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Station "C" and Fleet Radio Unit Melbourne (FRUMEL) Revisited

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The following article is a presentation made by Captain Whitlock at the third annual Cryptologic History Symposium at NSA on 28 October 1992.

I have been asked to share with you my recollections of the role that the Navy's Station "C" played in producing radio intelligence just before and shortly after it was evacuated from the Philippines to Australia in the early months of 1942. To do that most meaningfully, I must roll back some seventy years of cryptologic history to explain why there ever was a Station "C" in the Philippines and how it came to be situated on the island of Corregidor. Corregidor, as a few of you may not know, is the largest of several rocks in the entrance to Manila Bay about the size of Gibraltar and about as inviting as Alcatraz. To the U.S. Army in the Philippines – including, I suspect, General Douglas MacArthur – we Navy types were unwanted and unwelcome guests on their island fortress, so not surprisingly, our intercept and processing tunnel was drilled into a small hill in the remotest possible piece of jungle still remaining on the island. In deference to the most populous denizens living there, including a few enormous lizards and a boa constrictor or two, the site was known formally as Monkey Point. Certainly it was not by chance that we found ourselves isolated physically, professionally, and socially from the Army garrison that populated the rest of Fort Mills. Several of us, I might add, were also isolated financially because the cost of evacuating Navy dependents from the Philippines on the cruise ship *Monterey* in November 1940 was taken out of our meager pay, and we could ill afford the eight-hour round trip ferry ride to Manila. The ride was free, but Manila wasn't!

So far as I was concerned, being on the day watch as a traffic analyst, I obtained most of my diversion by returning to the tunnel in my off-duty hours to assist in the cryptanalytic attack on JN-25, which was the short title for the Japanese Navy's general operating code. This experience gave me a great deal of preliminary insight into the comparative strength and weaknesses of traffic analysis and cryptanalysis and the characteristics of the intelligence potentiality of these two complementary disciplines. Having thus worked both sides of the radio intelligence game, I acquired the knowledge and now have the obligation to reconstruct for you an aspect of cryptologic history that I know best and that is still poorly understood and grossly unappreciated. I refer to the role that traffic analysis played in providing the continuous warp through which the fibers of cryptanalysis were drawn from the very outset of cryptologic history in the Pacific theater. That history has its origin in the impromptu and originally uncoordinated efforts of

several enterprising enlisted Navy and Marine Corps radio operators on the Asiatic Station who taught themselves how to intercept Japanese Navy radio messages transmitted in the telegraphic equivalent of the Japanese phonetic alphabet known as *kata kana*.

The *kata kana* syllabary is nearly twice as long as the English alphabet, and the ability to master the fifty different dot-and-dash combinations equivalent to that syllabary escaped either the ambition or the skill of all but a precious few of the U.S. radio operators on the China Station at that time. By the mid-1920s, the unenciphered *kata kana* messages intercepted by these few self-trained operators had been used to develop a very respectable order of battle for the entire Japanese Navy as well as the radio networks and communications procedure serving that order of battle. Most if not all of this work was accomplished on the China Station, apparently with the input of one or two Japanese linguists and without benefit of any significant cryptanalysis. Station "A," which was established in Shanghai in 1924, may have been the scene of this innovative effort, but wherever or however it was done, the accomplishment so impressed the admiral on the scene he informed the Navy Department that the peculiar situation of the Asiatic Fleet rendered most important the development of a radio intelligence service. Thus prompted, the Navy began carefully selecting a few top-notch radio operators out of the U.S. Fleet to train them in the art of writing and intercepting *kata kana*. This training took place in Washington, D.C., on the roof of one of the wings of the old Navy Department building on Constitution Avenue. It concentrated primarily upon developing intercept skills and offered no significant training in the field of analysis. Graduates of this course eventually became known as the "On-the-Roof Gang." I am obliged to confess I was one of those "Gangsters," and that sobriquet was not entirely unearned because in the early days we often had to beg, borrow, or steal some of the crucial supplies we needed to get on with the job.

