# “THOSE MARVELOUS TIN FISH”

## THE GREAT WORLD WAR II TORPEDO SCANDAL AVOIDED

### AN ALTERNATE HISTORY SCENARIO

**BY**

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*Author’s note: Alternate history writing uses some abbreviations not normally familiar to the general public. ITTL: in this time line. OTL: original timeline. POD: point of divergence. A POD is a change in the original timeline that creates the new timeline. In this case the POD is Roosevelt’s tour and Josephus Daniel’s G.O. 457, which did not exist in reality.*

***PROLOGUE, APRIL 2, 1945, PEARL HARBOR, HAWAII***

Fleet Admiral Chester W. Nimitz sat back in his chair and stared out the window of his office at the harbor full of stately grey warships. He used this moment to gather his thoughts and massage a sore writing hand. He was at the end of a rough draft of a lengthy letter to President Roosevelt concerning the recent victorious end to the Pacific campaign. There were rumors that the President was not feeling well and thus Nimitz felt rushed to get the report finished and off to Washington as soon as possible. He paused a moment longer and then returned pen to paper:

“*The importance of those marvelous tin fish to our ultimate victory over the Japanese Empire simply can not be overstated. Torpedoes proved to be one of the key weapons in this struggle, and without their unimpeachable performance I fear this deadly contest would still be raging. With them, we impeded Japanese naval operations from the very beginning, and torpedoes enabled us to virtually destroy their maritime ability to resupply their forces and sustain their home economy. The complete collapse of the Empire a month ago was enabled in large part by those wonderous underwater missiles. In 1919 when I was on the battleship South Carolina I followed your efforts at reorganizing our Navy’s torpedo infrastructure with a great deal of interest, but with some justifiable skepticism. The ultimate results of your hard work are plainly apparent to me now. You can take a great deal of justifiable pride in knowing that those efforts paid off so handsomely all these years later. On behalf of the entire United States Navy, I would like to pass on a simple but heartfelt, Thank You.*”

***JUNE 1919, WASHINGTON, D.C.***

Assistant Secretary of the Navy Franklin D. Roosevelt hurried through the sweltering environs of Washington and arrived early for his meeting with his boss Secretary of the Navy Josephus Daniels. There was a move afoot, now that the Great War was over, to demobilize the armed forces. There was a common belief that the arms race of the early 1910's had exacerbated the tensions that led up to the war, plus the horrors of trench warfare and the depredations of the war at sea in the Atlantic had led to a feeling amongst many that positive steps had to be made to disarm so as to prevent war from ever happening again. Roosevelt felt this was all rubbish, and had fought to preserve his beloved Navy. He had already been successful in resisting a move to eliminate naval aviation and could only suspect that Daniels had summoned him to further his efforts.

Sure enough, Daniels had been receiving inquiries from senators in the New England states about the Navy's torpedo research, development, and production capacity. There were some requests to consolidate all of these efforts into one facility at the Naval Torpedo Station (NTS) Newport Rhode Island. Daniels needed more information before he could make a decision so he charged the 37-year-old Roosevelt with making an inspection tour of all of the Navy's torpedo facilities and deliver him a detailed report no later than the end of July.

Roosevelt immediately made the arrangements and departed on his tour 10 days later. He toured NTS Newport, NTS Alexandria, Virginia, and the E.W. Bliss Company of Brooklyn, NY, a civilian manufacturer of torpedoes. In typical Roosevelt fashion, his tour was detailed and lengthy, leaving no stone unturned. He inspected production lines, research facilities, and testing labs. As the tour progressed, he became increasingly excited at the potential of the torpedo, and became convinced that it was the "weapon of the future". The scientific expertise of the engineers at Newport deeply impressed him, as did the production acumen of the employees at the Bliss company. He used his influence to arrange a viewing of live firing tests and went to sea aboard the destroyer USS *Stevens* (DD-86), and the submarine USS *O-1* (SS-62), becoming thoroughly familiar with the employment of the weapons in a war scenario. On the 14th of July he witnessed the earliest tests of a live Mk 7 Type D torpedo airdropped from a Curtiss R-6L floatplane in Narragansett Bay. Utterly thrilled at seeing the aerial employment of the torpedo and fully understanding the long-range implications of this test, he returned to his office in late July to develop his report for Daniels.

The report was submitted on 01 August 1919 and was titled *The Assistant Secretary of the Navy's Report on the Research, Development, and Production of Torpedoes for the United States Navy.* It proved to be Roosevelt's seminal work while in office. His deeply felt enthusiasm for these weapons came through in his eloquent prose and at the end of the report he recommended the following courses of action:

1. NTS Newport shall become the center of all research, development, and testing efforts for torpedoes.
2. NTS Alexandria shall remain open as the primary government owned production facility, taking the designs developed at Newport and putting them into mass production. They will have a secondary task of backing up Newport with expanded testing facilities.

3. It is vital to maintain a secondary production source, so the E.W. Bliss Company should be allowed to continue to bid on production contracts. Seed money for the improvement of their production and testing facilities should be provided.
4. A Torpedo Development Council shall be established, chaired by the Assistant SecNav. It shall consist of senior representatives from Newport, Alexandria, and the Bliss company. The council will meet six times a year in Washington and will be charged with developing naval policy on the combat use of torpedoes for the SecNav, developing new projects, reviewing the progress on existing projects, and clearing production roadblocks and red tape in the undersea weapons community.
5. A Fleet Liaison Office shall be established in Newport. It will consist of officers and senior enlisted personal with fleet experience from the three major communities (surface, subsurface, and air). The office will be charged with observing all aspects of torpedo research and development, and a Liaison office representative shall be present at all testing evolutions, providing feedback and fleet context to the engineers. The office will be commanded by a full Captain and he will report directly to the Assistant Secretary. He will also be a primary member of the Torpedo Development Council.
6. With testing being an integral part of a successful development program, adequate funds shall be provided to ensure the success of the development efforts. Every effort shall be expended in providing Newport with realistic targets in the form of decommissioned ships, with the intent of conducting as much live testing as it practical.

Daniels took two weeks to digest the voluminous report. He knew full well that this would be an uphill battle with congress as funding was going to be tight, but Roosevelt's enthusiasm energized him to persevere. In the end he decided to implement all of Roosevelt's recommendations. Reformatted, the report became part of Navy Regulations as Secretary of the Navy General Order 457, effective 01 September 1919.

*Author's note: This is the POD for this story. None of this actually happened. Alexandria shut down and the Bliss company eventually folded. The Navy's torpedo R&D and production infrastructure became centralized in Newport. The facility became isolated from the fleet and became an insular sanctuary for officers and technicians who came to believe in their own unimpeachable brilliance. When combined with a post-war disarmament mindset and generalized lack of funds for the military, torpedo R&D became stunted and uninspired, with little or no oversight. This is the root cause of the Great Torpedo Scandal.*

***GETTING STARTED, 1919-1922***

This was a period in which the Council got organized and established itself as an adjunct to the Bureau of Ordnance. General Order 457 was supported by some and opposed by others. Daniels and Roosevelt immediately ran into opposition from newly elected Congressman Clay Burdick of Rhode Island. A banker by trade, Burdick proved to be a thorn in the side of G.O 457, as his conservative financial views argued against an expansion of weapons development. Daniels persevered however and G.O. 457 continued, although at a slower pace than originally intended.

Getting the organization squared away was the first priority. At first Newport strongly opposed the formation of the Council, believing that they didn't have to answer to anyone. Daniels and Roosevelt strong armed them into compliance, throwing them the bone of being the center of the science end of the effort. The remaining production lines at Newport were closed down and all production moved to Alexandria and Bliss. Bliss had worked through its contract for the 18" Mk 7, and was now heavily involved in the newer 21" Mk 8 for the flush deck destroyers that were still rolling off the building ways. Bliss was a bit behind in that regard and so the contracts for the new Bliss designed Mk 9 and 10 submarine torpedo were taken over by Alexandria, which used the opportunity to iron out the intricacies of a modern production line. Bliss initially protested this to the TDC, but they were mollified a bit when the first part of the seed money for facilities improvement came their way after a battle with Burdick and his committee.

Daniels was dismayed when Roosevelt resigned in 1920 to pursue the Democratic nomination for Vice President under James Cox. Roosevelt soothed Daniels somewhat by promising to remain involved with the project as much as possible, a promise he kept to the end of his days. President Wilson appointed Gordon Woodbury of New Hampshire to the post and he served ably until the end of the Wilson administration.

