

The index of Enigma messages

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An account of the vital role played by indexing in the code-breaking work carried out at Bletchley Park during the Second World War.

The code- and cipher-breaking operations at Bletchley Park are said to have shortened the 1939–45 war by at least two years. However, at the end of the war the then prime minister, Winston Churchill, ordered not only indefinite secrecy but also the destruction of everything connected with the Bletchley Park operations. It is only in recent years that the veil has been lifted so that historians could piece together and publish what Bletchley Park had done; and only now do we learn something about the vital role played by indexing in that work, especially the part involved in utilizing the decodes from the Germans' Enigma cipher machine to make possible the flow of military intelligence known as 'Ultra'. (The Enigma cipher was broken by, amongst many others at Bletchley Park, the brilliant mathematician Alan Turing, one of the geniuses of the 20th century – subject of biographies, a play *Breaking the Code*, a TV film and a website.)

Among the 10,000 or so people working at Bletchley Park were the uniformed women (WRNS and WAAFs), together with civilian colleagues, who made and maintained the astonishingly comprehensive indexes which played such a part in winning the war. This fact must add significance to all current indexing activity, especially when we consider that the world might have looked rather different today without the contribution of those indexers.

Early in 1999 four one-hour weekly British television programmes were devoted to the fascinating and previously little publicized codebreaking activities at Bletchley Park (Station X of the Second World War). These programmes revealed in an almost tentative and coy fashion the existence of an index of vast proportions and mysterious entries. So important does it appear to have been that even now, over 50 years after the end of the Second World War, it can only be written about in the most tantalizingly vague manner.

It appears that there were several different indexes in the 'back rooms' because everything was strictly compartmentalized and nobody knew the whole indexing scene. Even now, those who worked there, who are still alive and whose memories must be fading, still feel distinctly uneasy about the Official Secrets Act they all signed. So all we can manage to reconstruct so far comes from the briefest entries in published books (Hinsley and Stripp, 1993; Lewin, 1978; Smith, 1998 and Winks 1987; and obliquely from Herman 1996 – which was incidentally indexed by SI member Barbara Hird).¹

In Winks (1987: 273–4) the index is described as follows:

Another feature of BP [Bletchley Park] was the Index. After an intercept from the Luftwaffe or the German army had been broken and converted into the original German, it moved on to Hut 3, where future professors and young academics translated the deciphered signal, assessed it – without commentary, as the text must be distributed raw, since Bletchley was not an intelligence center with access to other sources of information – and directed it to an appropriate recipient. In Hut 3, as translation and analysis proceeded, items of interest in the contents of the message were marked for filing in the Index, the largest intelligence index in Britain. Whenever a name or place appeared in a subsequent intercept, it would be checked against previous occurrences. (A copy was kept, in case of bomb destruction at BP, in the Bodleian Library at Oxford.)²

The Index had begun in a single shoe box; by the end of 1943 it occupied a large room in Block D, with nine women on three shifts, drawing out the Index material as called for: every unit, every man, every gun, every engine, every tank, or ball bearing number noted in any German cipher. One American reporting for work in Hut 3 early in 1944, the newsman Alfred Friendly, looked upon the Index room, its worn furniture and thumb-bent filing cards, and summed up his view of the difference between British and American intelligence: the British had this room, with its hundreds of thousands of cards, while the Pentagon, he said, had rows of shining new filing cabinets with nothing in them.

In fact there was a vast filing system in Washington DC in the offices of the Coordinator of Information, but Alfred Friendly was correct in the sense that the USA lacked any coordinated general plan of the Bletchley Park type for producing Ultra intelligence. It was eventually realized in 1943 – shortly before the invasion of Europe was to begin – that the best plan was to put American staff into Bletchley Park itself. As Winks (1987: 274) says: 'If those shining new filing cabinets were not filled, then an American group must go to the dog-eared cards of the English'.

William Millward (in Hinsley and Stripp, 1993: 24–5), writing on life in Hut 3, where the decrypts were evaluated for information to be passed on, stated:

The most significant of the back rooms was the Index. It had been carefully designed by a refugee from Kelly's Directory, Wing Commander Cullingham ('Cully'). Some half-dozen young women, most of them graduates, were constantly at work. It registered everything, from every possible source, and by the end of the war had become a splendid instrument. It had two branches, corresponding to the two Services. The German Book Room had the task of compiling and typing up a daily German Book, a verbatim transcription of all the messages which had been emended, in the original language, with a record of the reporting action taken. The final process was 'squeezing the books', a close scan by the indexers for any reportable points that had been overlooked.³

The Hut 3 index recurs in Smith (1998: 45; quoting remarks by Jim Rose):

One of the great strengths of Hut 3 was the Index. Every message was cross-referenced under one or maybe two headings. That gave them their depth of knowledge of whether something of a similar kind had indicated something which was known to have happened earlier. A message was not just a message in itself. It led to all sorts of backwards and forwards intelligence. We were very lucky we had a man called Cullingworth [recte: Cullingham?] who had worked for Kelly's Directories.

