Warning at Pearl Harbor: Leslie Grogan and the Tracking of the *Kido Butai*

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While some aspects of the Japanese attack on Pearl Harbor have been studied exhaustively, it remains surprisingly true that a few elements have almost completely escaped scholarly attention. It is often obvious why these topics have been bypassed: in most cases the barest exploration reveals that they lead nowhere. Yet not all undigested bits fall in this category. A select few are both important and relatively unstudied. It was once thought that the pre-Pearl Harbor reports of Leslie Grogan, 2nd Radio Officer aboard the Matson Steamship and Navigation Company's SS *Lurline* (see figure 1), were unworthy of notice. Several days before Japan's Strike Force, or *Kido Butai,* attacked Pearl Harbor, Grogan reported that he had copied Japanese coded signals emanating from the North Pacific. It may be noted that while the United States Navy (USN) made a formal investigation of the much less credible reports of Robert Ogg, known as Seaman Z in John Toland's *Infamy,* there was apparently no naval investigation of Grogan's considerably more detailed reports. Nor did his account capture the attention of any of the documented Pearl Harbor inquiries, if one may judge by its omission in the thirty-nine volumes of published Pearl Harbor investigations. Moreover, Grogan's reports have not drawn any attention from the renowned expositor of the main current of Pearl Harbor historiography. Gordon Prange never mentioned Grogan's reports in any of his Pearl Harbor studies because, his principal collaborators have told us, he could attach no credence to Grogan's reports.

Yet Grogan's strange, almost unbelievable, story is based solidly on documentation first generated *before* the attack. It thus is potentially of great significance for our understanding of Pearl Harbor. A technical study of his reports, and an attempt to place them in context, is long overdue. That this episode merits the closest scrutiny from scholars can be easily demonstrated. Revisionists will likely conclude that it points to foreknowledge of the attack, whereas traditionalists will look upon it as the most telling vindication of the Wohlstetter thesis that the real warnings were difficult to pick out in a sea of false signals.' The meaning of the facts will long be debated, but it is clear that they cannot be ignored any longer, for they provide key information on the attack's prelude.

In the week before the attack on Pearl Harbor, high up on the bridge deck of the express luxury liner *Lurline,* flagship of the most prestigious passenger and cargo company of the Pacific, an experienced thirty-year veteran of radio communications monitored the maritime bands for activity. The equipment was always placed high up on such ships to

The Northern Mariner/Le Marin du nord, XI, No. 2 (April 2001), 1-17.

reduce signal interference. Nearly eighty feet above the level of the ocean, with earphones attached, Leslie Grogan twirled the knobs of his receivers moving back and forth, occasionally leaving the room to report to his fellow officers on the bridge. His attention was drawn to some unusual transmissions that did not fit into his long experience. Comparing signals transmitted on two different frequencies he detected the employment of a relatively new approach to radio communications: the so-called "repeat-back" transmission.

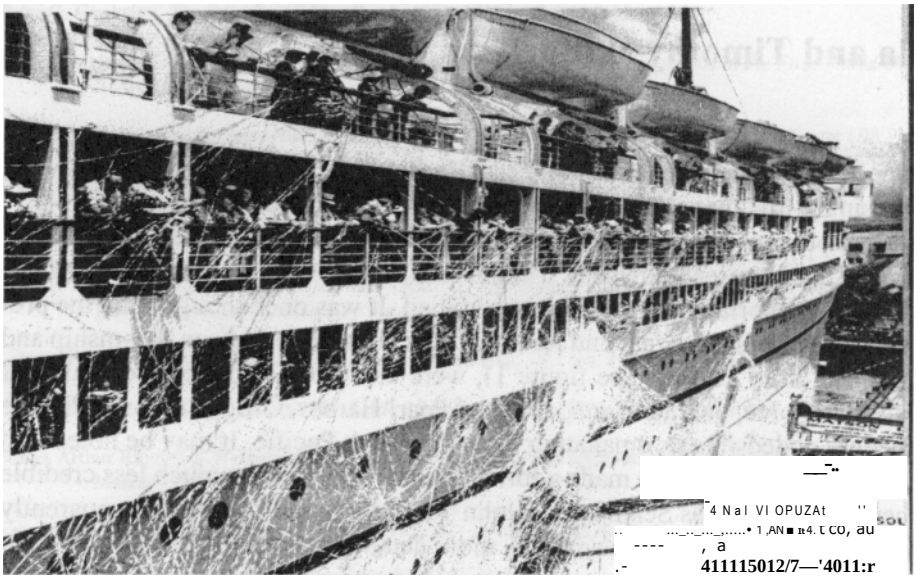

Figure 1: SS *Lurline* in Prewar Appearance.

Source: Fred A. Stindt, *Matson 's Century of Ships* (Kelseyville, CA, 1982), cover.

The basic facts of Leslie Grogan's story are fascinating. Grogan and Chief Radio Officer Rudy Apslund copied Japanese coded signals from 30 November to 2 December 1941 and tracked their source in the North Pacific using radio direction finding (RDF). The signals emanated from northwest of Honolulu, three full days before the first bombs fell on Pearl Harbor. Grogan noted that these were simultaneous "repeat-backs" of signals originally transmitted by Japanese shore stations. Grogan and Apslund reported their findings on 3 December to Lt. Cmdr. G.W. Pease of the 14th Naval District in Honolulu. Furthermore, Grogan composed his own "Record for Posterity" on 10 December, following *Lurline's* arrival at San Francisco. This record was sent to Grogan's superiors at Matson in lieu of the ship's logs, which had been confiscated in San Francisco by a USN boarding party led by Lt. Cmdr. P. Allen. Hence, two versions of Grogan's observations were recorded: one written before Pearl Harbor and one written afterwards in an atmosphere of national security.

