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# DAILY ENTERPRISE



## (U) HISTORY TODAY - 11 December 2015

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### (U) PURPLE and MAGIC – World War II



(U) Earlier this month, *History Today* published articles about the pre-World War II success by the U.S. military in exploiting Japanese diplomatic communications. The Japanese Foreign Ministry used a machine-generated cipher, which the Americans called “PURPLE.” This was solved in 1940, and exploited by both the U.S. Army and Navy for about a year and a half before war broke out between the two countries, and by the U.S.

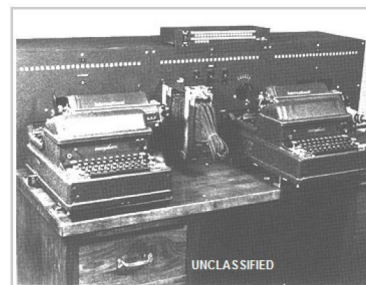
Army during the war itself.

(U) The cryptanalysts invented a device, known as the PURPLE Analog to decrypt Japanese diplomatic messages automatically. The resultant intelligence reports were labeled with the codename “MAGIC.”

(U) Before the war, MAGIC provided good insights into Japanese policy; during the war, MAGIC had information critical to military operations in Europe, solving the communications of the Japanese ambassador in Berlin.

(U) Did the Japanese have their own version of PURPLE/MAGIC?

(U) In fact, the Japanese had a similar ability before the war. They could read, with measurable success, diplomatic messages of the United States and others such as Great Britain, China, Portugal, and France. From these decrypts, the Japanese Foreign Ministry (Gaimusho) was aware of the American strategy objective of fending off Tokyo’s aim at dominating East Asia.



(U) Historical photo: PURPLE Analog device invented by the U.S. to decrypt Japanese diplomatic messages.

(U) Senior U.S. leaders suspected this in the 1930s. Many in the U.S. State Department believed the Japanese were reading the Gray and A-1 codes, the department’s basic systems. The American ambassador to Japan, Joseph C. Grew, admitted in an August 1941 entry to his diary that an informant (probably Japanese) had told him that all but one of the State Department codes could be read by Tokyo. Grew felt assured that this one system, the Brown Code, was secure for messages with Washington.

(U) To illustrate this assumption of cryptographic insecurity, on December 6, 1941, President Franklin Roosevelt sent a personal note to Japan’s Emperor Hirohito. Attached to it was a handwritten note to Secretary of State Cordell Hull from the president asking that the message to the emperor be sent in the State Department Gray Code because it “saves time.” Roosevelt also added, “I don’t mind if it gets picked up.”

(U) Even the Brown Code might have been vulnerable. An article in 2001 in the *Los Angeles Times* offered strong, but not conclusive, evidence that the Japanese could read almost any message between Washington and the Embassy in Tokyo prior to the start of the war. A Japanese-American scholar from Kobe University had discovered a folder of papers in the CIA records at the U.S.

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National Archives. These were Xeroxed copies of microfilmed typewritten transcriptions of encrypted American and British diplomatic messages between their embassies in Tokyo and London and Washington. Attached to them were the Japanese translations of the messages.

(U) The scholar asked a colleague in Japan to check the archives of the Japanese Gaimusho [Foreign Ministry] for similar papers, although he had little hope that anything would be discovered. At the end of World War II, the Japanese managed to destroy the bulk of their records that had not already been burned in American air raids.

(U) However, the colleague found a folder marked "Special Documents," which contained 34 messages from London and Washington and their embassies in Tokyo. Many were from the U.S. Secretary of State Cordell Hull. Along the top of the messages were notations that the messages were sent in "double" and "machine" ciphers. The messages range in date from August to early December 1941.

(U) The Japanese acquired these messages in a method quite similar to the way Americans picked up copies of Japanese diplomatic messages. The Japanese Communications Ministry maintained a Censorship Section, which got copies of all incoming and outgoing diplomatic messages. To avoid the Censorship Office's reach, Ambassador Joseph Grew sometimes had his messages couriered to other cities, even outside of Japan, such as to Shanghai, but the Japanese had contacts and agents in many overseas cable terminals watching for American and British diplomatic traffic. These messages were given to Japanese codebreaking elements in the Foreign Ministry, Army, or Navy.