On page 44 of Hinsley and Stripp (1993), Edward Thomas, writing about naval work, says:

[Professor 'Bimbo' Norman] . . . had become Dr R. V. Jones's principal researcher at Bletchley, scanning every type of decrypt for signs of German technological and scientific innovations. Jones owes to him, and the fabulous index he maintained, an only partly acknowledged debt of gratitude.

This is presumably a different index from the one mentioned by Millward (above) as there appear to have been a number of different indexes all being constructed simultaneously. Indeed, Lewin (1978) does make it clear that the first index, Cully's, was Air; then came Army in 1941; then (sometime not stated) Naval; and 'by the peak of the war' the Hut 3 Index had a large staff on round-the-clock shifts. He says (p. 121) that 'effective processing of the intercepts would have been virtually impossible without this invaluable check-point'. He also mentions the Bodleian Library copy, 'presumably updated', while Welchman (1984: 160-1) quotes Peter Calvocoressi as saying the cards were photocopied and kept in another location.

In Hinsley and Stripp (1993: 49), Edward Thomas also wrote about the night watch:

. . . a battle would be raging in Africa, and the watch, the Advisers, and the Index would be totally monopolized without a second to spare for one's problems . . . But of all the girls at Bletchley the palm must go to the 3N [Naval] Indexers – an ugly word for a talented group of loyal and lovely ladies. Mostly WRENS and WAAFs, they were always on duty, keeping a record of every detail that might be needed for reference in solving some future conundrum. Often, with a gentle word, they would guide the harassed watchkeeper to the solution that had been eluding him. . . They also lightened the burden of the main Hut 3 Index.

Still within Hinsley and Stripp (1993: 68), Vivienne Alford writes of the Naval Section:

The resources for identifying [components of new weapons] consisted of a 'library' (at first just a few bookshelves) of Royal Navy service manuals, pilots, charts, etc, and such of the German, Italian, French and (later) Japanese counterparts as had been obtained by capture; and also intelligence reports from many sources – diplomatic and commercial, espionage and refugees. These were systematically combed by lowly mortals, including myself – also known as the Watch – and a small library staff. Useful information – references to equipment, manufacturers, personnel (particularly U-boat commanders), geographical locations – was fed into a battery of index drawers, to provide useful material for the elucidation of problems of translation or identification by a small group of superior beings known as 'Research'.

The Channel 4 book written to cover the television series (Smith, 1998: 86) describes what appears to be another index:

Among the new staff recruited as a direct result of Churchill's 'Action this day' minute were the members of the central index in Hut 7 which housed an enormous automated Hollerith punch-card sorter. Under the direction of Frederick Freeborn, the former head of Hollerith's Letchworth factory, women clerks cross-referenced every piece of information passing through Bletchley on punch cards. A request for details of a radio station, unit, codeword, cover name or indeed any type of activity would swiftly produce every card containing any previous mention or occurrence.

The punch cards were made in a room containing 20 to 30 special machines where women typed the coded messages into punch-card form, the resulting cards being read, sorted and collated by a battery of very noisy machines in another room, all 'banging on all night and day long', as described by Marjorie Halcrow, one of Freeborn's workers, in the same passage.

The significance of the work at Bletchley is summarized in Herman (1996: 102):

One of the best tests of any intelligence organization's long-term quality is the state of its indexes. This is true of single-source interpretation – accounts of Bletchley Park in the Second World War reiterate the importance of the indexes there – but applies even more to all-source work.

His footnote refers to the relevant pages in Hinsley and Stripp (1993). And under 'Work and skills' in the chapter on the agency manager, Herman says (p. 322) that 'Bletchley's production line built up around cipher-breaking machines set a pattern. The Second World War also saw the introduction of large-scale data-handling and indexing, applying *en masse* the techniques of individual scholarship.' (His footnote refers to Winks, 1987.)

After over five decades of mystery and years of tough negotiations we now learn from the *Bletchley Park Life* broadsheet that the Bletchley Park Trust will take control of the heritage site on a 250-year lease. A deal has been secured with the government's land agency PACE (The Property Advisers to the Civil Estate) and British Telecom who have agreed to hand over almost 30 acres of the Park, including the key existing buildings, to the trust.