Fortunately for historians, Ladislas Farago saw both reports when he interviewed Grogan in 1967. Grogan's story has drawn varied comments from historians since it first appeared in the postscript to the 1968 paperback edition of *The Broken Seal.'* Farago lent credence to Grogan's story, although he adhered to his original view that the Pearl Harbor

attack surprised the United States; warnings such as Grogan's were ignored. A.J. Barker agreed with Farago in *Pearl Harbor,* a book he wrote in 1969.[4] In 1981, Gordon Prange and his associates adhered to the theory of Japanese radio silence in *At Dawn We Slept,* and in 1986 they rejected Grogan's story in *Pearl Harbor: The Verdict of History.'* In 1982, John Toland offered quotations from Grogan's accounts in *Infamy: Pearl Harbor and Its Aftermath,* arguing that American authorities intentionally ignored Grogan's radio intelligence, along with other sources, to allow Japan to make the first strike against an American target.° Rear Admiral Edwin Layton and his associates rejected Grogan's story in Layton's 1986 autobiographical memoir, *And I Was There.* Layton, who had served as Pacific Fleet Intelligence Officer at Pearl Harbor in 1941, explained that *Lurline's* " unsophisticated direction-finding apparatus" likely picked up Russian freighters or " atmospheric anomalies."' In 1995 John Prados echoed Prange's views in *Combined Fleet Decoded,* in which he acknowledged Grogan's story but emphasised the radio silence theory. Prados carefully reminded his readers that the Japanese disabled their radio equipment by removing fuses and keying equipment.' More recently, in 1999, Robert Stinnett used radio intelligence sources to support Grogan's story in his revisionist account of Pearl Harbor, *Day of Deceit.*[9] Stinnett cited several examples of the USN interception of *Kido Butai* radio transmissions, seemingly confirming that the Japanese did not observe complete radio silence. Furthermore, Stinnett interviewed archival staff and learned that a copy of Grogan's 3 December report filed in the National Archives at San Bruno, California, perhaps the only extant copy, disappeared some time ago judging by the age of an unsigned withdrawal slip.

Grogan's reports and recorded observations, at least all those presently available, now deserve careful scrutiny. Both Farago's and Toland's respective studies of Grogan's documented accounts are important to consider given that some of the documents originally handed to the USN have gone missing. Fortunately for researchers, records from Station H, a former USN direction-finding station on Oahu, as well as USN intercepts of Japanese messages, corroborate Grogan's accounts.

Certainly Grogan's second account, his "Record for Posterity," written on 10 December, disclosed *Lurline's* interception of Japanese signals, but avoided specific details regarding frequencies and bearings. Grogan's entry for 1 December at 3:30 AM described the signals he heard on the evening of 30 November:

> The Japs are blasting away on the lower Marine Radio frequency – it is all in Japanese Code, and continues for several hours. Some of the signals were loud, and others weak, but in most every case, the repeat-back was acknowledged verbatum *[sic].* It appears to me that the Jap is not using any deception of 'Signal Detection' and boldly blasts away, using the Call letters JCS and JOS, and other Japanese based stations that have their transmitting keys all tied-in together, and controlled from a common source, presumably Tokio...So much of the signals reaching us on the SS Lurline were good enough to get good R.D.F. We noted that signals were being repeated back, possibly for copying by crafts with small antennas. The main body of signals came from a Northwest by West area, which from our second night from Los Angeles bound for Honolulu – would be North and West of Honolulu. Having crossed the Pacific for 30 years, never heard JCS Yokohama Japan before at 9 P.M. our time on the lower Marine Frequency,

> and then rebroadcast simultaneously on the lower Marine Frequency from some point in the Pacific. If anyone should ask me, I would say it's the Jap's Mobilization Battle Order.'°

Grogan pointed out that coded signals originating in Japan were being repeated back from another location. During his first night copying these peculiar "repeat-back" transmissions, Grogan could not be sure whether or not their source was stationary.

Grogan noted the next evening that the peculiar Japanese radio traffic resumed for two hours, just as the night before. His entry for the evening of 1 December explained how both he and Asplund readily copied these signals: "Again Rudy and I pick up without any trouble all the Japanese coded Wireless signals like last night – it goes on for two hours like before, and we are now making a concise record to turn in to the Naval Intelligence when we arrive in Honolulu, Wednesday December 3rd, 1941.'1

Grogan's entry for the late evening of 2 December confirmed that the Japanese flotilla continued to transmit "repeat-back:"

> We continue to pick up the bold Japanese General Order signals – it can't be anything else. We get good Radio Direction Finder bearings, mostly coming from a Northwesterly direction from our position. The Jap floating units continue their bold repetition of wireless signals, presumably for smaller craft in their vanguard of ships, etc. The Japanese shore stations JCS and JOS are keyed by remote tie-in, coming from Tokyo I presume, and if we had a recording device, it would only prove what we ourselves jot down, and we can't help but know that so much of it is a repeat back, letter for letter, because we have copied the original signals coming from Japanese land based stations, etc. The Japs are so bold in using these low Marine frequencies too, but with all the tension we've seen up to now, it's safe to say something is going to happen, and mighty soon, but how soon? All this display means something–time will tell, and tonights [sic] Radio Detection signals have come from a NW by W from Honolulu, and from the signals, the Japs must be bunched up, biding time.12

On 3 December *Lurline's* radio officers submitted a full report to the 14th Naval District intelligence office in Honolulu.

Yet Grogan's interview with Farago in 1967 disclosed further details. To begin with, Grogan justified the *Kido Butai* 's need for "intercommunication:"

> It was necessary for the Japanese to find a means of secret wireless communication between the ships of Nagumo's Striking Force, and his advance units. It would be sheer folly to expect that a huge armada of ships, widely scattered at times, would be sent to sea, and remain there for ten or eleven days, without some form of intercommunication. It was necessary to transmit orders and instructions, either to individual ships or to the Combined Fleet. Acknowledgement of such orders was mandatory to insure their proper execution. While the larger ships of the Striking Force were able to receive signals regularly from their homeland on the *high* frequen-

> cies, it was impossible for the low-lying submarines to do so...Submarines could often not intercept the high-frequency signals from Tokyo or other shore stations in Japan...other small craft found themselves in the same predicament."

Grogan also discussed technical details in 1967 that he had previously chosen (or had been obliged) not to reveal in the immediate aftermath of the Pearl Harbor attack. In his "Record for Posterity," Grogan's "lower Marine frequency," or "lower Marine frequencies," remained unspecified:[4] Furthermore, the same account explained that the Japanese were not using " any deception of 'Signal Detection.— Yet in 1967 Grogan explained to Farago how the *Kido Butai* concealed its "repeat-back" transmissions:

> The Japanese were able to solve this problem by resort to "hoax." It was only necessary for one ship to pick up the high-frequency signals from the homeland and then retransmit this same signal, simultaneously, on a *low*-frequency which the smaller craft could intercept. [An intercepted *high*-frequency signal from Japan would be used to] "key" a transmitter whose frequency could be selected at will — in this case 375 kilocycles, as was chosen by the Japanese for secrecy on the run to Hawaii. A 375 kilocycle signal would fall in the band reserved for direction finding, a master of strategy by the Japanese, because no intercept or monitoring station would look for a Japanese signal in this band. Moreover, the power of the 375-kilocycle transmitter was low enough to severely limit its range. Assuming that a particular intercept or monitor station had, by sheer coincidence, tuned across the spectrum and discovered a Japanese signal on 375 kilocycles, the receiving operator would not have known what to do about it...And unless the operator had returned to this same portion of the spectrum on successive nights to confirm any suspicions he might have had, as was done by the *Lurline's* Radio Officer, there would have been no effort made to evaluate the incident. It was only because the 375-kilocycle signals, transmitted from one or more Japanese ships of the Striking Force, were heard on *successive* nights that the *Lurline's* Radio Officer was able to confirm his original belief to the extent that he had discovered a group of moving objects.15

