

IN MEMORIAM MARIAN REJEWSKI
CHRISTOPHER KASPAREK AND RICHARD A. WOYTAK

On **February 13, 1980**, in **Warsaw, Poland**, there died, at the age of **74**, the **man** who, more than any other, was entitled to be considered the vanquisher of the German **Enigma** machine cipher and thus one of the architects of Allied victory in World War II.

Marian Rejewski (MAR-yahn Rey-EFF-ski), foremost of the team of cryptologists who created what became known as the Ultra secret, was born on **August 16, 1905**, at **Bydgoszcz**, then called **Bromberg** as it was in the German-occupied zone of Poland, a country partitioned since the late 18th century between **Prussia** Germany, **Russia** and **Austria**. He was barely a teenager when his country reappeared on the map in **November 1918**. At a time when only a tiny proportion of the population attended university, he went to study mathematics at **Poznan University**.



Marian Rejewski as a second lieutenant (signals) of the Polish Army in Britain, in late 1943 or in 1944.

In early 1929, while still an undergraduate, **Rejewski** participated in a cryptology course organized for about twenty selected mathematics students at Poznan University by the Cipher Bureau (Biuro Szyfrow) of Section II (military intelligence) of the Polish General Staff. The choice of Poznan for the course had apparently been prompted by an intention to attack German ciphers. This would require a knowledge of German which most of the students had: in 1793, in the second of the three progressive partitions of Poland, Poznan had been absorbed into Prussia where it was known as Posen.

After receiving his master's degree in mathematics on March 1, 1929, Rejewski spent a Year at Göttingen University in Germany, studying actuarial mathematics. Upon being offered a teaching assistantship in mathematics at his alma mater in the summer of 1930, Rejewski did not return to Göttingen for the second year of the actuarial course but spent the next two years teaching at Poznan, where he also resumed his involvement with cryptology at a temporary Cipher Bureau branch office that had been set up adjacent to the university's Mathematics Institute. Already working there were two students, Henryk Zygalski (HEN-rik Zig-AHLski) and Jerzy Rozycki (YEH-ih Roozh-II-ski), respectively two and four years his juniors.

Eventually the three young cryptologists received offers of employment at the Cipher Bureau in Warsaw, and as of September 1, 1932, became regular employees at the General Staff. (By extraordinary chance, they remains since World War II of the General Staff Building where worked, erected as a private palace in the 18th century and remodeled in the 19th, is the Tomb of the Unknown Soldier that in 1923 had been placed within the colonnade-topped arcade that joined the two wings.) It was here, in the final months of 1932 and the first weeks of 1933, just as Hitler was coming to power, that Rejewski, assisted by his two younger colleagues, broke the German Enigma machine cipher and elaborated means for its regular decryptment. Here, too, from their third-floor office in the north wing, adjacent to the colonnade, they could watch German dignitaries laying wreaths at the Tomb of the Unknown Soldier: the pompous, unmedalled Goering, the demonically grimacing Goebbels, and other notables of whom from 1934 on were frequent visitors to Warsaw. The cryptologists drew a sense of intellectual and moral superiority from the awareness that they, anonymous workers in one of the General Staff's backroom units could penetrate the Germans' most secret and sinister plans.

In 1937, for security, the fourth, or German, section of the Cipher Bureau (B.S.-4) was moved to new facilities near Pyry, in the Kabackie Woods south of Warsaw. There, on July 25, 1939, as war loomed, the Poles initiated their French and British allies into the secrets of Enigma decryptment and promised to give them the apparatus and techniques that they had developed. (The transfer took place by mid-August.)

On September 1, 1939, the Second World War broke out, and a week later the Cipher Bureau was evacuated eastwards. On September 10 the special evacuation train reached Brzesc (Brest-Litovsk). The subsequent route led south, and on September 17, the Soviet Army having that day at 4 a.m. eastern Poland just 60 miles to the east, the Cipher Bureau joined the long line of Poles who, together with the Polish Government crossed the

Czeremosz River into friendly Rumania at Kutry. Although the three mathematician-cryptologists had departed their homeland—except for **Rejewski** forever—for them the war was **just** beginning.