Eight graduates of the first two classes of this course were sent to Guam to set up an intercept station under the tutelage of one of the original self-trained operators. Being the second of its kind, the station was designated Station "B." In 1930, this station alone brought to light the fact that the Japanese Navy was engaged in an exercise of unprecedented scope and complexity. As it turned out, these maneuvers had entailed the complete mobilization of the Japanese Navy, including the activation of all of the ships and personnel on the reserve list. It was carried out with such secrecy that neither the U.S naval attaché in Tokyo nor the Navy Department in Washington, D.C., received any hint that anything unusual was taking place. Months later, when the Navy cryptanalysts back in the Navy Department were finally able to decrypt some of the messages intercepted on Guam, it became evident that the 1930 Grand Maneuvers of the so-called "Orange" Navy had been a full-scale dress rehearsal of the Japanese Navy's plans for supporting the invasion of Manchuria, which took place the following year. Had it not been for the nine enlisted intercept operators on Guam, the Japanese would probably have carried off this Grand Maneuver without naval authorities on this side of the ocean ever being the wiser.

Alerted to the early warning potential of such units as the one on Guam, it was decided to test the scope and the accuracy of information that could be derived from Japanese Navy communications by methods short of cryptanalysis. Accordingly, the radio intelligence officer then on the staff of Commander in Chief, Asiatic Fleet, Lieutenant J.N. Wenger, was given the task of conducting such a test. In the meantime, a third intercept station, Station "C," had been established at Olongapo in the Philippines, just a little too late in 1930 to be involved in the detection of the 1930 Grand Maneuvers. Because Japanese Grand Maneuvers had occurred in 1927 and again in 1930, it was presumed that the next one might occur in 1933. Against that prospect, Lieutenant Wenger aboard the Asiatic Fleet flagship arranged to receive "spot reports" by radio from Stations A, B, and C and from one or two temporary sites. By mail he planned to receive a copy of the intercepted messages and operator's log sheets from all of these various units. The Maneuvers came off as expected; all material was sent to Lieutenant Wenger as planned, and after receiving it, he spent the next six months performing post-facto traffic analysis. His report was sent back to Washington, where it took the small cryptanalytic staff laboring there another three years to confirm in depth the general accuracy of the comprehensive report produced by Lieutenant Wenger.

Not waiting for that assessment, CinC Asiatic Fleet, Admiral Upham, was so impressed with Lieutenant Wenger's work that he immediately made a strong representation to Washington for the establishment of a radio intelligence production center within the sphere of his command. Specifically, he recommended that one intercept unit complete with a decryption center be located in the Ultimate Defense Area of Manila Bay, to be so staffed with intercept operators and cryptanalysts as to conduct intercept activities with the mission of preventing surprise attack. This recommendation is of great historical significance for two reasons: (1) it was undoubtedly the first time that a requirement for COMINT direct support was ever levied by a military commander, and (2) it marked the beginning of a trend in the U.S. Navy to amend the long-standing doctrine of warfare that holds that the military commander should always be guided by an estimate of enemy capabilities, never by an estimate of enemy intent. It was a willingness to meld capabilities with intent that allowed Admiral Hart in the early days of World War II to largely nullify the effects of surprise attack on his Asiatic Fleet, and somewhat later awarded Admiral Nimitz his victories in the Battles of Coral Sea and Midway. General MacArthur, unfortunately, was not so disposed, and, as a result, he suffered in the Philippines the loss of virtually all of the Army aircraft under his command. Until after the Battle of the Coral Sea, we had difficulty getting our estimates of Japanese intent past his intelligence officer, one Colonel Willoughby, who was a staunch doctrinarian. I could elaborate on this subject from personal experience, but my allotted time today does not permit me to do so.