Grogan also explained to his friend H.W. Dickow how the timing of these Japanese transmissions had been so important to his assessment. In a letter of 24 July 1968, Dickow explained to Farago how Grogan knew that the "repeat-back" transmissions of30 November to 2 December 1941 originated from a mid-Pacific location rather than from Japan:

> He was on watch between 8 P.M. until midnight, and from 8 A.M. until noon. *It was only because he heard the Japanese signals between 8 P.M. and 9 P.M.* that he was able to evaluate, *with absolute certainty,* that the Japanese had perpetrated a hoax. Signals transmitted from Japan during the daylight hours there *can not* be picked up by a ship at sea during the hours of 8 P.M. and 9 P.M. (ship's time) in the Pacific...Grogan instinctively *knew*

> that he could not pick up a signal from the Japanese homeland between 8 P.M. and 9 P.M. *Lurline* time, *and this aroused him to action.* Then he went to his direction finder, and located the Japanese ships. It was only on the second and third nights of his continued search with the D-F that he found he was receiving signals from a *moving target,* and that the movement was *away from Japan* and towards the *east* (Hawaii).'

The 375 kHz transmissions propagated best at night – both the *Kido Butai* and *Lurline* were under darkness when Grogan intercepted the "repeat-back" signals. Dickow, elaborating upon Grogan's observations, also explained to Farago that the Japanese chose the direction-finding frequency of 375 kHz because they thought that this frequency was not monitored in the open waters of the Pacific Ocean, "there being no reason why any ship would want to take bearings in these waters – except when two vessels of the same steamship line are about to converge and pass close to each other"" Grogan knew that his discovery of clandestine Japanese "repeat-back" transmissions emanating from the North Pacific was important enough to keep from *Lurline's* junior radio operators for security reasons – Grogan and Chief Radio Officer Rudy Asplund reported their findings directly to the USN intelligence office in Honolulu on 3 December 1941.

Most significantly, Grogan's reports and observations are entirely consistent with the documented movements of the *Kido Butai* during the period in question. For example, position reports made by the 3rd Battleship Division indicated that the *Kido Butai* moved about ten degrees east along the forty-second parallel (179°W to 169°W) from 30 November to 2 December, *Lurline* time.'[8] As well, the *Kido Butai* stopped to refuel on 2 December, a fact that Grogan could not been aware of by any other means other than radio direction finding in early December 1941.'[9] As Grogan explained with reference to the signals of 2 December, "tonights *[sic]* Radio Detection signals have come from a NW by W from Honolulu, and from the signals, the Japs must be bunched up, biding time." In short, Grogan knew from direction finding that the Japanese flotilla had stopped moving. The Japanese had wisely combined the need to pause for major refuelling with the plan to stop the fleet and await final confirmation of the attack decision from Tokyo. Grogan's account thus mirrors exactly the principal pause in the force's forward movement, information that was not publicly available until years after Grogan wrote his reports.

This evidence thus sheds entirely new light on the long controverted question of whether the attack force could maintain total radio silence during the two-week voyage across the winter seas before arriving at the launching point for its planes. Veterans of the *Kido Butai* have insisted that the force maintained absolute and total radio silence until the attack planes began their final approach to Pearl Harbor. Some have chosen to attribute absolute veracity to these sources. It is, however, known that these same sources gave conflicting reports of the track of the force, denied the survival of any written records, and denied that the Honolulu consulate had provided any intelligence for the *Kido Butai.* These inaccuracies have since been exposed. Nonetheless, American sources have left unchallenged the Japanese claim of total silence. No records that might contradict the Japanese claim have been released by the United States, the widely held assumption being that there could be none. Grogan's accounts suggest otherwise.

While the question of radio silence cannot be conclusively decided in a brief article, some of the reasons for doubting Japanese claims can be briefly indicated. To begin with,

in 1941, the term "radio silence" did not necessarily exclude the use of all frequencies and power levels if certain special uses were considered inaudible to the enemy. Some communications specialists, both American and Japanese, believed that both frequency and power determined signal range in a relatively predictable way. For instance, Edwin Layton, Pacific Fleet Intelligence Officer, offered the following explanation to the Roberts Commission in a memorandum of 5 January 1942:

> During tactical exercises ORANGE [Japan] utilizes medium and low frequencies which are inaudible here [Hawaii]. During such periods it is *necessary* to *rely* on the *intercept* activities at Guam and Cavite to observe and report on these activities. When in port, a unit almost invariably shifts to the low-frequency, low-power, limited range, "harbor frequency" depriving all intercept stations of originated traffic.2°

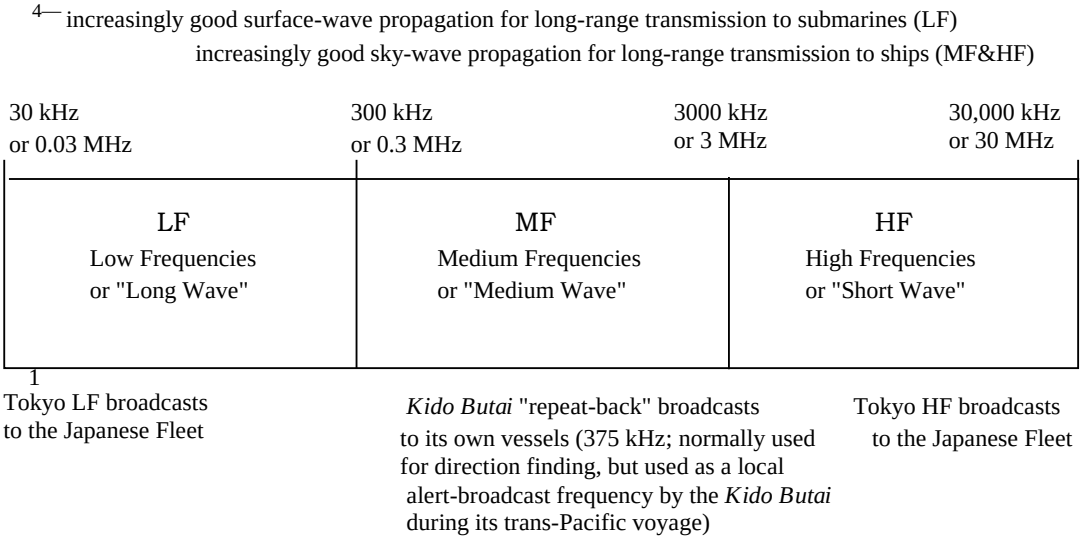

Figure 2: A Frequency Spectrum for Naval Radio Transmissions

Note: In 1941, the divisions between LF, MF and HF were not necessarily defined as shown. For example, frequencies below 500 kHz were often considered as LF or long wave. Furthermore, the unit of frequency measurement was called the *cycle* rather than the *Hertz (Hz).* Accordingly, frequency was measured in *cycles (c), kilocycles* (kc) and *megacycles (mc).*

Siource: Courtesy of the author.

