The focus of this essay is upon the efforts of a United States Navy communications intelligence expert before and during World War II. He was one of literally thousands of Allied personnel dedicated to finding out what the plans of the Axis nations were so that our military could respond appropriately and in time.

His name was Joe Rochefort. More specifically, he was Ensign Joseph J. Rochefort, U. S. Navy. The year was 1919. Rochefort was stationed aboard the USS Cuyama, an oil tanker. The ship's executive officer was Commander Chester C. Jersey. In a conversation one day with Rochefort Jersey mentioned his affinity for playing bridge. Rochefort replied: "I like bridge, but I'm addicted to crossword puzzles." In 1923 Jersey was posted to the Navy Department Headquarters in Washington, D. C. Jersey remembered Rochefort's crossword comment when he found out that the Navy was looking for someone to work on codes. Jersey recommended Rochefort. At that time the Navy's cryptanalytic staff consisted of one person, Lieutenant Laurance F. Safford. He was the Navy's one-man code breaking bureau! Safford, like Rochefort, had never planned to be a cryptanalyst. In 1925 the Navy had little concern about codes of other countries. Safford decided that to create a good Navy code he needed to find out what other countries were doing. The result was the creation of a "research desk" in Room 1621 of the old Navy Department Building in Washington.

Rochefort reported for duty in October, 1925. Safford designed a six-month course in cryptanalysis by giving Rochefort cryptograms to solve. In February, 1926 Safford was called to sea duty once again. By default Rochefort became the officer in charge of the research desk. His staff consisted of a cryptographer and a poorly-qualified assistant. These three were the Navy's communications intelligence department.

Rochefort's had enlisted in the Navy in 1918. He hoped to become a Navy aviator flying bi-planes off of Navy carriers. It didn't turn out that way though. He

was a driven man, but not a flamboyant person. His Navy career path consisted of sea duty, study in an engineering school, commission as an ensign, and then more sea duty. His dream of becoming a Navy pilot simply faded away. The fact that he was not a graduate of the Naval Academy played a distinct part in his career later. But in 1926 his focus was on the work of a fledgling cryptanalyst.

Since the Navy in 1926 had little interest in the need for communications intelligence there was little pressure exerted on Rochefort to produce. However, Rochefort could not sit idly by and do nothing. His work ethic had a way of creating its own compulsive pressure. Rochefort developed an ulcer before being called back to sea duty. He had dedicated himself to decipher the then current Japanese code.

He took advantage of a $100,000 secret Navy intelligence slush fund left over from 1918. The fund was concealed from Congress by depositing the money in a Washington bank in a personal account under the name of the Director of Naval Intelligence. With the succession of new DNIs each was simply handed the money and the keys to the office. In the early 1920s a DNI used some of the money to finance a break-in of the Japanese consulate in New York City where the Japanese Navy's "Red" code book was kept. More of the fund was used to pay linguists from Columbia University to laboriously translate the code book.

Rochefort had the translated code book but he did not have the additive book. The Red code could not stand on its own. It could easily be broken. It was an enciphered code. That is, each word or syllable in a message was assigned a numerical value, e.g. the "code" part. Before the Japanese would send a coded message the code clerk would refer to a second book, the additive book, containing page after page of random numbers. The code clerk would start at the top of the page in the additive book and add the first of the random "additives" to the first code group, the second to the second, and so on. The code clerk would bury an indicator in the message to indicate what page in the additive book to turn to. The person receiving the encrypted message would then turn to the page in the additive book, strip off the additive and then look up the meaning of the code group. The additive book was changed frequently by the Japanese. The challenging task for

Rochefort was to create an additive book he had never seen. Reproducing the additive book was the cause of Rochefort's ulcer. In 1942 Rochefort's task was to not only reproduce the current additive book, but also its corresponding code book. Rochefort had neither.

