

Enigma History and an Unexpected Treasure Trove

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Abstract

Documentary history of the Polish contribution to the Enigma breaking is convoluted, difficult to follow and heavily dominated by the narration based on the documents preserved in the American and British archives. Therefore, every new document of strictly Polish origin, in particular preserved beyond the US National Archives and Records Administration or the UK National Archives collections, attracts attention and, usually, presents new, so far unknown, aspects of this history. In this paper we present a sensational history of discovery and recovery of the part of the archive of Polish codebreaking service, and some basic remarks regarding its contents.

1 Context

Winston Churchill is credited with a famous quote *“History will be kind to me, for I intend to write it”*. It seems that what he really said was *“For my part, I consider that it will be found much better by all Parties to leave the past to history, especially as I propose to write that history”* (Shapiro, 2006). Both, the unofficial and the official versions reflect the simple truth, that the history is usually recorded by the victors.

That truth fits particularly well the history of the secret services in general, and the cryptography and codebreaking in particular. Secret services have a natural tendency of self-censoring the history of their own operations, carefully preserving in their files traces of

successful operations and equally carefully annihilating others. Leo Marks (1998) recollected that *“(m)indful, perhaps, of Churchill’s injunction to ‘Set Europe Ablaze’, on 17 January [1946] parts of Michael House went up in flames, and though ‘immediate action was taken’ to put them out, many important records were destroyed. (...) I’d worked too long for SOE to believe it was accidental”*. Fate of the archives of the Polish pre-war and WWII intelligence service (of which the Cipher Bureau represented a part) resembled the story of the SOE archive.

The first stage of its loss took place during the 1939 campaign. Before leaving its HQ, the Cipher Bureau staff took care to burn less essential files – the Germans have not found any important tracks of Enigma breaking operation (its slight indication found in the captured general military archive, in the form three deciphered Kriegsmarine messages, was disregarded by the German intelligence). Other files had been burned on the way towards (or, as we shall learn soon, immediately after crossing) the Romanian border. Between October 1939 and July 1945 Polish intelligence service was working in the relative safety in Paris and then in London. Historical drama started to unveil just after hostilities had ceased in Europe.

After the British government had withdrawn on 6 July, 1945 the recognition of the Polish government in exile, and had switched its sympathies to the communist controlled government in Poland, Commander Wilfred Dunderdale, acting as a liaison officer between the

British and Polish intelligence services, requested immediate transfer into British hands of all of its files, financial documents, wireless sets, etc. (Bortnowski, 1945). As in the preceding weeks Polish intelligence service was seriously taking such a development into account, all the less important files had been destroyed beforehand. Dunderdale had taken control only over the crucial files, illustrating best the contribution of the Polish intelligence service for the Allied cause during the World War Two.

In this paper we cannot present the entire history of the search by Polish historians for this archive; this story is best described in the preface to the official report of Anglo-Polish Historical Committee (Dubicki, Nałęcz, Stirling, 2004). It suffices to quote the official statement by Tess Stirling: *“Having consulted all relevant departmental colleagues in Whitehall, I regret to have to say that any Polish intelligence reports held by SIS at the end of war (...) were destroyed as ephemeral once their original usefulness had lapsed. Likewise, all those entrusted to Commander Dunderdale were also destroyed”* (op. cit.). Consequently, most of our present knowledge about the pre-war and wartime operations of the Polish intelligence service is based on the documents scattered initially among its members and gradually deposited in one of the historical institutes founded by Polish emigration circles.

In these circumstances the Polish part of the Enigma story is known mostly from those documents, which survived in the British and American archives, most of them reflecting the truly Churchillian spirit of writing the history. Therefore, emergence of the new documents presenting this story from the point of view of its original authors, usually causes some sensation. In the next sections we shall present a brief summary of most important Polish source documents known so far, the background of the deposit recovered in 1997 and the reasons why it had to stay secret until 2021, finally a brief overview of the archive contents.