Expert though Layton was, he was not entirely correct. Under certain conditions, which occurred more commonly than was sometimes believed, low frequencies (LF), medium frequencies (MF) and high frequencies (HF) travel much further than usual, particularly when the ionosphere allows such signals to "skip," although such propagation is usually associated with HF (see figure 2).[21] Ionospheric propagation characteristics were

excellent throughout 1941, according to reports produced by the National Bureau of Standards (NBS) in that year!' What in other years may have passed for acceptable levels of radio discretion or silence may have been broadcast very far indeed in 1941. Captain Fuchida Mitsuo, commanding the air groups of Carrier Division 1, was astonished to learn that a message he had transmitted from his fighter aircraft to his carrier, with the request that it be relayed to Tokyo, was heard both by Admiral Yamamoto aboard the *Nagato* and by the Naval General Staff in Tokyo *before* the long-distance retransmission of the message. Fuchida later commented that this was "surely a long distance record for such a low-powered transmission from an airplane."[22]Judging from Japanese knowledge of tactical air broadcasts that emanated from Honolulu, this was less surprising than it appeared.

A partial misunderstanding of radio propagation seems to have influenced the radio silence policies adopted by military personnel on both sides. Layton explained that American forces used HF ship-to-air voice communications believing, as did Fuchida, that such transmissions were short-range or limited to the horizon.[24] On occasion, the Japanese, upon intercepting these transmissions well beyond their intended range, ordered military alerts believing that the Americans were close at hand. As a further example, on 16 November 1941 the Combined Fleet issued "Striking Force Operation Order # 1," which defined communication bands: "Commencing 0000 on 19 November, 'Battle Control' effective for short wave frequencies and 'Alert Control' for long wave."[25] The Strike Force was not yet ordered to observe radio silence but was required to use HF for local battle control and LF for broadcast alerts. Again, HF (likely at low power) was reserved for short-range local communications. LF was reserved for alerts because it could reach most ships and submarines around the clock, provided that sufficient power was used. USN policy in this period was similar. Thus a COM 13 dispatch of 17 December 1941 permitted the 13th Naval District to use HF frequencies during periods of radio silence: "In the future when radio silence is ordered this silence will not affect transmissions on frequencies above five thousand Kc."[26] For both sides, certain transmissions clearly were allowed during periods of nominal radio silence.

Hitherto unnoticed Japanese radio procedures specifically allowed a number of exceptions to complete radio silence during secret operations. A dispatch of24 October 1941 from the 1st Air Fleet Staff to the 1st Air Fleet, for instance, emphasized the use of broadcasts to hide fleet activity, but offered the following provision: "General operating procedure for *Striking Force* during *Combined Fleet* Communications Test #2...Communications from the *striking force* to other forces will be sent through Flagship BATDIV #3. Wave lengths of BATDIV #3 (TAN201, TAN401)."[27] In November the Japanese Navy directed the Tokyo Communications Unit, with which the 1st Air Fleet communicated directly and exclusively, to broadcast constantly on 4.175 MHz, 8.350 MHz and 16.7 MHz, and in thirty-minute intervals on 1.744 MHz from 0100 to 1800 hours daily.28 The Japanese Navy also adopted the strategy that "Broadcasting will be the principal means of communicating with an operational force. Acknowledgement will be required when there is uncertainty concerning receipt of the message or when confirmation is required because the message is especially important."[29] A dispatch of 25 November confirmed that emergency communications were possible during radio silence: "From 26 November, ships of Combined Fleet will observe radio communications procedure as follows...Except in extreme emergency the Main Force and its attached force will cease communicating."" It

is thus clear that the Japanese navy admitted the possibility that it might be necessary in particular circumstances to use radio.

The *Kido Butai,* sailing under difficult conditions in winter seas, faced a number of circumstances that seemed to compel the use of radio for its secret operation. As Rear Admiral Kusaka of the 1st Air Fleet later explained that "It was needless to say that the strictest radio silence was ordered to be maintained in every ship of the Task Force. To keep radio silence was easy to say, but not so easy to maintain."[31] How could the *Kido Butai,* spread out over 360 square miles of ocean by day and ninety square miles by night, cope with fog, storms and a ban on night illumination without recourse to radio communications?[32] Under these circumstances, the ships certainly needed low-power radio to assemble at a common point in the north Pacific for refuelling.

Little noticed USN intercepts suggest that the *Kido Butai* was forced to transmit radio messages before and during the voyage to Hawaii.[33] On 25 November, Carrier Division 5 of the Strike Force broke radio silence by transmitting on 4.963 MHz under call sign NAO 0, as recorded in the Station H Chronology.[34] On 26 November Station H reported that "the Carriers were heard using secret calls on 4963M [4.963 MHz] during the evening watch."35 These HF transmissions on a common frequency of 4.963 MHz were most likely from the *Kido Butai,* since six of Japan's eight carriers were part of the force. Vessels such as the aircraft carrier *Akagi,* the oil tanker *Shiriya* and the battleship *Hiei* were also reported as making transmissions. On 28 November Station H recorded call signs and code movement reports transmitted from two of these vessels, *RU SI 8,* using *Akagi 's* transmitter, and HA NI 1 on *Shiriya.*[36] The next day Station Hypo, a USN communications intelligence unit in Pearl Harbor, reported that *Hiei* sent a message to the Chief of Staff, 3rd Fleet. Station Hypo's report for 30 November explained that Japanese oil tankers, or *marus,* conversed with *Akagi:* "The only tactical circuit heard today was one with *Akagi* and several *marus."*[37] On 1 December, the USN intercepted a position report transmitted by *Shiriya.*[38] Moreover, Station H intercepted a radio transmission from a *Kido Butai* submarine using call sign WA HI 8 on 6 December at 0552 hours, Tokyo time." Nonetheless, Station H records cannot at present be used to confirm the *Kido Butai's* radio activities from 1 to 3 December, the period when the force sailed through mid-Pacific storm conditions, because pages 43 to 48 of the Station H intercept log, which cover this period, have not been released by the security authorities.4°

It is unlikely that these USN intercepts all represented Japanese radio deception. Secret call signs intercepted by American monitoring stations suggested clandestine operations. Code movement reports, as well as traffic between carriers and their oil tankers, reflected operations far away from home, rather than stationary anchorage in home ports, as Japanese deception was trying to convey using routine call signs. The Japanese would not have sent a false message indicating that *Akagi* was conversing on a " tactical circuit" with oil tankers when previous false messages were trying to convince American naval intelligence that the carriers were in home waters. The oil tanker traffic with the carriers clearly meant long voyages, not anchorage in Kyushu.