In the intervening years from 1926 to 1942 Rochefort spent three years in between sea duty in Japan becoming fluent in the Japanese language. In December, 1941 Rochefort was in charge of Station Hypo, the Navy's intercept station in Pearl Harbor. As early as September, 1941 there were forewarnings of disaster when the U. S. Army succeeded in breaking the Japanese diplomatic code named "Purple." The Purple cipher carried the highest diplomatic messages of the Japanese Empire. The U. S. Army named the code MAGIC. It operated by means of a complicated machine. In eighteen months of intense effort the U. S. Army's codebreakers determined the wiring and setup of the machine, an incomprehensible feat! They created a replica of the machine without ever having seen it. Now it was possible to decode Japanese diplomatic messages instantaneously.

On December 3, 1941 a Japanese message ordered the Purple code book and one of its two Purple machines destroyed in its Washington, D. C. embassy. With the decoded message in hand Colonel Otis Stadler, the officer in charge of distributing MAGIC decrypts, raced into the office of Frank Rowlett, a senior cryptanalyst in the Army's Signal Intelligence Service. Stadler said to Rowlett: "You know what this means? It means Japan is about to go to war against the United States." Three days later the latest decrypts of Japanese messages were delivered to President Franklin D. Roosevelt during a White House dinner. Now the inner circle knew war was inevitable. The Japanese were about to break off diplomatic relations with the United States.

We now knew that the Japanese were about to attack, but we did not know where. We did not know because since mid-1939 we had not read a single message in the current Japanese naval code designated JN-25, an enciphered code. As of June 1, 1939 the U. S. Navy's communications intelligence office in Washington, D.

C., designated as OP-20-G, was comprised of thirty-six enlisted men and officers. Naval intelligence used the term "AN" to stand for JN-25. Efforts by OP-20-G to break the AN code was thought of more as a "research" project rather than a "current decryption" project. It became an intellectual exercise.

U. S. Navy operators in Hawaii, Guam, and the Philippines were intercepting Japanese Navy radio signals. The messages were transcribed by hand onto message blanks. Then they were bundled up and once a week were handed to the captains of Dollar Line's "President" passenger liners in the Pacific. When the ships reached ports on the West Coast these bundles of messages were dropped into mail boxes for delivery to OP-20-G in Washington. This meant inordinate delays of many weeks before the messages were in the hands of the OP-20-G cryptographers. The problem was simply too many messages received too late by too few cryptographers.

The Purple cipher messages, the diplomatic messages, were decrypted the day they were sent. The AN messages, the Japanese naval messages, were pouring in at the rate of 7,000 per month in Washington's OP-20-G code breaking headquarters. By November, 1941 only ten percent of the AN code groups were identified. By the time the attack on Pearl Harbor occurred not a single AN message transmitted at any time during 1941 had been read by December 7!

Rochefort's Station Hypo was working on a dead end problem before Pearl Harbor. On December 10 Rochefort was given the go-ahead to tackle AN on its own. He blamed himself for not foreseeing the attack on Pearl Harbor. He drove himself and his men relentlessly and without mercy. Rochefort had moved Station Hypo in November 1941 to the basement of the Navy Administration building at Pearl Harbor. He named the new location "The Dungeon." For six months after December 7 Rochefort scarcely moved from the Dungeon. Later he said: "I can offer a lot of excuses, but we failed in our job. An intelligence officer has one job, one task, one mission – to tell his commander, his superior, today what the Japanese are going to do tomorrow." Rochefort became a living legend as he paced the Dungeon dressed in a smoking jacket and wearing a pair of carpet slippers. It was not uncommon for Rochefort to spend twenty-hour days in the Dungeon and finally

moving in a cot for the infrequent naps he took. This is how fifty years later a Station Hypo man who ran an IBM machine described Rochefort: "He was my ideal of the ideal man. He never raised his voice, but he knew that what he said was law and everybody believed it. He made sure people knew what they were doing and left them to it."

