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Elizebeth S. Friedman

Elizebeth Smith Friedman--wife, mother, writer, Shakespeare enthusiast, cryptanalyst, and pioneer in U.S. cryptology--died on 31 October 1980 in Plainfield, New Jersey, at the age of 88. Although she is often referred to as the wife of [William Friedman](#), she enjoyed many successes in cryptology in her own right and has been dubbed "America's first female cryptanalyst." In fact, although her husband is credited with numerous contributions to cryptology, it was Mrs. Friedman who introduced him to the field.

Born in 1892 to John M. Smith--a Quaker dairyman, banker, and politician--and Sophia Strock Smith, Mrs. Friedman was the youngest of nine children. The special spelling of her name is attributed to her mother, who held a strong passion against Elizebeth ever being called "Eliza." Elizebeth was energetic, impatient, and at best strongly opinionated, with a disdain for stupidity. She is known to have been a hairdresser, seamstress, and fashion consultant whose talents were often exploited by her friends.

After briefly attending Wooster College in Ohio, she graduated from Hillsdale College in Michigan with a major in English literature. Having exhibited her interest in languages, she had also studied Latin, Greek, and German, and minored "in a great many other things." Only she and one other sibling were privileged to attend college.

Prior to her employment with the Newberry Research Library in Chicago, she was a high school principal for at least a year. A great Shakespeare enthusiast, she was probably attracted to Newberry because of an "original Shakespeare folio" known to be there. In 1916, while working at Newberry, she was recruited by George Fabyan to work on his 500-acre estate at Riverbank, his private "think tank."

The librarian who interviewed Mrs. Friedman on her first day is credited with having made a phone call to Colonel Fabyan that would change the then Miss Smith's life forever.

The librarian conveyed in her telephone conversation Smith's love for Shakespeare, among other things. Colonel Fabyan, a wealthy textile merchant, soon met Miss Smith, and they discussed what life would be like at Riverbank, Fabyan's great estate located in Geneva, Illinois. He told Miss Smith she would assist a Boston woman, Elizabeth Wells Gallup, and her sister with Gallup's attempt to prove that Sir Francis Bacon had authored Shakespeare's plays and sonnets using a cipher that was supposed to have been contained within.

At Riverbank Miss Smith joined a versatile and distinguished staff. There were typists, translators, a graduate student in genetics, and professionals specializing in acoustics, engineering. Riverbank was one of the first such facilities to promote cryptology and other subjects. Through the work of the Friedmans, much historical information on secret writing was gathered. Up until the creation of the Army's Cipher Bureau, Riverbank was the only facility capable of exploiting and solving enciphered messages.

Counted among the staff of fifteen at Riverbank was the man Miss Smith would marry in May 1917, William Friedman. The newlyweds worked together for the next four years or so in the only cryptologic laboratory in the country at the time. In 1921 Mr. and Mrs. Friedman moved to Washington, DC, to work for the War Department.

Mrs. Friedman's employment as a cryptanalyst for the U.S. Navy followed in 1923, which led to her subsequent positions with the U.S. Treasury Department's Bureau of Prohibition and Bureau of Customs. The net result of her career is quite significant and embraces cryptology against international smuggling and drug running in various parts of the world. The smugglers and runners resorted to radio and encoded messages to conduct their operations, presumably with a great sense of security. This, however, became a mistaken notion after Mrs. Friedman came to Washington. A more detailed account of her cryptologic contributions has been presented in a previous Almanac article.

During the post-World War Two period, Mrs. Friedman became a consultant to and created communications security systems for the International Monetary Fund.

Longtime Shakespeare enthusiasts, Mrs. Friedman and her husband, after retirement from government service, collaborated on a book entitled "The Shakespearean Ciphers Examined." It won awards from the Folger Shakespeare Library and the American Shakespeare Theater and Academy. In this book, the Friedmans dismissed Baconians such as Mrs. Gallup and Ignatius Connelly with such technical proficiency and finesse that the book won far more acclaim than others addressing the same topic. The work that Gallup had done earlier operated on two assumptions. One was that Bacon invented a biliteral cipher and that the cipher used in the original printed Shakespeare folios employed "an odd variety of typefaces." The Friedmans, however, "in a classic demonstration of their life's work," buried a hidden Baconian cipher on a page in their publication. It was an italicized phrase which, using the different type faces, expressed their final assessment of the controversy: "I did not write the plays. F. Bacon." Their book is regarded as the definitive work, if not the final word, on the subject.