The Japanese already used HF for broadcast calls, "repeat-back" and aircraft communications. On 28 November, the USN intercepted a message from Tokyo, addressed to all communication units, that ordered HF broadcasting: "Beginning 1 December 1941, Tokyo Comm Unit will initiate broadcasts on...4175 kc in order to (maintain) volume of traffic... afloat, etc., in accordance with principles given in 2nd Communications Analysis

of 1941."[4]' On 2 December, Station H discovered a "repeat-back" circuit operating on HF: " MERO6 (Takao Air Corps) on 11500M [11.5 MHz] brought up a 'repeat back circuit'...all traffic received previously from Tokyo direct, on the 1st [1 December]." The Strike Force also revealed itself on an HF frequency allocated to Japanese shore-station JAH in Koyama. A 1942 Japanese study of the Pearl Harbor operation offered the following explanation: "The investigation since several days before the attack revealed that the 'A' short wave for air operations of the 1st Air Fleet had intense mix-ups with the station with the code name of ` JAH'." Moreover, almost every message addressed to the Strike Force that was intercepted by the USN had been transmitted by HF.

The records also show that Tokyo used LF frequencies to make broadcast calls to the Combined Fleet. On 5 December, Station H reported that Tokyo "UTU" broadcasts were made on two frequencies: "At 0430/6th Tokyo was observed using 32 Kcs for an UTU broadcast. This frequency was used dual with 12330 Kcs. Signals were very strong during the day. The use of this low frequency indicates traffic sent on this broadcast is for ships at a great distance from Tokyo."" On 6 December, Station H confirmed its earlier observation: "It was discovered that Tokyo had a UTU up on 32 Kcs simultaneous with 12330 Kcs. It came in S2 to 5 during the day watch and most traffic was good to solid. Much of the traffic was repetition but of high precedence.' These reports support Grogan's observation that Japanese shore stations broadcast strong signals to outlying vessels.

Indeed, Japanese shore stations were sometimes used to transmit messages in a simultaneous fashion. Laurance Safford offered the following explanation in the Congressional Hearings: "It was a matter of official record in Op-20-G, and common knowledge among our intercept operators, that the Naval Radio Station Tokyo had, on several occasions during the period 1936-1941, keyed other transmitters for test or during Grand Maneuvers of the Combined Fleet." He recalled that four Japanese shore stations operated at power levels ranging from 50 to 400 kilowatts and on LF frequencies ranging from 19.6 to 63 kHz. Safford also explained that "Broadcasts on 19.6 kcs from Haranomachi (JAA), the most powerful station in Japan, would have implied submerged reception by submarines or transmission to a far-distant surface force."

It has not previously been noted that the communication plan for the Strike Force provided that any vessels failing to copy Tokyo's HF and LF broadcasts could receive " repeat-back" on LF. On 16 November 1941, the Combined Fleet issued "Striking Force Operation Order # 1," which allocated HF for local "Battle Control" and LF for "Alert Control." This Strike Force order was the *only* one sent to "Tokyo DF Control" for information. Tokyo DF Control needed to know that the Strike Force would use a long-wave direction-finding frequency for its own "Alert Control." Indeed, this communications plan already had a precedent with Tokyo DF Control. A message of 6 November from the chief of Tokyo DF Control to the commanders-in-chief of both the 2nd Fleet and the 1st Air Fleet reminded the former that a long-wave frequency it had used was actually reserved for the Strike Force: "In spite of the fact that 92 [kHz] is the wave length of the *Striking Force* [censored] sent a message over this wave length to Tokyo Comm Unit at about 2100.""

Not surprisingly, a more clandestine frequency was later selected for the Strike Force. The 375 kHz "repeat-back" frequency used by Nagumo's ships was actually reserved for direction finding by international agreements. This fact is made quite clear in a table entitled "Summary of Frequency Allocations in United States," found in a 1941 edition of *The Radio Engineering Handbook*.[49] Land-based radio beacons transmitted signals on 375

kHz so *that ships could find their positions. In essence, these fixed radio beacons, then as* now, served as a radio aid to navigation. Alternatively, ships could transmit signals on 375 kHz so that land-based stations could take bearings on them and then transmit RDF data back to the ships on the same frequency.[5o] Yet when Grogan took bearings on the "repeat-back" signals each night, he noticed that the 375 kHz signals were not from a fixed radio beacon or land station – they were moving. Although the Strike Force sometimes used low power HF to exchange messages, as USN intercept logs show, low-power LF "repeat-back" on a reserved direction-finding frequency ensured that all vessels, particularly submarines and smaller craft, could receive Tokyo alerts at any time of day in relative secrecy.

Grogan also explained that the Japanese must have used automatic re-broadcasting equipment to "repeat-back" the original messages from Japan to the vessels of the *Kido Butai.* Grogan's explanation is supported by the fact that such equipment existed in 1941 and was already used by both the Japanese navy and the USN. Station Hypo reported on 29 November 1941 that the Japanese used such equipment, although their attempt was unsuccessful on the day in question: "Automatic transmissions [were] attempted on the Tokyo-Takao circuit but was a failure and traffic sent by hand." As well, the USN used " automatic re-broadcast" equipment in 1941 to transmit messages between its Pacific coast stations.[5'] Select vessels of the *Kido Butai,* such as *Hiei* and *Akagi,* may have used such equipment to re-broadcast messages originating from Japan. For Grogan, simultaneous " repeat-back" transmissions from the North Pacific suggested a clandestine naval operation rather than ordinary commercial traffic between trawlers or other civilian craft. In this he was unquestionably correct.

While the Grogan story is detailed, circumstantially accurate, and fully consistent with what we know of the *Kido Butai* and its communication plan, his account undoubtedly poses a most difficult question: How did a single radio operator using admittedly good, but certainly not state-of-the-art equipment, succeed in penetrating the *Kido Butai* when both USN and Commonwealth naval radio intercept networks, spread across thousands of miles of the Pacific using dozens of specially-trained operators and state-of-the-art radio direction-finding equipment, apparently could not equal his feat? In answer to this question, it may be said that the methods by which Japan attempted to conceal necessary radio transmissions, methods which Grogan thought were so ingenious and subtle, were in fact known to the USN. Quite surprisingly, records show that USN radio operators sometimes used the reserved direction-finding frequency of 375 kHz to exchange radio intelligence, including the exchange of detected radio bearings. For example, a letter of 6 October 1941, sent from Station Cast to Washington, explained that Station Baker in Guam had transmitted radio bearings to Station Cast on 375 kHz." Most revealingly, W.J. Holmes, a traffic analyst at Station Hypo in 1941, later explained that "the lower frequency used to assist navigators" sometimes produced more accurate direction-finding intelligence than on the high frequencies." Evidently the USN already monitored this frequency.

