

The Navy Tunnel

STATION CAST: Tip of the Lance

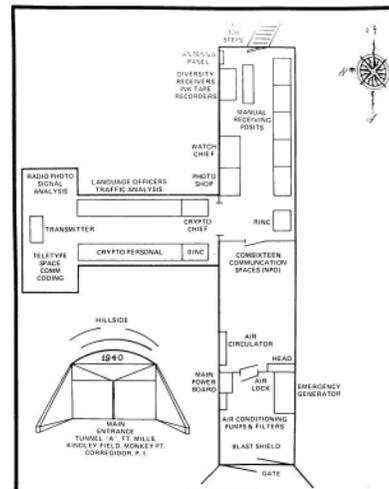
Timothy J. Mucklow

*Hell – I don't need Congressional authorization
to dig a hole in the ground!*

From the beginning, the American sister services competed—often bitterly—for public attention, congressional funding, and service prestige. Nowadays, the public facet of this rivalry manifests itself chiefly in spirited, intercollegiate sporting events such as the Army-Navy football game. Such benign geniality, however, was not always the case. Even as dark storm clouds slowly thickened over the Pacific before World War II, the Navy and Army resisted efforts at cooperation. There was little perceived reason why they should. Our history after all was hardly rich with examples of interservice operations, and few barbarians were at the gate. The notion of “joint” would have to await another day.

By the mid-1920s, the two services had carved out their respective fiefdoms in the now-pacified American territory of the Philippines. The Navy maintained and made good use of its support infrastructures at Olongapo, Cavite, and elsewhere. The Army guarded its control over numerous installations throughout the archipelago—but none did it hold so assiduously as its impregnable island-bastion at the mouth of Manila Bay.¹ Dubbed the “Gibraltar of the Pacific,” Corregidor the citadel was considered a symbol of Army might and pride in the East. The Navy was permitted to look perhaps at the island from its warships as they approached or departed the capital area but little else.

A decade later, as Japan’s military star began its ascent over Asia, relations between the American services had hardly changed. Nonetheless, busy as they were keeping a wary eye on the other, they were not blind to Japan’s furthering its designs of empire. This expansion was a source of



A drawing of the AFIRM tunnel on Corregidor Island that was begun in February 1939.

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¹ Ft. Mills, Corregidor Island, was the centerpiece of the U.S. Army’s defenses of the American Territory of the Philippines. Between 1904 and 1921 vast resources had been expended on insuring its impregnability. More than 9,000 U.S. and Filipino military and civilians lived and worked on the rugged, tadpole-shaped three-mile-long island situated at the mouth of Manila Bay. Advancing technologies and Japanese military tactics later proved Corregidor to be militarily worthless. Its fall in 1942 was a disaster for America’s strategies for defending her Far East possession, not to mention its impact on public morale.

uneasiness for American commercial interests in the Far East and was beginning to pose a threat to the sovereignty of U.S. possessions as well. In light of Japan's appetites, the U.S. military sought to expand its radio intelligence capabilities in the Far East.² As part of its effort to do so, the Army radio intercept personnel established themselves in a portion of their newly constructed tunnel on Corregidor. This final redoubt was an engineering triumph composed of a sophisticated series of galleries, warehouses, shops, hospital facilities, and machinery spaces.³ Burrowed deeply into Malinta Hill (Malinta is a local word meaning "plenty of leeches"), the complex could sustain thousands of soldiers for months in complete safety from an attacking force. Corregidor also offered the Army the finest site in the Pacific for clandestinely intercepting international undersea cable message traffic and for receiving Japanese radio transmissions.⁴ What worked well for the Army in this respect, the Navy later would also reason to be true for itself.

The Navy had tried unsuccessfully for nearly two decades to locate a suitable vantage point in the Philippines from which to track the Japanese military and diplomatic corps. Each attempt, from Los Baños to Olongapo to Marviles and to Cavite, had uncovered serious limitations and ultimately necessitated relocation.⁵ Some sites were geographically ill suited for signals collection. Others suffered noise from adjacent industrial/military facilities, and others yet were too far removed from the military decision makers in Manila. As early as 1933 Adm. Frank Upham, Commander-in-Chief, Asia Fleet (CINCAF), and Asiatic Communications Intelligence Officer, Lt. Joseph Wenger together conceived of placing a listening station in a secure, hardened facility on Corregidor.⁶ The admiral (USNA '93) had had much experience in the Orient, especially with the Japanese, and well appreciated the value that signals intelligence might bring to any future conflict. At his behest, Lieutenant Wenger began the initiative to establish a presence on Corregidor. Success would not be achieved easily, nor would it come quickly.

In February 1934 Navy officials in the Philippines formally approached their Army counterparts about relocating their radio intercept station from Olongapo to Corregidor.⁷ It was the Navy's desire to expedite the move as quickly as possible. Surprisingly, the commanding general of the Philippine Department entirely agreed with Admiral Upham's request.⁸ When the more senior leadership at the War Department learned of the plan, however, they were less kindly disposed to the notion and rescinded the permission. The old seadog Upham was not so easily daunted by the Army's opening salvo and waited for the smoke to clear before raising the issue to a higher echelon. The Chief of Naval Operations (CNO) was asked to take up the matter with the Army

² By 1933, Japan's aggressive economic and military adventures on the Asian mainland were becoming an increasing concern to not only the United States but every other nation that had interests in the area. The British, like the Americans, entertained suspicions about Japan's long-term adherence to the Washington Naval Treaty.

³ The Malinta Tunnel, built between 1922 and 1933, was the final fallback position for U.S. forces in the Far East and played a major role in the overall ORANGE plans. Also, see Capt. Duane L. Whitlock, USN (Ret), "The Silent War Against the Japanese Navy," *Naval War College Review*, Autumn 1995, Vol. XLVIII, No. 4.

