



H-Gram 008: Torpedo Versus Torpedo

3 July 2017

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1. 100th Anniversary of World War I

On 25 June 1917, the Assistant Chief of Naval Operations dropped dead from exhaustion. The pace and intensity of operations, and the accomplishments of the U.S. Navy in the first three months of the war, were truly astonishing, especially given the lack of pre-war planning. Within two months, aided by the U.S. invention of underway refueling, the U.S. Navy had deployed over 30 destroyers to European waters. These were immediately and effectively integrated into the new British convoy system. The decision to send destroyers overseas was controversial, given the surprise visits of a German merchant U-boat (Deutschland) to Baltimore and a combat U-boat (U-53) to Newport, RI, in 1916, and U-53's subsequent



Navy recruiting poster by Henry Reuterdahl, 1917 (69-233-D).

sinking of five merchant ships just outside U.S. territorial waters after leaving Newport. U.S. destroyers were powerless to intervene due to U.S. neutrality at the time. Of great significance, the first U.S. convoy escorted by U.S. warships left New York City on 14 June and arrived safely at St. Nazaire, France with no loss due to U-boats on 26 June, carrying 14,000 troops (including 2,700 U.S. Marines) of the American Expeditionary Force. The arrival of U.S. troops in France so soon was a profound shock to the German High Command, who did not believe that many could be transported so quickly, and a severe embarrassment to the German Navy, who had assured the Kaiser that U-boats would prevent just such an occurrence. Although the vast majority of U.S. troops did not in fact arrive until a

year later, the early and safe arrival of initial elements of the AEF was a huge boost to British and French morale and resolve that contributed (along with war material safely transported by sea) to their ability to withstand the great German offensive in the spring of 1918. For more about the U.S. Navy in the first months of the World War I, please see Attachment H-008-1. Attachment H-008-2 is a famous painting from World War I in the U.S. Navy art collection showing the U.S. destroyer Allen (DD-66) escorting the troopship USS Leviathan (formerly the German liner and auxiliary cruiser Vaterland) transporting some of the 2 million U.S. troops that reached France safely thanks to the U.S. Navy.

2. 80th Anniversary of Loss of Amelia Earhart, 2 July 1937

Eighty-years ago, the famous woman aviator Amelia Earhart and her navigator, Fred Noonan, were lost on a 2,000-mile flight from Lae, New Guinea, to Howland Island on the trans-Pacific portion of her attempt to circumnavigate the globe. Her disappearance resulted in the largest U.S. Navy search since the disappearance of the tug Conestoga in 1921. The aircraft carrier Lexington (CV-2) was dispatched from San Diego, along with her air group and escorts, to spend several weeks searching the remote (and poorly charted, and therefore dangerous) waters in the vicinity of tiny Howland Island. Earhart most likely ran out of fuel while trying to locate the island and crashed at sea. However, given Earhart's fame (and political connections at the highest levels), her disappearance is arguably considered one of the greatest aviation mysteries of all time, and all manner of conspiracy theories and alternative hypotheses have been advanced to explain what happened (and which have sold countless books). There is, however, no credible evidence that she was on any kind of spy mission of Japanese-administered islands on behalf of the U.S. government, although many have tried to make that case. The fuel capacity of her aircraft and the distance off-track of the Japanese Mandate Islands make it virtually impossible that she would have deliberately gone so far off course (in the dark, no less), nor is it likely that she could have ended up there after missing Howland Island (450 nautical

miles in a tangential direction). There is some intriguing new information that outside researchers are working on that may soon become public, which suggests she somehow ended up in Japanese hands, but I remain highly skeptical given the fuel/time/distance issues involved.

3. 75th Anniversary of World War II

Torpedo Versus Torpedo: Before World War II, the U.S. Navy received, and ignored, accurate intelligence about the capabilities of the Japanese Type 93 oxygen torpedo ("Long Lance"). More than 3,100 U.S. Sailors perished because the U.S. Navy did not understand or prepare for Japanese night torpedo attack capabilities and tactics. At the same time, U.S. submarine, surface, and air-launched torpedoes, considered by us to be the most sophisticated in the world, repeatedly failed in combat. Countless opportunities to sink Japanese ships early in the war were lost, along with many U.S. lives as a result. In one of the worst instances of attempted blame shifting in U.S. Navy history, the shore establishment (the Bureau of Ordnance, in particular) refused to believe reports from the field that U.S. torpedoes were defective, and not until tests conducted by operational forces (and bad combat experience) were severe shortcomings addressed. Even until 1943 and into 1944, numerous problems remained, and not until late 1944 did U.S. torpedoes evolve into highly effective weapons. For more on what some historians have called the "Great Navy Torpedo Scandal," please see Attachment H-008-3. Attachment H-008-4 is a photo of a Type 93 torpedo outside of the Navy Department ("Main Navy") in Washington, DC, after it had been found washed ashore on Guadalcanal. Only then, too late for many ships and Sailors, did the U.S. Navy begin to have a full appreciation of the weapon's capabilities.

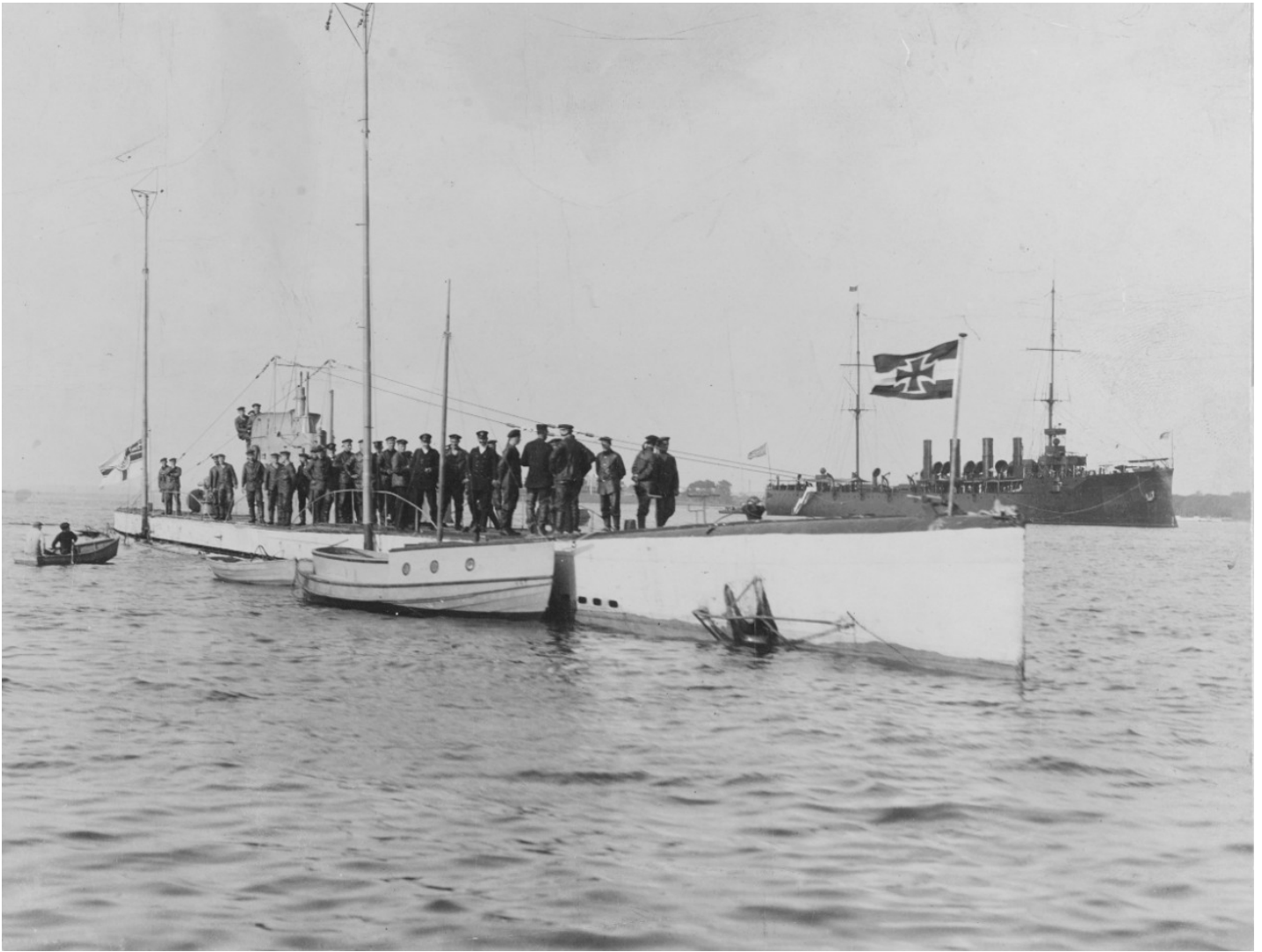
Admiral Ernest J. King, Wartime CNO: Admiral King earned a reputation as the most disliked senior Allied military leader in World War II. Even the normally mild-mannered General Dwight D. Eisenhower suggested that the war effort would be greatly aided if someone would shoot King. Abrasive and blunt, King was nevertheless a brilliant strategist who