Admiral Upham, when he was relieved as CinC Asiatic Fleet, was ordered to duties on the General Board in Washington, D.C., where he finally persuaded the Chief of Staff of the Army to let the Navy construct an intercept and processing tunnel on Corregidor over the objections of the Army commander on the scene. It was this tunnel that was housing

the eleven officers and sixty-one enlisted men who manned Station "C" at the time of the Japanese attack on Pearl Harbor. Two of the officers were occupied mainly with the administration of the unit; four were Japanese linguists engaged in various subsidiary tasks when their services were not otherwise required for book breaking, translation, or interrogation; four were junior officers employed almost exclusively as code clerks in additive recovery; and one junior officer specialized in IBM machine applications. None of the officers had a useful knowledge of telecommunications per se, so four intercept operators were assigned to the decryption unit to perform traffic analysis duties. These duties entailed the cryptanalytic solution of Japanese secret callsign codes, ciphers, and address lists; maintenance and updating of Japanese radio frequency plans, as well as expanding and correcting the Japanese Navy order of battle handed down by our self-trained predecessors. Three of the four analysts enjoyed the added responsibility of originating all of the radio intelligence summaries issued by Station "C" in the name of the Commandant of the 16th Naval District. I was one of the analysts so privileged, and it is important for me to tell you that that privilege was never formally bestowed on us; we just sort of absorbed it by default.

That all came about when the Asiatic Fleet radio intelligence officer, one Lieutenant Jefferson Dennis, was relieved in the summer of 1941 and came down to Corregidor from Shanghai to await transportation back to the States. He took over an empty desk next to mine, and I watched him for several days as he studied the callsigns and routing instructions in the headings of various intercepted messages. Finally, after he selected out all of those he found interesting and flipped back and forth among them for a while, he would push them aside, take up paper and pencil and start drafting a daily summary of the activities of Japanese ships and aircraft. The process looked intriguing, so I decided to give it a try. On my first attempt, I broke out the callsigns and addresses in the heading of a message that looked inviting, and according to the routing indicators in the heading, it appeared to me that a division of Japanese destroyers was fixing to leave Taiwan, which lies north of the Philippines, and proceed to Palau, an island just to the east of Mindanao in the southern Philippines. I took the message and my idea to Lieutenant Dennis, and he said no, he didn't think so because navy ships bound for Palau from Japan never go by way of Taiwan. They first go south to Saipan or Truk far to the east of the Philippines, then west to Palau. Thoroughly deflated, I returned to my desk and resumed doing the things I was supposed to be doing. Two days later, one of our PBY flying boats out of Cavite reported sighting three Japanese destroyers about two hundred miles east of Manila proceeding on a southeasterly course toward Palau. From that day on, we three enlisted analysts began contributing to the daily estimates being prepared by Lieutenant Dennis, and when he departed, we took over and continued issuing the summaries on our own. I have recounted this episode so that you can appreciate what a potent intelligence tool traffic analysis really was, and why it was that three enlisted men were the only analysts at Station "C" who ever used that tool.

In early October 1941, we three submitted an updated version of the Japanese Navy order of battle to Commander in Chief, Asiatic Fleet, for transmittal to Commander in

Chief, Pacific Fleet, and to the Chief of Naval Operations. Admiral Hart's intelligence officer, Lieutenant Commander Redfield Mason, added an endorsement stating that the report revealed the Japanese Navy had assumed a wartime disposition and that the report could not be construed in any other way. In early November, we informed the same addressees by message that Japanese merchant ships were being inducted into the Japanese Navy in alarming numbers and that we on Corregidor could account for no less than 200 such ships in ports bordering the Taiwan Straits just north of the Philippines. Then on 27 November we elaborated in great detail upon the composition of two powerful Japanese task forces converging on the Philippines, one from the north preparing to join the transports in the Taiwan Straits area, and one from the Mandate Islands to the east, closing upon Palau and the southern Philippines. Traffic analysts at Station "H" in Hawaii scooped us by one day in reporting the existence of these two forces, but we retaliated by laying both forces out in somewhat greater detail.