2 What Have We Known Before?

After the first news about Bertrand's book (Bertrand, 1973) had reached Poland, Marian Rejewski answered the call for the Polish participants of this adventure. When telling his story he could use his exceptional memory and a copy of his own recollections deposited in 1967 in

the Institute of Military History (Rejewski 2013). Living since 1946 in the communist-controlled Poland he was wise enough not to keep any records of his former work.

His revelations attracted the attention of Col. Tadeusz Lisicki, wartime signals officer of the Polish General Staff, living in Great Britain. Lisicki was able to consult the Polish archives in London, locating among other files, document prepared in 1940 by Rejewski, representing an appendix to Col. Gwido Langer's report from the pre-war activities of the Cipher Bureau. This document, known as “Dokument L”, basically confirmed the story of the Enigma breaking recreated from memory only in Rejewski's “Memories”. Being very technical in nature and focusing on the mathematics of Rejewski's breakthrough, it did not provide a lot of historical circumstances of Cipher Bureau's success.

From the British sources the historians knew that during the famous Pyry meeting in July 1939 Polish codebreakers had shared with their British and French colleagues a comprehensive memorandum (in German language) describing in the detail both the theory of the Enigma breakthrough and the construction of machinery used by the Poles to speed up the key recovery. Unfortunately, search for the copies of this memorandum in the British and French archives did not bear fruit for a long time. It was only in 2016 when one of the authors of the present paper managed to get access to the files freshly declassified by the French military archives. Among these files there was a copy of the report in the German language representing, most probably, an abridged version of the original Pyry report (Rejewski et al., 1940) (commented and translated into English, French, and Polish language version of the document is available in (Grajek, 2019)). New documents confirmed the body of historical evidence on the story of breaking the Enigma cipher, providing some interesting clues, deserving further research.

Probably the most important information resulting from this discovery was the scope of the Polish Cipher Bureau's mastery of the Kriegsmarine ciphers. The very fact of breaking the Kriegsmarine Enigma by Polish codebreakers was known from the sources available earlier (Rejewski 2013), but the precise scope of their knowledge and experience remained a bit of a mystery. Consequently, most Enigma historians

were accepting the conclusion that while the Polish codebreakers managed to break the Wehrmacht and Luftwaffe Enigma, breaking of the Kriegsmarine ciphers represented an almost exclusive achievement of the British codebreakers, in particular Alan Turing's.

A report found in the French military archive contains a separate section, situated beyond the mostly chronological narration of the main document, dedicated entirely to the Kriegsmarine ciphers. Its contents, when compared with the post-war reports by the British codebreakers (Alexander 1945, Mahon 1945), clearly confirms that the British knowledge about Kriegsmarine Enigma was based, until 1941, strictly and (almost¹) entirely on the pre-war findings by the Polish codebreakers.

British wartime and post-war reports contain references to the details of the pre-war work by the Polish codebreakers, which are not included in the report being discussed. A complete and full Pyry report could be the only source of their knowledge. Therefore, the search for the full Pyry report is going on and, as we shall demonstrate below, is yielding unexpected and sometimes sensational effects.

3 Dramatis Personae

Before we return to the main line of narration, we need to introduce two personalities, who were crucial for preserving the so far unknown witnesses of the Enigma story and sharing them with the posteriority: Edmund Mieczysław Piechowiak and his son, Alfred Piechowiak.

Edmund Piechowiak was born in 1896 in Poznań. Drafted into the German army during WWI, he (like numerous members of the Cipher Bureau) took part in the Wielkopolska Uprising in 1918-1919, then in the Polish Soviet war of 1919-1920 and finally in the Third Silesian Uprising in 1921. Between 1919 and 1933 he served in the artillery regiment in Gniezno, being gradually promoted to Lieutenant and Captain. In 1933 Piechowiak was transferred from artillery to the intelligence service and assigned to the Bydgoszcz branch, from where he was infiltrating the Kriegsmarine units.