On occasion the USN used frequencies close enough to those used by the *Kido Butai* to draw comment from Japanese authorities. Much to the alarm of Japanese radio intelligence, it was discovered on 29 November that the USN was using the nearby frequency of355 kHz. The commander of the 6th Communication Unit, Kwajalein, reported this fact to the chiefs of both Tokyo DF Control and the Special Duty Section – Naval General Staff, as well as to the commanders-in-chief of both the 4th and the 6th Fleets, indicating which American call signs were used by "ship shore stations" on 355 kHz and

2352 kHz.[54] This Japanese report, which the USN intercepted on 30 November, used a high-level address heading that was rare, if not without precedent. A communications unit in the Mandates would not normally send an intercept report to a "Special Duty Section" of the Japanese naval staff, as well as to the 6th Fleet, a submarine unit. The later could be explained because the Sixth Fleet was almost certainly using a nearby LF frequency. The report to the Special Duty Section of the Japanese Naval Staff likely reflected anxiety over American use of certain frequencies that were too close for comfort, considering the *Kido Butai's* communication plan. The Naval General Staff had to know if American penetration of Japanese radio communications might force cancellation of the raid on Hawaii. Why the USN could not put all these pieces of the puzzle together in 1941 remains unknown. Perhaps USN historians will later address the Grogan reports.

Even more questionable is why the USN could not put it all together when Grogan spelled it out for Naval Intelligence in a report countersigned by his superior officers three full days before the Zeros appeared over Oahu. *Lurline's* report of 3 December revealed what frequencies had to be monitored, although USN stations were already exchanging radio bearings on 375 kHz, the *Kido Butai* "repeat-back" frequency. Any differences of opinion between USN traffic analysts regarding the location of the missing carriers could have been dispelled by *Lurline's* report. Not that USN traffic analysts necessarily required outside assistance: direction finding, radio fingerprinting, frequency analysis, call signs, code movement reports, traffic volume and decrypted message headings could and should have provided much more detailed radio intelligence than that which *Lurline* turned over to Naval Intelligence on 3 December. Yet past censorship and missing documents obscure the results of USN traffic analysis from 30 November to 2 December 1941, when the *Kido Butai* transmitted messages in the North Pacific. Station logs for this period are not available in their entirety. Therefore, *Lurline's* report becomes all the more important in helping us estimate what intelligence the USN could have received concerning Japanese actions in the region. *Lurline's* report shows not only that the *Kido Butai* was tracked during its arduous voyage but also that the USN was privy to this information, probably before 3 December but certainly on that date and thereafter.

In conclusion, it is important to distinguish between what is unarguable, what is perhaps debatable and what is uncertain about the reports of Radio Officer Grogan. It is virtually unarguable that the automatic repeat of messages that caught Grogan's attention in the first days of December were the signals of a major naval force conducting operations at a very great distance from its base of operations. No attempt to dismiss these signals as those of some stray Japanese fishing fleet will hold any water. Nor can any credence be attached to the suggestion that the signals might have come from some major American, British or Dutch naval force in the quadrant that Grogan identified as the originating source of these automatic repeats. We know that such naval forces of the ABD powers that operated in the Pacific were all in the southwestern quadrant, not the northwestern. In the high Pacific there was no force that would be using automatic repeating save Japan's. Grogan's surmise that this could only be a Japanese naval force was perfectly reasonable, as postwar records amply confirm. We know that this "repeat-back" was required to get messages to the advance submarine force with any degree of certainty, and we know that the low frequency employed at low power was in the range of the frequency band assigned for the radio transmissions of the *Kido Butai.* We know that the advance submarine force communicated with the Strike Force before the attack. We are not certain that Admiral Nagumo, commander of the 1st Air

Fleet, acknowledged the reports of the advance submarine force, but some form of acknowledgment of reports and commands must be considered necessary. We know that Nagumo made a decision after the date of the imperial decision to go ahead, and that his decision likely would have been communicated to the Imperial Command for relay to the other forces whose operations were all closely tied with the strike on Hawaii. Furthermore, communications were required to coordinate the delivery of a *de facto* war declaration to Washington half an hour before the start of hostilities in compliance with international law and the Emperor's specifically-expressed command. Such close timing likely required confirmatory reports from the *Kido Butai.*

In the context of the whole evidence it is virtually unarguable that Grogan heard the signals of the *Kido Butai,* and that from his report detailing the movement of the "beacon" signals, the direction of the Japanese movement could have easily been ascertained. Most tellingly, Grogan carefully noted that the flotilla stopped moving on 2 December, the date when Admiral Nagumo awaited confirmation of the attack plans while refuelling in the North Pacific. We also know beyond any doubt that responsible officers of the Matson Line communicated this information to USN intelligence in Hawaii three days prior to the Pearl Harbor attack. That is not just the contention of Leslie Grogan but also of a steamship company that was heavily dependent on government contracts and subsidies. What happened immediately after Grogan turned in his report countersigned by the ship's commander we do not know. There is an important gap in the record. But we do know that after Pearl Harbor the USN again met Grogan when his ship tied up and took away the communications log and never provided a return copy to the Matson Company. It is no exaggeration to say that the preservation of logs is sacred to officers and that by never returning the original or a copy, the USN clearly attached great significance to these logs. We know that Grogan then wrote up a second account that has survived, one that was considerably less detailed, if we may judge by the explanation that Grogan offered to Farago in 1967, which was based upon his first report. It is hard to see why Grogan would have bothered to write a second, less detailed report unless he clearly understood that the USN wanted to muffle the details of his first report for security reasons. We know that an unsigned withdrawal slip in the National Archives at San Bruno confirms that the original report and logs, formerly in the possession of the USN, have either been lost or relocated. The complete absence of any recorded inquiry into Grogan's report suggests that its contents were considered highly confidential. Without doubt, Grogan's first report had great evidentiary significance for anyone wishing to find out what advance warning was obtained or obtainable before the attack.

We are in the ground of speculation, however, when we ask why the USN seized these records and then took no official notice at the time or in the decades that followed. As best we can determine, based on the research of Robert Stinnett, the log did not disappear until the 1970s. Why did the USN not take any notice in the nearly thirty years after it first came into possession of the evidence and before the disappearance of the records? Perhaps there was some officer's negligence in the handling of these materials, negligence that was too embarrassing to admit. But in that case we can be certain that there would have been some confidential investigation. If there was unintentional negligence in this or some similar way, then the records may eventually surface, for the story of negligence is less controversial than the version that would have the USN intentionally keeping critical information from the Hawaiian commanders, Admiral Husband E. Kimmel and Lt. General Walter C. Short. It is hoped that official naval historians will consider Grogan's reports and produce a

comprehensive history. But one way or the other, either by the release of records hitherto unsuspected, or by the unnatural prolongation of silence more than half a century after the event, we shall be able to know or estimate the truth. The time for the clarification of the official records is slowly slipping away.

