

## How Cryptology enabled the United States to turn the tide in the Pacific War.

### *A Precarious State of Affairs*

In late spring of 1942, the Allied war effort in the Pacific was in a precarious state. The combined elements of the Japanese Empire's armed forces had moved from victory to victory. The Pacific fleet, save for several aircraft carriers, had been left in ruins. It appeared that Japan's plans for reducing American and Western hegemony in the Pacific would become a reality. Admiral Yamamoto, the leader of Japan's naval efforts in the early days of the Pacific campaign, had promised that at the outbreak of hostilities he would "run wild for a year," but that he had "utterly no confidence for the second or third year." As a young naval officer, Yamamoto had traveled extensively in the United States and was well aware of America's industrial capabilities. His goal was to force the U.S. to sue for peace before this industrial might could be directed against Japan. With this goal in mind, he sought to lure the American Navy into a decisive battle, in which it would be forced to deploy its remaining assets, thus providing his forces an opportunity to administer one final knockout blow.

While Yamamoto plotted to bring a quick end to war in the Pacific Theater, the United States Navy in the Pacific, led by Admiral Chester Nimitz, was desperately trying to anticipate Japan's next move. Nimitz, unlike his counterpart, had little room for error. At the time of the battle, his 3 aircraft carriers, 45 fighting ships, and 25 submarines were all that lay between Hawaii and the West Coast and a large Japanese Fleet that had yet to suffer a significant defeat. It appeared that Nimitz would have one shot at the enemy. A miscalculation by Nimitz on where Yamamoto would strike next would not only be disastrous, but also possibly fatal to the Allied war effort in the Pacific.

### *OP-20-G and Station Hypo*

In order to prevail, Nimitz had to have some sense of Japan's intentions. The task of obtaining the critical information required to turn the tide in the Pacific fell to OP-20-G, the Navy radio intelligence organization tasked with providing communications intelligence on the Japanese Navy. Established in the early 1920s by Laurence F. Safford, the "Father of Navy Cryptology," OP-20-G was key to Nimitz's planning. In addition to his earlier cryptologic efforts, Safford had played a major role in placing Commander Joseph Rochefort in command of Station Hypo, the Navy's codebreaking organization at Pearl Harbor. Over a period of 18 years, OP-20-G had developed a highly skilled group of officers and enlisted men.

In 1942 Rochefort and his staff began to slowly make progress against JN-25, one of the many Japanese command codes that had proven so challenging to the Station Hypo team. JN-25 was the Japanese Navy's operational code. If it could be broken, Rochefort would be able to provide Nimitz the information he needed to make wise and prudent decisions concerning the dispersal of his precious naval assets.

### *The Breaking of JN-25*

Breaking the Japanese code known to Americans as JN-25 was daunting. It consisted of approximately 45,000 five-digit numbers, each number representing a word or phrase. For transmission, the five-digit numbers were super-enciphered using an additive table. Breaking the code meant using mathematical analysis to strip off the additive, then analyzing usage patterns over time, determining the meaning of the five-digit numbers. This complex process presented a challenge to the officers and men of Station Hypo, but Rochefort



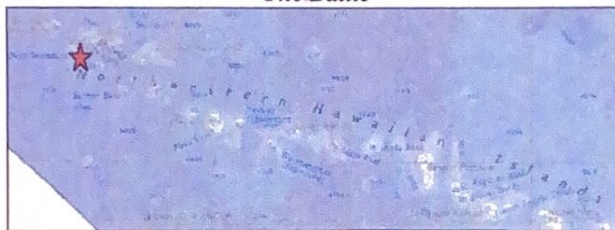
and his staff were able to make progress because the system called for the repetitive use of the additive tables. This increased the code's vulnerability. Even so, the work was painfully slow. Prior to the attack on Pearl Harbor, only 10 to 15 percent of the code was being read. By June of 1942, however, Rochefort's staff was able to make educated guesses regarding the Japanese Navy's crucial next move.

### *AF Is Short of Water*

In the spring of 1942, Japanese intercepts began to make references to a pending operation in which the objective was designated as "AF." Rochefort and Captain Edwin Layton, Nimitz's Fleet Intelligence Officer, believed "AF" might be Midway since they had seen "A" designators assigned to locations in the Hawaiian Islands. Based on the information available, logic dictated that Midway would be the most probable place for the Japanese Navy to make its next move. Nimitz however, could not rely on educated guesses.

In an effort to alleviate any doubt, in mid-May the commanding officer of the Midway installation was instructed to send a message in the clear indicating that the installation's water distillation plant had suffered serious damage and that fresh water was needed immediately. Shortly after the transmission, an intercepted Japanese intelligence report indicated that "AF is short of water." Armed with this information, Nimitz began to draw up plans to move his carriers to a point northeast of Midway where they would lie in wait. Once positioned, they could stage a potentially decisive nautical ambush of Yamamoto's massive armada.

### *"The Battle"*



Courtesy of the National Geographic Society

Due to the cryptologic achievements of Rochefort and his staff, Nimitz knew that the attack on Midway would commence on 3 June. Armed with this crucial information, he was able to get his outgunned but determined force in position in time. On 4 June the battle was finally joined. The early stages of the conflict consisted of several courageous but ineffective attacks by assorted Navy, Marine, and Army Air Corps units.

The tide turned however, at 10:20 a.m. when Lt. Commander Wayne McClusky's Dauntless dive bombers from the USS Enterprise appeared over the main body of the Japanese invasion force. After a brief but effective attack, three of the four Japanese carriers, the Akagi, Soryu, and Kaga were on fire and about to sink. Later that day, Navy dive bombers located and attacked the Hiryu, the fourth and last major carrier in the invasion force, sending her, like the previous three, to the bottom.

### *Final Thoughts*

As in any great endeavor, luck did indeed play a role, but Nimitz's "Incredible Victory" was no miracle. Gordon Prange, the distinguished historian, noted that "Midway was a positive American victory not merely the avoidance of defeat." General George Marshall, the U.S. Army Chief of Staff, in his comments on the victory, perhaps said it best, "as a result of Cryptanalysis we were able to concentrate our limited forces to meet their naval advance on Midway when we otherwise would have been 3,000 miles out of place."

In the end, Yamamoto's worst fears had become a reality. Due to an impressive mix of leadership, determination and skill on the part of Admiral Nimitz, the officers and men of Station Hypo, and the pilots soldiers, sailors and marines who carried the fight to the enemy, Japan would be on the defensive for the rest of the war. The Rising Sun of Dai Nippon, which had shone so brightly for so many months, was beginning to set.