Following Pearl Harbor Rochefort immediately set out to decrypt the backlog of Japanese JN-25, e.g. AN, messages. He was short of manpower. He reviewed the records of all military personnel arriving from the main land, selecting any person with even the slightest qualifications for cryptanalytic work. He even enlisted the Navy band from the battleship California that was severely damaged from the Pearl Harbor raid. He put the band members to work running IBM machines. Several of these men spent their remaining Navy careers in cryptanalytic work. Finally on March 18, 1942 the backlog of messages were completely decrypted. Station Hypo was finally current. Rochefort issued an order stating that JN-25 was in a "current decryption" status. He had won the war against the Japanese code makers! Now Rochefort had to win the intra service rivalry war against the Washington code breakers of OP-20-G.

The commander of OP-20-G requested that all principal decoding activities be conducted from its office. Rochefort, however, displayed his stubborn streak. He made it clear that his boss was the commandant of the Fourteenth Naval District in Honolulu, even though it was OP-20-G that had assigned Rochefort to Station Hypo. It was an inescapable collision course between OP-20-G and Station Hypo. Rochefort insisted that he was answerable only to the new Pacific Fleet commander, Admiral Chester W. Nimitz. Rochefort did not mince words about the meddling of Washington in the activities of Station Hypo.

Rochefort and Captain Edwin Layton, the intelligence officer of the Pacific Fleet had developed a close working relationship. They were in constant contact by phone. Layton considered Rochefort to be a highly reliable, but cautious person. In 1942 most commanders looked somewhat askance at intelligence reports as though they were the work of alarmists. However, on May 14 Layton answered his phone.

On the other end was Rochefort who exclaimed: "I've got something so hot here it's burning the top of my desk!" Layton hurried to the Dungeon. What Rochefort had was a partial decrypt from JN-25 containing the words "KORYAKU BUTAI" and the term "AF." The former decoded meant "invasion force." The latter stood for Midway. KORYAKU BUTAI had appeared in Japanese codes for the invasions of Rabaul, Java, Sumatra, and Bali. Rochefort had tentatively identified AF as Midway. The clincher for Rochefort was an order that air base equipment was to be shipped to Saipan to be in position for the AF ground crews. AF was obviously an island air base. To Rochefort it had to be Midway.

To confirm that AF was indeed the Japanese designation for Midway this is what Rochefort did. He alerted Nimitz. Relying on Rochefort's report on May 17 the Admiral ordered his three remaining aircraft carriers to return at once from the South Pacific. Nimitz proceeded to formulate his strategic plan to surprise the Japanese as they assembled their forces to capture Midway.

By January, 1942 the discord between Station Hypo and OP-20-G had reached the critical stage. Commander John H. Redman had replaced Safford, Rochefort's old mentor, as head of OP-20-G in a bureaucratic power play. On May 14 Redman authorized a memo to Admiral Ernest King advising King that the Japanese were preparing a "coordinated air and submarine attack on the Hawaiian Islands." Further, OP-20-G advised King that Station Hypo had bungled its additive tables. AF should have read "AG," the Japanese designation for Johnston Island. OP-20-G also was forecasting possible Japanese attacks on the Aleutian Islands, Alaska, and the West Coast.

Admiral Isoroku Yamamoto, Commander in Chief of Japan's Combined Fleet, was completing plans for "the most elaborate seaborne attack ever conceived by the mind of man." The plan included five separate forces, a total of two hundred ships and 250 aircraft, including eleven battleships, eight carriers, and twenty-three cruisers, all assembled to capture Midway.