The election of Warren G. Harding brought in Edwin Denby to the office of SecNav. Daniels passed on his enthusiasm for G.O 457 by "pulling a Roosevelt" and arranged a guided tour for Denby of Newport and Alexandria. He even had him witness an aerial torpedo drop and a firing by a destroyer. The Michigander was suitably impressed and became a diehard supporter. In a move that both surprised and pleased the outgoing Daniels, Theodore Roosevelt Jr. was named to the post of Asst. SecNav and thus inherited the chairmanship of the all-important Torpedo Development Council. FDR and TR Jr. put aside their family differences and FDR passed on to his cousin all that he had learned and believed about the tin fish and their potential, and in the end TR Jr. shared his cousin's passion.

Another task the TDC took on after getting organized was to take stock of the Navy's current inventory of torpedoes. Following a suggestion from the Fleet Liaison Office (FLO) It was decided to simplify things and in 1922 all torpedoes prior to the Mk 7 were declared obsolete and were removed from service. This greatly eased maintenance and training issues and cleared out inventories so that the more modern weapons could replace them.

*Author's note: Not a lot of changes here from the OTL, with the exceptions of the activities of the TDC and the FLO.*

***TESTING EFFORTS AND THE SEARCH FOR A BIGGER BOOM, 1923***

The first meeting of the Torpedo Development Council in 1923 had two major agenda items to discuss. Input from the Fleet Liaison Office had indicated that the operating forces were not satisfied with the size and power of the torpedo warheads. A comparison with publicly known data from other navies showed that indeed the USN torpedoes were lagging behind in that regard. Several years ago TNT had replaced the traditional wet guncotton and had proven to be a nice step up in power, but there was still a desire to get more bang for the buck. It was resolved that there were two courses of action. First off you could

increase the physical size of the warhead section. This proved to be problematic as it would change the operating characteristics of the weapon and would make them potentially incompatible with existing torpedo tubes. After much debate it was realized that by increasing the density of the packed TNT you could also increase the explosive power. This would require a test series in order to recalibrate the weapon's depth setting mechanism due to the warhead's increased weight. There was some objection to this mostly based on the cost of the testing, and the Newport faction (prodded by Burdick) pointed out that mathematical calculations could be made and the depth mechanism adjusted accordingly without the need to run expensive tests. It was proposed that the explosive warhead be replaced with a water filled one so that the weapon could be recovered and bench tests made to ensure that the weapon was operating correctly. Although Newport still objected they were overruled and a testing program for the Mk 8, 9, and 10 weapons was drawn up.

The second course of action was to investigate the use of different explosives. TNT had been the gold standard for years now, but there was promising new research going on in both Europe and the United States on a compound known as hexogen (also as known as cyclonite). Two different patents (one in the UK and one in the US) had been obtained. The council resolved to investigate this new explosive further and appointed a special committee from within their ranks to look into the matter. It was understood that it could be several years before anything came of the effort, but the initial data was promising enough to warrant a closer look.

Two weeks later LCDR Charles A. Lockwood, a member of the submarine contingent of the FLO, sat at his desk in Newport and read through the minutes of the recent TDC meeting. Keenly interested, he pored over the section about the use of water filled exercise heads for the new testing program. Something about it didn't seem right and after a few minutes of contemplation it finally hit him. Water in the exercise head, even though it would fill the same volume as the explosive, would not be as dense and therefore would be lighter in weight. This would throw off the calibration of the depth setting mechanism. After consulting with other colleagues he hit upon a calcium chloride mixture that when loaded correctly would simulate the weight of the warhead. He also proposed that the test weapons be fired through nets so that an unimpeachable measurement of the depth setting be obtained. His last suggestion was to launch the Mk 9 and 10 weapons from a submarine instead of a barge. This would accurately replicate wartime conditions. He wrote up a memo and circulated it through the Commanding Officer of the FLO and up through the TDC. After review the members of the TDC were quite chagrined when they realized that Lockwood had discovered two major flaws in the testing program and they agreed on the third point, but using a submarine would depend on availability at the time the test could be scheduled.

The test program was finalized and passed on to the SecNav for final approval. Live testing against a target ship was requested in addition to the net testing, but no ship was available at the time so SecNav approved the program without it. Executed in the fall of 1923, the testing program used the submarine USS *S-3* (SS-107) and the flush deck destroyer USS *Reuben James* (DD-245) and showed that minor tweaks to the depth and gyro settings were needed, but otherwise the weapons worked as designed.

*Author's note: IOTL the flaw in the depth control of the Mk 10 was most likely due to the discrepancy in the weight between the exercise head and the warhead, which inexplicably no one seemed to realize until just before WWII. Hexogen eventually becomes RDX, which will be a key ingredient in torpex. The brilliant Lockwood is destined for bigger things later...*

***DEVELOPING ALTERNATIVES AND LIVE TESTING, 1923-1925***

Working in parallel in case the search for new explosives failed, a highly secret research project had been initiated in April 1922 at Newport. Fearing the newer and thicker armor of the modern battleships would negate the explosive effects of a torpedo, this project was intended to find a method of detonating the weapon *under* the ship, were there was no armor. Using the ship's natural magnetic field seemed to be the most likely avenue. Realizing the paradigm shift in naval warfare that this could cause, only the 10 members of the Council and three other research engineers at Newport were aware of the project. Known originally simply as project G 53, knowledge of the project was on a strict need-to-know basis and work was highly compartmentalized, with individual component engineers often not knowing the big picture. The task was daunting as magnetism and electricity was still a bit of an arcane science and the state of the art was in its infancy.

An effort to develop a torpedo propelled by electric motors had been percolating at Newport since 1917. The primary advantage over the wet-heater types (Mk. 7,8,9, & 10) was that an electric torpedo would not leave a visible wake, as the exhaust from the steam turbines of the other types did. The Sperry Corp. had been assigned a research contract and had produced a sub-scale (7.25") test weapon, but there was not a lot of enthusiasm in BuOrd and work proceeded at a snail's pace until the full size EL Mk 1 came along in 1923. As with the highly secret G 53 project, the engineers struggled with the technology and the EL Mk 1 was never successful. Even still, one small laboratory at Newport continued to tinker with the project during the 20's.

The FLO had been pushing hard to conduct live testing of torpedoes. It was argued that this was the only way to get realistic end to end testing and it would also give submarine, destroyer, and torpedo plane crews valuable experience in preparing and firing warshots. This concept was supported by the Council and the SecNav, but ran into trouble with Congress over cost. Franklin Roosevelt, convalescing from his experience with polio, used this issue to reinsert himself into his beloved project. He used his political influence to clear the objections and get the needed funds allocated, Congress agreeing once a compromise had been reached. Obsolete and decommissioned ships would be allocated, but the Council and the FLO would have to share them with the other Navy branches as gunnery and bombing targets. Further destructive testing would be done on two new testing ranges. Based on a survey by the FLO, the Council obtained permission to set up Torpedo Testing Range Atlantic in the Mt Desert Narrows off Bar Harbor, Maine. Uninhabited Bald Porcupine Island and its sheer cliffs would serve as the target. Torpedo Testing Range Pacific would be set up at Kahoolawe Island in Hawaii. SecNav established a training policy in which every torpedo capable commissioned warship and aircraft squadron was required to fire at least one warshot every two years, either on the test ranges or against a target ship.

This new policy had the side effect of restarting low-rate production on the Mk 7, 8, & 10 torpedoes, and also prompted development work on the new Mk 11 destroyer torpedo. Expenditures during live testing would have to be replaced and luckily Bliss and Alexandria had retained the production tooling. The Mk 11 and its follow-on Mk 12 were not intended for mass production, serving mostly as a production development model intended to demonstrate a long range, multi-speed weapon.

*Author's note: Project G 53 was the beginning of the infamous Mk 6 magnetic influence exploder. Both it and the electric torpedo project (pretty much verbatim from the OTL) will produce results ITTL, both good and bad, as you will see in upcoming chapters. The lack of realistic live testing was cited as a causal factor in the Great Torpedo Scandal. Unbelievably, by 07 December 1941, virtually no one in the USN had ever*

*seen or heard an actual torpedo warhead detonation! My timeline here has corrected that. IOTL both Bald Porcupine and Kahoolawe Islands were used for live testing, but not until after WWII had started.*

***THE FISH HAS WINGS AND SOME UNPLEASANT TRUTHS, 1925-1930***

Up to 1925 the Navy's aerial torpedo had been variants of the 18" Mk 7 destroyer torpedo. Testing had shown that it worked reasonably well as long as you did not exceed the specified deployment parameters of dropping it at 95 knots or less and from altitudes of less than 35 feet. As aircraft performance increased, and as the anti-aircraft capabilities of ships got better, it was realized that these parameters were dangerously low. In order to ensure a reasonable chance of survival for the aircraft crews these launching parameters had to get better. Also, the small size of the weapon meant it carried a small warhead and thus a bigger boom was desired.