⁴ Corregidor provided the best listening post in the Far East. Reception of Japanese radio traffic came in remarkably clearly, and a clandestine tapping of undersea cables that connected Manila with the rest of the world permitted a monitoring of telegraphic traffic. Ronald Lewin, *The American Magic: Codes, Ciphers and the Defeat of Japan* (Penguin Books, 1983).

⁵ Whitlock, "The Silent War Against the Japanese Navy"; Sidney A. Burnett, "Intercept Station "C": From Olongapo through the Evacuation of Corregidor, 1929–1942," *CRYPTOLOG*, Naval Cryptologic Veterans Association, 2; *US Naval Pre-War Radio Intelligence Activities in the Philippine Islands* (aka SRH-180), July 1981, 44, Center for Cryptologic History (CCH) files.

⁶ *Naval Security Group History to World War II* (SRH-355) (PART II), prepared and compiled by Capt. J. S. Holtwick, Jr., USN (Ret), June 1971, Appendix X, CCH Files; Whitlock, "The Silent War."

⁷ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), July 1981, 44, CCH files.

⁸ *Ibid.*

Chief of Staff, General MacArthur. Simply put, the Navy wished to establish a radio intelligence unit on Corregidor and needed—at Navy expense—the Army’s civil engineering services in developing a site.

The CNO’s office took a slightly different tack with the Army and asked to place a radio direction finding station on Caballo Island, Corregidor’s close neighbor.⁹ Hardly a fortnight passed when the War Department tendered a response. The memorandum intimated that there was no real urgency involved and that the Navy might want to select another suitable location. It also pointed to the fact that the Navy already had such a facility in the Philippines.¹⁰ Apparently, the more direct expression “Pound sand!” had not yet entered the Army lexicon.

The U.S. Navy now had to accept two unpleasant realities. One was that the only good location for an Asiatic intercept station was Corregidor and the second was that the Army was loath to share. Since their attempts to gain the Army’s acquiescence had proven unsuccessful, they would just have to try again . . . and perhaps again.

Unbeknownst to the Navy, the Army had drawn up its own plans for a sensitive direction finding station and harbored deep concerns that the proposed Navy facility might interfere with its operations.¹¹ Too, there was principle to be considered. Giving an inch to the Navy would be the same as giving a mile, and with interservice rivalry at stake, the Army wanted no precedents. Furthermore, there were quietly expressed concerns that the Navy’s enlisted personnel might be a corrupting influence on the garrisoned soldiers.¹² In short, the War Department planned on holding its ground on Corregidor.

The Navy for its part was not willing to dip its colors, at least not yet. Lieutenant Wenger, with the support of the new CINCAF, continued to work the problem. If the Navy could not gain a beachhead on Corregidor either directly or via Caballo Island, another approach would have to be taken. Throughout the summer of 1935, the Navy worked with its amenable Army counterparts in the Philippines to garner local-level support for the station. As the months passed, Navy officials at OP-20G in Washington also decided it might be worth another attempt to change the Army’s thinking on the matter by elevating it even further. They had been informed, and it is still not known by whom, that the Army might be softening its hard-line position and that another try might be in order.¹³ Based on this information, the secretary of the navy submitted a request to the secretary of war on November 29, 1935, for the authority to place a Navy radio intercept station and direction finder on Corregidor. This time the Army would have to address the issue seriously and could not blithely dismiss it.

To keep the initiative from stalling in the War Department’s digestive process, the Navy raised the proposal with the Joint Army-Navy Board in the Philippines at a February 1936 meeting.¹⁴ The Navy’s contention, among other well-honed arguments, was that such a facility would enhance the

⁹ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 45, CCH files.

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² *Ibid.*; Burnett, “Intercept Station “C”: From Olongapo through the Evacuation of Corregidor, 1929–1942,” 3.

¹³ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 45, CCH files.

¹⁴ Holtwick, *Naval Security Group History to World War II*, Part I (SRH-355), 188, CCH files.

existing war plans for defending American Far East possessions. The sister-service group was in such agreement with the plan that it selected a site at Monkey Point on Corregidor and forwarded its report. A month later the secretary of war, in a letter to the secretary of the navy, approved the joint report, and in something pointedly short of an authorization to begin digging, recommended the work be accomplished according to Army plans and specifications.¹⁵ Naturally, the Navy would be expected to supply the necessary funds and requirements details as well as attending to the legal concerns. What had caused the Army to reverse itself remains something of a mystery to this day. The fact that it did was to have profound consequences for the course of the Second World War.

The devil, as always, was in the details, and these would have to be addressed if success were to be attained. Too, there persisted the gnawing possibility that the Navy's tunnel on the Army's island might die a quiet, suffocating bureaucratic death were the Army not determined to keep it alive. The defense of far-flung American territories after all was not the nation's highest priority in the middle of the Great Depression.

As the Army nominally stood by to perform its portion of the project, the Navy set about resolving numerous financial, congressional, legal, and international issues. Questions arose as to whether the facility would require congressional approval and/or funding. Would the construction violate provisions of the postwar Washington Naval Treaty?¹⁶ Which Navy organization would champion the tunnel's construction and coordinate with the Army? Other lower hurdles had to be surmounted, not the least of which was identifying and assigning resources. When Rear Adm. Ben Moreell, the newly appointed chief of the Bureau of Docks and Yards, was approached about the Corregidor tunnel project, he enthusiastically remarked, "Hell—I don't need Congressional authorization to dig a hole in the ground! But I will need it before I put up any buildings. If the CNO [Chief of Naval Operations] can get me the funds for the Tunnel I will start it immediately and I will also get the funds for the Quarters and take care of Congressional approval."¹⁷

Three years later in what must have seemed geologic time to the Navy, the secretary of war got around to granting authorization to commence construction.¹⁸ By then Admiral Moreell had proven better than his word. All of the Navy's significant preparatory work had been accomplished. Rather unexpectedly, the Army's civil engineers seemed to share Admiral Moreell's zeal and worked diligently to rein in costs and to make improvements in the plan whenever possible. Mirroring their work on the Malinta Tunnel, the engineers planned on using cheap and plentiful Philippine prison labor.¹⁹ Other economies could be achieved by using condemned munitions. Convicts extracted powder from obsolete ordnance and rolled it in old magazine pages to make the charges. In all respects, lower-echelon Army elements did what they could to assist the Navy in coming ashore.