Unfortunately, I included in our report a gratuitous and mistaken estimate of the location of the aircraft carriers that were at that very time on their way to strike Hawaii. As for this error, I have some reason to believe I may have been taken in by radio deception. However that may be, history reveals that between them the traffic analysis summaries from Hawaii and Corregidor in late November 1941 presented an amusingly complete and accurate picture of the Japanese Southern Expeditionary Force that overran all of Southeast Asia. This force sank with impunity the British battleship *Prince of Wales* and the battle cruiser *Repulse*, a loss that is militarily and cryptologically unconscionable if British cryptanalysts at the Far East Combined Bureau in Singapore, FECB, were reading JN-25 to the depth that Eric Nave and James Rusbridger claim they were at that time. Assuming he was told by FECB of the composition and intent of the powerful air and surface force descending on him and lacking adequate air cover, no naval commander in his right mind would have sacrificed his only two capital ships to a cause he could not hope to resolve in his favor or even alter materially. If this fiasco does not put the lie to recent revisionist claims that FECB sent a message to Corregidor warning us of the impending attack on Pearl Harbor, then I can most certainly do so. Without question, such a message would have passed through my hands, and I can certify under oath if necessary that no such message ever reached Corregidor.

Rusbridger and Nave, of course, are coauthors of the book *Betrayal at Pearl Harbor*, which holds that Churchill betrayed President Roosevelt by withholding from him the fact that the British were reading JN-25 in depth for many months prior to Pearl Harbor. [Editor's note: see the Summer 1992 *Cryptologic Quarterly* for extensive comments on Rusbridger and Nave's book by [redacted]] They then inexplicably turn about and claim that Roosevelt betrayed the American people by withholding from them the fact that we too were reading JN-25 and that he was fully aware of the impending attack. If you have not read this book, I would not recommend that you rush right out and buy one.

You will note that up to this point I have said nothing about the extent to which we were reading JN-25 at Station "C" during this era. That is quite simply because we weren't reading JN-25 at Station "C" or anywhere else at that time. What seemingly does

not come through to modern revisionists with an eye on the bottom line is the fact that credit for breaking JN-25 goes more to the Japanese themselves than to the genius of either British or American codebreakers. No matter how much talent [was thrown] at the problem on either side of the Atlantic, entry into the Japanese Navy operating code in either case moved forward initially with only such speed as the Japanese errors would allow. It is unthinkable that the British had access to any more of these errors than did we. What apparently is not realized today is the fact that the breaking of JN-25 was a Catch-22 situation. You had to recover the five-digit key groups or additives before you could expose and assign meanings to the underlying five-digit code groups, but, paradoxically, you first had to recover the five-digit code groups before you could break out the additives. Both we and the British had to stand by many months before the Japanese code clerks made enough stupid mistakes to let us get a toehold on JN-25.

By December 1941, we had gained such a toehold, but it was by no means a very sturdy one. I worked for many weeks with the best code clerk on Corregidor if not anywhere else in the business, one H.V. Anderson. My knowledge of the Japanese order of battle allowed us both to make educated guesses as to which of the recovered code groups in our meager supply might underlie the additives in the messages we were working on; but even so, we moved ahead at a snail's pace. Often we worked together an entire evening to recover only two or three additives out of the many thousands that the Japanese were using. Things began to speed up toward the end of December when Anderson noticed that when any two basic code groups were enciphered by the same additive, the numerical difference between them in their enciphered form was precisely the same as it was before they were enciphered. Using this knowledge, he worked up a "difference table" that greatly simplified the process of searching for additives. It came to be known on Corregidor and elsewhere as the "Handy Andy," and it accounted for a phenomenal upturn in the production of additive and code recoveries. Even with this shot in the arm and with the input of additional recoveries teletyped in from Washington and Hawaii, it was not until the middle of March 1942 that Station "C" was finally able to issue the first complete JN-25 decrypt from Corregidor. More on that subject in a moment.