Following her husband's death in 1969, Mrs. Friedman devoted much of retirement life to compiling a library and bibliography of William's work. This "most extensive private collection of cryptologic material in the world" would finally be prepared for the George C. Marshall Research Library in Lexington, Virginia.

Elizebeth Smith Friedman, as evidenced by the life she led, was truly a legend in her own time.

"Our office doesn't make 'em, we only break 'em," uttered Elizebeth Smith Friedman to a representative of a code-building company who came to sell his wares and to tout their precious worth. And "break 'em" she did many times over for many years against many targets. Quite admirably, she did all this without the aid of calculators or computers and with only a basic background in mathematics. Her successes led to the conviction of many violators of the Volstead Act during Prohibition years.

While the Eighteenth Amendment of 1919 forbade the manufacture, sale, import, or export of intoxicating liquors, the Volstead Act forbade the consumption of such beverages. Prevailing conditions during those days, however, encouraged illegal activity.

Further, as radio equipment became less cumbersome, less conspicuous, and more sophisticated, it afforded the criminal element another means to circumvent the law. To avoid taxes, etc., criminals smuggled liquor and, to a lesser degree, narcotics, perfume, jewels, and even pinto beans. Related enciphered communications were passed by persistent anti-prohibitionists to protect their operations.

Anti-prohibitionists provided Mrs. Friedman and her team of cryptanalysts with innumerable opportunities to hone their cryptanalytic/codebreaking skills during her employment with the U.S. Treasury Department. She led the cryptanalytic effort against international smuggling and drug-running radio and encoded messages, which the runners began to use extensively to conduct their illegal operations. Even though early codes were very basic, their subsequent change in complexity and resistance to solution was predicated on the financial success and growth of the operation. The extent of sophistication seemed to pose no problem for Mrs. Friedman; she still mounted successful attacks against both the simple substitutions and transpositions and the more complex enciphered codes which eventually came into use. While working for the Coast Guard and the Bureau of Foreign Control during the Prohibition era, she solved over 12,000 rum-runners' messages.

Mrs. Friedman also perceived the need for a more dedicated effort against suspected communications. By 1931 she had convinced Congress of the need to create a headquartered, seven-man cryptanalytic section for this purpose. As her cryptanalytic responsibilities began to mount, Mrs. Friedman sensed the need to teach other analysts cryptanalytic fundamentals, including deciphering techniques. This allowed her ample time to attack the more atypical new systems as they cropped up and expedited the entire process from initial analysis through to solution. It also allowed her to stay one step ahead of the smugglers.

In addition to her cryptanalytic successes, she was often called to testify in cases against accused parties. The messages that she deciphered and decoded enabled her to implicate several smugglers operating in the Gulf of Mexico and on the Pacific Coast. She subsequently testified in cases in Galveston and Houston, Texas, and New Orleans, Louisiana. Her efforts in 1933 resulted in convictions against thirty-five bootlegging ringleaders who were found to have violated the Volstead Act. Ringleaders were directly linked with suspected vessels as a result of the information arising out of her analysis.

The next year she played a major role in settling a dispute between the Canadian and U.S. governments over the true ownership of a sailing vessel called the *'I'm Alone'*. It was flying the Canadian flag when it was sunk by a U.S. Coast Guard cutter for failing to heed a "heave to and be searched" signal. The Canadian government filed a \$350,000 suit against the U.S., but the intelligence gleaned from the twenty-three messages decoded by Mrs. Friedman indicated U.S. ownership just as the U.S. had originally suspected. As a consequence, the owner of the ship was identified and captured.

Obviously impressed with her work, the Canadian government sought Mrs. Friedman's help in 1937 with an opium dealer problem which evolved into an outstanding case. She complied and eventually testified in the trial of Gordon Lim and several other Chinese. Her solution to a complicated unknown Chinese enciphered code, in spite of her unfamiliarity with the language, was key to the successful convictions.