During February 1939 the prison-labor force camped on the hillside at Monkey Point and began

¹⁵ Ibid.

¹⁶ The Washington Naval Treaty greatly limited the activities of its participating nations. It regulated not only the tonnage of capital ships but other facets of their naval programs as well. Japan withdrew from the treaty in 1936 and pressed full-speed-ahead with its shipbuilding program.

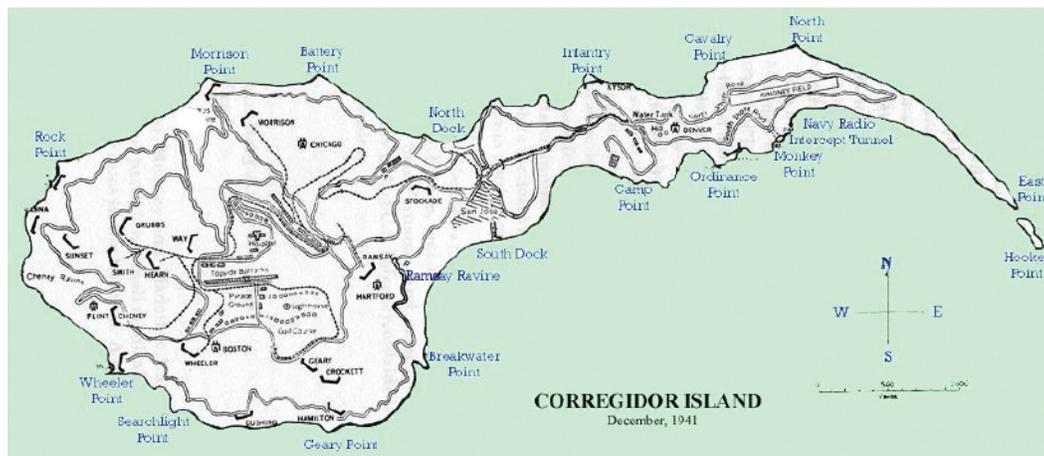
¹⁷ Capt. Laurance F. Safford, USN (Ret), *A Brief History of Communications Intelligence in the United States* (SRH-149), CCH Files. Admiral Moreell, the energetic and visionary engineer, would later become best known with the public for being the "Father of the Seabees."

¹⁸ *US Naval Pre-War Radio Intelligence Activities*, July 1981 (SRH-180), 47, CCH files.

¹⁹ Holtwick, *Naval Security Group History to World War II*, Part I (SRH-355), 193.

work on the tunnel—codenamed Project A[FIRM]. Half a world away Navy financial experts orchestrated their legion of bookkeepers and accountants. Because of the highly secret nature of the effort and because of the complexities of intergovernment agency resourcing, money was transferred from one cost center to another and back again. Occasionally, additional sources of revenue had to be sought to accommodate last-minute requirements and specification changes.²⁰ In those hard times, it could not have been easy for the little men with the green eyeshades to keep the measured tide of funds flowing out to Corregidor. When their resourcefulness failed them at last, they reluctantly had to approach Congress for supplemental funding.²¹ The request was attached to an innocuous appropriations bill that was not likely to receive close scrutiny. No questions were asked, and no explanations were offered. Without the raising of too many eyebrows along the way, the allocation found its way to the president's desk, and the money was paid out by the Treasury.

The sound of drills and blasting at AFIRM had hardly begun when several other high-priority undertakings associated with the intercept/direction finding station vied to attach themselves.²² The Sixteenth Naval District Communications (COMSIXTEEN) staff decided they, too, needed a portion of the space for an emergency command post.²³ Thus, before workers on the shaft had reached the other side of the hill, there already was too much mission and too little hole. Other smaller tunnels (Projects E[ASY] and D[OG]) ultimately had to be bored into Corregidor nearby to satisfy these add-on requirements. In something of a compromise with OP-20G, the COMSIXTEEN Command Post was temporarily assigned a portion of AFIRM's spaces until EASY was completed.²⁴ The Navy went on to construct a large emergency fleet communications center in a series of tunnels collocated with the Army's extant Malinta complex. Mission creep seems to have been every bit as lively then as now, and Monkey Point proved to be the camel's nose that had gotten under the pup tent's flap.



Corregidor Island at the mouth of Manila Bay offered both the Army and Navy the finest site in the orient for clandestine intercepts of Japanese communications.

²⁰ *Ibid.*, 193–94.

²¹ *Ibid.*, 194.

²² *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 58–59, CCH files.

²³ *Ibid.*, 60/Appendix F-1.

²⁴ *Ibid.*, 59–60. Until AFIRM was fully completed, the Army offered the use of some extra cabling and equipment.

The excavation and lining of AFIRM with reinforced concrete was deemed 90 percent complete by late December 1939.²⁵ (That the Portland cement used throughout was imported from Japan was a bit of irony appreciated only much later.) With the Army's responsibilities for AFIRM nearly at an end, Navy planners and engineers faced the task of fitting the tunnel with its mission equipment and internal furnishings. The Army's laborers then turned their attention to building AFIRM's personnel quarters on the ridge above. This phase of the work was codenamed Project C[AST]). Providing the funding for these tropically adapted frame dwellings and their actual construction took nearly as long as the tunnel itself. AFIRM's buff-colored interior paint was nearly dry when the facility was declared ready for emergency operations in August 1940.²⁶ Most of the equipment, including back-up generator, fuel and water tanks, sanitary facilities, and the antenna field topside were in place. Finer details such as steel blast doors, improved lighting, emergency air vents, machinery spare parts, and noise suppression measures for the diesel generator would be applied later.