achieved extraordinary results. He was not anti-British as many have claimed, nor was he against the strategy of "defeat Germany first" agreed by President Roosevelt and Prime Minister Churchill. However, the British did not believe the Allies would be ready to invade France before 1944 at the earliest, and King argued that in the interim, while the buildup continued, some additional resources should be shifted to the Pacific to take advantage of the victory at Midway. He proposed commencing offensive operations to draw the Japanese into a battle of attrition that the U.S. would eventually win. The results were some truly acrimonious meetings of the U.S. and British Combined Chiefs of Staff that tested the cohesiveness of the Alliance. In King's first months as CNO, he faced profound crises in both the Atlantic and the Pacific, and many historians have blamed him for the U.S. Navy's lack of preparedness to counter the U-boats that (unlike in World War I) Germany immediately sent to the U.S. East Coast. There, before the U.S. was finally able to implement an effective coastal convoy system, they ran amok, sinking over 600 merchant ships in 1942 with a huge loss of life. The disaster that befell the Arctic convoy PQ-17 in July 1942 at the hands of German U-boats and torpedo bombers, during which only 11 ships of the 35-ship convoy made it to Russia, contributed to poor relations between King and the British since PQ-17 was the first joint U.S.-British Navy effort and under British Command. King also arguably has some of the best all-time Navy quotes (most of which never made it into Reef Points.) To read more about King (and his quotes), please see Attachment H-008-5.

4. 50th Anniversary of Vietnam War: Forrestal Disaster, 29 July 1967

Fifty years ago, the aircraft carrier Forrestal (CVA-59) suffered a devastating fire while conducting combat strike operations on Yankee Station off North Vietnam. It was initiated by an electrical malfunction that ignited a Zuni rocket, which fired across the flight deck and caused an unstable bomb to cook off, resulting in a series of explosions and a massive fire that killed 134 men, injured 161, and destroyed 21 aircraft. LCDR John S. McCain III was in the cockpit of one of the first two aircraft hit by the rocket. Lessons learned (and in many cases re-learned from World

War II) had a profound effect on the U.S. Navy's approach to damage-control training, equipment, and ordnance handling, and in many respects are responsible for the comparatively safe operations of the U.S. Navy today. In recent years, numerous highly inaccurate accounts about the Forrestal fire have appeared on the internet. So, if you would like more detail, as accurate as I could make it, please read Attachment H-008-6.



German submarine U-53 at Newport, Rhode Island, on 7 October 1916. She subsequently attacked Allied shipping off the U.S. East Coast. USS Birmingham (Scout Cruiser No. 2) is in the right distance (NH 50090).

H-008-1: World War I 100th Anniversary

*H-Gram 008, Attachment 1
Samuel J. Cox, Director NHHC
July 2017*

So you think your OPNAV tour was tough? On 25 June 1917, Captain William V. Pratt (future CNO, 1930-33) assumed the duties of Assistant Chief of Naval Operations after the untimely death of Captain Volney Chase due to exhaustion. The pace of operations and the accomplishments of the U.S. Navy in the opening months of the war

were profound, particularly considering much contingency planning had been forbidden by the Wilson administration in the lead-up to the war so as not to compromise U.S. neutrality.

On 26 June 1917, the first convoy transporting troops of the American Expeditionary Force (14,000 total, including 2,700 Marines,) escorted by the U.S. Navy, began arriving in St. Nazaire, France only two and a half months after the U.S. declared war on Germany. Taken for granted today, the transport of that many troops in so short a time was an astonishing feat in 1917 and shocked the German high command, which had assured the Kaiser that even if the resumption of unrestricted submarine warfare caused the U.S. to

enter the war on the side of the Allies, there was no way that the United States could get the U.S. Army (then about 17th largest in the world) through the submarine blockade to Europe before the spring of 1918. With Czarist Russia knocked out of the war in the spring of 1917, the German plan was to shift hundreds of thousands of troops from the Russian Front to the Western Front and deal a knock-out blow to the French and British before the U.S. could get into the fight. Actually, the German high command was almost right; the vast majority of American troops didn't begin to arrive in Europe until after the great German offensive in the spring of 1918 had already reached its culminating point. However, the arrival of U.S. troops in June 1917 provided a huge boost to Allied morale and resolve, and the subsequent arrival of vast quantities of war material protected by the U.S. Navy had significant impact on the Allies' ability to hold out until the arrival of 2 million American troops in 1918, which turned the tide and caused the Germans to sue for an armistice.

U-Boats Visit the United States

In a previous H-Gram, I described how the first U.S. destroyers arrived at Queenstown, Ireland, on 4 May 1917—the first U.S. combat forces to reach the European theater—and that the decision to send the destroyers was very controversial within senior leadership of the U.S. Navy. Primary concerns included the fear that sending destroyers to Europe would leave the U.S. East Coast and the U.S. Battle Fleet unprotected against U-boat attack. Although German U-boats did not begin sinking ships off the East Coast until the spring of 1918, the concerns were not unfounded. In fact, two U-boats had already visited U.S. ports, much to the consternation of the U.S. Navy. The first was the German submarine *Deutschland*, a very large submarine built as a "merchant submarine" (but converted to an attack submarine later in the war), which showed up at the entrance to Chesapeake Bay, by surprise, on 9 July 1916, made a port call in Baltimore (with much press hoopla and a warm

public welcome), then left with a cargo of critical strategic materials (tin, nickel, and rubber), and avoided several British and French cruisers that arrived off the Virginia Capes in an attempt to intercept the sub. The British were not amused by this successful effort to avoid the blockade of Germany.

Then, on 7 October 1916, *U-53* brazenly entered Newport, Rhode Island, and anchored for a port call, also completely by surprise. While the U-boat's skipper, *Kapitanleutnant* Hans Rose, paid a courtesy call on Rear Admiral Austin Knight, commander of the naval district, boats filled with curious Newport civilians swarmed the U-boat, and many made it onboard (including a reporter) and were given tours inside the boat. Rose also paid a call on Rear Admiral Albert Gleaves, commander of the U.S. Destroyer Force, onboard his flagship, the scout cruiser *Birmingham* (CS-2.) Knight and Gleaves (with his wife and daughter) then paid a reciprocal call onboard the U-boat. Under naval protocol at the time, it was perfectly legal for a foreign warship to pay a call in a neutral port, as long as it did not stay more than 24 hours. A port call by a combat U-boat, however, was unprecedented, and the wires burned between Newport and Washington, DC, seeking guidance. Before nightfall, Knight ordered the U-boat to leave and the circus ended. However, the next day, *U-53* sank five merchant ships just outside U.S. territorial waters while a large number (16) of U.S. destroyers looked on, with no authority to do anything about it except rescue 216 survivors from the British, Canadian, Dutch, Norwegian, and U.S. merchant ships (the U.S. merchant ship *West Point* had gone down before the destroyers arrived on the scene). *U-53* used traditional "cruiser rules" for sinking the merchant ships: surfacing, firing a shot across the bow, reviewing the ship's papers, and, if "contraband" was found, ordering the crew into lifeboats and sinking the ship with deck gun, torpedo, or demolition charge (*U-53* used all three methods, expending a torpedo on the Canadian liner *Stefano*, which refused to sink despite gunfire and explosive

charge). The sinkings, despite no loss of life, provoked outrage that soured any goodwill generated by the two port calls, and resulted in an embarrassment within the U.S. Navy over the German submarines' ability to act with impunity. When the *Deutschland* returned for a second visit to the United States on 1 November 1916, to New London, she received a very unfriendly reception and also collided with a tug while departing, killing five U.S. seamen. The Germans had definitely worn out their welcome. The next U-boat to reach the U.S. East Coast, *U-151* in May 1918, would not make a port call, but would turn her torpedoes and guns on U.S. merchant shipping.