First, let me say that with the departure of the first group of evacuees from Corregidor on 4 February 1942, I alone became responsible for composing the radio intelligence summaries from Station "C." By that time, we were beginning to get bits and pieces of information out of partial JN-25 decrypts, but nothing that would really stand on its own. One time that I specifically recall involved a pair of code groups to which Lieutenant Ruf Taylor was trying to assign meaning. He was fairly certain he was dealing with a ship name, and he had tentative values for both code groups, but he had to try alternate readings for those values before he suddenly realized he had discovered the name that the Japanese had given to one of the two new super battleships they were known to be building. It was the *Yamato,* which had apparently just been placed in commission. The name could not be exploited in any further context at the time, but we wasted no time in reporting it.

Because the so-called "spell groups" for the English alphabet were among the first and easiest code values to be recovered in JN-25, we managed to isolate some of the Japanese geographical designators at a fairly early stage. The controversial designator "AF," for example, was first seen on Corregidor in late February or early March about the time I began to see indications that the Japanese were preparing for a thrust toward the eastern Pacific. In reporting that buildup in early March, I suggested that the designator "AF" was probably assigned to the island of Midway. On 13 March, three days before I left Corregidor forever, that guess was confirmed in one of the first complete decrypts ever produced by Station "C." I was quite aware that the Midway buildup was separate from the forces gathering to the south at Truk and Rabaul, and I commented to this effect in one or two of the last summaries I issued from Corregidor. Four days after I left the Rock, my two fellow analysts, who departed Corregidor in early February, filed their first daily summary from Melbourne.

It is clearly a matter of record that every summary of forces or estimate of Japanese intent ever issued by the unit on Corregidor was the product of traffic analysis. It is now also a matter of record that the tunnel from which those estimates emanated was not blown completely out of existence by its Japanese defenders as is generally supposed. Much of that tunnel is still there and is precariously accessible through the clogged emergency exit leading down to the side tunnel or lateral in which the processing unit was housed. I have seen a videotape revealing that this part of the tunnel is virtually intact. The main tunnel, which housed the intercept positions, is pretty badly torn up, but about two-thirds of it can still be negotiated by anyone having more than the average amount of courage and dexterity. The tape was made two or three years ago by a retired paratrooper friend of mine who participated in the retaking of the island in 1945.

Out of my experience on Corregidor, I learned the strengths and limitations of intelligence produced by traffic analysis. It was a very potent tool in laying out the strategic posture of Japanese naval forces and revealing in general terms the focus of their strategic intent. In an isolated environment, it also had a transient potential to supply vital early warning support to the military commander in a tactical situation. Generally speaking, however, it could supply very little of the detail needed to refine either the strategic or the tactical intelligence picture. As I began to learn on Corregidor and definitely came to understand in Melbourne, it was the province of cryptanalysis to supply the specifics of enemy intent in both of those arenas. Nowhere is this truth made clearer than it is in Fred Parker's unclassified account of the contribution that COMINT made in winning the battles of Coral Sea and Midway. [*A Priceless Advantage: U.S. Navy Communications Intelligence and the Battles of Coral Sea, Midway, and the Aleutians*, published by The Center for Cryptologic History, 1993]. I commend it to you.

It is a fine piece of work, and he depicts Melbourne's role in that evolution in a reasonably favorable light. He also paints an accurate and compelling picture of the tactical advantages that accrued from the reading of JN-25, but in highlighting that cryptanalytic effort, he has tended like many others to overlook the subtle weaknesses that were in it. There were, so far as I can determine, at least two major deficiencies in the

intelligence derived from JN-25. In neither the Battle of the Coral Sea nor the Battle of Midway did it ever lay out a complete order of battle for the Japanese naval forces committed to those operations. This deficiency is no doubt traceable to the fact that in the Japanese Navy, as well as in almost every other navy, operations orders that organize forces on such a large scale are habitually delivered by hand and seldom if ever entrusted to radio. Even Rusbridger's cryptologic advisor and coauthor, Eric Nave, is on record as stating with regard to the operation order organizing the strike on Pearl Harbor that the Japanese were the only ones who ever read that operations order. Admiral Nimitz, on the other hand, was carrying plans for the Guadalcanal invasion in the waterproof lining of his cap when his plane crash-landed in San Francisco Bay, and extraordinary measures had to be taken to recover his cap from the sunken aircraft.

