codes. The most important reason however, was the Poles assistance. Without the Poles help, Bletchley Park would never of had anything to work from, and would never have been able to break any Enigma codes. It was impossible without a replica, which was just what Poland provided.

Other less important reasons why Bletchley Park was able to break the Enigma were the mistakes made by the Germans, and the production of new technology. If the Germans were careful, and did not make any sort of mistakes, the ideas of Turing and Herivel would not have had any success at all. The technology was vital in Bletchley Park as it greatly reduced the time taken to break a message, as it no longer had to be done manually. Without the Poles help, German mistakes and the new technology, the allies would never of had a chance of breaking the Enigma.