In 1939 he was reassigned, under diplomatic cover, to the intelligence outpost in Istanbul. After a series of adventures leading through Bucharest, Bulgaria and Turkey Piechowiak landed in January 1941 in Palestine, where he assumed the post of deputy commander of the local outpost of the Polish intelligence service known as "Ekspozytura T". During his service in Jerusalem Piechowiak reportedly participated in the training of Jerzy Iwanow-Szajniewicz, Polish agent, who later won considerable fame for his exploits in the occupied Greece.



Figure 1. Edmund Piechowiak.

In 1943 Piechowiak was transferred back to Istanbul, from where he carried out activities in the Balkan area. After the end of hostilities in Europe he was transferred to London, where he assumed the duties of the deputy commander of the Course of Military Administration for Officers, representing in fact a clandestine training in intelligence operations. During this time Piechowiak met both Marian Rejewski and Henryk Zygalski, who in 1945 and 1946 were participating in the course.

It is a proper time to introduce briefly also Alfred Piechowiak, born in 1926 in Gniezno. In 1939 Alfred was spending his summer vacations in France. Unable to return to Poland he restarted his education at the Polish high school in Paris,

¹ Wiring of Kriegsmarine rotors VI, VII and VIII, recovered by the British from the sunk U-Boats, being the only exception.

relocating then to Nyéres and Villard de Lans. After his matriculation in 1944 he joined the French resistance, and after the liberation of France reached Great Britain, joining the Polish navy in exile, and serving on board the destroyer ORP Garland and the cruiser ORP Conrad. After the demobilization he was able to join his father in the ranks of the Polish Resettlement Corps. Considering Edmund Piechowiak's intelligence background, return to the communist-controlled Poland was out of question. The reunited family settled down in London and in 1965 moved to a newly purchased 15th-century cottage in South Hinksey, near Oxford.

4 Archive

4.1 Committee

During the first half of 1943 some of the Polish codebreakers had managed to evacuate from occupied France, and, via several prisons and internment camps in Spain, had reached Great Britain. There, they had reunited gradually in the Polish Army's signals intelligence company in Stanmore. The scope of their operations in the last two years of war is uncertain. From Rejewski's memories we know that he was busy breaking the double Playfair. Writing his memories in the communist-controlled Poland Rejewski did not refer to his probable participation in the attacks on the Soviet codes and ciphers. From other sources we know that Soviet codes and ciphers represented equally important target for the unit Rejewski served in, and the attacks on the Soviet communications were vigorously encouraged by the British intelligence service, which was forbidden to undertake any activity in this area as a result of Churchill's declaration addressed to Stalin after the German attack on the Soviet Union.

After the end of hostilities in Europe Rejewski's unit was disbanded. As no one seemed to know what to do with the codebreakers before their demobilization, they were assigned to the clandestine intelligence course, where both, Rejewski and Zygalski, have encountered Edmund Piechowiak. But before they started their new occupation, they had to participate in the final demise of their wartime unit. According to the orders received they had to burn the documents rescued from Poland, and accumulated during their service in France and Great Britain. For this purpose, a committee was formed, consisting of

Lt. Marian Rejewski, Lt. Henryk Zygalski, and the Sec. Lt. Sylwester Palluth.

The committee convened on 8 October 1945, for reasons unknown supervised or at least accompanied by Maj. Edmund Piechowiak, and, for equally unknown reasons, executed its orders only partially. Protocol signed by all the committee members confirms burning of 24 out of 36 files contained in the archive. The remaining 12 files, selected from among the entire set, were entrusted to Maj. Piechowiak.

4.2 The Guardians

From the future developments we know that the documents remained in Lt. Col. Piechowiak's (who was promoted on 1 January 1946) custody until 1977-1979, when the aging officer, struggling with a serious illness, decided to return to Poland. Before implementing this decision, he decided to secure the documents in his custody as a witness of Polish exploits during WW2. For that purpose, he placed the documents in a metal ammunition box, and together with his son Alfred they buried the box in the garden of their cottage at South Hinksey.