U.S. Anti-Submarine Actions in European Waters, May-June 1917

Despite internal Navy opposition to sending destroyers to Europe, the Navy did so, and by June 1917 over 30 U.S. destroyers were operating in the Western Approaches to Great Britain and the Bay of Biscay off France against German U-boats. As of 21 May, the British had (finally) adopted the convoy system as the best means to combat U-boat attacks rather than fruitlessly patrolling in open waters. U.S. destroyers were immediately integrated into the British convoy system. In the first weeks, although there were several encounters with U-boats, real and imagined, the U.S. destroyers mostly rescued survivors from ships sunk by U-boats that were not protected by convoy.

On 21 May 1917, *Ericsson* (DD-56) launched a torpedo at a surfaced U-boat that was shelling a Norwegian and a Russian sailing vessel, the first torpedo fired by the U.S. Navy at an enemy in the war. The torpedo missed. The U-boat dived and sank the two sailing vessels with torpedoes of its own, leaving *Ericsson* to rescue survivors.

On 4 June 1917, Chief Boatswain's Mate Olaf Gullickson, commanding the Naval Armed Guard on board the U.S. steamship *Norlina*, opened fire on *U-88*, just as *Norlina* was hit by a torpedo.

Despite two hits, *U-88* survived. (The U-boat's skipper was *Kapitanleutnant* Walter Schwieger, who as skipper of *U-20* had sunk the British liner *Lusitania* in May 1915. *U-88* would hit a mine and be lost with all hands, including Schwieger, in September 1917.) For his quick action, Gullickson would be awarded the Navy Cross, the first of the war (I think.)

On 16 June 1917, *O'Brien* (DD-51) depth-charged and slightly damaged a German submarine. The British were so thrilled (thanks to intercepting and reading German codes) that Vice Admiral Sir Lewis Bayly, Commander-in-Chief of the Western Approaches, put the *O'Brien's* commander, Lieutenant Commander Charles A. Blakely, in for the British Distinguished Service Order (Blakely was also awarded a U.S. Distinguished Service Medal for the same action) and Ensign Henry N. Fallon for a British Distinguished Service Cross (not a bad haul for a near-miss.) Fallon would later receive a Navy Cross for action with another U-boat in September 1917.

U.S. Naval Aviation Arrives in European Theater

On 5 June 1917, the initial elements of the U.S. Navy First Aeronautic Detachment, commanded by Lieutenant Kenneth Whiting (yes, namesake of Whiting Field near Pensacola,) arrived in France aboard the collier *Neptune* (AC-8), while a second element arrived three days later on the collier *Jupiter* (AC-3,) which would later be converted to the first U.S. aircraft carrier, *Langley* (CV-1). The detachment, consisting of seven officers and 122 enlisted men, commenced training on French aircraft, experiencing their first fatality on 28 June 1917, when Thomas W. Barrett was killed in an air crash at Tours, France. Barrett was the first U.S. Navy member killed in France in World War I.

First U.S. Troop Convoy to Europe

On 14 June 1917, the first American Expeditionary Force (AEF) convoy, with 14,000 troops (Army and Marines), departed from New

York City in four groups bound for St. Nazaire, France, under the overall command of Rear Admiral Gleaves (see *U-53* incident above). Each group consisted of three or four troopships (including *Dekalb*—ID-3010—formerly the commandeered German liner/auxiliary cruiser *Prinz Eitel Friedrich*, which had been interned in Norfolk in March 1915 following seven months as a commerce raider in which she sank, among others, the U.S. schooner *William P. Frye* in January 1915, the first U.S.-flagged ship sunk in the war). Each of the groups was also escorted by an armored cruiser (*Seattle*—CA-11), protected cruiser (*Charleston*—CA-19—and *St. Louis*—CA-20), or a scout cruiser (*Birmingham*—CS-2), and three destroyers each. The oilers *Kanawha* (AO-1) and *Maumee* (AO-2) provided underway refueling (which had been done only for the first time on 28 May) for the escorting destroyers. Group 3 also included the armed collier *Cyclops* (AC-4), which would become famous for disappearing without a trace in the “Bermuda Triangle” in March 1918.

As each group approached the Western Approaches/Bay of Biscay, additional U.S. destroyers operating out of Queenstown, Ireland, augmented the escorts. Although there were several reported torpedo attacks (which were probably imaginary), none of the ships was hit by U-boats. On 26 June, while escorting Group 2, *Cummings* (DD-44) spotted a submarine and dropped a depth charge, bringing considerable oil and debris to the surface. Although the U-boat apparently survived, the British richly awarded *Cummings* with a Distinguished Service Order for the CO, Lieutenant Commander George P. Neal, and a Distinguished Service Cross and Distinguished Service Medals for other crew.

On 26 June, Group 1 anchored in the Loire River off St. Nazaire, France, and immediately began disembarking troops. This was to lead to one of the most famous quotes of the war, “Lafayette, we are here!” by AEF Commander Major General John J. Pershing’s “designated orator,” Colonel C. E. Stanton, in Paris on 4 July 1917. Of note, before

Vice Admiral William S. Sims (Commander U.S. Naval Forces Operating in European Waters) went to greet Pershing, he removed his newly acquired third star so as not to upstage the AEF commander, who had yet to receive his promotion.

(My thanks to Dr. Frank Blazich, former NHHC historian, for his research and World War I chronology; to Dr. Dave Kohnen, NHHC Naval War College Museum Executive Director, for his original research on William S. Sims; and Matt Cheser, NHHC historian, for his research on the first AEF convoy. Also, the book *America’s U-Boats* by Chris Dubbs has the best accounts of German U-boat visits to the United States.)



"A Fast Convoy," oil painting by Burnell Poole, depicting Allen (DD-66) escorting Leviathan (ID-1326) in the war zone, 1918 (NH 42690-KN).

H-008-2: "A Fast Convoy"

H-Gram 008, *Attachment 2*
Samuel J. Cox, Director NHHC
July 2017

H-008-3: Torpedo Versus Torpedo

H-Gram 008, Attachment 3
Samuel J. Cox, Director NHHC
July 2017

In 1940, a Japanese “walk-in” source provided the U.S. naval attaché in Tokyo with information on the Japanese Type 93 “oxygen torpedo” (known after the war as “Long Lance”). The Type 93 had a much longer range, was faster, and had a larger warhead than any other known torpedo in the world. The Office of Naval Intelligence (ONI) provided this intelligence, from an “impeccable source,” to the Navy Bureau of Ordnance, which evaluated and dismissed the report in the belief that the Japanese could not have developed a torpedo more advanced than our own, and that the use of compressed oxygen as an oxidizer was too dangerous. Seven U.S. Navy cruisers, nine destroyers, the abandoned aircraft carrier *Hornet* (CV-8), and additional Allied ships were sunk by Type 93 torpedoes during World War II (over 3,100 U.S. Sailors killed), in most cases when the target ships, believing themselves to be safely out of torpedo range, were hit by surprise. The Type 93 and other Japanese torpedoes were reliable; U.S. torpedoes were not, despite being more “sophisticated.” (See H-008-4 for a photograph of a “Long Lance.”)

U.S. Mark 14 Submarine Torpedo

At the start of World War II, the newest operational U.S. torpedoes were the Mark 13 air-launched torpedo, the Mark 14 submarine-launched torpedo, and the Mark 15 surface-launched torpedo. Although each torpedo was different, each version had significant components in common, particularly the Mark 6 magnetic influence exploder (on the Mark 14 and 15.) As passive anti-torpedo defenses of capital ship designs significantly improved as a result of

World War I experience, the United States sought to overcome increased armor, water-tight compartmentation, anti-torpedo blisters, and other features by designing a torpedo that would pass underneath the target ship and detonate several feet below the keel using magnetic influence (similar to modern torpedoes.) The Japanese approach to the same problem was to build a bigger and faster contact torpedo with a huge warhead.