Accordingly, in 1925 Newport initiated Project G 6 for the development of a new aerial torpedo. Initial specs called for a 21" weapon capable of being launched at 140 mph from an altitude of at least 40 feet with a warhead charge of 350 lbs. of TNT. At first excited by the project, the Council and the FLO were soon frustrated by Congress and their usual penny-pinching ways. In addition, the Bureau of Aeronautics (BuAer) vacillated on the whole concept. There was talk in some aviation circles about doing away with the concept of aerial torpedoes altogether. Low level development work continued at Newport while the Council worked these issues, once again turning to their patron FDR for help. FDR assisted in clearing the obstacles in Congress and the Council was successful in clearing the fog from BuAer on concept issues.

The engineers at Newport studied several different concepts for this new torpedo, including trying to make it all fit into a weapon that did not exceed 1,000 lbs. This was found to be nearly impossible with the existing state of the art and by 1930 they had settled on a weapon that was short and squat, designating it the Mk 13. It was only 13.5 feet long, but they compensated for that by making it 22.5 inches in diameter. It had a warhead of 404 lbs. and could do 33 knots for 5700 yards.

Work on the ultra-secret magnetic influence exploder proceeded apace. CDR Ralph Waldo Christie, an experienced submariner and a graduate of MIT took charge of the project in early 1926. Work had proceeded to the point that an operational test was needed and the new exploder was fitted to a Mk 8. An obsolete submarine, the *L-8* (SS-48) had been provided and it was moored in Narragansett Bay off Goat Island. On the 8th of May the Mk 8 with the new exploder was loaded aboard a test barge and fired at the *L-8*. The weapon passed under the old sub and ominously failed to detonate. Recovered, it was checked out and reset for another test. Once again it failed to detonate and a frustrated Christie took the exploder back into the shop for a thorough bench test. Not finding a problem, he was determined to try again. In the intervening days, changing weather and tidal conditions in the bay forced the NTS to move the *L-8* to a new spot and re-moor her. On the 26th the range was ready and this time the *L-8* disappeared in a huge blast as the weapon detonated dead center under the old boat.

A jubilant Christie pressed the Council for another more extensive test series and they quickly granted it, having obtained an old destroyer, the *Ericsson* (DD-56) as a target. Wanting to obtain as much data as possible, Christie substituted the warhead for one of the new calcium chloride filled exercise heads. Over the course of the summer 30 test firings from a barge were conducted against the *Ericsson,* but a dejected

Christie found that the exploder tripped only eight times, with three of those proving to be premature, a timing device showing that the exploder activated before the weapon passed under the ship. In one other instance the exploder activated after a run of only 75 yards. The Council was not impressed and Christie, mystified at the inconsistent performance of the exploder, took Project G 53 back to the lab in an attempt to find the cause.

Further testing during this period also revealed some other unpleasant truths. Even though the earlier testing on the *S-3* and *Reuben James* had rung out the depth keeping problems on the Mk 8, 9, and 10 weapons, those tests had been conducted under controlled conditions and in calm sheltered waters. More rigorous and realistic testing in Maine, Hawaii, and in other locations showed disturbing problems in torpedo performance. Cold runs (i.e. failure of the motor to start), erratic course keeping and depth control, and failure of the contact exploder resulted in an end to end success rate of only 61%. With many of these weapons having been built by Bliss, some very pointed questions were asked of the Bliss representatives on the Council. Embarrassed, the company undertook a top-down review of quality control at its plant in New York, finding numerous but minor issues that had led to a larger quality control problem. The company managers quickly stamped out these issues and quality rapidly improved. NTS Alexandria closely mirrored the production techniques and practices of Bliss and they too found and corrected quality control issues.

Fleet Problem IX, an exercise conducted in the Pacific near the Panama Canal in January 1929, included live ordnance testing and it showed that the issues with torpedoes had been largely corrected. The old cruisers *Pueblo* (CA-7) and *Charleston* (CA-19) served as destroyer and submarine targets with *Pueblo* going down after taking four Mk 8 hits and *Charleston* succumbing to three Mk 10's from USS *R-7* (SS-84). The old battleship *South Carolina* (BB-26) proved quite resilient, absorbing two aerial Mk 7's and two Mk 8's before going down under a hail of bombs by dive bombers from the *Lexington* (CV-2). The use of Mk 7's in this exercise and their lack of power against the armored *South Carolina* underscored the need for a new aerial torpedo and gave the G 6/Mk 13 project greater emphasis.

Despite having corrected quality control problems, the Navy's existing torpedoes were beginning to show their age by 1930 and with new and much more capable ships being designed and built, Navy was desirous of a new torpedo to match. The new decade marked the beginning of an idea that would prove to have momentous consequences in the years to come.

*Author's note: ITTL the initial work on the Mk 13 proceeded pretty much along the lines of the OTL. The big POD's here are the further testing of the G 53/Mk 6 exploder, and the correction of the deficiencies noted in the field tests of the other torpedoes. None of that actually took place and it greatly contributed to the breadth and depth of the scandal. Fleet Problem IX was real, but I added the live testing.*

### *FRUSTRATION AND PROGRESS, 1930-1935*

By the spring of 1930 the prototype Mk 13 was ready for testing and 10 examples were provided to squadron VT-1B from the USS *Lexington* (CV-2). This first round was conducted on the test range in Narragansett Bay under controlled conditions. The Martin T4M-1 biplanes came in low and slow (30 feet and 80 mph) with camera's clicking away and retrieval boats buzzing about. Of the ten initial drops, three broke apart upon entering the water, two failed to start, one ran on the surface, and two ran erratically.

Only two ran hot, straight, and normal, a miserable success rate of only 20%. Seven of the ten were recoverable and were taken back to the shop for analysis. Assisted by engineers from Bliss and Alexandria, the Project G 6 technicians found and corrected several faults. Testing continued throughout 1930 and the operating parameters were eventually ramped up, including end to end testing on Torpedo Testing Range Atlantic (TTRA) in Maine and at sea out in the Atlantic Ocean. Results were mixed, with water entry characteristics causing a lot of concern. The Navy's highest performing torpedo aircraft was brought in, the Great Lakes TG-2 and it was found that as the drop speeds and altitudes increased so did the erratic performance. The whole point of the project was to increase tactical operating parameters of the launching aircraft so the G 6 team took the Mk 13 back to the shop for some further development work and lab testing.

Ralph Christie and his Project G 53 team were also experiencing frustrations with the magnetic exploder. Bench tests in the lab showed great promise, but during operational testing at sea the exploder was maddeningly inconsistent, sometimes tripping prematurely and sometimes not at all. The *Ericsson* became a familiar partner in the tests, towed about by fleet tugs to different locations, mostly off the New England coast. A deflated Christie, not willing to give up on his pet project, cajoled the Council into requesting an expanded test program with newer and larger ships. After quite a bit of debate the request was approved and in February 1932 he was granted the use of the brand new heavy cruiser USS *Indianapolis* (CA-35) and two destroyers. He loaded them up with torpedoes, exploders, and test equipment and they sailed for the equator off the Pacific coast of Chile. The testing there went much better and Christie gathered a large amount of data which he took back to the lab in Newport, where he continued to refine the design of the exploder.

Fleet Problem IX and other tactical exercises amply demonstrated that although the torpedoes performed well, they were beginning to show their age and a desire for higher performance moved to the forefront of the Council's priorities. Changing tactics and new ships showed that the old weapons were too slow, too short legged, and lacked explosive power. A series of discussions at Council meetings lead to a new design that was intended to serve as a weapon common to both submarines and surface ships. Refining the concept and taking into account the vastly different launching techniques and combat employment tactics the new weapon morphed into two closely related designs, designated the Mk 14 for submarine use and the Mk 15 for destroyer use. Using the standard 21" diameter, they shared the same engine, control mechanisms, and the same exploder design (intended to be the Mk 6 from the very beginning), but the Mk 15 was to have a larger warhead and a longer range, and thus was over two feet longer than the Mk 14. They were capable of speeds up to 46 knots with greatly increased range over their predecessors. For simplicity sake the same wet-heater engine used in the Mk 13 was adapted for the new weapons.

The initial design prototype as developed by Newport proved to be a finely crafted piece of machinery and the technicians there were justifiably proud of it. Production planners at Bliss and Alexandria examined it from a mass production standpoint and were far less impressed. They recommended numerous changes and simplifications. The Newport contingent, offended by the suggestions, pushed back, insisting that the design stay as is. It took the intercession of the Chairman of the Torpedo Development Council, Assistant SecNav (and shipbuilding engineer) Ernest L. Jahncke, who overruled Newport after hearing both sides. Bliss engineers took the design and refined it for mass production. Their efforts also had the pleasant side effect of refining the Mk 13 design, as the three torpedoes shared the

same propulsion system. Bliss also assisted in setting up the production line at Alexandria, with both facilities sharing common tooling.