The station's nearby quarters, CAST, were begun in April 1940 and projected for occupancy in February 1941, but they were sufficiently far along for the men to move in by mid-October. The old intercept station at Cavite ceased operations at 1700 hours on the 15th, and its personnel used the following day to decommission, crate, and move their equipment, classified files, and cipher machines to Corregidor. The logistics of relocating to an island 20 miles distant in two days was no mean feat.²⁷ The station's direction finding mission remained at Cavite for a while until its new tunnel site near AFIRM was readied. Station "C," or CAST as it was to be known to some, became operational at 1700 hours on October 17, 1940. With a suite of the most advanced intercept radios and equipment, the 8 officers and 60 enlisted men continued their signals analysis and cryptanalytical work that would alter the course of a war not yet begun. Incongruously, two handball courts had been placed on a flat area 50 paces from the tunnel's entrance.²⁸

Physically, the Navy tunnel's primary drift was driven through the hill atop Monkey Point from the south-southwest to the north-northwest with openings at either end. About 12 feet wide and nearly as high, it stretched nearly 220 feet in length. The first 60 or so feet in from the main entrance at the south-southwest side of the hill was used for the storage of provisions and series of three-tiered emergency bunks. Farther along the passage was an area partitioned on either side for the auxiliary diesel engines and machinery, including the large air-conditioning units needed to cool the vacuum tube technology. Beyond that was an air lock followed by a "temporary" command post for the Sixteenth Naval District communicators. The same area included 70-foot-plus vertical conduits reaching to the surface. These serviced the auxiliary diesel generator and air-conditioning systems.²⁹

At something close to the midway point in the tunnel was a second, equally proportioned lateral branching off to the left that extended some 160 feet to a third entrance on the north-northwest side of Monkey

²⁵ Ibid., 51.

²⁶ Ibid., 54.

²⁷ Not all of the mission equipment from Cavite was moved in October 1940. The direction finding equipment and some of the CI radios remained and were moved incrementally. Even so, decommissioning, crating, and moving the equipment was a major undertaking for the small staff. The direction finding equipment did not find its way to a specially designed tunnel on Corregidor until the end of February 1942. See *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 69, CCH files.

²⁸ The handball court was installed at the behest of one of the CAST officers who was an avid player. Official documents collected after the war referred to a tennis court and a handball court. The oral accounts from CAST veterans allude only to a handball court. The concrete portion of the court is the only facet of AFIRM/CAST that was not ruined in the course of the war. The officer/enlisted quarters (CAST) were destroyed by Japanese bombardments between January and May 1942.

²⁹ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 56, CCH files; Duane Whitlock, USN (Ret), *Station C- Corregidor as I Remember It*, http://corregidor.org/chs_whitlock/station_c.htm.

Point.³⁰ Sixty feet along this tunnel was another lateral tunnel, some 60 feet in length, 25 on either side, that housed office and workspaces for the duty section linguists and traffic analysts. The most sensitive mission equipment like the RED and PURPLE machines and the IBM equipment were also to be found in this space. The remainder of the Navy tunnel was entirely filled with electronic mission equipment, a photographic laboratory, emergency supplies, auxiliary machinery, and fuel and water tanks.

Although the Navy tunnel was neither as commodious nor as elaborate as its Army counterpart nearly a mile away, Station CAST was situated at a higher elevation and offered a greater degree of habitability. The unceasing din from electrical generators, water pumps, and air handling systems that preyed on the nerves of the occupants of the Army's tunnel had been addressed by Navy engineers. The Navy tunnel was comparatively better ventilated, less humid, and quieter—all due to lessons learned from the construction of Malinta. Making Army personnel all the more envious, Station CAST's surface billeting offered better quarters and amenities (translated *fewer mosquitoes*)—not to mention a panoramic coastline vista and more regular breezes.³¹ The latter was especially appreciated in the pre-air-conditioner Philippines. Just how badly Army morale and morality suffered from the corrupting influence of sailor-cryptologists remains a topic open to debate.

STATION CAST MISSION EQUIPMENT LISTING – July 1941

Equipment	Number
RAA (Rate Allocation Algorithm) -1 LF Receiver (10-1000 kHz)	3
RAE (Royal Aircraft Establishment) Diversity Receiver (1000-30000 kHz)	1
RIP (Radio Intelligence Publication) (Typewriter) 5	21
RAO HF Receiver (540-3000 kHz)	11
NC-110 SHF Receiver (30-300 kHz)	1
DT-1 HFDF Unit (2-30 MHz)	2
Boehme Recorder	3
Boehme Tape Pullers	6
High-Speed Camera	1
Electron Oscillograph	2
NC-100 HF Receiver (540-30000 kHz)	1
RAS HF Receiver (190-30000 kHz)	6
DY HFDF Unit (540-30000 kHz)	1
HRO Receiver	1
RAK-2/RAL-2 Receiving Equipment	1
Generator (62.5 KVA)	1
RME (Radio Manufacturing Engineers) Receiver	4
Hallicrafter SX-25 Receiver	2
Meissner "Traffic Master" Receiver	2
RME DB-20 Preselector	11

³⁰ Appendix F-1 of SRH-180 provides a diagram of AFIRM, but this illustration drawn from memory after the war does not indicate a third entrance on the north-northwest side. SRH-180, however, does allude to an expansion of the tunnel. A 1990s-era survey of the ruined AFIRM site clearly shows an extension to the lateral with its own entrance. Captain Whitlock also made a passing reference to the third entrance but made no mention of the tunnel's undergoing modifications.