Disobeying Rumanian orders to proceed to an internment camp. **Rejewski**, **Rozycki**, and **Zygalski** took the first train for Bucharest, reported to the Polish military attache, then rent to the British embassy to obtain papers for their transfer to Britain. They remembered that in July the British had shown keen interest in cooperation (indeed, in December 1939 the British could ask Polish Cipher Bureau chief Lieutenant Colonel **Gwido Langer** to turn his cryptologists over to them, and at the moment most of their bitterness toward Poland's do-nothing western allies who had contented themselves with merely declaring war on **Germany** was directed at France, with her enormous, well-equipped army and substantial air force. But as chance would have it, just when they had arrived at the British embassy, a bus carrying personnel evacuated from the British embassy in Warsaw rolled into the yard, and the British diplomats gave the Poles what they took to be a brush-off ("Come back in a few days"—or, as **Rejewski** has commented, "Manana"). Constantly in danger of arrest and internment by the Rumanians, the Poles went to the French embassy, where they were given a warm welcome and French visas. The French were eager to get the Polish cryptologists—so much so, that French radio-intelligence chief Lieutenant Colonel **Gustave Bertrand**, unaware that the trio were already on their way to Paris, rent to Rumania to locate them and their Cipher Bureau colleagues.

By October 20, B.S.-4 was back in business at Command Post Bruno—the Chateau de Vignolles in the town of Gretz-Armainvillers, about 20 miles southeast of Paris, where the Poles constituted the heart of the entire operation. Bruno became in that period the mainstay of all Allied radio intelligence. It encompassed monitoring stations, fixed and mobile goniometric posts for direction-finding of enemy radio stations, and other auxiliary facilities. The Poles had the use of three Polish-produced Enigma machines, two secretly taken out of Poland during the evacuation and one presented to the French after the Warsaw conference of July 1939. Contact and collaboration were established with the British at Bletchley Park, northwest of London, who were making their own cryptological bomb, perforated sheets (sometimes called **Zygalski** sheets) and other cryptanalytic devices based on the Polish plans. Bruno was providing German naval and air force signals to the British, who were particularly interested in these, threatened as they were from the sea and the air.

Just before opening their general offensive in the West on May 10, 1940, the Germans changed the procedures for using Enigma in all their armed forces. Nevertheless, within six or eight days the Polish cryptologists were again reading Enigma. In the first days of the German offensive, part of Bruno's personnel were moved from Gretz-Armainvillers to French Intelligence headquarters at 2 bis, avenue de Tourville, Paris, behind Invalides. Here the Polish cryptologists and technicians worked around the clock in three shifts, never leaving the building. As the front disintegrated and their sources of intelligence shrank, Enigma information became increasingly vital. Its authenticity and accuracy soon came to be appreciated, and the feuilletes jaunes (yellow pages) printed on thin gold-colored paper in a score of copies were snapped up by generals and colonels of the

French High Command, some of whom waited at the entrance to the cryptologists' quarters and even slept in the building in order to get their hands on the hot information. But, as had been the case in Poland, the best intelligence could not by itself stem the tide. On June 10, 1940, Bruno was evacuated. The unit retreated southward by stages, reading German signals along the way. At Toulouse, on June 22, the Poles learned that Marshal Henri-Phillipe Petain had signed an armistice. On June 24, Bertrand managed to fly Bruno's 15 Poles and 7 Spaniards (ex-Republican officers who worked on Italian ciphers) to Algeria.

A little over three months later, on October 1, 1940, the former Bruno, now renamed Cadix resumed work, at the Chateau des Fouzes near the historic town of Uzès, 50 miles northwest of Marseilles in unoccupied, "Vichy" France. Langer's Polish unit, codenamed Ekspozytura 300 (Field Office 300), reported directly by radio to the Polish commander-in-chief's staff in London. The Polish team's duties included collaboration with Polish intelligence organizations in France and North Africa. But in the meantime the Germans had once again changed their procedures for transmitting *"-Sage keys, and as a result the poles*Zygalski sheets had become useless. They now worked on other ciphers. After seven and a half years, their involvement with Enigma decryptment had come to an end.