Testing of the refined prototypes kicked off in 1933, originally from barges right off NTS Newport. The 46-knot speed of the weapon thrilled the onlookers, but almost immediately problems arose. Net testing showed that the weapons were running about 10 feet deeper than set. Recovered weapons were checked thoroughly and found to be in perfect working order. Quite mystified, Newport ended the series and set a date to continue testing. Three weeks later, a new engineer from Bliss, recently graduated from MIT, was being hosted on an introductory tour of Newport and during the walkthrough of the testing lab he noticed that the depth setting test rig was not calibrated correctly. He meekly raised his hand and pointed out the error. At first incredulous, the Newport technicians later sheepishly admitted that the rig was indeed mis-calibrated, and they quickly applied the fix to the test weapons. New tests showed that the fix had helped, but the weapons were still running approximately 6 feet deeper than set. There were also a higher than anticipated rate of erratic runs, with some weapons nearly running a full circle.

The final solution to these two problems eventually were found by conducting tests on sub-scale models at the Washington Navy Yard's Experimental Model Basin. It was found that the much higher speed of the weapon created low pressure flow eddies in the area of the tapered aft section that led to the rudders and propellers. The depth sensor was located in this area and the low-pressure eddies were making it think it was running too shallow, and thus a correction was sent to the depth planes that made the weapon run deeper. Launch tests here also showed that the gyro compartment access cover tended to leak under pressure or impact with the water and this threw the gyro into a tumble.

During this time models of the Mk 13 were also tested, dropped into the basin from a special test rig, simulating the launch characteristics from an airplane. The results showed that the impact with the water was much more severe than thought, and damage to the models frequently occurred. The speed and impact angle also caused unfavorable post entry behavior, including broaching, hooking left or right, and sinking. Various methods of controlling and mitigating these impact forces were tested, including parachutes. Tests on the Mk 13, both in scale-model and full-size form, continued to 1935. The solution ultimately proved to be drag rings installed to slow and stabilize the torpedo in the air, and shroud rings to protect the rudders and depth control surfaces. By the end of that year, the Mk 13 could be dropped up to the maximum speed of the T4M/TG aircraft (approx. 140 mph) and up to 500 feet altitude. At or below these levels the weapon achieved a successful run 90% of the time. These efforts were so successful that it was felt that even greater drop performance could be achieved with minimal development work, even to the point that the Council strongly recommended to BuAer that development work on a new torpedo plane be accelerated.

Testing of the Mk 14 and 15 continued on the TTRA. The Mk 6 exploder was not yet ready so the weapons were fitted with a version that did not have the magnetic features installed. The underwater cliffs at Bald Porcupine Island immediately revealed a vexing problem: duds. Eight out of ten failed to detonate. Mystified, the Newport staff immediately set to checking the remaining weapons while one member of the FLO contingent on site (a trained deep sea diver) bravely volunteered to dive down and retrieve as many of the unexploded weapons as he could find. Five of the weapons were in a condition to be retrieved so they were brought aboard a barge towed out from Bar Harbor and thoroughly checked.

The root cause of the duds was revealed to be the design of the firing pin assembly itself. It was set vertically in the exploder, perpendicular to the axis of travel for the weapon. At 46 knots the weapon

struck the cliff with a force of nearly 500 G's. The firing pin, built solidly for this exact reason, had enough mass that when the weapon struck the cliff the force of gravity pushed the pin against the guide studs intended to guide the pin into the fulminate exploder cap. The spring could not overcome the friction this caused and the pin did not move far enough to strike the fulminate cap, thus no explosion.

Returning to the lab in Newport, a submarine qualified Chief Torpedoman from the FLO suggested an innovative and inexpensive testing technique. Weighted warheads (minus the explosive) were hoisted up on a crane cable and dropped onto steel plates from a height meant to simulate the impact force of hitting a ship. Sure enough the firing pin guide studs deformed and the pin failed to move 90% of the time. When the steel plates were angled to simulate a glancing hit, the exploder worked far more often. This was eventually found to be the result of reduced G forces from the glancing blow. This stunning revelation came as a shock to the Newport staff. Duds in earlier weapons like the Mk 8 and Mk 10 had been rare. It was found that the much higher speed of the Mk 14 and 15 magnified the G forces beyond what the legacy design of the firing pin could handle. The first solution offered was to lower the speed of the torpedo, but this eliminated one of the primary advantages of the new weapons. Ultimately the solution proved to be deceptively simple; manufacture the firing pin out of a lighter grade of aluminum so it had less mass. The new pins were installed and tested in live shots and the rate of detonations soared to nearly 100%.

By late 1935 the Mk 14 and 15 were considered to be refined enough to allow their deployment to the fleet. Bliss and Alexandria immediately began to turn out production versions and the first weapons were loaded aboard submarines and destroyers by the end of the year.

Another fortuitous event occurred in 1933 that would prove to have a profound impact on the Navy's torpedo community and to the nation as a whole. Franklin Delano Roosevelt was elected in a land-slide victory as the 32nd President of the United States. The architect of the present torpedo infrastructure and the founder of the Torpedo Development Council was now the President and was in a position to clear any and all governmental and financial hurdles to success.

*Author's note: As stated before, the lack of testing was a prime factor in the scandal. The reason most often given for no testing was the lack of funding. True, money would have to be spent and by 1932 this became problematic. But the reality was that it wouldn't have been prohibitively expensive as long as the will was there. Innovative techniques like the crane drop would have been easy and cheap to conduct, but Newport would have none of it. Their confidence in themselves had become hubris, to the detriment of the entire Navy.*

### *NEW PATHS, "ONE HELL OF A WALLOP", AND SOME FORTUNATE ANGINA – 1935-1940*

The Navy's Bureau of Aeronautics (BuAer) had initiated a project to develop a new torpedo plane in 1934. The T4M and TG biplanes were well beyond their age and the fleet was desirous of a plane that could take advantage of the work being done on the Mk 13. Buoyed by the positive reports of the Mk 13 tests by Naval Aviators assigned to the Fleet Liaison Office, BuAer kicked the project into high gear. The Douglas Aircraft Company was declared the winner of the competition and their design, the XTBD-1 Devastator was delivered to the fleet on 24 April 1935 for testing. The Navy's first carrier-based monoplane, the Devastator was a very advanced aircraft for the time. Its low wing and semi-retractable landing gear provided great advantages in drag reduction and safety. The fleet marveled at the powered upward

folding wings and 206 mph top speed, an increase of over 60 mph on the TG-2. Initial testing went quite well and the TBD-1 entered fleet service with squadron VT-3 in the summer of 1937. Fleet aviators found that the Mk 13 could be launched without problems at the top speed of the Devastator and up to 600 feet in altitude. At these drop parameters the rates of hot, straight, and normal runs of the now fully developed Mk 13 approached 100%.

After taking a year to set up his administration and get his recovery agenda set in motion, President Roosevelt was now eager to take a look at how his pet project had progressed over the years. Despite staying in touch during his illness and his political activities as governor of New York, Roosevelt had felt somewhat detached and wanted a full update on the Council's activities. Accompanied by the Chief of the Bureau of Ordnance Rear Admiral Harold R. Stark, the President toured Newport, Alexandria, and the Bliss company. He witnessed live tests on the TTRA, embarked on the brand-new destroyer USS *Hull* (DD-350).

Deeply impressed, Roosevelt returned to Newport and sat in on a meeting of the Council. He was especially keen on new development projects. He was briefed on the Ralph Christie led Project G 49, which was an effort to develop a very long-range weapon powered by a form of hydrogen peroxide called Navol. While work on the project had proceeded reasonably well, the head of the FLO expressed deep reservations about using Navol powered torpedoes aboard ship. Navol was a tricky and dangerous substance to handle. The torpedoes would require special handling and vastly different equipment aboard ship, which would greatly alter designs, especially for submarines. There was also a great deal of concern about battle damage to the Navol equipment and storage tanks, fears of hydrogen peroxide explosions were at the forefront of the concerns.

The FLO and the Council however were much more enthusiastic on the concept of the electric torpedo. Low level development work had been ongoing at Newport for almost 10 years, and when combined with advances made in the electrical industry by companies like Westinghouse, Exide, and General Electric it was felt that an electric torpedo was now well within the capabilities of the establishment. Besides, the fact that it was wakeless provided the fleet with a substantial tactical advantage. The project prototype had been re-designated as the Mk 18. All they needed to proceed was funding.

He was updated on the progress of the Mk 6 exploder project. The *Indianapolis* tests had buoyed the effort, but subsequent testing had once again showed that the damnable device was maddeningly inconsistent.