³¹ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 56, CCH files; Don Abbott, "The Navy Intercept Tunnel at Monkey Point (Station "C")."

AFIRM publicly was assigned the name “Navy Emergency Radio Station” as a cover for its true purpose. Its purported, published mission was providing redundant communications service to U.S. ships and conducting fleet radio reception research. Its other touted responsibility was to maintain backup communication and navigational services for Pan American Airways, whose flying boats offered a critical link from Hawaii and the west coast. Whether by studied design or by careless oversight, however, the secret facility came to be identified on Army topographical maps as U.S. Navy Intercept Tunnel.³² So much for the Kabuki-esque exercise in OPSEC.

Radio reception on Corregidor proved even better than Lieutenant Wenger originally had argued and seemed to vindicate the Navy’s persistence in gaining a toehold on the island.³³ From the onset CAST, along with the less powerful facilities at Station B[AKER] on Guam, Station A[BLE] at Shanghai, and Station H[ypo] on Hawaii, was able to copy and glean much valuable information from Japanese military and diplomatic traffic. The new station had been operational less than two months when its mission expanded again. Station A was becoming untenable. Collocated with the American consulate at Shanghai, the facility there offered Station A little in the way of physical security. Given the growing Japanese presence in the city, the risk of the compromise of 17 years of cryptologic successes was no longer acceptable. The Navy collection mission in China, therefore, was transferred to CAST on December 10, 1940.³⁴ A week later the men and equipment arrived from Shanghai to augment CAST’s complement. It came again as something of an agreeable surprise that CAST’s coverage of Station A’s Japanese military targets was every bit as good as it had been from Shanghai. The Japanese diplomatic targets came in even more clearly. Far less agreeable was that there were now 87 officers and men assigned to CAST, making the work spaces even hotter and more congested.³⁵

Proving the old adage that when it rains it pours, the underground facility had to absorb even more bodies and machines. At the end of February 1941, CAST picked up the mission of monitoring the Berlin-Tokyo circuits, which heretofore had been accomplished from Guam. This realignment had much to do with the fact that CAST had the only PURPLE machine in the Pacific. Then in June came the arrival of a number of IBM machines to assist the analysts.³⁶ Among these were a Type 405 alphabetical tabulator, a Type 075 sorter, a Type 035 punch, and a Type 513 reproducing gang. There is never a cool, much less low-humidity, day on Corregidor, and the additional seven tons of heat-generating vacuum-tube equipment made shift work in the tunnel nearly unendurable—and the shooting had not even begun.

The additional personnel and equipment produced a greater volume of intercept traffic and analysis, and the problem of getting this information to Guam or



The Electronic Cipher Machine (ECM) Mark II came into use at Station CAST in July 1941.

³² Ibid.; *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 52, CCH files.

³³ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 55, CCH files.

³⁴ Ibid., 58.

³⁵ Ibid., 59; Whitlock, “Station C- Corregidor as I Remember It.”

³⁶ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), July 1981, 55–61, CCH files.

Washington proved to be a mounting problem. The new Electronic Cipher Machine (ECM) Mark II (known as SIGABA to the Army) came into use at CAST in July 1941. It, along with the ECM Mark I used for overloads, provided secure communications to the other sites.³⁷ Still, the ECM Mark II did not yet enjoy the total confidence of the intelligence community, and the most sensitive reports and progress against the Japanese systems had to be handled another way.

Initially CAST and ABLE had microfilmed all output and forwarded it via lockbox, hand-carried to scheduled Pan American Clipper aircraft. Experience soon proved this very secure method to be too cumbersome and too slow to meet the need. As an improvement, documents were typed onto onionskin paper and forwarded via registered airmail at an extravagant \$2.50/lb. The packages were delivered directly to the Clippers to avoid the Philippine Post Office. Red-pencil-wielding government auditors at the time no doubt grumbled at this extravagant practice. Officials at OP-20G, more concerned with timeliness than cost, continued to seek a more expedient means of getting information from Corregidor. The logistical problem resolved itself when CAST began producing daily reports in the late summer of 1941. Air freighting and China Clippers were out of the question, and the decision was made to use the updated ECMs.³⁸

The problem of handling intelligence information was not limited to just long-distance communications. Station CAST quite regularly translated a variety of intercepted Japanese messages collected by the Army. Getting the classified documents out to Corregidor and the finished product back to the commanding general in Manila entailed a process of from two to four days. The Army employed a similar process to and from its Malinta Tunnel facilities. In July 1941, with war so close on the breeze, the Army and Navy mutually accepted that redundancies could not be afforded. To this end they worked out an agreement by which the Army would focus on the collection of Japanese PURPLE traffic, and the Navy would process it. This division of labor was an improvement, but it still took far too long to get critical intelligence to the desks of those who were to act on it. When the Army finally had to retreat from Manila to the Malinta Tunnel, the turn-around time was almost sprightly.³⁹ By then it hardly mattered.

Nine hours after the Japanese struck Pearl Harbor on December 7, 1941, they attacked American military installations in the Philippines Station as well. CAST was among these. Japanese pilots mistook the handball courts for a fuel storage tank and rained 1,000-kg bombs onto the tunnel and the adjacent area.⁴⁰ This incident seems to bear out Churchill's contention that "In war, nothing ever goes according to plan except occasionally, and then by accident." Still, other than producing some slight vibrations in the tunnel below, the attack served only to disable one of the antennas topside and to vex the handball courts. This damage was soon put to rights.⁴¹ The Filipino convicts had done their work well; operations inside continued unabated. The same could not be said of the overall defense of the Philippines. The staggering loss of American air and sea

³⁷ Ibid., 63.

³⁸ Ibid.

³⁹ Burnett, "Corregidor Was Not All That Good"; Howard W. Brown, *The Reminiscences of Lieutenant Colonel Howard W. Brown*, Signal Security Agency, August 4, 1945 (SRH-045), 12.