In the early 1980 Piechowiak's wife, Stefania Cecylia Piechowiak passed away, and Edmund Piechowiak undertook the journey to Poland to place the urn with her ashes in the family grave in Gniezno. Piechowiak himself passed away in July of the same year during a visit to his family living in Opole.

The custody of the Polish Cipher Bureau documents passed into the hands of Alfred Piechowiak, who in 1990, after the collapse of the communist system in Poland, decided to return to his homeland. Piechowiak Jr assumed the post of the English language lecturer at the Poznań University, lecturing also at the Naval Academy at Gdynia.

4.3 The Recovery

In the autumn of 1997 one of the authors of this paper was contacted by Alfred Piechowiak, who suggested a common journey to Oxford and an attempt to recover the deposit of the documents relating to the Polish codebreaking operations before and during WW2. Available literature permitted an easy verification of his father's story, but the entire plan did not look very credible. But when during the conversation Alfred Piechowiak mentioned his lessons in cryptology delivered

personally by Henryk Zygalski, no further arguments were necessary.

In November 1997 Alfred Piechowiak and Mariusz Borowiak reached South Hinksey by car, via Calais and London. The garden of Alfred's former cottage was overgrown with shrubs, and he could not easily identify the exact location of the deposit. Fortunately, we had decided to put a metal detector in our luggage. After some time, the detector indicated a potential location of the treasure, and after digging to about 1 meter depth we were able to unearth the metal box. After we opened it up, we were surprised by the perfect state of conservation of the documents therein.



Figure 2. Alfred Piechowiak (right) and Mariusz Borowiak recovering the deposit.

The documents were duly transported to Poznań, where the story of the Enigma breaking had its beginning. The circumstances of their depositing and, equally, their recovery, complicated the answer to the question – what next? In the meantime, Alfred Piechowiak passed away in 2004, leaving in his last will the rights to the documents to Mariusz Borowiak. Finally, in 2021, the level of publicity resulting from the preparations to the inauguration of the Enigma Cipher Center in Poznań catalyzed the decision to announce the discovery in public.

5 The Contents

The recovered archive contains the following documents:

- a) Enigma 1930-1940. History and method of solving the German machine cipher (abridged),
- b) Naval ciphers 1923-1939. History and method of solving the German 4-letter naval code (abridged),
- c) Dossier on Turkey. Summary of intelligence on Turkey, Istanbul, 1 September 1944,
- d) Etude des Procèdes de Chiffrement utilisés par les Agents du S.A. (Très Secret). Dactylographié par Officier ; Exemplaire No. 2,
- e) Protocol of receipt of 36 documents and artifacts after the liquidation of Group “300”. Committee consisting of Cpt. Stanisław Szachno, Lt. Marian Rejewski, Sec. Lt. Sylwester Palluth, 23 May 1945,
- f) Protocol of destruction of 24 document files from the liquidation of the former Group “300” in France. Committee: Lt. Marian Rejewski, Lt. Henryk Zygalski, Sec. Lt. Sylwester Palluth, 8 October 1945,
- g) Doppelkastenverfahren, 30 July 1942,
- h) Doppelkastenverfahren 26 Aout 1942,
- i) Model of the Swiss Enigma with instructions, deciphered Swiss messages from 12 November 1940 to 28 March 1941, 16 October 1941,
- j) Equations permitting the recovery of wiring of the Swiss Enigma, 16 October 1941,
- k) Application of “Méthode d’un mot probable” to Enigma, 16 October 1941,
- l) Notes on Codes and Ciphers.

Among the documents item c) is obviously unrelated to the codebreaking and represents a summary of Edmund Piechowiak's experience from his intelligence work in Turkey. From Churchill's memories and Robin Denniston's work (Denniston 2016) we know that the idea of getting Turkey to the Allied side was boiling continually at the British side during WW2. Simultaneously, the relations between this country and the members of the anti-Axis coalition belong to the least researched aspects of this global conflict. Piechowiak's analyses might be interesting for future research.