U.S. submarine skippers were the first to realize that U.S. torpedoes had major problems, and they found out the hard way as a result of failed attacks. The skipper of *Sargo* (SS-188) fired 12 torpedoes on 24 December 1941 at four targets—the last four torpedoes with textbook perfect set-up—and none hit. *Seadragon* (SS-194) fired eight torpedoes on her first war patrol in January 1942 for only one hit. Numerous other submarine commanders experienced the same problem. Even the great Lieutenant Commander Dudley “Mush” Morton on *Wahoo* (SS-238) came back empty-handed from a patrol in May 1943 due to faulty torpedoes. On 9 April 1943, the skipper of *Tunney* (SS-282,) Lieutenant Commander John A. Scott, had probably the most frustrating day in the history of the U.S. submarine force, with perfect short-range shots at three Japanese aircraft carriers (*Junyo*, *Hiyo*, and *Taiyo*,) firing all ten tubes without a single hit.

The initial response from the Bureau of Ordnance (BuOrd) was to blame the submarine skippers (“operator error”) because the torpedoes had worked fine in pre-war tests. Actually, they hadn’t. Because of the expense of torpedoes (about \$160K in today’s dollars), BuOrd’s limited budget, and inability of the U.S. industrial base to produce anywhere near enough of the torpedoes required, the U.S. Navy conducted no tests before the war using production torpedoes against an actual target. (The Japanese conducted extensive live-fire tests against target ships.) All U.S. tests used exercise warheads, with an upward looking camera substituting for the magnetic influence

sensor, and since the exercise torpedoes passed under the target ships—as they were supposed to—the tests were deemed a success.

The Mark 14 had several serious flaws, which masked each other. The first flaw detected was that war shots ran about 10 feet deeper than set. Shortly after assuming command of Southwest Pacific Submarines in June 42, Rear Admiral Charles Lockwood ordered a series of tests with submarines firing torpedoes into nets that conclusively proved that the torpedoes were running too deep. By then, Pacific Fleet submarines had fired over 800 torpedoes (a year's worth of production at that time) with very little to show for it. When news of the tests reached CNO Ernest J. King, he turned his famous wrath on BuOrd, which, however, did not save a number of submarine skippers who had been relieved of command for supposedly being incompetent or not aggressive enough (in some cases true, but they certainly were not helped by torpedoes that didn't work).

Once the Mark 14 depth-control issue was recognized, many submarine skippers set their run depths to "zero," which increased the chance of a torpedo broaching. However, even when the torpedoes ran at an appropriate depth, the number of premature detonations and duds greatly increased. This is actually what happened to Scott on *Tunney*: seven of the ten torpedoes he fired at the three Japanese carriers would have been hits except that they exploded prematurely, resulting in only light damage to one carrier. As submarine skippers began to suspect the Mark 6 exploder, nearly all requested permission to deactivate this component, which was denied. As a result, some skippers deactivated the exploders anyway, and in their post-patrol reports inflated the estimated tonnage of their targets to justify expending more torpedoes per target. After he became Commander Submarine Force Pacific, Rear Admiral Lockwood used reports from submarine skippers, as well as intercepted and decoded Japanese radio reports that

documented premature explosions, to request permission from Admiral Nimitz to deactivate the magnetic exploders, which Nimitz promptly granted. Deactivation was ordered on 24 June 1943.

The deactivation of the magnetic exploders solved the premature detonation problem, but revealed that the contact exploder had major design flaws as well, resulting in more duds. Lieutenant Commander Dan Dasplit of *Tinosa* (SS-283) returned from a patrol with convincing data that the contact pistol was defective. Lockwood ordered another series of tests (drop tests and even firing torpedoes into cliff faces) that confirmed the detonators were defective. In fact, torpedoes that hit the target at a 90 degree angle (i.e., a perfect shot) were more likely to fail. The interim fix was for submarines to attempt to hit targets at more oblique angles, and this actually did help reduce the dud problem.

The fourth major problem with the Mark 14 was a tendency to run in circles, with the risk to the submarine that fired the torpedo. Although no U.S. subs are known to have been sunk by a circling Mark 14, this problem was never completely solved. In fact, *Tang* (SS-306,) Lieutenant Commander Richard O'Kane commanding, was sunk on 25 October 1944 by her own circling torpedo, a new Mark 18. *Tullibee* (SS-284) was sunk by a circular run on 26 Mar 1944, but the type of torpedo is unknown.

By early 1944, with fixes finally implemented, the Mark 14 became a very reliable weapon that inflicted enormous damage to the Japanese navy and merchant marine, but it could have inflicted so much more sooner had adequate budget resources been devoted to realistic testing and training before the war and had there been a more expeditious BuOrd shore establishment effort to fix problems identified by submariners—rather than trying to pass the blame back to the sub skippers.

U.S. Mark 13 Air-Launched Torpedo

Like submariners, U.S. aviators quickly began to suspect that their torpedoes were frequently defective. Dismal results with torpedoes during early carrier raids in the Marshalls and at Tulagi fueled suspicions. Although some torpedoes actually hit the Japanese carrier *Shoho* at the battle of the Coral Sea –and worked as designed– there were actually significantly fewer hits than claimed, as many bomb near-misses were mistaken for torpedo hits. No torpedoes hit the Japanese carrier *Shokaku* at Coral Sea, but none of the TBD Devastator torpedo bombers were lost in that attack or during the attack on *Shoho*, either, giving a false sense to U.S. commanders that the TBD/Mark 13 combination was a viable means of attack. This notion was disabused at Midway when nearly every torpedo bomber was shot down without obtaining a single hit. Some reports claim that even before Midway, Vice Admiral Halsey had been so concerned about the TBD's lack of effectiveness and vulnerability that he had no intention to use them in future engagements until dive bombers had thoroughly worked over the targets well in advance. Pre-war tactics ideally called for the dive bombers to drop on target just slightly ahead of the torpedo bombers in order to divert fighters and suppress anti-aircraft fire, giving the torpedo bombers a better chance. At Midway, the torpedo bombers reached the Japanese carriers first and paid the price.

Due to high cost and production shortfalls, pre-war exercises with even exercise torpedoes were extremely rare, but even then showed that the Mark 13 was prone to running at errant angles, running on the surface or too deep, or not running at all, even when dropped at very low speeds. In the case of air-dropped torpedoes, the reason for failure was generally because components of the torpedo were damaged upon impact with the water. The TBD-1 Devastator, the U.S. Navy's torpedo bomber at the beginning of World War II, was not very fast to begin with, but additional speed and altitude restrictions meant

to improve torpedo reliability made the TBD even more vulnerable to enemy fighters and shipboard anti-aircraft fire. A sad irony is that extensive tests conducted after the battle of Midway concluded that the stringent speed and altitude restrictions were actually counter-productive: The reliability of the torpedo had more to do with the angle it impacted the water than with speed or altitude of drop. The slow speed and low altitude caused the torpedo to hit the water on a very flat trajectory that actually resulted in more component damage.

Extensive tests in late 1942 and 1943 revealed twelve major flaws with the Mark 13 torpedo, which resulted in a dual-track solution of making fixes to the weapon while attempting to simultaneously accelerate the development, with significant technical risk, of the Mark 25 torpedo. The development of shroud rings that reinforced the tail fins (frequently damaged in drops) and drag rings, which slowed the torpedo after drop (allowing the aircraft to maintain higher speeds and higher altitudes, while improving angle of entry into the water), had significant positive impact on Mark 13 reliability. Although Mark 13 torpedo performance remained poor throughout 1943, by mid-1944 performance improved markedly, particularly with the addition of radar to TBF Avenger torpedo bombers that provided a precise range to the target. By 1944, Avengers were able to drop the Mark 13 at altitudes up to 800 feet and at a speed of 260 knots, significantly increasing attack profile flexibility and aircraft survivability.

Nevertheless, because of the torpedo bomber debacle at Midway (and the spectacular success of the dive bombers,) the U.S. Navy skewed carrier air group composition toward more dive bombers and fewer torpedo bombers after Midway. The result was that fewer Japanese ships were sunk than might have otherwise been the case, which was a particular factor in the disappointing number of Japanese ship losses due to air attack at the battle of the Philippine Sea

in June 1944. Although Japanese aircraft carriers had design flaws that made them vulnerable to bombs, Japanese surface combatants were very resistant to bomb damage, and numerous ones survived multiple bomb hits to fight another day. Japanese battleships and heavy cruisers were almost impossible to sink with bombs alone, although a cruiser's torpedo banks were vulnerable. The Japanese super-battleships *Musashi* and *Yamato* both absorbed numerous bomb hits and kept on coming; it was improved Mark 13s that sank them (and even then, it took numerous torpedo hits).