Finally, he was briefed on the search for a new explosive. In 1923 the Council had established The Committee for Explosives Research within their ranks to investigate alternatives to TNT. The progress had been slow, but recent cooperative work spurred by the Committee between the military science establishments in Great Britain and the United States had borne fruit. A new industrial process for efficiently and inexpensively manufacturing a compound called hexogen had been developed and it showed great promise. When combined with TNT and other compounds as a booster, a powerful new explosive could be developed.

Roosevelt and Stark sat in the background of the meeting and listened intently to the debates, some of which were quite heated, especially in the area of the Navol torpedo. In the end, when asked for his input the President decided on four courses of action:

1. Project G 49 would be relegated to a technology research project only for now. He agreed that the nature of the Navol project would cause complications and issues that were unwarranted at the present time. With the tried and tested performance of the Mk 13, 14, and 15 weapons this new path seemed redundant. Perhaps sometime in the future it could be pursued again.
2. He heartily endorsed the Mk 18 project, believing the concept to be the right direction. He promised the Council would get the funding needed to move the project forward.
3. He and Stark were very enthusiastic about the hexogen research and realizing the Depression recovery benefits of seeding industry with the funding necessary to initiate production, they fully endorsed this program.
4. The Mk 6 project would be given three more years to produce a fully operational product or it would be abandoned.

The Council set about on its new Presidential sanctions with gusto. Bliss was handed overall responsibility for refinement of the Mk 18 weapon, and they engaged Westinghouse and Exide as partners in the project. The learning curve was still quite steep, and work proceeded in fits and starts for the next 6 years.

Within 10 months of the meeting, the DuPont Company, sanctioned by BuOrd and in cooperation with the Waltham Abbey Royal Gunpowder Mills in Great Britain tested the first formulation of a new explosive compound called Torpex. It consisted of 40% TNT, 18% powdered aluminum, and 42% RDX (a refinement of hexogen). The test was conducted at the Naval Proving Ground at Dahlgren, Virginia. A member of the submarine contingent of the FLO, LTjg Dudley W. Morton was present for the test, and suitably impressed, wrote in his report to the Council that torpex "packed one hell of a wallop!" Using seed money from the Navy budget, DuPont immediately began set up work for a new production facility for torpex, sharing a license with Waltham Abbey, with the goal of having it available for use by the Navy and War Departments no later than 1938. Further research was necessary, but DuPont was confident they could meet the goal.

Ralph Christie had returned to the fleet and had turned the Mk 6 project over to his deputies. However, alarmed by the President's three-year proclamation, he once again interjected himself into the project. He designed a new testing regimen and once again the old *Ericsson* was hauled out of storage in Philadelphia and was used in a renewed series of tests. This time instead of being moored the old tub was towed behind a fleet tug off the Virginia Capes and a series of Mk 14s and 15s with exercise heads installed were fired at it. The *Ericsson* was towed at a variety of speeds and courses and in differing sea states. The Mk 6 was back to its old tricks and it only worked about 15% of the time. Supremely frustrated and thinking that maybe the old destroyer was the cause of the problems, Christie disposed of the *Ericsson* with a Mk 14 equipped with the standard (and well proven) Mk 5 contact exploder fired from the submarine *Cuttlefish* (SS-171). The Mk 14 was equipped with a prototype torpex warhead and the remnants of the *Ericsson* sank less than 30 seconds after the detonation.

He cajoled the Council into granting him another target ship and this time was given access to the old armored cruiser *Missoula* (CA-13). The Mk 6 team did everything they could think of to get the Mk 6 to work. The *Missoula* was first tested off the Virginia Capes, then down in the Caribbean off Panama, then was towed all the way to Hawaii and was fired on by Mk 15s on the TTRP off Kahoolawe. By thorough and detailed preparation work in the lab, they were only able to get the exploder to work approximately 22% of the time. Frustration was mounting as time ticked away, but the team refused to follow any other technological path. Christie would not hear of it and stuck to his convictions.

The inability of the Mk 6 team to produce consistent results lead the chairman of the Council Charles Edison to the only possible conclusion. By the fall of 1937 he had enough and on the 3rd of October officially halted any further work on the Mk 6 exploder. The team was disbanded and the remaining equipment was locked away at Newport for possible future development. Ralph Christie, totally deflated at the twin failures of the Navol and Mk 6 projects returned to the fleet and gave top-level service for the rest of his career.

On the morning of 18 August 1940, Captain William H.P. "Spike" Blandy was having breakfast with his wife at home when he suddenly felt stinging pains in his chest. Short of breath and in a lot of pain, his wife rushed him to the Naval Hospital at Balboa in San Diego. Over the next two days he suffered a series of minor heart attacks which did permanent damage to his heart. His strength of character and robust constitution allowed him to survive, but he would not be able to continue his naval career. He was medically discharged from the Navy three months later and he and his wife retired to a comfortable home in Seaford, New York.

*Author's note: Such was the pace of aircraft development in the late 1930's that an aircraft that was on the cutting edge of technology in 1935 would be so hopelessly outdated just 6 years later. It must be remembered that the TBD Devastator was an outstanding aircraft when introduced in 1935, but was quickly overtaken by technology. Its days were still numbered, but perhaps a portion of the criticism leveled at it would have been milder if the damned Mk 13 had worked the way it had been designed.*

*The Mk 16 and 17 Navol torpedoes could have been our answer to the famous Japanese Long Lance torpedo. There was really nothing to stop us from developing those weapons prior to the war, except for a rigid adherence to tradition and an overly cautious approach to shipboard safety. I deliberately sidestepped their development here because their use would have caused major changes in submarine and destroyer design, and that would have introduced butterflies in the timeline that I did not want to deal with. The story is interesting enough without all of those complications. However, I will admit the possibilities are fascinating…*

*In the OTL Newport dragged its collective feet on the development of an electric torpedo and thus we started very late and relied on captured German models as a guide. Even then Newport badly mis-managed the project, forcing BuOrd to turn the whole shebang over to private industry. I have tried to correct that ITTL.*

*I will admit that there is a slight amount of hand-waving on my part when it comes to torpex. In the OTL the science involved was still struggling right up to the start of the war. After some thought on the subject, I decided that I wanted to accelerate that part because it would have given the Council an added incentive to drop the damnable Mk 6. Dudley Morton was destined to become one of the USN's most capable and outstanding submarine skippers. His comment about the explosive power of Torpex was lifted by me directly from a patrol report he submitted during WWII, after witnessing a Torpex explosion against a Japanese ship.*

*Yes, if Newport had conducted even a moderate amount of testing on the Mk 6 during the 30's the results that I described would have been revealed. I believe that even the normally stodgy and reticent Newport would have been forced to abandon the project with the raw data staring them in the face. I shake my head every time I think about the opportunity that was missed here.*

*Spike Blandy was the head of the Bureau of Ordnance during the first half of WWII and I have never been a fan of his. His intractable denial that there was anything wrong with the torpedoes was a MAJOR factor in the Great Torpedo Scandal. How many men died because of his rigidness is incalculable. Blandy and Lockwood damn near got into a fistfight over the issue. I have relegated him to the dustbin of history here.*

***GEARING UP FOR WAR – 1941***

President Roosevelt declared a "limited emergency" on 08 September 1939 in response to the initiation of war in Europe. This declaration freed up funding for the military and served as a priming pump to the armed forces and the industry that supported it. The Navy asked for and got a new torpedo plane project initiated as a replacement for the rapidly obsolescing TBD Devastator. Grumman made quick progress on the new bomber and by August 1941 the first prototype had flown and Grumman was standing up a full production line in Bethpage, New York. The new aircraft had a substantial performance increase over the TBD and this prompted the Council to develop a new testing program to expand the drop parameters of the Mk 13 in order to take full advantage of the new planes' performance. The new test series was scheduled to begin in March 1942.

There was a great deal of concern over existing torpedo inventories. It became Navy policy that for every destroyer torpedo tube there should be three torpedoes, for every submarine tube six torpedoes, and for every torpedo plane five torpedoes. Plus, additional weapons were needed for practice shots and replacements. As the reality of the deteriorating world situation became clear, the Council realized that a lot more weapons would be needed if and when the shooting started. Fortunately, government seed money during the 30's had allowed both Bliss and Alexandria to keep their production capabilities in a fully modern state, and Bliss had implemented efficiency efforts at both facilities. Plus, using the seed money both locations had built extra production space that had laid dormant for just such an emergency. By the spring of 1941 the Navy was taking delivery of 250 new weapons each month. A report submitted to the Council in April 1941 showed that Bliss was fully capable of ramping up to nearly double that rate within 120 days of getting the order to proceed, with NTS Alexandria capable of similar numbers. By the fall of 1941 the Navy's fear of a torpedo shortage in the event of war had been largely alleviated.