Items i) and j) confirm our knowledge of breaking by the Polish team of the Swiss Enigma,

providing additional details. Items g) and h) illustrate the results of Rejewski's and Zygalski's work on the double Playfair during their work at Stanmore. Their presence in this archive offers some insight into the nature and scope of their work in Great Britain between 1943 and 1945. It is a well-documented fact that the unit they were serving in was heavily engaged in the attacks on the Soviet codes. Rejewski's memories, however, do not contain even the slightest reference to his work on the Soviet messages. There is some level of disagreement among the historians as to whether Rejewski decided to omit this aspect of his work (a reasonable decision considering that he was compiling his memories in the communist-controlled Poland), or there was nothing to omit, as Rejewski was only attacking the German ciphers. Presence of the samples of the Doppelkastenverfahren in the recovered archive indicates that latter is probably closer to the truth. Should Rejewski be directly involved in the attacks on the Soviet ciphers, he would probably include in the deposit also their samples.

Items k) and l) represent copies of the documents previously known from the Bertrand's archive (Bertrand, SHD).

Document a) represents one of the most interesting parts of the recovered archive. Beyond any doubt it represents a Polish translation (or Polish original?) of the document known from the Bertrand's archive (Grajek 2019). Minor differences between the language versions provide additional insight into the history of the Cipher Bureau team. The previously known German version was rather technically and mathematically oriented, focusing on the theory and practice of Enigma breaking. Its Polish equivalent includes more information of a purely historical nature, like for example more detailed than previously known information regarding the evacuation from Warsaw to Romania. From the Polish version we learn for example that the Cipher Bureau team hoped to resume its work while still on Polish soil, keeping all the records (and crucial equipment) until crossing the Romanian border under the Soviet threat. Two copies of cyclometer and a considerable part of records were destroyed already after crossing the border. Information most fascinating for the treasure hunters concerns more precise than previously known location of burying several copies of the Polish ciphering machine Lacida,

two copies of Rejewski bombs and a batch of less important documents.

Document b) is interesting in the context of the Polish attack on the Kriegsmarine Enigma. In his memories Rejewski mentioned that the first task assigned to the team after its transfer from Poznań to Warsaw was the attack on the 4-letter Kriegsmarine training code. New document provides additional details about this adventure.

Documents e) and f) represent the most valuable part of the archive, even if only in a negative context. An inventory of the documents rescued from PC Cadix and preserved by various team members during their internment in the Spanish prisons and internment camps provides an insight into the areas of "Ekspozytura 300" activities. An outline of work in PC Cadix was known from several sources; Bertrand's book (Bertrand 1973), several documents from Bertrand's archive (Bertrand SHD), Maj. Wiktor Michałowski's (Michałowski 1943), and Langer's reports (Langer 1945). Considerable part of activities of "Ekspozytura 300" were implemented in double conspiracy; from both Germans, and Col. Bertrand, nominally commanding PC Cadix, and consequently could not be reflected in Bertrand's summaries. Both, Michałowski's and Langer's reports were most probably compiled without the access to the source documents referenced in the inventory.

Document f) (Figure 3) is even more fascinating, offering us indications about what we have (probably) irrevocably lost from the history of the Cipher Bureau team and the history of the Enigma breaking.