⁴⁰ The Japanese launched a devastating attack against Clark Field near Manila and other targets less than nine hours after their surprise raid on Pearl Harbor. Having broken the back of American air power in the Far East, Japan was free to extend its southward expansion. The December attacks had no significant impact on CAST's operations. Later in February and March, some of the antennas sustained heavy damage, but repairs and work-arounds permitted continued operations. See Holtwick, *Naval Security Group History to World War II*, 112, CCH Files; *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 66/73, CCH files.

⁴¹ Ibid.

power left the ground forces powerless to resist the Japanese juggernaut. By the end of January 1942, the Japanese army had advanced across Luzon, and the capitulation of the entire American Territory was a certainty. Corregidor, the island fortress, nevertheless, was ordered to be held as long as possible.

Until Corregidor was overrun, it was decided that life should go on in one fashion or other, and CAST's commander saw to it that operational efforts were redoubled. As a concession to the new realities imposed by war, though, he ordered his personnel to henceforth sleep in the tunnel. The men complied at first, the thought of being dashed to atoms being what it was. After several nights of heat, noise, and crowded conditions within, most decided to share their lot with the insects and sleep outside near the entrance in bunks hauled down from their quarters.⁴² The men continued to shower and mess at their surface quarters until these facilities became untenable. When the air raid sirens sounded or with the first salvo of artillery fire from the mainland, they sought shelter in the hill. At one point the cryptologists manhandled the cook stove down from the galley and took their meager meals near the handball courts. Always cramped and forever hot, CAST was hardly a model of creature comfort. Even so it was still preferable to conditions at Malinta Hill, which had become a teeming refuge for more than 4,000 military personnel and civilians.⁴³



The Japanese overran U.S. installations in the Philippines soon after the attack on Pearl Harbor. The handball court remains, marking the general area of the Navy tunnel.

The Japanese heavy guns wrought most of the destruction to Corregidor. Coming with more frequency and intensity than the air attacks, their artillerymen set about methodically to reduce the island's defenses to rubble. More than one round found its way to AFIRM, but no damage of consequence was sustained. The men at CAST were most affected by the occasional disruption of electrical and fresh water service that also plagued other sites around Corregidor. Until repairs could be made, CAST had to rely on its emergency diesel generator and haul water from the Malinta tunnel. As the tempo of attacks increased, CAST relied more and more on the generator. Transporting food and supplies became a hazardous undertaking because no one knew when the Japanese would commence their firing. Ironically, CAST's only fatality came in January as the result of a tractor accident during one of the watering sorties.⁴⁴

As the military situation in the Philippines deteriorated for the American forces, the Navy's leadership in Washington became increasingly concerned over the impending fall of Corregidor.

⁴² *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 72; Holtwick, *Naval Security Group History to World War II*, 112.

⁴³ At one point 156 men occupied the tunnel. This included personnel from all of the missions assigned to AFIRM. It did not include the Army personnel who occasionally sought escape from bombing and shelling. See *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 72, CCH files.

⁴⁴ The accidental death of YN3 Kenneth Grisham came as he was hauling water from the Malinta Tunnel to AFIRM. For reasons never fully explained, the tractor went over a cliff, crushing the driver. Grisham was buried in a temporary grave nearby. See *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 65, CCH files; Whitlock, "Station C - Corregidor as I Remember It."

Their messages to the beleaguered station assured the men that the Navy would make every effort to spare them from capture.⁴⁵ In spite of these promises, the sailors knew there was little chance of a relief expedition, and their knowledge of the treatment accorded Japanese captives was already understood. The real question was whether they would live long enough to become prisoners of war. Each man was assigned a battle station for the long-awaited Japanese frontal assault. Some were detailed to defend the small beach below Monkey Point with WWI-era “tin” hats and old Enfield and Springfield rifles. Others were to man light machine-gun positions higher up the hill. Plans called for yet another party to defend the entrance to the tunnel while their comrades destroyed what little of value remained inside.⁴⁶

The men at CAST well understood their criticality to the war effort, and, too, they well understood the consequences of their capture and compromise of the secrets they held. The outcome of the Pacific war might well hang in the balance. This knowledge did little to calm their imaginations. While the Americans made preparations for their enemy’s imminent arrival, encoded messages to CAST’s commander, Lt. (Honest) John Lietwiler, emphasized that every means must be taken to insure that neither the men nor the equipment were to be taken by the Japanese.⁴⁷ The meaning was sufficiently clear. As the days passed and operations increased all the more, the men quietly became aware that several officers were making contingency plans to ensure that none of them would be subjected to Japanese interrogation methods. It was one of those instances when the good news and the bad news was the same news.

By the first week in January 1942, the cryptologists had burned their extensive library of classified manuals and files and had destroyed their sensitive equipment, excepting that needed for minimal operations. Even with much of their equipment smashed and consigned to deep water, CAST continued to produce a stream of good intelligence. Traffic analysis alone had produced the Japanese order of battle information and even intentions. On one occasion it had also revealed the presence of a Japanese convoy in Subic Bay to the north. Acting on this information, General Wainwright mustered what little air power he had remaining to sink or otherwise maul the troop carriers and cargo ships waiting in the roadstead.⁴⁸ This success did not appreciably slow the enemy onslaught, but it did lessen his sense of invulnerability.

One morning in early February, those coming off their night shift in the tunnel discovered that nearly a third of their fellows—3 officers and 14 enlisted men—had disappeared without a trace or sign of struggle. Their clothes and belongings were left untouched, and the men sleeping next to them had not been awakened during the night. How and why the missing had been culled from the ranks, not to mention the nature of their fates, led to rumors and tight-lipped speculation. That several of the officers had exchanged knowing looks was hardly reassuring.⁴⁹

⁴⁵ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 65, 67, and 69, CCH files; Holtwick, *Naval Security Group History to World War II*.