On January 9, 1942, the three Polish mathematician-cryptologists were reduced to a two when the youngest, Rozycki, while returning to Cadix from a three-month tour of duty at a Cadix branch in the Chateau Couba on the outskirts of Algiers, went down with the French passenger ship Lamoriciere, which had fallen prey to reefs or a mine. Lost with him were two members of Field Office 300's Russian section, Captain Jan Gralinski (chief of the three-man section) and Piotr Smolenski (like Rejewski, Rozycki, and Zygalski, a civilian), and a French officer accompanying the Poles, Captain Francois Lane.

In mid-1942, Rejewski and Zygalski were asked to test the security of the Polish "Lacida" or "LCD" cipher machine that had been constructed before the war and was used for communication with the Polish General Staff in London. Although the cryptologists had never before seen the machine, it took them no more than two hours to break the test cipher.

The designation LCD came from the initial letters of the names Langer-Ciezki-Danilewicz. Langer had headed the Cipher Bureau, his deputy, Major Maksymilian Ciezki (CHEN-shkee)--B.S.-4, and the brothers Ludomir and Leonard Danilewicz (Dah-nee-LEV-eech) had worked at the AVA Radio Manufacturing Company that had filled orders for the Cipher Bureau.

The Germans were keeping close watch over southern France, and were always ready to occupy the "Free Zone" (Vichy France) should the need arise. On September 3, 1942, Bertrand, the French chief of Cadix, learned from an official at the German embassy in Paris about definite preparations for Operation Attila, the German occupation of southern France that was to occur automatically in the event of threatening Allied moves. On September 25 Bertrand was informed at the prefecture in nearby Nimes about the arrival, in the vicinity of Montpellier, of a special German radio-location team. The hunt for Cadix was on. Every so often, at all hours of day and night, electric power was cut off to facilitate a precise fix on the Cadix

transmitter. At the **beginning** of November. London notified Cadix that the Allied landings in North Africa were imminent. On November 6, a **radio-location** team visited the two neighboring farms, but unaccountably neglected the **Chateau des Fouzes**. On November 8, 1942, Cadix learned that the Allies had landed in North Africa. Next morning Cadix was evacuated, on November 11 the Wehrmacht moved into the **"Free Zone,"** and on the 12th Cadix was occupied by the **Germans**.

Rejewski and **Zygalski**, virtually alone of the 15-man Polish team, reached Britain eight and a half months later, on July 30, 1943, via Spain (where they were imprisoned for three months at Belver, Seo de Urgel, and Lerida) and Portugal and Gibraltar. They joined the Polish Army and were put to work breaking **double Playfair ciphers** of the SS. **Whatever** the reason--**misplaced** British distrust, **amnesia** regarding the Polish origins of the **"Ultra secret,"** or perhaps more likely, **British** desire to monopolize the **benefits** and glory of **Enigma decryptment**--the Poles were never again allowed to work with Enigma.

On November 15, 1946, according to his military service record. "No. 32145 Lieutenant (Sig[nals]) Marian **REJEWSKI** [was] discharged on repatriation to Poland." After having (according to Colonel Stefan Mayer of Polish military intelligence) requested and obtained permission from Polish intelligence authorities, he became one of the approximately 10% of the 200,000 Polish soldiers, sailors and airmen at the war's end in the west, to return to Poland.

In Poland, for a number of reasons, mostly of practical and family nature, it proved difficult for Rejewski to find employment as a mathematician at an institution of higher learning and in the early postwar period he felt it imprudent to apply for a job in cryptology. An obituary published in Poland states, somewhat cryptically, that "on November 21, 1946, he returned to Poland, then for 20 years worked in the administrations of various concerns in Bydgoszcz, and in February 1967 retired."

What had Rejewski and his colleagues personally gained from their unique cryptological work?

Not money. To be sure, Mayer has stated that before the war they had received a cash reward, sizable for the time, for having given their country the mastery of Enigma. Rejewski later confirmed that they had indeed received a bonus, but denied that it had been a princely sum.