U.S. Mark 15 Surface-Launched Torpedo

The Mark 15 torpedo was the standard torpedo employed by U.S. destroyers in World War II, and suffered most of the same problems as the Mark 14 submarine-launched torpedoes. However, it took longer to detect the problems because of fewer opportunities to employ the weapons in the early months of the war. The Mark 15 was designed to have a longer range and larger warhead, which made it longer and heavier than the Mark 14. Despite the differences, the Mark 15 and Mark 14 had numerous components in common, in particular the problematic Mark 6 exploder. Problems with the Mark 15 were not actually solved until after the problems with the Mark 14 were first identified by the submarine community.

U.S. Navy surface torpedo tactics were also seriously flawed, as they were developed in the 1930s without an appreciation for Japanese capabilities. The *U.S. Navy War Instructions* (FTP-143) stated that U.S. cruisers were to avoid night combat unless conditions were favorable (U.S. cruisers had had their torpedo banks removed to save weight, whereas Japanese cruisers retained theirs). As a result, U.S. cruisers were unprepared for night fighting and suffered severely from Japanese torpedo attacks during the Solomons campaign (which will become apparent in the next H-Gram on Savo Island). Under FTP-143, U.S. destroyers were to attack first with guns, but to

reserve torpedoes for capital ship targets. The typical result was that Japanese ships (which held fire until after launching torpedoes) would fire their longer-range torpedoes at the U.S. gun flashes, and numerous U.S. destroyers were sunk before ever having a chance to employ torpedoes (despite the advantage of having radar). Not until the battle of Vella Gulf in August 1943, after numerous engagements in which U.S. destroyers suffered grievous losses, did U.S. Navy destroyers finally successfully execute a surprise night torpedo attack against a Japanese force. Even at the night battle of Surigao Strait in October 1944 (which was a debacle for the Japanese), the number of hits obtained by U.S. torpedoes relative to the number fired was dismally low.

Japanese Type 93 Sanso Gyorai "Oxygen Torpedo" ("Long Lance")

The term "Long Lance" was coined by U.S. Navy historian Rear Admiral Samuel Eliot Morison after World War II, so was not used during the war.

From the early 1920s, the Japanese understood that their battle line would always be outnumbered by the U.S. fleet, initially due to the limitations of the Washington and London naval treaties, but also because senior Japanese naval leaders did have an understanding of, and respect for, U.S. industrial and ship-building capacity. The Japanese expected a war with the United States to unfold in almost the same manner as the U.S. Navy did in War Plan Orange, specifically that the U.S. battle fleet would work its way across the Pacific to a climactic Mahanian duel of battle lines in waters near Japan. Realizing their disadvantage, the Japanese embarked on an extensive effort to develop an asymmetric advantage (long before anyone came up with that term) to attrite the U.S. fleet as it came across the Pacific so that the odds would be more even for the great surface battle. The Japanese solution of choice was the night torpedo attack.

Throughout the pre-war years, the Japanese invested enormous resources in developing night

torpedo attack capability, including extensive realistic nighttime training—despite the inherent dangers. By contrast, the U.S. severely curtailed realistic night training after the Point Honda disaster in September 1923, when seven destroyers ran aground at night at high speed doing exactly that kind of training (I will cover the Point Honda disaster in a future H-Gram). The Japanese invested heavily in improved night optics, searchlights, pyrotechnics, night-scouting flights by cruiser-embarked float planes, and even lookouts specially selected for superior night vision. Extensive live fire testing against actual target ships ensured torpedo reliability.

The culmination of Japanese efforts was the development of the surface-launched Type 93 oxygen torpedo (and the similar, but smaller, Type 95 submarine-launched torpedo). The Type 93 was a 24-inch diameter torpedo with a 1,080-pound warhead, which could range up to 22 nautical miles at 35 knots or 12 nautical miles at 50 knots, but would typically be employed between 6–11 nautical miles from the target (U.S. torpedoes were typically employed within 5 nautical miles). Although U.S. torpedoes were technically more sophisticated with their highly secret Mark 6 exploder, the Japanese weapons were much more reliable, relying more on a brute-force approach. Nevertheless, the use of compressed oxygen as an oxidizer, which was the key to the Type 93's range and size, required the Japanese to successfully overcome numerous significant technological hurdles, which they did through extensive testing and lessons learned from a number of accidental explosions. It took them from the early 1920s until 1935 to do it. Although both the Royal Navy and the U.S. Navy had experimented with oxygen torpedoes (and the British *Nelson*-class battleships carried them in the early 1920s), their development had been essentially abandoned due to the inherent danger of the use of compressed oxygen. Additional advantages of the Type 93 were that it could be fired from outside the range of U.S. searchlights, and the use of compressed oxygen resulted in

very minimal bubble wake (caused by unburned nitrogen in other torpedoes). In many cases, U.S. ships were hit by Japanese torpedoes before they even knew the Japanese ships were there, sometimes believing that the torpedo had come from a submarine.

Because the Type 93 torpedo was potentially as great a danger to its own ship as to the enemy, the Japanese torpedomen were the elite sailors of the Japanese navy and were very highly trained and extremely secretive. The rest of the crew was generally completely unaware of what was really in the "secondary air tank" that stored oxygen for the torpedoes. As the Japanese lost air superiority during the course of the war, ships facing imminent air attack had to decide whether to jettison their Type 93 torpedoes as a precaution. At Midway, the Japanese heavy cruiser *Mogami* jettisoned her Type 93s and survived a severe pounding, whereas *Mikuma* did not, and the explosion of her own Type 93s inflicted fatal damage. At the battle of Santa Cruz in October 1942, the heavy cruiser *Chikuma* survived because she jettisoned her torpedoes, whereas at the battle off Samar in October 1944, a desperately lucky 5-inch shot from the fleeing escort carrier *White Plains* (CVE-66) hit the heavy cruiser *Chokai* in the torpedo bank and she had to be scuttled.

Despite the danger to themselves, the Japanese employed the Type 93 with devastating effect early in the war. Allied forces first encountered the weapon at the battle of the Java Sea in February 1942, when a spread of Type 93s from the unseen heavy cruisers *Haguro* and *Nachi* sank the Dutch light cruisers *De Ruyter* (taking the task force commander Rear Admiral Karel Doorman with her) and *Java*; only through luck were the *Houston* (CA-30) and HMAS *Perth* spared. However, they were to be sunk by the same weapons from the Japanese heavy cruisers *Mogami* and *Mikuma* at the battle of Sunda Strait the next night. Type 93 torpedoes were primarily responsible for the loss of HMS *Exeter* in the Java Sea; *Quincy* (CA-39,)

Vincennes (CA-44), and *Astoria* (CA-34) at Savo Island; *Northampton* (CA-26) at Tassafaronga; *Helena* (CL-50) at Kula Gulf, and of 11 allied and U.S. destroyers. Despite the pre-war intelligence report, U.S. operating forces remained ignorant of the Type 93's true capability at great cost until examples were recovered intact following the Guadalcanal campaign in 1943.



Japanese Type 93 "Long Lance" oxygen torpedo on exhibit outside the main Navy/munitions building complex in Washington, DC, during World War II. This torpedo was recovered from a reef off Point Cruz, Guadalcanal (NH 94125).