⁴⁶ Holtwick, *Naval Security Group History to World War II* (Part I) (SRH-355), 112, CCH Files.; Holtwick, *Naval Security Group History to World War II* (PART II) (SRH-355), June 1971, Appendix E, CCH Files.

⁴⁷ Holtwick, *Naval Security Group History to World War II* (SRH-355) (PART II), 110–111, 115, CCH files.

⁴⁸ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), CCH files; Holtwick, *Naval Security Group History to World War II* (PART II) (SRH-355), 112.

⁴⁹ Vince Chamberlain, “Corregidor, The Final Days,” at <http://www.usncva.org/clog/corregidor.html>; *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 70, CCH files; Burnett, “Corregidor Was Not All That Good.”

In the days that followed, the diminished numbers continued to carry on their important work with a sense of urgency befitting their circumstance. The long hours in the tunnel, nevertheless, began to take their toll, and Lieutenant Lietwiler had to make some difficult decisions. One of these was that not all missions could be accomplished. After consulting with OP-20G in Washington, they dropped their monitoring of Japanese diplomatic circuits in exchange for assisting the Army with more urgently needed local support.⁵⁰ Besides scanning the skies for approaching enemy aircraft and forwarding the warning to the Malinta Tunnel, the Navy's linguists translated documents captured on the mainland. Much time was expended on this work at the expense of collected radio traffic. Unfortunately, the materials such as diaries, maps, and personal documents offered little actionable intelligence. In spite of the manpower expended on their behalf, the Army expressed dissatisfaction with CAST's support and complained to OP-20G back in Washington.⁵¹

With bombs and shells dropping around them, CAST had stopped its usual practice of providing the Army with general situation and fleet movements data obtained by the unit. This was occasioned "due to a lack of security awareness on the part of the Army." Three months earlier CAST had forwarded to Army HQ at Manila a copy of an intercepted Japanese diplomatic message. Soon thereafter, Lieutenant Lietwiler had overheard its contents being openly discussed on Corregidor's golf course. Just how widely this information had been disseminated, the lieutenant could only guess.⁵² That the Army did not seem to be able to keep secrets was an old source of interservice irritation and remained a serious ongoing issue for the Navy. The final straw involved an incident that promised to compromise the Navy's radio intelligence work. In January CAST had passed along to the Army information concerning the scheduled arrival of a Japanese convoy at the former U.S. Navy base at Olongapo. Soon afterward, the Japanese commander in Manila urgently changed the convoy's orders that resulted in the convoy's safe arrival in Lingayen. This OPSEC failure was traced back to a U.S. Army radio transmission. Lieutenant Lietwiler was convinced that further security breaches might well cause the Japanese to change their code books.⁵³ Had this occurred, almost certainly war in the Pacific would have been far different, not to mention being far bloodier for all of the combatants.

February 1942 was not good month for the American forces in their Territory of the Philippines. Thousands of U.S. and Filipino troops had been killed, wounded, or captured, and the prospect for the future was bleaker still. Even the most optimistic had to admit that resisting the Japanese Army would buy only weeks before Luzon fell entirely. Yet, this was one of the most productive periods at CAST. In spite of heavy bombardments, endless hours of confinement in the tunnel, and mind-dulling fatigue, the cryptanalysts, translators, direction finding personnel, signals analysts, and yeomen at CAST trooped on. Their work over the next three months resulted in intelligence breakthroughs, which were shared with their sister stations, and provided the foundations for the American survival at the Battle of Coral Sea and the later triumph at the Battle of Midway.⁵⁴

On March 16 activities at Station CAST became even more focused and concentrated when 36 of the remaining 57 CAST personnel were spirited off the island under cover of darkness by an-

⁵⁰ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), July 1981, 67–68, CCH files.

⁵¹ *Ibid.*, 68.

⁵² *Ibid.*

⁵³ *Ibid.*

⁵⁴ Whitlock, "The Silent War."

other awaiting submarine.⁵⁵ Abandoned clothes again were consigned to the lucky bag and the cigarettes entrusted to a chief petty officer for rationing. Morale began to run all the lower a few days later when the Japanese tightened their blockade of Manila Bay. By then their daily rations had been reduced to a starvation diet of 30 ounces of rice and beans a day—if they could get it. This, combined with ceaseless duty in the clammy tunnel, left the group too tired and too hungry to linger on personal thoughts. Most of the men lost from 20 to 40 pounds—and these were the already-lean children of the Great Depression.⁵⁶ Heat, anxiety, malnutrition, and vitamin deficiencies had bestowed on several what was to later become known as the “Corregidor Stare.” The only course of action for the 21 was to dig in, pull their duty in the tunnel, listen to the incessant bombardment of Bataan, and wait. It was now a matter of when.

Shortly before the fall of Corregidor, a long series of messages was intercepted for which only a small portion of the key had been recovered. By then CAST’s best cryptanalysts had made good their escape to Australia, and Lieutenant Lietwiler found himself in a tight situation. He sensed that this particular traffic might be especially significant and warranted particular attention. His only hope was to appeal to Station NEGAT in Washington where they had a number of analysts available. NEGAT responded that it had priorities of its own and could not help.⁵⁷ Lieutenant Lietwiler, therefore, had to summon what analytical skills he possessed and worked for 36 hours to make what sense he could of it. He turned out to be a better analyst than he or anyone else suspected. Between his efforts and those of Lieutenant Rufus Taylor, a Japanese linguist, they were able to learn that a task force was headed for the Indian Ocean.⁵⁸ This information was forwarded to the British, who withdrew their vulnerable naval assets in the area.