To simplify things, the Navy made the decision to thin out the stocks of existing older weapons. The Mk 7 Mod A, 2A, and 5A aerial torpedoes along with the Mk 9, 11 and 12 weapons were all pulled from the inventory and scrapped. They were all obsolete once numbers of the newer weapons arrived. A handful of the submarine type Mk 9 Mod 1B weapons remained in the inventory at Cavite in the Philippines as a stop gap until deliveries of the new build Mk 10's caught up in late 1941. The 18" Mk 7 Mod 0 torpedo was retained in limited numbers so that it could equip the old O-class submarines that were being brought out of mothballs in 1941 to train new submarine crews.

By early 1941 the Navy was well along in the concept development of the Patrol Torpedo Boat. Having renewed an interest from WWI in small torpedo armed boats, the Navy initiated development work in 1938. By late 1939 the Electric Launch Company (ELCO) had refined its 70-foot design and the Navy contracted it to build 11 copies of the *PT-9.* The main armament for the boat was four Mk 8 torpedoes in two trainable black powder fired torpedo tubes on each side of the boat. Company testing of the boats showed that they had promising performance characteristics, but they seemed overweight and sluggish. During a March 1941 open ocean run from Key West to New York the boats pounded heavily in the waves

and all of them suffered some sort of minor structural failure. It became plainly apparent that the boat needed to be bigger and the topside weight had to be reduced.

On the evening of the squadron's arrival in New York two of the ELCO designers, Irwin Chase and Glenville Tremaine sat in a bar outside the Brooklyn Navy Yard and dejectedly mulled the situation over a few beers. After a bit they were joined by a young Navy officer, LT John Bulkeley. He was a member of the FLO at Newport and had sought out the designers to discuss the disappointing results of the run. Talking long into the night the three men discussed ways to improve the boats' performance. Bulkeley was fully aware of the capabilities of the Mk 13 and suggested replacing the Mk 8s with Mk 13s. The Mk 8 had to be launched in an upright horizontal position to avoid tumbling the gyro, hence the tube launch method. The advantage of the Mk 13, being designed for aerial launch was that it was much more tolerant to gyro tumble and thus could be simply rolled off the deck from a light weight launch rack. The weight savings would be on the order of 7000 lbs when taking into account the lighter Mk 13 and the greatly reduced weight of the launching system. The three men literally made notes and calculations with pencils and notepads from the bar and came away convinced that this was the way to go. Chase and Tremaine excitedly returned to their plant and immediately fabricated four launch racks while Bulkeley went to the Council and begged for four Mk 13s to test the new concept with. Three weeks later the repaired *PT-11* was fitted with the new racks and successfully launched the four Mk 13s while doing 35 knots on the range in Maine.

Greatly encouraged by the results, ELCO incorporated the new racks into the design of their 78-footer which after a summertime competition was chosen by the Navy, along with designs from Higgins Industries and the Huckins Yacht Corporation for full production, with the Navy dictating that the ELCO torpedo rack design be used by all three companies. The weight savings also allowed the incorporation from the start of a Mk 2 20 mm Oerlikon rapid fire cannon on the aft deck, to supplement the normal gun armament of two twin mount .50 caliber M2 machine guns. The first squadron to deploy overseas was MTB Squadron 3 with 78-foot ELCOs and they arrived in the Philippines in September 1941 with Mk 13's and 20 mm Oerlikons, and were under the command of none other than LT John Bulkeley.

Persistent and lengthy development work on the Mk 18 by Bliss, Westinghouse, and Exide had yielded results by late 1941. It had been a frustrating R&D period, with one problem after another cropping up and demanding attention. Issues with short circuits, excessive hydrogen production from the batteries, varying voltage in different water temperatures (and thus varying speeds and ranges) had all bedeviled the development team. The prototypes had also shown a propensity towards requiring detailed and intensive maintenance, which obviously was not always obtainable onboard a submarine. On one occasion a tube loaded prototype weapon short circuited onboard the submarine *Sturgeon* (SS-187) and the subsequent hot run very nearly destroyed the submarine when it exploded shortly after being ejected from the tube. One by one these problems were addressed by the combined industry team and with assistance of technicians from Newport were all eventually solved. Since Bliss was fully involved with steam torpedo production the tooling was handed over to Westinghouse and on 05 December 1941 the first low rate production model rolled off the production line and was immediately delivered to Newport for subsequent validation testing.

*Author's note: And so the stage is set for the great test of Roosevelt's torpedo infrastructure. Will it make a difference? If only we could know…*

*One of the other factors in the scandal was Newport's shocking inability to adequately ramp up production. At the start of the war, with three shifts running and over 3000 workers employed they were still only turning out about 2.5 weapons per day. The reasons were multi-fold, but primarily rested with the fact that Newport was primarily an R&D center and was not in the production mindset. All three of the torpedoes were finely crafted works of art and in some cases parts were individually fitted and thus not identical. This practice did not lend itself to mass production. The overall shortage of torpedoes drove home the need to conserve torpedoes and reinforced in the minds of men like Christie, Blandy, and Admiral English in Pearl Harbor the need to rely on the Mk 6 exploder to solve their problems. It added to the reluctance to give the damn thing up.*

*The early performance of the PT boats suffered in large part because of the black powder fired tube system they carried. The tubes were very heavy, they did not work reliably, and gave off a easily seen bright flash when fired at night, but without a viable alternative in the OTL it was their only choice. A large number of the easier to handle and perfected Mk 13's gave them a choice ITTL and I butterflied in John Bulkeley to the bar scene to give Tremaine and Chase the inspiration. In the OTL the decision to convert to Mk 13's only happened in 1943 and it went down similar to how I described it, only with different players.*

*Working up a viable electric torpedo by the start of the war would not have been easy IOTL, but I am convinced that with the right support and funding it could have been done. It would be interesting to discover how this would have affected the timeline.*

***SIDE BAR: A DISCUSSION OF SUBMARINE TACTICS, 1941-1942***

I feel it is prudent to step out of the narrative character and this timeline for a bit and discuss an OTL factor that very well might prove to leaven the effect of our now fully evolved and tested torpedoes.

On the afternoon of 07 December 1941, the Submarine Service found itself, through providence, to be the only force within the USN with the capability of carrying out offensive operations against the Empire of Japan. The rest of the Pacific Fleet had either been destroyed or pushed into an impotent defensive role by the brilliant, if not audaciously risky Japanese attack on Pearl Harbor and the Philippines.

And yet, the Submarine Service utterly failed to so much as even slow down the Japanese juggernaut. Numerous factors, many deeply imbedded in Navy policy and doctrine, with some traceable back to the post-Civil War era, served to impede the initial success of the submarine force. It took eighteen months of trial and error, persistence, technological retrenchment, and tactical development to overcome these factors. Once overcome, the Submarine Service cut the heart out of the Japanese merchant marine and dealt severe blows to the IJN, sealing the fate of the Mikado warlords and their dreams of Japanese hegemony in Asia.

Why then, was the service unprepared to fight?

In general, USN submarine skippers in the pre-war period were by and large a very cautious group. This led to some serious issues when the war started. There were several reasons behind this:

1. Being Lieutenants or Lieutenant Commanders they were too junior to have any experience from WWI. Even if they had, our contribution submarine wise to the first war was very limited and nothing on the order of what the Germans and British had. We just didn't have the time to develop comprehensive and

cohesive strategies and tactics for the sub force during the first war. With the exception of this less than one-year limited taste of combat, the U.S. Submarine Force was completely untested. *There was only a very limited amount of combat experience, and that was 20 years old.*

2. Several notable submarine accidents with the resultant losses of the boat and/or the crew in the interwar years (*S-5, S-51, S-4, O-5*, and *Squalus* among others) had focused a lot of negative publicity on the force. The problems in the Submarine Service mirrored what was going on in the rest of the Navy (USS *Mississippi* turret explosion, Point Honda destroyer grounding, etc.). Pressure on the Navy Department from the public, the press, and the Congress to stop the accidents caused a new emphasis on safety and caution to creep into operational orders. Placing your boat in any situation that smelled of danger was frowned upon, to put it mildly. *Fear had overridden aggressiveness and sound battle tactics.*

3. Despite the problems of caution noted above the Navy was eager to showcase what it could do. Heavy emphasis was placed on the annual Fleet Problem (a fleet wide exercise), various smaller exercises, and the Presidential pass-in-review. These things were hyped up and promoted and the desire to have them come off seamlessly and problem free was foremost in the minds of the admirals. Excellence in performance during these exercises became one of the prime considerations for promotions. Aggressive sub skippers were judged to be reckless and their boats were ruled as “sunk” in the exercises. Given the relatively small size of the Navy after the post-WWI draw down and the lack of promotional opportunities this provided for officers, the desire to not screw up and follow the script became paramount in the minds of many sub skippers. *Innovation and outside the box thinking had been effectively stifled.*