Finally, Mrs. Friedman left her mark on the life of one of espionage's most notorious spies, Velvalee Dickinson, whose path to and role in espionage are noteworthy. Following high school and some college, she married the head of a brokerage firm that had Japanese-American clients. The Dickinson's interest in Japan grew so much that they joined the Japanese-American Society, where they began to rub shoulders with members of the Japanese consulate. When the brokerage firm's success suffered a downturn, so too did the Dickinson's role as proponents of good Japanese-American relations. At some point, the couple became spies for Japan. Velvalee became a major player, and her successful doll shop was a cover for her espionage. Known as the "Doll Woman," she corresponded with Japanese agents using the names of women she found in her business correspondence.

This would be her downfall. Her correspondence, which contained encoded material addressing significant naval vessel movement in Pearl Harbor, was analyzed and solved by Mrs. Friedman. This analysis resulted in a guilty verdict against Mrs. Dickinson.

Although Mrs. Friedman worked closely with her husband William as part of a team, many of her contributions to cryptology were unique. She deciphered many encoded messages throughout the Prohibition years and solved many notable cases single-handedly, including some codes which were written in Mandarin Chinese. As has been determined, the complexity or difficulty mattered not. After fifty years at her business, Elizebeth Smith Friedman had indeed proved to be a pioneer in code breaking.

To further commemorate the contributions of the Friedmans, NSA's OPS1 building was dedicated as the William and Elizebeth Friedman Building during the Agency's 50th Anniversary Commemoration in 2002.

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Agnes Meyer Driscoll

Agnes Meyer Driscoll's work as a navy cryptanalyst who broke a multitude of Japanese naval systems, as well as a developer of early machine systems, marks her as one of the true "originals" in American cryptology. She was born in 1889, and, in 1911, she received an A.B. degree from Ohio State University, majoring in mathematics, physics, foreign languages, and music. From her earliest days as a college student, Agnes Meyer pursued technical and scientific studies atypical for a woman of the times. After graduation, she moved to Amarillo, Texas, where she was director of music at a military academy, and, later, chair of the mathematics department at the local high school.

In June 1918, about one year after America entered World War I, Agnes Meyer enlisted in the United States Navy. She was recruited at the highest possible rank of chief yeoman and was assigned to the Code and Signal section of the Director of Naval Communications. Except for a two-year hiatus, when she worked for a private firm, Agnes Meyer Driscoll (she married in 1924) would remain a leading cryptanalyst for the U.S. Navy until 1949.

Her efforts were not limited to manual systems; she was involved also in the emerging machine technology of the time, which was being applied both to making and breaking ciphers. In her first days in the Code and Signal section, she co-developed one of the U.S. Navy's cipher machines, the "CM." In 1923, Miss Meyer left the navy and joined the fledgling Hebern Electric Code Company as technical advisor. Although Hebern's company ultimately failed, its work in rotor technology would affect machine cryptography for years to come. She returned to the navy in 1924.

In her thirty-year career, Mrs. Driscoll broke Japanese Navy manual codes -- the Red Book Code in the 1920s, the Blue Book Code in 1930, and, in 1940, she made critical inroads into JN-25, the Japanese fleet's operational code, which the U.S. Navy exploited after the attack on Pearl Harbor for the rest of the Pacific War. In early 1935, Mrs. Driscoll led the attack on the Japanese M-1 cipher machine (also known to the U.S. as the ORANGE machine), used to encrypt the messages of Japanese naval attaches around the world. At the same time, Agnes sponsored the introduction of early machine support for cryptanalysis against Japanese naval code systems.

Early in World War II, Mrs. Driscoll was engaged in the U.S. Navy's effort against the German naval Enigma machine, although this work was superseded by the U.S.-U.K. cryptologic exchanges in 1942-43.

Mrs. Driscoll was part of the navy contingent that joined the new national cryptologic agencies, first the Armed Forces Security Agency in 1949 and then the National Security Agency in 1952. Mrs. Driscoll died in 1971 and is buried in Arlington National Cemetery.

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Juanita Moody

Recalling the Cuban Missile Crisis of 1962, former NSA senior Juanita Moody said that it "allowed us to take advantage of everything we had learned during World War II and post-World War II... and I felt that every day in my career in the Agency from the Cuban crisis on was affected by my experience at that time."