Ultimately, two possibilities stand out. One is that there might have been some unfortunate negligence or incompetence in the USN's handling of this information. The other is that the USN had ample means of corroborating Grogan's reports and of notifying Hawaii, but failed to do so, a possibility given substance by the absence of any indication that Grogan's report had been passed on to either Kimmel or Short. Both traditionalists and revisionists will continue to debate this issue within the context of Pearl Harbor historiography. What is certain, however, is that quite aside from the Navy's handling of his effort, Leslie Grogan performed a great service to his country on the eve of the Pacific War by carefully monitoring Japanese "repeat-back" transmissions from the North Pacific, tracking the eastward progression of these transmissions, and reporting his findings to USN Intelligence in Honolulu. He performed a brilliant piece of detective work in the radio room of SS *Lurline* and ensured that his countrymen received forewarning of Japan's naval movements across the vast expanses of the Pacific. The reports of Leslie Grogan, an exceptional radio officer and American patriot, represent something unique in the record of the Pearl Harbor controversy.

NOTES

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I. This joint article is based upon collective research. It draws upon Villa's own research into signals intelligence as part of his upcoming book on the Pearl Harbor controversy, as well as Wilford, "Pearl Harbor Redefined," 81-97.

2. Roberta Wohlstetter, *Pearl Harbor: Warning and Decision* (Stanford, CA, 1962), 3 and 387. Wohlstetter offered the following explanation: "signals announcing the Pearl Harbor attack were always accompanied by competing or contradictory signals, by all sorts of failed to anticipate Pearl Harbor not for want of relevant materials, but because of a plethora of irrelvant ones."

3. Ladislas Farago, *The Broken Seal: "Operation Magic" and the Secret Road to Pearl Harbor* (New York, 1968), 379-402. Curiously, one copy of Farago's postscript found in the John Toland papers, which are deposited at the Roosevelt Library in Hyde Park, New York, now has several pages missing, including Leslie Grogan's remarks on pages 385-386. These missing pages are hard to explain; it is difficult to imagine why anyone would want to censor copies made from a *published* paperback.

4. A.J. Barker, *Pearl Harbor* (New York, 1969) , 81.

5. Gordon W. Prange, with Donald M. Goldstein and Katherine V. Dillon, *At Dawn We Slept: The Untold Story of Pearl Harbor* (New York, 1981), 427-428, 772 and 734; and Gordon W. Prange, with Donald M. Goldstein and Katherine V. Dillon, *Pearl Harbor: The Verdict of History* (New York, 1986), 52-53.

6. John Toland, *Infamy: Pearl Harbor and Its*

Aftermath (Garden City, NY, 1982), 278-280 and 285.

7. Rear Admiral Edwin T. Layton, with Captain Roger Pineau and John Costello, *And I Was There: Pearl Harbor and Midway – Breaking the Secrets* (New York, 1985), 261-262.

8. John Prados, *Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II* (New York, 1995), 172.

9. Robert Stinnett, *Day of Deceit: The Truth about FDR and Pearl Harbor* (New York, 1999), 196198.

10. Toland, *Infamy,* 279. See also Franklin Roosevelt Library (FDRL), John Toland Papers (JTP), SS *Lurline* file No. 2, Leslie Grogan, "Record for Posterity," 2. Quotations from *Infamy* are necessary because page 3 of Grogan's ten-page account, a complete copy of which Toland deposited in the FDRL, is now missing. Moreover, the Matson Company was unable to provide a copy of Grogan's account.

11. Ibid., 280.

12. Ibid.

13. Farago, *Broken Seal,* 385.

14. In his account of 10 December 1941, Grogan used the phrase "lower Marine frequency" to represent any frequency on which the Japanese were transmitting. Of course, the "repeat-back" frequency used by the Strike Force had to differ from the frequency used by Japanese shore-based stations sending the original messages, otherwise interference would occur. Grogan's 10 December account did not disclose these frequencies.

15. Farago, *Broken Seal,* 385-386.

16. Boston University, Special Collections, Farago Papers, box 50, folder 2, H.W. Dickow to Ladislas Farago, 24 July 1968.

17. Ibid.

18. Donald M. Goldstein and Katherine V. Dillon (eds.), *The Pearl Harbor Papers: Inside the Japanese Plans, c. 1993* (Dulles, VA, 2000), 258-259.

19. Ibid., 105. Combined Fleet Operational Order No. 5, issued by Admiral Isoroku Yamamoto on 25 November 1941, ordered the Strike Force to "advance to the standby point (42 N, 170 W) by the evening of 3 December," which was 2 December, *Lurline* time.

20. United States, National Archives II (NA II), Modem Military Records Branch (MMRB), Record Group (RG) 80, Pearl Harbor Liaison Office (PHLO) Records, box 41, entry 167F, Lt. Cmdr. Edwin T. Layton, "Memorandum for the Commision," 5 January 1942.

21. LF, also known as long wave, usually denotes frequencies from about 30 to 300 kHz (kilohertz or kilocycles). MF, also known as medium wave, usually denotes frequencies from about 300 to 3000 kHz. HF, also known as short wave, usually denotes frequencies from about 3000 to 30,000 kHz (or 3 to 30 MHz, one megahertz representing 1000 kilohertz). Lower frequencies propagate well along the earth's surface, particularly when high power is used. At night, lower frequencies sometimes propagate as sky waves or "skip," refracting between the earth's surface and the ionosphere over great distances. Higher frequencies, even at low power, propagate exceptionally well as "skip" if the time of day is correct for the frequency in use. For example, 3000 to 6000 kHz HF signals " skip" better at night, whereas 12,000 to 18,000 kHz HF signals "skip" better during daylight hours.

22. For example, see National Bureau of Standards (NBS), "Predictions of Useful Distances for Amateur Radio Communications in January, February and March, 1941," *QST,* XXV, No. 1 (January 1941). 32-33; NBS, " Predictions of Useful Distances for Amateur Radio Communications in April, May and June, 1941," *QST,* XXV, No. 4 (April 1941), 46-47; NBS, "Predictions of Useful Distances for Amateur Radio Communications in July, August and September, 1941," *QST,* XXV, No. 7 (July 1941), 24-25; and NBS, "Predictions of Useful Distances for Amateur Radio Communications in October, November and December, 1941," *QST,* XXV, No. 10 (October 1941), 41-42.