4. The Navy at the time was dominated by the "Gun Club", a euphemism for a group of like-minded senior officers that had staked their long and distinguished careers on the idea of the primacy of the big gun battleship. They believed (not without reason) that the battleships and cruisers were the center of the fleet and that their long-range guns would carry the day in any battle. Unfortunately, these ships were extraordinarily expensive and getting large numbers of them built was hard to push by an isolationist and passive Congress. The Gun Club placed in jeopardy a great deal of their personal reputations, literally placing their careers on the line, to convince everyone that this was the way to go. These admirals held virtually all the senior positions in the fleet. They made almost all the major decisions, including the format of the fleet exercises. With the best of intentions in mind, and sometimes with not, weight in the exercises was placed on the gun line, other elements such as aviation and submarines were de-emphasized and sometimes the rules were even skewed to make the gun line virtually omnipotent. The exercises were nearly always held in perfect weather conditions with calm seas and good visibility. They were held in areas (like Hawaii and Panama) where sonar conditions were well known, and the general location of the opposing submarines was already known to the other force. In essence, they stacked the deck against the submarine force and created conditions under which the failure of an attack against the surface fleet was a foregone conclusion. These “leaders” were not stupid; they fully understood that the airplane and submarine were tremendous threats to their precious battleships. Submariners were bullied into a supporting role for the battle line and had been cowered into a position of impotency in the face of destroyer opposition by the Gun Club officers, mostly to preserve the idea of the battleship as the queen of the fleet. Eventually the restrictive and unrealistic nature of the exercise rules became so prevalent and accepted that many of the submariners themselves came to believe in their supposed vulnerability. These false beliefs were reflected in some of the tactics that became standard in the pre-war years and they often were proved to be totally useless or unwarranted once the war started. Some of these false beliefs included:

- Attacking on sonar bearings only from 100 feet depth or more. This was done to remove the potential of the periscope being sighted. Unfortunately, the fairly primitive submarine sonar gear of the day and the lack of emphasis on proper sonar training produced information that was not accurate enough to allow precise fire control solutions to be generated. Bearings and speed of the target were imprecise, range was nothing but a guess, and angle on the bow was completely unknown. These are all *very* important elements of torpedo fire control.
- Unwarranted and unjustified fear of aircraft and destroyers and their ability to detect you. It is actually very difficult to visually detect (remember, no radar in the pre-war years) a surfaced submarine in most conditions. This led boats to dive too early and thus lose their all-important asset of surface speed and maneuverability. In anything other than a dead calm sea, seeing a periscope amongst the chop and whitecaps is actually pretty difficult. I have personally witnessed this myself. But it was taught to the skippers that virtually any exposure of the scope equated to instant death.
- Depth charges held tremendous destructive power, were instantly fatal, and one or two is all it takes to destroy a sub. This is actually true, but only if the depth charge explodes less than 75 feet away from the boat! Actual tests showed that much beyond that range, a depth charge may give you a good shake and scare the hell out of you, but they rarely caused fatal damage. Only a large accumulation of damage over time caused by these far off misses would prove fatal. That is not to say that depth charges were not dangerous. Indeed they were. You still had to fear them, but not to the extent that was previously believed. They were very hard to accurately target and only very near misses or direct hits would be instantly fatal.

When the occasional submarine skipper raised the BS flag and tried something different, he was quickly hammered back into place by the exercise referees. These sore thumbs were quickly reported up the chain and the only thing that saved their careers was the occasional sympathetic squadron commodore. *Politics and personal agendas suppressed common sense and stifling tradition prevented looking to the future.*

Where am I going with this? Sub skippers of the USN in the late 1930's and early 40's could be broken into three main groups.

Some understood that the state of affairs prior to the war was complete rubbish, but kept their mouth shut and only rarely spoke out or acted on their beliefs. They understood that banging their head against the un-moveable wall of the Gun Club was utterly useless. They worked from within the Submarine Force to improve things the best they could and bided their time until the conditions were right (the war), then unleashed their beliefs in a cold hard fury against the Japanese. Strange as it may seem, this group produced some outstanding skippers early in the war. They also mentored and trained the junior officers who commanded boats later in the war that shot the bottom out of the IJN and the Japanese merchant marine.

Another group spoke out strongly against the silliness of the policies and tried radical new tactics during exercises. They were determined to change the system and felt that they had the best interests of the Navy at heart (and they did). They sometimes proved their point, but they didn't last. The Gun Club wielded enormous power; they did not like being proved wrong and often squashed these mavericks like a bug.

The last group were the careerists and ladder climbers. They were so immersed in the system that they couldn't see the faults nor understand the unreality of their training. They were utterly confident in their ability to drive a submarine effectively and believed their tactics to be sound. When the reality of war hit them like a sledgehammer, proving their entire belief system to be horribly flawed, they couldn't handle it and they failed miserably. If the Japanese didn't get them then our Navy did and they were relieved of command and sent off in disgrace.

As the USN moved into 1941 and the inevitability of eventually getting into the war became clear, a new attitude of getting ready came to the forefront of naval policy. Unfortunately, it proved to be too little, too late and the USN Submarine Service entered into war on December 7th woefully unprepared for the battle that awaited them. It took nearly a year of trial and error combined with the willingness to admit you were wrong before positive results became common. It also took the leadership of men like Charles Lockwood, Chester Smith, Wreford Chapple, Elton Grenfell, Dudley W. Morton and others to show that taking risks by aggressively taking your boat into harm's way, tempered by common sense, was the only way to carry the war to the enemy. To the credit of the force, the Submarine Service was able to swallow their pride and honestly self-evaluate, admit fault when needed, and correct the deficiencies in time to win the war.

Having next to useless torpedoes was definitely a factor. How much this realization tempered the actions of the skippers and crews on patrol is a matter of debate. A strong argument can be made that if the fish had worked the way they were supposed to it would have helped to reduce the problems in training and lack of aggressiveness. In other words, if you are going into battle with a wooden gun, you will be a lot more hesitant to take risks. But if you are going into battle with a load of nuclear warp grenades you can afford to be more aggressive. I see this argument and understand it, but the problems that were created by the unreality of pre-war training ran deep and were going to take time to work out.

There were also significant problems at the senior leadership level too. Admirals Carpender, Wilkes, English, Withers, Hart, and of course Blandy and Christie, all men with a lot of gold on their collars made some rather stupid and unusual tactical and strategic decisions that went a long way to render the force impotent. A lot of the criticism of these men is admittedly Monday-morning-quarterbacking, but when their contemporaries like Lockwood and Voge spoke out about their policies I have to believe there was something to it.

So, I believe we have to temper our expectations of this timeline a little. There would have undoubtedly been a vast improvement, but maybe not as much as many of you may think. Preventing the Great Torpedo Scandal would have dealt the Empire of Japan a heavy blow, but it would not have been the ultimate solution to all of the issues facing the USN.

*Author's note: … and now back to the story. Once the war starts the butterflies of fate begin to flap their wings rather vociferously. My earlier prediction of the war ending sometime in March 1945 I feel to be reasonably realistic if we had good torpedoes from the start. Submarines, destroyers, and torpedo planes would have sent a larger percentage of Japanese tonnage to be bottom at an earlier date, but Japanese tenacity would likely have prolonged the conflict and the level of suffering within the home islands of Japan would have been exacerbated to disastrous levels. It is not my intention to give a detailed timeline of the entire war, but to just point out a few occasions in which good torpedoes would have made a difference. All of the incidents described below actually happened in the original timeline, but with good torpedoes they may have turned out differently…*

***INITIAL ACTION IN THE PHILIPPINES – 1941-1942***

The debacle that was the defense of the Philippines has been well documented in numerous history texts. The effects of the Asiatic Fleet and the Philippine ground and air forces being a dumping ground for the infirm, washed up, incompetent, or retiring officers and enlisted men were dramatically shown during the military campaigns subsequent to the opening of hostilities. The strategy was flawed, the leadership was edging towards incompetence, and cooperation between the Navy, Army, and P.I. forces was almost non-existent. The end result was an unfortunate foregone conclusion, but there were a few shining moments. The efforts of Franklin Roosevelt, the Torpedo Development Council, the Fleet Liaison Office, and the technicians and industrialists at Newport, Alexandria, Bliss, Westinghouse, and others resulted in the Asiatic Fleet having plethora of finely tuned and deadly torpedoes to fight the enemy with. Despite the loss of 233 Mk 14's and 15's in the bombing of Cavite on the first day, pre-war production rates ensured that there were plenty of weapons to go around. On the occasions in which these marvelous tin fish were married up with units that could and would take the fight to the enemy the results were dramatic:

***14 DECEMBER 1941*** – Location: Northeastern coast of Luzon, near Aparri. *Seawolf* (Warder) attacks a large ship, the seaplane tender *Sanyo Maru* anchored in the cove, with two Mk 14 torpedoes. Both hit and the ship sinks 15 minutes later. On the way out of the harbor he sets up and sinks a large fleet destroyer with two Mk 14's. He had earlier sidestepped the destroyer in order to get into the cove.