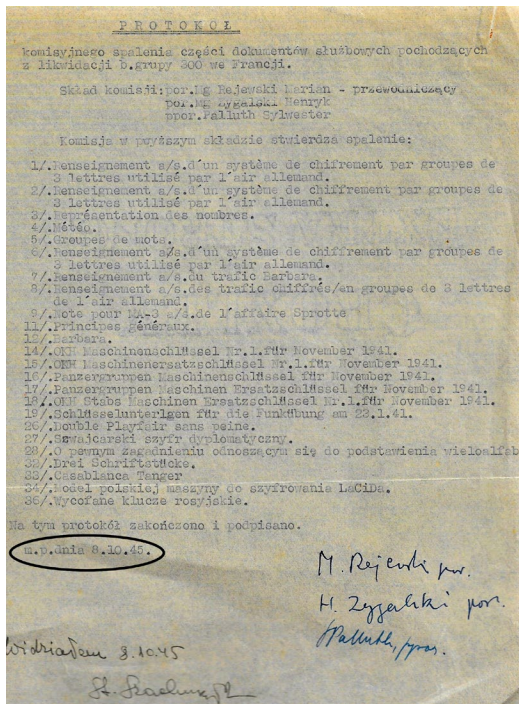


Figure 3. Protocol of document destruction.

Several positions of the protocol refer to the minor cipher system which had greatly facilitated Enigma breaking in the early period of WW2 (items 1, 2, 6, 8). Rejewski mentions that in the early 1940 the British codebreakers had identified a network of air-to-ground traffic using a simple 3-letter code. Letters of this code were additionally superenciphered using a monoalphabetic substitution. Soon after the first wartime Enigma breakthrough the codebreakers realized that the substitution used was identical to the Enigma switchboard setting for the “Red” network for a given day. Interestingly, this discovery was never mentioned in the British reports.

Another group of documents (14, 15, 16, 17, 18) represents the keys for a number of Enigma networks for November 1941. In November 1941 Polish prewar methods of Enigma key recovery were not valid anymore. Key recovery at Bletchley Park depended entirely on Turing bombs, which were obviously unavailable for the Polish team, working at PC Cadix in the southern France. From (Bertrand 1973) we know that the Polish team managed to break a number of Wehrmacht keys, in spite of the lack of any equipment. It seems, however, that the keys mentioned in the protocol, did not belong to that group. They represented probably examples of German keys captured by the British in North Africa during the Operation Crusader and, under

unknown circumstances, shared with the Polish team working in Vichy France (Jackson 2014). Their presence in the team’s archive confirms a limited cooperation between the British and Polish codebreakers during 1941/1942. On the other hand, those keys did not represent Poles’ own achievement, hence the decision of their burning.

Document number 36 (described as *retired Russian keys*) confirms and supplements information previously known from Bertrand’s papers – success of the Polish team versus Soviet codes and ciphers. Bertrand’s papers include French translations of several tens of the deciphered Soviet messages from 1941 and 1942. Unfortunately, we do not know in what system they were originally enciphered. The character of information in the messages indicates rather political than military traffic, and the identity of senders and receivers hints to the southern areas of the Soviet Union as the source of the messages. We might reasonably assume that the deciphered messages were exchanged between the regional NKVD offices, and were being intercepted and deciphered by the branch office working in Algiers (organized, to a large extent, to improve the interception of the Soviet traffic). From TICOM sources we know that the NKVD was using mostly a 5-number code, occasionally broken by the Finns and Germans. But the protocol refers clearly to the retired keys, referring rather to a cipher than a code. Unfortunately, we shall never know the real scope of the Polish success versus the Soviet signals; did the codebreakers break only the Soviet (NKVD?) code, or were they breaking also the lower level, tactical ciphers used by the military units?

A number of less important documents described the ciphering procedures used in the German military communications (3 – number representation, 4 – weather information, 5 – groups of words, 11 – general principles), Swiss diplomatic traffic (27), traffic exchanged by the German intelligence stations in Casablanca and Tangiers (33), as well as general description of the double Playfair cipher (26).

For crypto historians the most important document in the part of an archive irrevocably lost was probably item 34, described as a model of Polish ciphering machine LaCiDa. LaCiDa had been constructed in the late 1920s or early 1930, as the Polish answer to the appearance of Enigma.