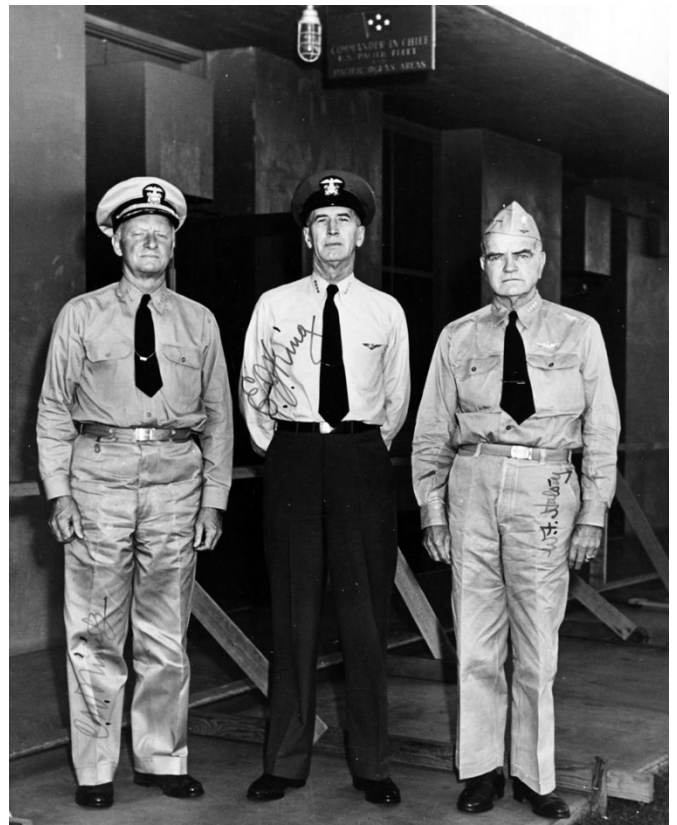
H-008-4: "Long Lance"

*H-Gram 008, Attachment 4
Samuel J. Cox, Director NHHC
July 2017*

H-008-5: Admiral Ernest J. King—Chief of Naval Operations, 1942

H-Gram 008, Attachment 5
Samuel J. Cox, Director NHHC
July 2017

"Brooke got good and nasty and King got good and sore. King about climbed over the table at Brooke. God he was mad. I wish he had socked him." General Joseph "Vinegar Joe" Stillwell wrote this description of an encounter between Admiral Ernest J. King, Chief of Naval Operations and Commander-in-Chief U.S. Fleet (CNO/COMINCH) and General Sir Alan Brooke, Chief of the (British) Imperial General Staff, at the Cairo Conference in November 1943. Brooke described it as "the mother and father of a row." So much for the "special relationship" between the United States and the United Kingdom. The issue in contention, as usual, was a dispute between King and the British regarding allocation of resources between the European and Pacific theaters of operations. Contrary to many historic interpretations, King was not opposed to the Allies' "Defeat Germany first" strategy, nor was he especially anti-British. King was pretty much abrasive and rude to everyone (not just the British) and he believed that as long as the British resisted U.S. Army proposals to land in France as soon as possible, more resources should be shifted in the interim to the Pacific to take advantage of the stunning U.S. victory at Midway. King's view, in a nutshell, was that the Pacific should be getting 30 percent of available resources instead of the 15 percent he claimed it was getting. King was not hostile to the British, or British ideas, but the relationship was certainly far from harmonious, much of which stemmed from events of the first half of 1942.



Admiral Ernest J. King (CNO/COMINCH), center, Admiral Chester W. Nimitz (CINPAC-POA), left, and Admiral William F. Halsey (COMSOPACFOR), right, at CINPAC HQ, Pearl Harbor, Hawaii, 28 September 1943, when King held conferences there. This photo has been signed by all three officers (NH 62645).

King had become Commander-in-Chief, U.S. Atlantic Fleet, in the fall of 1940, when his career was resurrected by CNO Admiral Harold "Betty" Stark. Stark had gotten the CNO position instead of King in 1939, and King had been assigned to be a member of the General Board, generally regarded as a twilight tour for very senior admirals. King was highly intelligent (fourth in his USNA class of 1901) with extensive experience in submarines (he proposed and designed the "Dolphins" pin, although he never earned one), and was a qualified aviator. He had a long and distinguished record for being able to get things done. He also did not suffer fools (or anyone who disagreed with him) gladly, with a leadership style and a volcanic temperament that would probably not survive in today's Navy. King's leadership philosophy can be summed up by a quote when he was a two-star: "I don't care how good they are. Unless they get a kick in the ass every six

weeks, they'll slack off." President Roosevelt said that King, "shaves every morning with a blowtorch." Even his own daughter (one of six) was quoted as saying of her father that "he is the most even tempered person in the United States Navy. He is always in a rage." He also partied hard and had a reputation as a womanizer, and was even upbraided as junior officer by Rear Admiral Charles McVay (father of the skipper of *Indianapolis-CA-35*) for bringing women onboard his ship. Perhaps worst of all, King was an avid reader and proponent of the study of military history (as was Nimitz, for that matter).

After the attack on Pearl Harbor, Admiral Husband Kimmel was relieved of his duties as Commander-in-Chief, U.S. Fleet (CINCUS) and Commander-in-Chief, U.S. Pacific Fleet (CINCPACFLT.) (Before World War II, CINCUS was the senior of the three U.S. Fleets—Pacific, Atlantic, and Asiatic—which was invariably CINCPACFLT.) However, after Kimmel's relief, and in recognition of the "Germany first" strategy, the CINCUS title passed to CINC Atlantic Fleet Admiral King on 30 December 1941. On being tapped to be CINCUS, King was widely reputed throughout the Navy to have said, "When they get in trouble, they send for the sons of bitches." When asked near the end of the war if he really said that, King replied that he hadn't, but if he had thought of it, he would have. The CNO, Admiral Stark, was also a casualty of Pearl Harbor, although he received more gentle treatment than Kimmel. King was selected by President Roosevelt to relieve Stark, who retained four stars and was reassigned as the new Commander, U.S. Naval Forces Europe. On 18 March 1942, King became CNO and retained CINCUS responsibility, although he immediately changed the acronym from CINCUS ("Sink Us") to COMINCH. King was the first and last to hold both positions simultaneously; he was also the first qualified aviator to serve as CNO. The Assistant CNO, Rear Admiral Royal Ingersoll (whose son would be killed in a "friendly fire" incident at Midway), received a third star and relieved King

as CINCLANTFLT (and got his fourth star in July 1942).

As CINCUS, King had responsibilities in both the Atlantic and the Pacific, and faced extreme challenges in both. Exercising oversight of both Admiral Nimitz in the Pacific and Vice Admiral Ingersoll in the Atlantic, King found the situation dire in both. Previous H-Grams have covered the situation in the Pacific, and in one I described the beginnings of the "Second Happy Time" for German U-boats on the U.S. East Coast. After Germany declared war on the United States, and the United States reciprocated, the head of the German submarine force, *Vizeadmiral* Karl Dönitz, wasted no time in seizing an opportunity to take the war to our shores before we were ready. Operation *Paukenschlag* (literally "Timpani Beat," although usually translated as "Drumbeat") commenced in January 1942 with the arrival of five Type IX long-range U-boats. Although the Type VIIs were much more numerous, they lacked the endurance to sustain patrols off the U.S. East Coast, at least initially (by mid-1942, the innovative Germans had figured out ways to do it). Although Dönitz's assets were limited, the first few U-boats ran amok. Successive waves of U-boats also had great success, and, in the late spring, U-boats began operating in the Caribbean (threatening oil supplies from Venezuela) and even in the Gulf of Mexico (Operation *Neuland*). During 1942, U-boats would sink over 600 ships (over 3 million tons,) killing thousands of merchant seamen. Although the scale of losses did not equal that of the unrestricted U-boat boat campaign in 1917, which almost brought Britain to its knees, and brought the United States into World War I, it did represent about a quarter of all losses to U-boats during World War II. The Germans lost about 22 U-boats in the process, although very few in the opening months.

The fact that the U.S. Navy was so unprepared to deal with the arrival of U-boats on the U.S. East Coast has been roundly criticized by many historians, especially since the U.S. Navy had been

engaged in an undeclared war with U-boats for many months before Pearl Harbor. Much of the blame has been heaped on King, some deserved, most not. The unlikeable King makes for an easy target, but there were many factors that resulted in what was effectively a disaster as great as Pearl Harbor in terms of ships sunk and lives lost. British naval Intelligence provided timely warning to the U.S. that the first U-boats were on the way, but little was done with it. The Commander of the U.S. Eastern Sea Frontier, Rear Admiral Adolphus Andrews, had very little to work with, at least initially, with only 100 or so aircraft along the entire coast, and a number of U.S. Coast Guard cutters that were brought under Navy command. Given the lessons learned from World War I, the U.S. failure to immediately implement a convoy system along the U.S. East Coast has attracted a lot of historical "analysis." There were certainly cases in which U.S. destroyers were inappropriately apportioned, and some were occasionally idle in port while merchant ships were being sunk almost within sight. Nevertheless, the destroyer force was actually heavily tasked and generally in very short supply. Most were committed to escorting transatlantic convoys providing troops and critical war materials to the British war effort, and others to escorting U.S. Navy ships operating in the Atlantic to guard against forays by the German surface navy, as the battleship *Bismarck* had done earlier in 1941.