In early 1943, Juanita Morris, at a small college in North Carolina, wished to contribute to the war effort and volunteered at the nearest recruiting office. By April, she was at the Army cryptologic headquarters at Arlington Hall Station. While awaiting her security clearance, the Signal Security Agency (SSA) put her into unclassified training in cryptanalysis; she became fascinated with the subject.

At the end of the war, her supervisor asked her to stay on, rather than be demobilized, and she agreed. In 1948, she married Warren Moody, a noncryptologic employee.

Ms. Moody supervised NSA's day-to-day -- sometimes, minute-by-minute -- response to the Cuban Missile Crisis as head of the major element responsible for Signals Intelligence (SIGINT) on that region. In addition to directing production and reporting, she frequently gave impromptu briefings to high-level civilian and military leaders. She often worked around the clock, grabbing only a few hours sleep on a cot in her office.

In the years following the Cuban Missile Crisis, Ms. Moody was assigned to higher positions within the production organization at NSA. She revolutionized SIGINT reporting, and put NSA into the White House Situation Room.

However, in the mid-1970s, she was one of NSA's spokespersons during Congressional hearings and was incorrectly identified by the media as having been involved in intelligence community abuses.

Juanita Moody retired from NSA in 1976 after 33 years of service. The previous December she had become the first recipient of the National Intelligence Medal of Achievement, presented by then Director of Central Intelligence George Bush.

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Genevieve Grotjan Feinstein

Genevieve Grotjan Feinstein was a skilled cryptanalyst whose discovery in September 1940 changed the course of history. Her successful breakthrough enabled the Army Signal Intelligence Service (SIS) to build an analog machine that solved the Japanese diplomatic system known as "Purple." Exploitation of this system provided crucial intelligence in the Atlantic and Pacific theaters during World War II.

Ms. Grotjan Feinstein was hired by William Friedman for the SIS in 1939. By 1940 she made her discovery that led to breaking the "Purple" code, and by October 1943 she was assigned to the Soviet problem and worked on the project later known as "Venona." She devised a process for recognizing the re-use of key, which, in turn, permitted the decryption of Russian KGB messages. The discovery was labeled "... the most important single cryptanalytic break in the whole history of Venona."

Ms. Grotjan Feinstein's brilliant findings in two instances enabled exploitation of communications that provided invaluable intelligence information to policymakers. This information was used by the most senior government officials for decisions in World War II and the Cold War.

In 1943, Ms. Grotjan married Hyman Feinstein, a chemist at the National Bureau of Standards. After serving as a cryptanalyst and as a research analyst for over seven years, on May 4, 1947, Genevieve Grotjan Feinstein resigned from the government and later became a professor of mathematics at George Mason University.

Genevieve Grotjan Feinstein died in 2006 at the age of 93. Before his death in 1995, Hyman Feinstein established an award in cryptology within the Department of Mathematical Sciences at George Mason in honor of his wife.

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Ann Caracristi

Ann Caracristi began her career with the Army's cryptologic organization during World War II. After a brief civilian career immediately following the war, she joined one of NSA's predecessor organizations as a cryptanalyst.

She served as Chief of Research and Operations organizations, primarily with A Group (Soviet issues) where she was chief from 1975 to 1980.

In addition to her management duties, Ms. Caracristi served in various capacities on committees and panels established to provide technical and career support to cryptanalysts. She mentored many of NSA's cryptanalysts. She also chaired a special panel convened by NSA Director Admiral Bobby Ray Inman to identify the next generation of likely NSA senior executives. Many of those identified by the panel went on to become Deputy Director or high-level seniors.

In April 1980, she was named NSA's sixth Deputy Director (D/DIR) and served in that position until August 1982. As D/DIR, she had special responsibilities for recruitment, training, and personnel.

Ms. Caracristi retired from NSA in 1982, but remained active on several panels convened by components of the Intelligence Community. President Clinton named her to the President's Foreign Intelligence Advisory Board in 1993, and she has served as consultant to the NSA Scientific Advisory Board (NSASAB). In addition to her service on government panels, she was president of the Association of Former Intelligence Officers (AFIO) from 1989 to 1991.

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