Welchman, (William) Gordon

(1906–1985)

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Welchman, (William) Gordon (1906–1985), code-breaker, was born at Fishponds, near Bristol, on 15 June 1906, the younger son (the elder was killed in 1914) and youngest of three children of William Welchman (1866–1954), a missionary who became a country parson and archdeacon of Bristol, and his wife, Elizabeth Marshall, daughter of the Revd Edward Moule Griffith. He went to Marlborough College in 1920 and to Trinity College, Cambridge, in 1925. In the mathematical tripos he obtained a first class in part one (1926) and part two (1928). He then went on to teach at Cheltenham for one year before returning to Cambridge where he became a fellow of Sidney Sussex College in 1929 and wrote *Introduction to Algebraic Geometry* (1950). He was recruited for service at the government communications headquarters at Bletchley Park in 1938 or 1939 and worked there until 1945.

It was during the early years of the Second World War that Welchman made a significant contribution to the solving of the Enigma machine cipher which was used extensively by the Germans. He worked with Alan Turing and C. H. O'D. Alexander. Some of his key technical solutions had already been devised by the Poles and by others at Bletchley, but he instinctively grasped a whole range of problems, possibilities, and solutions which included two vital mathematical constructs as well as a concept of the total process required, from the intercepted German ciphered traffic to passing on significant intelligence implications to the commanders in the field—a highly complex logistical operation for which total secrecy was an added condition.

Welchman, assigned by Dillwyn Knox on arrival at Bletchley Park to comparatively low-level research on call signs, quickly realized that he and his few colleagues were dealing with an entire communication system that would serve the needs of the German ground and air forces. It was the development of traffic analysis which was his greatest contribution, but in these early months he made two startling breakthroughs in enabling Enigma-coded signals to be read. The first had to do with the indicator setting and indicator of an Enigma message. A long and intricate series of mathematical thought processes resulted in Welchman reinvestigating a system of perforated sheets, ignorant of the fact that the Poles had done this before, and that a colleague elsewhere in Bletchley Park already had production in hand. Early in 1940 Alan Turing had the idea of making a machine which would test all possible rotor positions of the Enigma to find those at which a given cipher text could be transformed into a plain text. Welchman greatly improved on Turing's design by his invention of a device known as a diagonal board, which Turing himself immediately recognized to be invaluable.

These two relevant and vital achievements took place within months of his arrival, and it was not long before Welchman was applying his mind in a wider context. He had practical gifts and a strong personality. Once it was clear that Bletchley Park would be able to read enemy traffic on a massive scale he established the need for increased facilities and close co-operation between the intercepting stations, the cryptographers, the intelligence processors, and the ultimate users. An informed view is clear that the task of converting the original breakthrough into an efficient user of the material was one for which Welchman should receive much of the credit. He himself wrote about his work long after the war in a book for which he was wrongly attacked by the authorities for divulging secrets which might still be of use to a hostile power. His motives however were transparently honourable and the sustained powers of thought and memory evinced in the early chapters of *The Hut Six Story* (1982), somewhat amended in a subsequent article in *Intelligence and National Security*, are characteristic not only of his considerable mental powers but also of his deep conviction that there were important lessons to be learned from the breaking of the Enigma secrets, and that governmental refusal to disclose such matters in order to learn from them was a matter of overriding public concern. After the publication of his book his accreditation to the Mitre Corporation, which he had joined in America in 1962 and where he concentrated on the development of secure communications systems for the US forces, was withdrawn and the last months of his life, as he was dying of cancer, were marred by the authorities trying to stop him from publishing. He had moved permanently to America in 1948 and became an American citizen in 1962.

Welchman's great achievement took place in 1940–43. At Bletchley Park he became assistant director for mechanization. He was appointed OBE in 1946. After the war he became director of research for the John Lewis Partnership but settled in America in 1948. His wartime experience led him to the computer field and he pioneered developments in digital compiling.

Welchman had an acute analytical mind, boundless drive and enthusiasm, but rather limited imagination. At a crucial moment in the Second World War he brought together discrete ideas and divergent pieces of evidence to produce a total policy framework. As a man, though not always easy for his colleagues to communicate with, he was admired, trusted, and liked, for his great charm as well as intelligence and kindness.

Welchman married in 1937 a professional musician, Katharine, the daughter of Francis Faith Hodgson, a captain in the 84th Punjabis, Indian army. They had one son and two daughters. After divorce in 1959 he married Fannie Hillsmith, an artist, the daughter of Clarence Hillsmith, consulting engineer, of New Hampshire. This marriage also ended in divorce (1971) and in 1972 he married Elisabeth, daughter of his second cousin, Myrtle Octavia Hussey, and her husband, Anton Wilhelm Huber, owner of a sawmill and a carpentry contractor, in Aschau in Chiemgau, Bavaria, Germany; she was a physiotherapist. He loved mountains, for climbing and skiing. He was an avid gardener and a keen amateur musician. He died on 8 October 1985 at Newburyport, Massachusetts. He was survived by his third wife.

Sources

- G. Welchman, *The hut six story* (1982)
- private information (1990)
- personal knowledge (1990)