What the U.S. sorely lacked was the large number of small anti-submarine craft ("sub-chasers") like the hundreds that had been hastily built in World War I, but no longer existed. With insufficient escorts, King, Ingersoll, and Andrews reasoned that congregating coastal merchant ships into inadequately protected convoys would only make the U-boats' job of sinking large numbers of ships even easier and more efficient. This was not because King was anti-British or anti-convoy, but a matter of scarce resource allocation. It was, however, arguably arrogant on King's part to initially refuse the British offer to send smaller

escort ships to the U.S. east coast. By this point in the war, the British had those types of small escorts in comparative abundance, which is how they had ended the U-boats' first "Happy Time" in 1940. Eventually, the U.S. relented, and in March 1942, the British deployed 24 anti-submarine trawlers and 10 corvettes to the U.S. East Coast to assist, and 53 Squadron of the Royal Air Force Coastal Command (flying U.S.-made Lockheed Hudson aircraft) operated out of Quonset Point, Rhode Island.

The critical situation was also not helped by the initial refusal of the U.S. government to order coastal cities to turn out their lights at night, because of counter-arguments that this was bad for tourism and business. The German U-boats' tactical preference was to attack ships on the surface at night with deck guns so as to conserve torpedoes for the most lucrative targets. With lone coastal merchant ships backlit by coastal cities, the U-boats had easy pickings, sinking ships within sight of the U.S. coast. Eventually coastal blackouts were implemented (and implementation of strict gas rationing pretty much solved the tourist problem.) Some improvement was noted in April 1942 after Rear Admiral Andrews issued enforceable orders that coastal shipping traffic could only transit during daylight hours between protected ports. Numerous small craft were requisitioned by the Navy and put into service as coastal patrol boats. However, the first coastal convoy did not occur until 14 May. The implementation of escorted convoys on the East Coast had rapid positive effect, which is what prompted the Germans to shift their main effort to the Caribbean and Gulf of Mexico. Eventually the extension of the convoy system to those areas as well significantly cut down on losses to U-boat attacks, and brought about the end of the "Second Happy Time."

Nevertheless, convoys were not a panacea, and the experience of Arctic convoy PQ-17 in early July 1942, as the first joint U.S. and British effort under British command, was a total disaster, and

served to further sour relations between King and the British. PQ-17 was a 35-ship convoy that departed from Iceland on 27 June 1942 en route to the Soviet Arctic port of Arkhangelsk, carrying desperately needed war supplies to the Russians, then facing a second summer of offensive operations by the German army. The convoy included 23 U.S. merchant ships, with close escort provided by British ships. A covering force consisting of British cruisers and destroyers, and the U.S. cruisers *Tuscaloosa* (CA-37) and *Wichita* (CA-45), and two American destroyers trailed behind to guard against any sortie by German surface combatants, including the battleship *Tirpitz*, which were then based in northern Norway. An additional heavy covering force was also on alert, which included a British aircraft carrier and battleship, and the new U.S. battleship *Washington* (BB-56.) *Washington* had been detached from U.S. Task Force 39, which had been established by King and also included the U.S. aircraft carrier *Wasp* (CV-7.) The battleship would go on to a stellar combat record in the Pacific, but began her career with the dubious distinction as the only U.S. ship to lose an admiral overboard. On 27 March 1942, the first commander of TF-39, Rear Admiral John W. Wilcox, Jr., was washed overboard in heavy seas, and his body was never recovered. The board of inquiry was unable to determine exactly how and why it happened.

Although 12 previous convoys had gone from Great Britain to Russia with the loss of only one ship out of 105, German intelligence provided ample warning of PQ-17 and the Germans were ready. The Germans also ignored a returning convoy in ballast, and either failed to detect or ignored two decoy convoys. Initially, convoy PQ-17 went reasonably well; a couple of ships turned back due to engine casualty or ice damage, and a couple were lost to U-boats. On 4 July, concerted German air attacks by dive bombers and torpedo bombers went after the convoy. During the attacks, the American destroyer *Wainwright* (DD-419) distinguished herself by damaging multiple

German aircraft and severely disrupting multiple waves of German torpedo bombers (including a last wave of 25 Heinkel He-111 bombers) so that only a few torpedoes found their mark on merchant ships. However, after that, everything went to hell.

German surface ships did sortie to intercept PQ-17, but that turned into a fiasco of its own, when the German heavy cruiser *Lützow* and three destroyers ran aground in fog, followed by some chaotic German command and control and return of the rest of the ships, including *Tirpitz*, to port without engaging. However, when British reconnaissance aircraft detected *Tirpitz* missing, the British First Sea Lord, Admiral Sir Dudley Pound, issued orders for the covering force to withdraw and for the convoy to scatter and continue to Russia. Scattering the convoy was deemed the best defense against surface ship attack. The result was a bloodbath as German bombers and U-boats picked off one lone merchant ship after another, and merchant ships were scattered all over the Barents Sea, some taking refuge in the ice, and some in inlets on Novaya Zemlya. It wasn't until 25 July that the last of the surviving merchant ships made it into Arkhangelsk. Twenty-four of the merchant ships were sunk, with the loss of 153 merchant seamen in the frigid Arctic waters. Only five of the U.S. merchant ships made it to Russia, although one other ran aground and was recovered later. The Germans lost five aircraft.

The debacle of PQ-17 resulted in a suspension of Arctic convoys, with the next one not leaving until September 1942, with a radical increase in close escorts, and overhaul of escort procedures. It also resulted in a diplomatic flap, as Soviet dictator Josef Stalin refused to believe that almost an entire convoy could be lost, and accused the Allies of lying about how many ships had been sent in the first place and reneging on their pledges of support. An investigation into the affair came to naught, since it was the First Sea Lord himself who had given the order to scatter, and it

was considered politically unpalatable to hold him publically accountable. British Prime Minister Winston Churchill described the PQ-17 affair as "one of the most melancholy naval episodes of the whole war." Rear Admiral Daniel V. Gallery, then based in Iceland, called it a "shameful page in naval history." Admiral King was disgusted by the whole affair, withdrew TF-39, and sent *Wasp* and *Washington* to the Pacific (although he was probably looking for an excuse to do so anyway), where they served in the waters off Guadalcanal, which will be the subject of the next H-Gram.

And lastly, just for my friends at CHINFO: When asked about the U.S. Navy's public relations strategy for dealing with the press early in the war, King responded, "Don't tell them anything. When it's over, tell them who won."



Smoke from the burning Forrestal, as photographed from the flight deck of USS Oriskany (CVA-34), off Vietnam, on 29 July 1967. Planes on deck are A-1 Skyraiders and F-8 Crusaders (NH 1125490).

H-Gram 008-6: USS Forrestal Disaster, 29 July 1967

*H-Gram 008, Attachment 6
Samuel J. Cox, Director NHHC
July 2017*

On 29 July 1967, Forrestal (CVA-59) experienced a severe fire while operating on Yankee Station off Vietnam that killed 134 Sailors and aviators, injured 161, and destroyed 21 aircraft. This was (and remains) the second worst loss of life on a U.S. Navy ship since World War II. The disaster resulted in a very long list of lessons learned

(many of which were “lessons forgotten” from carrier conflagrations during World War II), which transformed the U.S. Navy’s approach to firefighting, damage control, and ordnance handling in the decades since. In recent years, articles have appeared on the internet that are extremely inaccurate and generally intend to unfairly tarnish the reputation of Senator John S. McCain III, who survived the fire.