To absolutely confirm that AF was in fact the Japanese designation for Midway Rochefort hatched a clever scheme designed to silence the meddlers of OP-

20-G. Knowing that all of Midway's potable water came from a desalination plant Rochefort and Layton with Nimitz's approval on May 19 sent instructions via the undersea cable to Midway. The Midway radio operators were to send an uncoded "flash" message stating that the distillation plant was broken. On May 21 Tokyo Naval Intelligence sent a signal in JN-25 code reporting that "AF Air Unit" had sent a message to Hawaii reporting that it had only two weeks' supply of fresh water and was asking for an immediate resupply. Both Station Hypo and the U. S. Navy's intercept unit in Melbourne, Australia had broken the Japanese signal. The following day Melbourne forwarded the intercept to Washington's OP-20-G with the comment: "This will confirm identity AF." Rochefort, to keep both the Japanese and OP-20-G from learning that it was all a setup, had Layton arrange for Hawaii to send a reply to Midway stating that the supplies were on the way.

In addition Station Hypo finally broke the last facet of JN-25, a separate code-within-a-code used to designate dates. Decrypts revealed that the Japanese air attacks would commence on either June 3 or June 4 and that troopships would arrive on June 6. This information Rochefort disclosed at Nimitz's final staff meeting on May 27. That same day the Japanese changed both their code book and the additive tables for JN-25. The Japanese then imposed a radio silence on the Midway and Aleutian forces. Even though our codebreakers were blacked out Nimitz had all the information he needed.

It is not the purpose of this paper to detail the Battle of Midway. Suffice it to say that its result was to stem the tide of Japanese expansion. From that point on Japan was on the defensive. Yet the battle between Station Hypo and OP-20-G intensified. It became a tug-of-war over who would claim credit for breaking JN-25 and correctly anticipating Japan's plans for Midway. Nimitz forwarded a recommendation to Admiral King that Rochefort be awarded the Distinguished Service Medal. Rochefort strongly advised against it because he said that it would only "make trouble." Redman of OP-20-G was claiming sole credit for the victory at Midway. His brother Captain Joseph R. Redman, Director of Naval

Communications, was conducting a verbal assault on Rochefort when he stated that Station Hypo was, "by virtue of seniority, in the hands of an ex-Japanese language student" who was "not technically trained in Naval Communications." Because of the Redman brothers' underhanded efforts Admiral King denied Rochefort a medal. OP-20-G had simply stolen the credit for Midway! Rochefort requested command of a ship. However, Navy regulations did not permit a cryptanalyst to serve aboard ship because of the concern of capture by the enemy with the possibility of disclosure of secret information. By diligence Rochefort was finally offered the command of a destroyer. Since the destroyer was leaving its West Coast port immediately, Rochefort turned down the command because he had promised his wife he'd take a three-week' leave. Rochefort ended the war in command of a floating dry dock in San Francisco. He never worked in codes again. Nine years after his death in 1985 Lieutenant Commander Joseph J. Rochefort was awarded posthumously the Distinguished Service Medal.

In conclusion may I add a postscript relating to my essay's title: "From A to Z." It was my meager attempt at cryptography by offering a challenge to our illustrious secretary. The title relates to the index of my principal source for the essay, a book titled *"Battle of Wits: The Complete Story of Codebreaking in World War II"* by Stephen Budiansky. "A," the first listing in the index, is the word "Abwehr," the German espionage service. "Z," the last listing in the index, is the term "Zygalski sheets." The term relates to a system devised by Henryk Zygalski, a German cryptographer, for encoding Enigma rotor settings. Enigma was the name of the code machine employed by the German military in World War II.

May I offer one final word. Periodically I receive Bargain Book catalogs that list literally hundreds of books at extraordinary cut rate prices. In browsing one of the catalogs I found *"Battle of Wits"* listed. The brief description intrigued me. I ordered the book through the Internet. The result is an intense interest in the codebreaking efforts of American, British, and Polish cryptographers and associated personnel, literally thousands of people, that more than likely shortened the war considerably, though this cannot be proved decisively.

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Note to readers: The essayist of this paper elected not to include footnote references for ease of reading. The factual information may be verified by reference to the above-listed bibliography publications.

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