Certainly their rewards had not included rank. Rejewski and Zygalski were commissioned second lieutenants after two months' military service in uniform, on October 10, 1943, and Rejewski (and probably also Zygalski) was promoted lieutenant on January 1, 1945. In subsequent civilian life, both ended their humbly, Rejewski in an unspecified but apparently not lofty station, and Zygalski, according to Mayer, as a lecturer at the Battersea Technical College in England, where he died (probably near Plymouth) in 1978.

As for distinctions, Rejewski's service record lists only the Gold Cross of Merit, the Silver Cross of Merit with swords, and the Army Medal, all Polish and all relatively lackluster. Considering the uniquely valuable

nature of their contributions, all three mathematicians would not have been excessively honored had they been given Poland's Order of Polonia Restituta, France's Legion d'honneur, and Britain's Distinguished Service Order.

Rejewski, however, did not seem unduly concerned with the trappings of success. When proposals were advanced around 1978 to bestow on him the degree of doctor honoris causa, he expressed no interest in attending such a ceremony. He was rather a private person, and moreover he was not feeling in the best of health. In any case, he did not live to take receipt of an honorary degree.

What satisfaction Rejewski derived from his prewar and wartime work less stemmed from the knowledge that he had contributed to the winning of the war, and from the feeling that is enjoyed by those who have made unique discoveries or inventions (he had made both). When public recognition finally came--over 30 years after the war, in the wake of the revelation^{ar},

Gustave Bertrand (1973) and F.W. Winterbotham (1974)--Rejewski unstingingly of his time to all who wished to know, through interviews correspondence, about his achievements. In his last years, he viewed by television crews from Poland, West Germany, and Brazil. A master the German language and also fluent in French and English, he

abreast of most of the polyglot nonsense being written about Enigma. In 1980 he became one of the heroes of a Polish movie, Sekret Enigmy, that used Enigma as what Hitchcock called a "McGuffin"--a more or less plausible business that serves as pretext for a plot--for a Polish-cryptologists--and-German-spies thriller, complete with a spurious love affair upon Ciezki, who died in Britain on public relief in 1951. Late 1980 also saw a Polish TV serial based on the Enigma story.

At the time of his death Rejewski was living with his wife on ulica Gdanska (Gdansk Street) in northern Warsaw's Zoliborz district in a spacious, comfortably furnished second-floor apartment in an apparently prewar building that was part of the less than 20% of the city that the Germans had not managed to destroy during World War II.

Rejewski had been suffering for some years from ischemic heart disease. Death came at his home, apparently of a heart attack, just after he had returned from shopping and was removing his shoes. He uttered a cry, fell back in the armchair, and expired. He was given a funeral with military honors at Warsaw's historic Powazki Cemetery, one of the pantheons of Poland's great and valiant.

Historians will, no doubt, long debate exactly what was the influence, upon the course of World War II, of the Allies' ability to read German machine ciphers. However, if but a fraction of what has already been disclosed withstands future scrutiny, verdicts will probably range between significant speeding of the ultimate outcome, with the saving of untold thousands of lives, and what Eisenhower termed a "decisive" influence--one that possible Britain's preservation as a vital base for subsequent operations in Europe, North Africa and the Atlantic, and vastly facilitated the prosecution of those operations. Of the two great secrets of World War II, the atomic bomb and Enigma decryptment (using what Rozvycki had dubbed the cryptological "bomb" and the world's first electronic computers that were

at least its spiritual offspring), the second was not only kept **much** longer—and much longer than necessary—but was **incomparably** the more important to the **conduct** of the war, **since** it played a crucial role throughout the duration, **whereas** the atomic bomb **merely** put the real **upon** the foregone **conclusion**. It may also be argued **that** the mirror **image** of the Enigma secret's positive importance in the Second **World War** has been the negative effect of its too-long-continued secrecy since the war: a secrecy that has made Allied victory seem too **much** a foregone **conclusion** and **thus** has distorted the United States' and **western** Europe's perceptions of their **power** to determine more recent world history.

It seems likely that future generations, in studying **the history of World War II**, will have to give at **least** as **much** attention to a handful of **cryptologists**--**most conspicuously** Marian **Rejewski**--**as they will to the politicians** and generals who have for so long held the limelight.