AVA manufactured over 40 copies of the machine, designed for the wartime use in the Polish Army, from the division level up. LaCiDa has never been operationally used during the Polish 1939 campaign. It was supposed to be distributed only after the stabilization of the frontlines. As the fronts have never stabilized during that campaign, machines have been buried during the Cipher Bureau's evacuation.

Two copies of LaCiDa survived the disaster in 1939 and the fall of France in 1940, and were finally applied for enciphering the communication between PC Cadix and London. Its use for this purpose generated some confusion, when Rejewski and Zygalski (who were not consulted during the machine's design and testing) asked for the samples of LaCiDa enciphered messages and managed to break the cipher within a couple of hours and based on a text of a single message.

Document mentioned as number 34 on the list represented most probably a summary of this experience, describing the LaCiDa construction as re-engineered by Rejewski and Zygalski. From scarce and fragmentary mentions in the available reports we know some basic traits of LaCiDa construction (Gaj 1992). The loss of its model in 1945 means that we will probably never know the full design of the machine, nor shall we be able to assess the scale of Rejewski and Zygalski's success over its cipher.

The history of this sensational deposit and its recovery confirms that *destroying the historical sources as ephemeral once their original usefulness had lapsed* represents a rather bad practice. Whoever follows such a policy is running a risk that an unexpected treasure unearthed in an unexpected place and under unexpected circumstances could in the future alter the imposed narration.

References

- Conel Hugh O'Donel Alexander, *Cryptographic History of Work on the German Naval Enigma*, NA HW 25/1, 1945
- Gustave Bertrand, *Enigma ou la plus grande énigme de la guerre 1939–1945*, Plon, Paris 1973.
- Gustave Bertrand, *papers*, Service Historique de la Defense, DE2016 ZB25.
- Leon Bortnowski, Col. Letter to Col. W. Bąkiewicz of 20.07.1945, Polish Institute and Sikorski Museum, Kol. 138/161.
- Robin Denniston, *Churchill's Secret War: Diplomatic Decrypts, the Foreign Office and Turkey 1942-44*, The History Press, Cheltenham 2016.
- Tadeusz Dubicki, Daria Nałęcz, Tess Stirling, *Intelligence Co-operation Between Poland and Great Britain During World War II: The Report of the Anglo-Polish Historical Committee, Volume I*, Naczelna Dyrekcja Archiwów Państwowych, Warszawa 2004. British version of the same report published by Vallentine Mitchell, 2005.
- Krzysztof Gaj, *Polish Cipher Machine LaCiDa*, Cryptologia, Volume 16, 1992 - Issue 1.
- Marek Grajek, *Sztafeta Enigmy. Odnaleziony raport polskich kryptologów*, Agencja Bezpieczeństwa Wewnętrznego, Warszawa 2019.
- John Jackson, ed., *Solving Enigma's Secrets. The Official History of Bletchley Park's Hut 6*, BookTower Publishing, Redditch 2014.
- Gwido Langer, *Sprawozdanie z działalności Ekspozytury-300*, Pilsudski Jozef Institute London, kol. 133/3, 133/4, 133/5, 1945.
- A. P. Mahon, *The History of Hut Eight 1939-1945*, NA HW 25/2, 1945.
- Leo Marks, *Between Silk and Cyanide: A Codemaker's War 1941–1945*. HarperCollins, Ney York, USA 1998.
- Wiktór Michałowski, *Sprawozdanie z działalności E-300*, Polish Institute and Sikorski Museum, Kol. 242/69, 1943.
- Marian Rejewski, *Memories of my work at the Cipher Bureau of the General Staff Second Department 1930-1945*, Adam Mickiewicz University Press, Poznań 2013.
- Marian Rejewski et al. *Enigma. Kurzgefasste Darstellung der Auflösungsverfahren*. Service Historique de la Defense, DE2016 ZB25, 1940(?).
- Fred R. Shapiro, *The Yale Book of Quotations*. Yale University Press 2006.
- All photographs – Mariusz Borowiak's archive.