Around 20:00 on April 8 the telephone rang in the code room. A few moments later Lieutenant Lietwiler dryly explained to his men that transportation would soon arrive and that they must be prepared to leave in 15 minutes! Insufficient time remained to destroy, much less to consider taking with them the seven and a half tons of carefully crated IBM machinery.⁵⁹ Not surprisingly, the sailors rallied around the stake-bodied truck—with time to spare—and were whisked to North Dock and an awaiting motorboat. For the next hour, they vainly searched the Bataan coast for a submarine. Finding such a vessel would have been impossible

⁵⁵ *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 72, CCH files.

⁵⁶ Chamberlain, “Corregidor, The Final Days,” 1992; Whitlock, “Station C” - Corregidor as I Remember It.” In an oral history interview, Captain Whitlock mentioned that CMM J. W. Lowery was said to have lost the most weight.

⁵⁷ Chamberlain, “Corregidor, The Final Days,” 1992; Whitlock, USN (Ret), “The Silent War.”

⁵⁸ Chamberlain “Corregidor, the Final Days,” 1992; Whitlock, “The Silent War”; *Cryptologic Almanac* submission, May 6, 1994.

⁵⁹ The IBM equipment proved to be of inordinate value to the analysts during their tenure at AFIRM. Before the war began, IBM technicians from Cavite maintained the suite of equipment, but after December 10 CAST was able to get Ensign Ralph E. Cook assigned to the unit. Cook, who had some IBM experience before the war, took over their maintenance thereafter. In January 1942 he carefully disassembled and crated the seven-and-a-half tons of equipment. From planks wrenched from their bungalow on the ridge, he made dozens of boxes small enough to be accommodated through a submarine’s hatch. Because of the suddenness of departure of the AFIRM personnel, on April 8, the IBM equipment had to be abandoned where it lay in the tunnel. In due course the Japanese recognized its value and shipped it to Tokyo. There, an IBM technician retrieved from a concentration camp took more than a year trying to reassemble it—making as long a process of it as he could. In the end, the Japanese were not able to use it. Ensign Cook, when he disassembled the machines, had cut the wire bundles and numbered the individual wires randomly so that no one but himself could easily put them in working order. Cook retired from government service as a rear admiral and Commander, Naval Security Group Command. See *US Naval Pre-War Radio Intelligence Activities* (SRH-180), 62, CCH files; Burnett, “Intercept Station “C””; Holtwick, *Naval Security Group History to World War II* (PART I) (SRH-355), 111, CCH Files.

had it not been for lethal fireworks illuminating the night sky on both sides of the strait. They stumbled onto the USS *Seadragon* as it completed offloading emergency stores to a minesweeper alongside. Possessing only the clothes on their backs, they saw the remainder of their classified equipment safely stowed aboard the submarine. Then, they went below. Ten minutes later their boat slipped beneath the dark Pa-



U.S.S. SEADRAGON-SS194
FULL LENGTH, POW VIEW
PROVINCETOWN, MASS.
28 AUG. 1939

On April 8, 1942, the submarine USS *Seadragon* rescued the remaining 21 men from Station CAST and what classified equipment they could save.

cific waves. The time was 21:20.⁶⁰ Forty minutes later they learned that 76,000 American and Filipino soldiers on Bataan had just surrendered to the Imperial Japanese Army. Death, disease, and slave-labor camps awaited the vanquished.

Corregidor remarkably held out for another month, and AFIRM was abandoned to the victors on May 6. To what use the Japanese put the tunnel over the next three years is not certain. That it was used to store munitions in 1945 goes unquestioned. By February of that year, Japan's Rising Sun was setting. The Americans had retaken much of Luzon and were looking to seize back their symbolic fortress Corregidor. On the morning of the 26th, Army paratroopers had that task well in hand when a violent explosion felt all over the island erupted from the vicinity of Monkey Point. The blast stripped all vegetation and soil from in front of AFIRM's entrances, and a nearby 35-ton Army tank was hurled into the air, killing all but one of its occupants. Thirty other U.S. soldiers were killed outright, and another 125 were wounded. When the smoke and dust dissipated around the ruined tunnel, the surviving American soldiers stood there in silence, stunned by what they had just experienced. Whether this cataclysm resulted from suicidal Japanese troops seeking an honorable exit or from the muzzle of the army tank may never be known.⁶¹

⁶⁰ Holtwick, *Naval Security Group History to World War II (PART I)*, 116, CCH Files; Chamberlain, "Corregidor, the Final Days," 72.

⁶¹ *Ibid.*

The last of Station CAST's men in due course joined the rest of their comrades who had already recommenced operations in Melbourne. In no small measure did their contributions serve to help liberate the Philippines and free their surviving brothers-in-arms. Their efforts doubtlessly saved the lives of tens of thousands of other soldiers, sailors, and marines who returned home to their families to quietly live out their lives. Of the 21 who escaped Corregidor that night in April 1942, one advanced to the rank of rear admiral and became the commander of the Naval Security Group. Another retired from active duty with the rank of vice admiral as the deputy director of the Central Intelligence Agency. Fictionalized accounts of the submarine *USS Seadragon* were later made into two major movies.⁶²

Seven decades of solitude have now brooded over the battered ghosts of Corregidor. Tropical vegetation has overtaken the handball court on Monkey Point, and the few remaining vestiges of Project AFIRM can be located only with the assistance of a local guide.

Photo credits: AFIRM tunnel drawing, <http://www.usncva.org>; Corregidor map and handball court, www.corregidor.org; ECM Mark II cipher machine, National Security Agency Center for Cryptologic History Museum; Submarine *Seadragon*, National Archives, 19-N-20953.

⁶² Ens. Ralph E. Cook retired with the rank of rear admiral as Commander, Naval Security Group Command. Lt. Rufus L. Taylor later became the Director of Naval Intelligence. He retired with the rank of vice admiral as deputy director, Central Intelligence Agency. The *USS Seadragon* survived the war with an impressive record and was later broken up for scrap. She lived on in two fictionalized movies, *Operation Petticoat* and *Destination Tokyo*.