The other shortcoming of cryptanalytic intelligence in the naval war in the Pacific was even more subtle and devolved from the axiomatic truth that if you don't know from whence a decrypted message has come and to whom it has been delivered, then the information extracted from that decryption can very well remain frustratingly opaque. To dispel this miasma, one has to be able to decrypt or decipher the callsigns, the addresses, and the routing instructions on the message as well as the text of the message itself. Throughout World War II, this vital task called for an increasing degree of sophistication in the cryptanalytic skills needed to solve the callsign codes and ciphers employed by the Japanese Navy. These skills were developed exclusively, so far as I can determine, by the on-the-job initiative and imagination of traffic analysts and intercept operators, none of whom were ever formally indoctrinated in the art of cryptanalysis. A measure of the efficacy of these self-taught skills can be judged by the fact that later in the war, the ability to use traffic analysis as an intelligence tool remained solvent in the face of an encrypted callsign system wherein every callsign in the Japanese Navy was changing every hour of every day.

Reviewing carefully what was known and how it was known just before the two battles that turned the course of the war in the Pacific, it becomes quite apparent that Admiral Nimitz would have had no clear idea of the actual size or composition of the Japanese naval forces that lay ready to confront him were it not for the intelligence produced by traffic analysis. Nimitz knew, for example, that the Japanese were prepared to commit some 300 ships to the campaign that opened with the Battle of the Coral Sea – the Japanese later admitted to a total of 282 – yet very few of these ships, perhaps a dozen, were ever mentioned by name in the text of JN-25 decrypts. Their presence was deduced from callsign identifications as applied to a knowledge of the command structure of the Japanese Navy, which in turn had been derived, maintained, and updated for nearly twenty years by traffic analysis. In other words, it was the cryptanalytic success scored against the Japanese Navy callsign system, not the reading of JN-25, that allowed Nimitz to draw up his estimate of enemy strength and to muster as best he could the forces he needed to oppose it. It was my experience in the war with Japan that traffic analysis consistently laid out the order of battle and the broad strategic picture while cryptanalysis

then came along and painted in the strategic and tactical details when time was not a limiting factor.

There is no question that these two analytical art forms needed one another and should never have been pursued in stark isolation as they were in Washington as the result of misplaced bureaucratic prerogatives, of faulty assessment of the need-to-know within the intelligence arena, and of blind adherence to a tenet of warfare outdated by the new intelligence potential supplied by modern technology. It is amazing that we on the Asiatic Station surmounted each and every one of these taboos without ever realizing they were there. In so doing, we set U.S. Navy cryptology more or less on the course still being followed and perfected, at least I trust that is the case. As for those of us who participated in that amazing revolution, some of us at Station "C" and Melbourne were awarded medals and promotions, while Commander Rochefort at Station "H" was relieved of all cryptologic duties and shuttled off into obscurity for violating those taboos. He was eventually awarded a DSM [Distinguished Service Medal] posthumously, an honor he quite clearly deserved.

In retrospect and in closing, however, I want to emphasize that neither he, nor I, nor anyone else at that time who was singled out and cited for superior cryptologic achievement, or thought he should have been, can ever lay exclusive claim to such an honor. We were merely the front men who functioned at or near the apex of an integrated team of rare professionals. There was nothing we ever accomplished that was not rooted in the skills, the sweat, and the sacrifice of many other equally dedicated officers and enlisted men and women who were as proficient in their duties as we were in ours, except they were less visible. I would like it to be understood that from my point of view cryptologic success in the naval war in the Pacific is not attributable to the few individuals who by circumstance were thrust temporarily into the limelight. It came about because the plebeian art of traffic analysis as invented and perfected on the Asiatic Station was successfully melded with the sophisticated art of cryptanalysis as originally nurtured and practiced by a few navy professionals in Washington, D.C. This point of view has been gnawing at me for many years, and I wish to thank NSA for affording me this opportunity to get if off my chest. And I thank you, ladies and gentlemen, for listening.