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(U) A look inside the SIS: cryptanalysis, PURPLE, and MAGIC during World War II



(U) In the last weeks before the United States entered World War II, the Signal Intelligence Service (SIS), the Army's cryptologic organization, had an important visitor.

(U) The SIS had been established in 1930, and its chief was William F. Friedman, the Army's senior cryptologist. Friedman, originally a geneticist, had put SIS on a scientific basis, with a heavy emphasis on using statistics for analysis. Despite its name, SIS initially engaged primarily in compiling codes for the Army's own use, with cryptanalysis as a secondary mission. Therefore, it was subordinate to the Signal Corps, not Military Intelligence.

(U) Friedman hired three "junior cryptanalysts" in April 1930, starting with Frank Rowlett, a high school mathematics teacher. The organization had added personnel over the 1930s, but in 1940 and 1941 sought to hire more personnel. Both the SIS and its Signal Corps parent realized it still had far fewer people than would be needed if the crisis with Japan moved to actual warfare.

(U) The following story is based on the published memoirs of Frank Rowlett. At the time he was responsible both for exploiting Japanese diplomatic communications and for managing the code production program. Rowlett doesn't give an exact date, but it appears to have happened in the fall of 1940.

(U) Colonel Spenser Akin, head of the Army Signal Corps school, without saying why, asked Rowlett to prepare a display on PURPLE for a senior War Department* official. Rowlett would need to be ready to give a demonstration of no more than 30 minutes. PURPLE was the American covername for Japanese machine-encrypted diplomatic communications, which SIS had begun to exploit by using an analytic machine known as the PURPLE Analog, invented by an SIS engineer. (PURPLE was the U.S. covername for the Japanese diplomatic cryptosystem; the Analog was a U.S. analytic machine designed to solve it.)

(U) The next afternoon, Akin alerted Rowlett to be prepared for the demonstration shortly, and about an hour later escorted General George Marshall, the Army's chief of staff, into the secure spaces.

(U) "I did not realize our visitor was General Marshall until Colonel Akin introduced him to me," recalled Rowlett. "I was so surprised and awestruck that for a few seconds I was absolutely speechless. General Marshall graciously shook my hand and with a few remarks about his interest in our activities put me at ease."

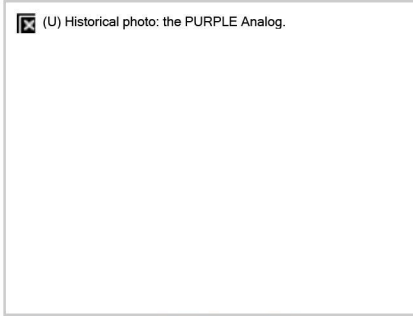
(U) Today we recognize General Marshall as one of the architects of victory in World War II, a man who had strategic vision and superior organizing abilities, but in 1941, even though his major achievements were still in the future, he already had respect within the Army beyond mere recognition of his rank. He had a distinct vision for how the Army had to grow and change, and a management style that brought people along with him.

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(U) Marshall was a regular consumer of MAGIC, the reports based on exploitation of the PURPLE system; however, he probably had only a sketchy idea of how decrypts were produced.

(U) Marshall appeared to be fascinated by the process. His questions to Rowlett turned the half-hour session into nearly an hour. Along with a verbal explanation, Rowlett showed the PURPLE Analog. In response to Marshall's questions, Akin had Rowlett remove the protective covers from the Analog, allowing Marshall to see it in action; the machine operated using telephone switching devices.



(U) Historical photo: the PURPLE Analog. The National Cryptologic Museum has a PURPLE model on display that Frank Rowlett, in retirement, identified as the device used in SIS spaces. The museum is open every federal workday from 0900 to 1600 hours, plus the first and third Saturdays of every month from 1000 to 1400 hours.

(U) Marshall then "got it." After the demonstration, noting how the U.S. had analyzed and exploited a clever device like PURPLE, the general asked if it might not be possible that other countries were doing the same to our communications. Akin told him that they had no evidence that this was happening, and had Rowlett tell the chief of staff about the SIGABA, a new COMSEC machine that had been developed jointly with the Navy.

(U) Rowlett pointed out that the SIGABA had been designed to avoid the features that made the PURPLE system vulnerable. Marshall left after making the comment that the best way to ensure our own communications security was to be able to solve the best systems elsewhere in the world.



(U) When Akin returned from escorting the general to his next appointment, the colonel told Rowlett how pleased he was with the way the visit had gone.

(U) Marshall was a regular reader of COMINT throughout the war, and there even were occasions when he found that President Franklin Roosevelt had not yet read decrypts sent to the White House and nudged the president into doing so.

* (U) The War Department was reorganized in 1947, renamed "Department of the Army," and subordinated to the new Department of Defense.

(U) To discuss historical topics with interesting folks, visit the Center for Cryptologic History's blog, [History Rocks](#) ("go history rocks").

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