23. Fuchida Mitsuo, "The Attack on Pearl Harbor," in Raymond O'Connor (ed.), *The Japanese Navy in World War II* (Annapolis, 1971), 24.

24. Layton, with Pineau and Costello, *And I Was There,* 369.

25. NA II, MMRB, RG457, SRN-115397, "SRN"

naval messages. Hereafter, SRNs will be cited only by their numbers.

26. United States, National Archives, Pacific Alaska Region (NAPAR), RG 181, A6-2, 13th District Commandant's Office, Regular Navy files, 1941, entry 1, 13/12/7, box 9, Memorandum dated 17 December 1941, from COM13 to RDO Puget Sound; Naval Section Bases 1, 2, 3, 4, 6; NAS Seattle; NAS Tongue Point; Comdt PSNY; Radio Bainbridge; Senior Coast Guard Officer, Seattle; Commander Inshore Patrol; and Inshore Patrol, 17 December 1941.

27. NA II, MMRB, RG 457, SRH-406, Pre-Pearl Harbor Japanese Despatches, entry 9002, box 120, Despatch #436, 24 October 1941, 39.

28. MacArthur Memorial Library, MacArthur Archives, Ca Nachi Papers, reel 547, Combined Fleet Top Secret Operation Order No. 1. Revision of 17 November 1941, 2/4-49 and 2/63, 19 and 26.

29. Ibid., 2/43, 17.

30. SRN-116866, quoted in Frederick D. Parker, *Pearl Harbor Revisited: United States Navy Communications Intelligence, 1924-1941* (Washington, DC, 1994), 62.

31. Quoted in Goldstein and Dillon (eds.), *Pearl Harbor Papers,* 143.

32. For a seemingly authoritative convoy map of the *Kido Butai,* see *ibid.,* 187.

33. Other primary sources discuss USN tracking of Japanese vessels across the Pacific. Contemporaneous primary evidence may be found in the diary of Captain Johan E.M. Ranneft, who served as the Netherlands naval attaché in Washington in 1941. On 2 December, Ranneft visited the Office of Naval Intelligence (ONI) at the Navy Department in Washington and saw a wall map showing that two carriers had "left Japan on an easterly course." On 6 December, Ranneft again visited ONI, finding this time that the two carriers were located west of Honolulu. Given Ranneft's sound reputation with the USN as the officer who provided them with plans for the coveted Bofors Gun, his diary entries are highly credible as evidence of his visit with ONI. As a respected officer, Ranneft was accorded the privilege of observing USN tracking abilities. Ranneft's diary may be found in the Ranneft Papers held at the Royal Netherlands Armed Forces Archives in Amsterdam, Netherlands. For assessments of Ranneft's diary entries, see Toland, *Infamy,* 283; and Alvin D. Coox, "Repulsing the Pearl Harbor Revisionists: The State of Present Literature on the Debacle," in Hilary Conroy and Harry Wray (eds.), *Pearl Harbor Reexamined: Prologue to the Pacific War* (Honolulu, 1990), 122.

34. NA II, MMRB, RG 38, Station H Monthly Report, November 1941, Station H Chronology, 25 November 1941, 110; and Stinnett, *Day of Deceit,* 164. This source was made available through the courtesy of Robert Stinnett, who originally obtained these records through Freedom of Information Act (FOIA) requests.

35. NA II, MMRB, RG 38, Station H Monthly Report, November 1941, Station H Chronology, 26 November 1941, 89; and Stinnett, *Day of Deceit,* 195.

36. NA II, MMRB, RG 38, Station H Monthly Report, November 1941, Naval Movement Reports, 28 November 1941, 111.

37. NA II, MMRB, RG 38, Crane – Inactive Stations, box 3, 5510/4, Naval Security Group (NAVSECGRU), Fourteenth Naval District Combat Intelligence Unit, Traffic Intelligence Summaries, 16 July to 31 December 1941.

38. SRN-115398, quoted in Frederick D. Parker, " The Unsolved Messages of Pearl Harbor," *Cryptologia,* XV, No. 4 (October 1991), 306.

39. NA II, MMRB, RG 38, Station H Monthly Report, December 1941, Station H Intercept Log, 6 December 1941, 98. This source was made available through the courtesy of Robert Stinnett, who originally obtained these records through FOIA requests.

40. Ibid.

41. Parker, *Pearl Harbor Revisited,* 63.

42. NA II, MMRB, RG 38, Station H Report, December 1941, Supervisor's Report, Eve Watch, 2 December 1941, 15.

43. Goldstein and Dillon (eds.), *Pearl Harbor Papers,* 297.

44. NA II, MMRB, RG 38, Station H Monthly Report, December 1941, Station H Chronology, 5 December 1941, 32-33.

45. NA II, MMRB, RG 38, Station H Monthly Report, December 1941, Supervisor's Report –Day Day Watch, 6 December 1941, 39. See also page 38 for a confirmation of Tokyo's transmitting frequencies.

46. United States, 79th Congress, *Hearings before the Joint Committee on the Investigation of the Pearl Harbor Attack* (Washington, DC, 1946), part 18, 3340-3341.

47. SRN-115397.

48. SRH-496, message no. 259, 6 November 1941, 41. "SRH" is the USN designation for an official history.

49. Dale Pollack, "High-Frequency Transmission and Reception," in Keith Henney (ed.), *The Radio Engineering Handbook* (3rd ed., New York, 1941), 535.

50. For an explanation of these procedures, see Independent Wireless Telegraph Company, *Instructions to Operators* (New York, 1926), section 153. As early as 1929, the USN offered free direction-finding on 800 metres (375 kHz) to maritime vessels. See Radiomarine Corporation of America, *Book of Rules: For the Information and Guidance of Radio Operators of the Radiomarine Corporation of America* (New York, 1929), 84. The authors wish to thank communications specialist Brian Holmes for locating these books and offering a technical assessment of their contents.

51. NAPAR, RG 181, A6-1/A1-1, 13th Naval District Commandant's Office, Regular Navy Files, 1941, entry 1, box 9, mailgram no. 080037, COM11 to COM12, 10 July 1941.

52. NA II, MMRB, RG 38, 1300/1, NSRS Philippines, Assignment and Distribution, Crane – Inactive Stations, box 15, Lt. John Lietwiler, Fort Mills, Philippines, to Lt. Robert Densford, Navy Department, Washington, 6 October 1941.

53. W.J. Holmes, *Double-Edged Secrets: U.S. Naval Intelligence Operations in the Pacific during World War II* (Annapolis, 1979), 19-20.

54. NA II, MMRB, RG 38, Records of the Chief of Naval Operations, Translations of Intercepted Enemy Radio Traffic and Miscellaneous World War II Documentation, 1940-1946, box 2684, GL1552-Z-DI, 30 November 1941.