So at last a proper educational memorial to the work of Second World War intelligence, cryptography and computing is to be instituted at Bletchley Park. At the same time the Secretary for Education and Employment (David Blunkett) requests that the revised National Curriculum include a study of the Bletchley Park codebreakers as part of the education of the nation's children. As indexers we should feel a glow of satisfaction that our profession played such a vital part in the whole wartime intelligence organization, now recognized as one of the most significant activities of the Second World War.

Notes

- 1 It has proved impossible to reconcile for this article all the different authors' mentions of the Index; how many parts it consisted of, and in which different buildings, has not yet become clear to us! Even its originator is shown two ways: Cullingham or Cullingworth? Flying Officer or Wing Commander?
- 2 We have to say that our imagination boggles at how this copying was managed logistically, other than in the very early stages; withdrawing cards for copying (by microfilm or other

- system) could not have been allowed to disrupt production. Lewin's (1978) specific mention, repeated by others, of the Bodleian Library as the security repository would repay investigation.
- 3 Extracts from F. H. Hinsley and A. Stripp, *Codebreakers: the inside story of Bletchley Park*, Oxford University Press (1993) are reproduced by permission of Oxford University Press.

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How the Index Society began – and ended

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The beginning of the Index Society, as recorded in its early minutes and first annual report. H. B. Wheatley was a prime mover. He wrote the minutes, acclaimed the Society's birth and recorded its untimely death.

The genesis of the Index Society is recorded in the minutes of committee meetings held from October 1877 to March 1879. The first meeting was held in the London Library, with Robert Harrison, Secretary of the Library, in the chair. Others present were E. W. Ashbee, FSA, H. Campkin, FSA, G. L. Gomme, of the Board of Works, R. E. Graves, of the British Museum, Edward Solly, FRS, and H. B. Wheatley, FSA, then Clerk to the Royal Society. After listing the names of those present, without more ado, the Minutes state: 'It was resolved to form a Society to be called the Index Society'. That was not, of course, the inspiration of the moment. Proposals for forming such a society and for compiling, and making known extant, indexes had been noted from 1842 onwards (Wheatley, 1902: 207–10).

It was also resolved that the Society's Committee of Management should consist of the gentlemen present, augmented by a list of 23 more names if they agreed to serve, and that subscribers, at a guinea a year, should be invited, through advertisements in the press, to join an Index Society 'with the immediate object of compiling Subject Indexes and Indexes of standard books of facts, to be printed and circulated among the members, and with the ultimate object of building up a general Index of Universal Literature which can be referred to at the office of the Society during compilation'. Henry B. Wheatley was elected Honorary Secretary.

At the following meeting a month later, it was reported that eight of the gentlemen invited to serve on the Committee had agreed to do so, together with three others (although in fact only the same half-dozen of the original members generally attended), that the formation of the Society had been announced in the journals, and 55 subscribers' names had been received. Among them were

John L. Roget, son of the originator of Roget's *Thesaurus* and at the time engaged in preparing the 1879 edition of his father's work, Walter Skeat, the philologist, and Stanley Jevons, Professor of Political Economy at University College London. A draft prospectus and a list of works to be indexed were prepared.

The manuscript minutes are interleaved with various printed pages – at this juncture with the printed prospectus of the Society, which goes into more detail of individual works and specific subjects that needed indexing, and also of the General Index. Among the works noted as having no, or inadequate, indexes were county and local histories, standard collections of travels, Birch's *History of the Royal Society*, Mill's *Political economy*, the *Gentleman's Magazine*, 'the complete works of our greatest authors', British Biography, History and Portraits, and Maps. Already the importance of subject specialization in the indexer is noted: 'Each of these hand-lists [to specific subjects – actually summary bibliographies] will be drawn up by one who is thoroughly acquainted with the subject he undertakes, and therefore able to bring important communications to the front'. When premises became available, indexes of all kinds would be collected and would be made available to enquirers.

Two further meetings were held before Christmas, the second and subsequent meetings in the premises of the Society of Arts, then in the Adelphi, thus beginning a connection with indexing currently revived each year with the presentation of the Wheatley Medal in the Society's present assembly rooms. Draft rules for indexing for discussion at the next meeting were to be drawn up.

By the middle of January 1878 membership of the Index Society stood at 95, and interest from America had been

The Enigma was a type of enciphering machine used by the German armed forces to send messages securely. Although Polish mathematicians had worked out how to read Enigma messages and had shared this information with the British, the Germans increased its security at the outbreak of war by changing the cipher system daily. This made the task of understanding the code even more difficult. Lorenz enciphered German strategic messages of high importance: the ability of Bletchley to read these contributed greatly to the Allied war effort. Turing travelled to the United States in December 1942, to advise US military intelligence in the use of Bombe machines and to share his knowledge of Enigma.