(U) While the diplomatic codebreaking was done at three different agencies, the Foreign Ministry cryptanalysts, naturally enough, took the lead against foreign diplomatic messages. The codebreaking section employed over twenty codebreakers and clerks arranged in offices working specific targets, with as many as 13 people tackling the American and British diplomatic systems. U.S. diplomatic codes from the decades before the war were routinely read.

(U) The question, though, is whether the Japanese could read the M-138 strip cipher, which was believed to be unbreakable by the Americans?

(U) Although the historical evidence is not totally conclusive, it appears that despite claims to the contrary, the Japanese *Gaimusho* codebreakers were reading U.S. diplomatic messages encrypted in the M-138 strip cipher.

(U) From post war interviews of Japanese cryptanalysts, it appears that sometime in the summer of 1940, a Japanese agent, anecdotally identified as a housemaid co-opted by Japanese military security (*Kempeitai*), who worked in the U.S. Consulate in the port of Dairen, in Manchuria, managed to photograph the strip cipher, the instruction booklet, and a month's worth of key. (Another codebreaker stated that the Japanese Navy obtained this material, which was delivered to the foreign ministry codebreakers.)

(U) The first decrypt, a November 20, 1940, message from Secretary of State Hull to Ambassador Grew, was completed late that year. From then on, if the handful of extant Japanese decrypts are a representative sample, the Japanese Foreign Minister, Shigenori Togo, was able to follow American diplomatic correspondence, much like the Americans read Japanese diplomatic exchanges.

(U) What he saw may not have been encouraging. Many of the messages from Ambassador Grew projected a sense of the inevitability of the conflict because of the control of the government by the Japanese military. Grew's messages also suggested that even Japanese Foreign Minister Togo was resigned to an inevitable conflict. Ambassador Grew also admitted to Washington that he had little chance to detect the start of any conflict.

(U) At the same time, what Secretary of State Hull and others saw in their PURPLE decrypts was not hopeful, either. Japan's proposals to the United States remained too narrow and the Japanese never

conceded that their attacks in China and French Indochina was nothing more than imperial aggrandizement. Likewise, Japan never understood how its position and policy in those two areas threatened the possessions of the United States, Great Britain, and the Netherlands in the region. This threat led to the series of economic sanctions imposed by these three countries. And these sanctions placed Japan in its strategic crisis of late 1941.

(U) The question might be fairly asked if this mutual reading of each other's mail by the gentlemen diplomats had any effect on the outbreak of the war. While the story of American-Japanese relations from mid-1940 to the outbreak of war is complicated, the eventual conflict resulted from a series of miscalculations made by both sides. The COMINT "advantage" for both sides may have been almost irrelevant to the final outcome, that is, the outbreak of war. Neither side exploited their respective signals intelligence advantage to try to find a political or diplomatic solution to the impasse in East Asia. Rather, it seems that the communications intelligence only fortified prior assumptions about the other side's intransigence.

(U) In truth, the impasse between Washington and Tokyo was too deep; Japanese and American terms for a solution to the Japanese occupation of China and French Indochina were mutually exclusive and ironclad. By September 1941, Tokyo had committed to a wider war with little hope of a political or diplomatic solution with the United States. So, too, the Japanese believed that by signing the Tripartite Agreement with Nazi Germany and Fascist Italy in September 1940, the agreement would neutralize United States' actions in East Asia. Most importantly, they underestimated American resolve in case of a conflict.

(U) Meanwhile, the Americans failed to grasp the notion that the Japanese would strike early in a major campaign across the Pacific to preserve their conquests in East Asia. Washington had hoped to play for time.

(U) This article is based on an essay written by a now-retired colleague from the Center for Cryptologic History.

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

(U) Have a question or comment on *History Today*? Contact us at [DL cch](#) or

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