At 1050, Forrestal commenced early launch of two KA-3B tankers, an EA-1, and an E-2A in preparation for an 1100 launch of a 24-plane Alpha Strike, the second of the day. At that time, a VF-11 F-4B (No. 110,) was spotted on the extreme starboard quarter of the flight deck. As the pilot of

F-4B 110 shifted from external to internal power, multiple electrical malfunctions ignited one of the four 5-inch Mk-32 Zuni unguided rockets in a pod on external stores station 2 (port inboard station), which fired across the flight deck and struck VF-46 A-4E No. 405, piloted by LCDR Fred White, rupturing its fuel tank, igniting the fuel, and initiating the fire. Although the board of investigation reached the opinion that the Zuni rocket hit 405, there is some ambiguity in eyewitness accounts as to whether the rocket hit 405 or the plane next to it, 416, piloted by Lieutenant Commander John McCain. The rocket itself actually impacted the ocean beyond both aircraft. Regardless, shrapnel ripped into both aircraft, and both were immediately sprayed by fuel; a pool of fuel ignited between and under the two aircraft. Both pilots initially escaped from the flames around their aircraft.

The impact of the Zuni rocket dislodged at least one, probably two, 1,000-pound AN-M65A1 bombs, which fell into the flames. The outdated AN-M65s were being used because of an acute shortage of Mark 83 general-purpose 1,000-pound bombs resulting from the intense Navy bombing campaign in North Vietnam, which expended bombs faster than they could be produced. The AN-M65 bombs had been brought aboard the day before, were over a decade old, in very poor condition, considered an extreme safety hazard by the commanding officer of Forrestal, Captain John Beling, and, according to the ship's ordnance officer, were an imminent danger to the ship and should be jettisoned overboard. Doing so, however, would have necessitated scrubbing that day's combat mission over North Vietnam, so Captain Beling reluctantly accepted the risk.

Damage Control Team Eight, led by Chief Aviation Boatswain's Mate Gerald Farrier, which had received specialized flight-deck fire-fighting training, immediately reacted to fight the fire. Based on their training with Mark 83 bombs, they expected to have approximately ten minutes to

extinguish the fire around the bomb before there was risk of the case melting or cooking off with a designed very low-order explosion. Chief Farrier immediately smothered the bombs with a PKP ("Purple K") extinguisher in order to cool them. However, the AN-M65s were not only unstable. Their age and chemical composition actually enhanced the power of the blast (the exact opposite of a Mark 83). A little more than one minute after the fire started, one of the bombs fractured open, and Chief Farrier immediately ordered his team to withdraw, fearing an imminent cook-off. At one minute and 34 seconds, the bomb exploded, killing Chief Farrier and almost his entire team (only three survived severely injured,) and also killed Lieutenant Commander White. A second bomb exploded nine seconds later and a chain reaction followed.

Both White's and McCain's A-4s, fully fueled and loaded with ordnance, were destroyed by the blast. Per the initial mishap board ("Informal Board of Investigation") report, "In period of four minutes, seven major explosions shook the entire ship and some 40,000 gallons of jet fuel from aircraft spotted on the flight deck was ignited and contributed to the damage. Fire-fighting teams, pilots, and squadron personnel on deck were knocked down, injured or killed by the series of explosions. The fire spread with the first explosion to every aircraft across the entire after part of the flight deck. Seven holes were ripped through the deck from explosions of 750 lb., 500 lb., and 1000 lb. bombs. Rockets and 20mm shells shot across the deck, and ejection seats fired into the air." Actually, later analysis indicates at least nine bombs exploded on the flight deck, eight of them AN-M65's with significantly enhanced blast over a normal 1,000-pound bomb. Other bombs on the flight deck performed as designed and did not detonate due to the fire.

Most of the pilots on the aft of the flight deck were able to escape, but two more (besides White,) Lieutenant Dennis Barton and Lieutenant Commander Gerry Stark, were killed in the

explosions. McCain was helping another pilot who was on fire when the first explosion occurred and he barely escaped by rolling into the port catwalk as other bombs exploded; he then proceeded to assist ordnancemen on the hangar deck in jettisoning bombs over the side to prevent them from exploding as well. (Three months later, on 26 October 1967, flying from Oriskany–CVA-34– Lieutenant Commander McCain would be shot down over North Vietnam on his 23rd bombing mission.)

The bomb blasts blew large holes in the flight deck, and flaming fuel poured down into the hangar bay and berthing compartments in the aft end of the ship, accounting for many of the casualties. Some of the burning fuel was spread by untrained hose teams using water on a fuel (Class B) fire, in some cases washing away foam laid by other teams and reigniting the fire. The death and incapacitation of the entire specialized fire-fighting team in the initial explosion had critical impact. By the end of World War II, as a result of lessons learned during the war, most Sailors on ships had received training in fighting shipboard fires. By 1967, the U.S. Navy had reverted to the Japanese model at Midway with specialized, highly trained damage-control and fire-fighting teams, but most of the crew was not trained. Doing so probably saved some money, but the result in crisis was heroic, but uncoordinated, often ineffective and counter-productive efforts by untrained teams that resulted in needless additional deaths and injuries. Nevertheless, the ad hoc firefighting teams of Sailors and Marines had the fire on the flight deck out by 1215. However, the fires below decks, spread by the burning fuel on water, were much more difficult to put out, with the last one not extinguished until 0400 the next day. The damage to Forrestal was so severe that she had to come off Yankee Station for repairs, commencing post-repair sea trials in April 1968.

The Navy investigation absolved Captain Beling of responsibility for the fire. Beling, who had been in

has cabin at the time, and supervised the damage control effort in his T-shirt, displayed considerable leadership throughout the harrowing 11-hour ordeal. Nevertheless, the initial board of investigation stated, "Poor and outdated doctrinal and technical documentation of ordnance and aircraft equipment and procedures, evident at all levels of command, was a contributing cause of the accidental rocket firing." At that time, such a state was not unique to Forrestal. The Commander in Chief of the Atlantic Fleet (to which Forrestal was assigned when not deployed), Admiral Ephraim P. Holmes, did not concur with some of the results of the final investigation report, specifically the part that cleared Captain Beling. Holmes appended a Letter of Reprimand for Captain Beling to the final report, which was removed by direct order of CNO Admiral Thomas Moorer. Beling made flag, but his orders to command a carrier battle group were cancelled by new CNO Admiral Elmo Zumwalt, and Beling was reassigned to command of the Iceland Defense Force, from which he retired as a rear admiral.

The Forrestal disaster was the second (and worst) of three serious U.S. Navy carrier fires in the 1960s. In the first, Oriskany suffered a fire on 26 October 1966 on Yankee Station that killed 44 and injured 138 when a magnesium parachute flare was accidentally ignited (human error) and a panicked Sailor threw it back into the magnesium storage locker instead of overboard; many of the dead were pilots killed by toxic smoke inhalation in their sleep. The third disaster occurred on Enterprise (CVA[N]-65) on 14 January 1969, while she was en route to Vietnam. It killed 28 and injured 314, and destroyed 15 aircraft when hot exhaust from an improperly placed aircraft starter ignited another Zuni rocket and started a series of explosions. In the case of Enterprise, lessons learned from Forrestal (and not having old and unstable ordnance on board) resulted in the fire being contained more rapidly with fewer casualties. Enterprise put in for repairs at Pearl Harbor and continued en route to Vietnam in

March 1969, although she was diverted to Korean waters due to the North Korean capture of Pueblo (AGER-2.)

The Forrestal fire resulted in many lessons learned (and re-learned) and resulted in significant changes in the U.S. Navy in training for shipboard damage control, the biggest being (re)-institution of firefighting training for all crewmembers. Another was the installation of a flight-deck washdown system that could spread water or foam as needed, with the first being installed on Franklin D. Roosevelt (CVA-42) during her 1968-69 refit. Another major change was establishment of the Weapon System Explosives Safety Review Board. The training films Learn or Burn (which included film from the flight-deck PLATT camera that filmed the entire Forrestal event) and Trial by Fire: A Carrier Fights for Life have influenced countless firefighting, damage-control, and recruit-training classes. Even I remember from my midshipman days, "the Chief with the Purple K" – Chief Farrier – who sacrificed his life trying to buy time for aviators to escape their jets before the flames spread.

Of note, the greatest loss of life on a U.S. Navy ship since World War II was 176 killed when Hobson (DMS-26) broke in half and sank after a collision with Wasp (CV-18) on 26 April 1952.

(My thanks to Dr. Richard Hulver, NHHHC historian, for sifting through mounds of official documentation, sometimes contradictory, so I didn't have to read it all myself. Due to the extent of the damage to Forrestal, there are still details that remain unknown.)