*OTL result: Several misses left the Sanyo Maru undamaged. The destroyer was not attacked.*

***14/15/16 DECEMBER 1941*** – Location: South China Sea. In a three-day series of attacks, *Swordfish* (Smith) sinks five freighters, including *Kashii Maru* and *Atsutusan Maru*. Chet Smith and his crew are subsequently awarded the Silver Star.

*OTL result: Only Atsutusan Maru was sunk. All others escaped.*

***22 DECEMBER 1941*** – Location: Approaches to Lingayen Gulf. *Salmon* (McKinney) engages in a night-time surface dance with two destroyers. After much maneuvering about while both sides sized each other up, the destroyers charged the *Salmon* and McKinney sank both with one torpedo each from the stern tubes.

*OTL result: One reported but unconfirmed hit. No sinkings.*

***23 DECEMBER 1941*** – Location: Lingayen Gulf. *S-38* (Chapple), is alerted to the presence of the main Japanese invasion force by a radio message from *Stingray* (Lamb). Chapple forces his way into the Gulf and at daybreak attacks an inbound column of four transports with a spread of four Mk 10s. The first transport is hit in the stern with one weapon and the torpex warhead blows the stern off the ship leaving the forward two thirds to float and eventually capsize 35 minutes later. The second ship in the column is hit with the remaining three Mk 10s in succession and the combination of the torpex warheads and a sympathetic ammo explosion in the aft hold virtually vaporizes the ship. It sinks in seconds with no survivors. The third ship in line is struck by debris and is set on fire. It manages to stay afloat and complete its mission. General Masaharu Homma is onboard the first transport. He survives, but a portion of this staff and much of their communications equipment is lost. Chapple subsequently takes his boat further into the gulf and spots the *Hayo Maru*, a 5,445 ton transport at anchor offloading troops. He attacks with two Mk 10s and the *Hayo Maru* sinks in shallow water.

*OTL result: Only Hayo Maru is sunk. Homma and his staff make it ashore without incident.*

***24-27 DECEMBER 1941*** – Location: South China sea off the coast of Vietnam. *Sargo* (Jacobs) conducts a series of carefully planned and executed attacks on five freighters and one tanker. Four ships are sunk and the other two damaged. Jacobs is subsequently awarded the Navy Cross for this patrol.

*OTL result: Jacobs ended this patrol supremely frustrated as no ships were sunk. Jacobs was an ordnance officer and one of the few Submarine Qualified officers in the Gun Club. The erratic performance of the torpedoes, especially of the Mk 6 exploder immediately led Jacobs to believe that the weapons were faulty. He reported this in detail in his patrol report and was promptly reprimanded for it.*

***19 JANUARY 1942*** – Location: Subic Bay near Binanga. *PT-34* (Chandler/Bulkeley), in the company of *PT-31* (DeLong) enters Subic Bay at night in search of a reported four Japanese ships. After deftly dodging an engagement by shore batteries, *PT-34* attacks a freighter estimated at 5,000 tons. Two Mk 13 torpedoes are launched and both hit. The freighter is observed by both the 34 boat and by American shore observers to break in half and sink 10 minutes later.

*OTL result: Reported but unconfirmed sinking.*

***24 JANUARY 1942*** – Location: Subic Bay. *PT-41* (DeLong/Bulkeley) glides into Subic Bay and attacks a new 6,000 ton anchored transport. Two Mk 13 torpedoes strike fore and aft. The transport slowly capsizes and sinks as the 41 boat makes a hasty retreat.

*OTL result: Reported damage but no sinking.*

***01 FEBRUARY 1942*** – Location: Subic Bay. *PT-32* (Schumacher) once again enters MTB Squadron 3's favorite hunting grounds. He sights what he thinks is a cruiser, but he actually attacks the large minelayer *Yaeyama* and sinks her with two Mk 13s.

*OTL result: Minor damage to the Yaeyama.*

***09 APRIL 1942*** – Location: Tanon Straight between Cebu and Negros Islands. *PT-41* (Cox/Bulkeley) and a barely operable *PT-34* (Kelly), engage in a running gun and torpedo battle with the light cruiser *Kuma* and the large torpedo boat/destroyer *Kiji*. In a finely executed and superbly aggressive attack both *Kuma* and *Kiji* are sunk. Cox and Kelly are awarded the Silver Star.

*OTL result: Kuma suffers minor damage from a dud hit in her bow. Interestingly, PT-41 fired Mk 14 torpedoes in this battle, having taken them on from a submarine due to the lack of Mk 8s in Cebu. ITTL, Mk 13s are plentiful.*

Unfortunately, despite these aggressive actions, U.S. and P.I. forces could not stem the tide of the Japanese. A loss of some supplies and Homma's brush with death slowed the Japanese timetable, allowing a brave if not futile final stand on Bataan and Corregidor. Allied forces surrendered to the Japanese on 30 May 1942.

### *THE Mk 18 ELECTRIC TORPEDO GOES INTO ACTION, APRIL 1942*

Westinghouse was taking longer than expected to get the brand-new Mk 18 electric torpedo into service. By late March 1942 they had only produced 20 production Mod 1 examples and all went directly and

immediately to Pearl Harbor. They were loaded onto *Tambor* (Murphy) along with four Mk 14's and she departed for patrol to Rabaul. Murphy and his crew aced this patrol, making nine aggressive attacks. They scored 14 hits out of 21 torpedoes fired and sank five ships for nearly 20,000 tons total. Seven of the attacks were made in broad daylight while submerged, but Murphy reported that the Japanese never sighted him nor the inbound torpedoes due to their wakeless nature. One Mk 18 failed to start upon launch, so one of the Mk 14's was hurriedly dispatched in its place. All in all it was a tremendous debut for the new weapon, and it was a harbinger of bad things to come for the Japanese merchant marine and the IJN. Murphy and his crew were awarded the Silver Star. Westinghouse and Exide still had production problems to work out, but the submarine force excitedly looked forward to the future.

*OTL result: John Murphy became a critic of the MK 14 after getting a miserable hit rate during this patrol. Although he believed he sank one ship, postwar analysis failed to confirm this. Murphy was dressed down by his squadron commander for expending too many torpedoes for too few hits. When Murphy suggested setting the weapons to run shallower, his squadron C.O., CDR Allan McCann sternly and directly ordered him to adhere to the prescribed depth settings. With the deep running fault of the Mk 14 this virtually guaranteed misses.*

***BATTLE OF THE CORAL SEA, MAY 1942***

***08 MAY 1942 –*** On the second day of battle, TBD Devastators of squadron VT-3 from USS *Yorktown* (CV-5) make an attack on the IJN carrier *Shokaku* in coordination with SBD Dauntless dive bombers. The low and slow flying TBD's manage to score two widely spaced Mk 13 hits on the starboard side with another on the rudder that along with two 1,000 lb bomb hits from the SBD's leave the carrier a burning wreck, listing to starboard and unable to maneuver. 30 minutes later, aircraft from *Lexington* (CV-2) arrive and TBD's from VT-2 hit her four more times with Mk 13's. With an additional hit from the SBD's, the devastated *Shokaku* sinks five minutes after the last torpedo hits, taking 90% of her crew down with her.

*OTL result: Squadrons VT-2 and VT-3 launched over 20 torpedoes during the attacks on Shokaku. Unbelievably, they scored zero hits. Shokaku survived three bomb hits and missed Midway, but because her hull was intact she survived and was repaired to fight again.*

***BATTLE OF MIDWAY, JUNE 1942***

***04 JUNE 1942 –*** *Nautilus* (Brockman), on patrol off Midway, raises her periscope at 07:55 and sights the battleship *Kirishima,* the cruiser *Nagara,* and two destroyers. Detected, *Nautilus* spends the next few minutes dodging a counterattack, then returns to periscope depth and sights on *Kirishima.* She barely has time to launch two Mk 14's, which run straight and true. The first strikes the aft end of the starboard armor belt causing hull deformation and some minor flooding that is easily controlled. The 2nd torpedo strikes squarely between the starboard propeller shafts, wrecking both and causing extensive but controllable flooding aft. Barely maintaining steerageway, *Kirishima* falls out of formation and is forced to return to Japan with one of the destroyers.

Later that afternoon, *Nautilus,* in a nearly divine stroke of luck, comes across the heavily damaged carrier *Kaga,* still afloat after being savaged by SBD dive bombers. Brockman sets up on the burning carrier and

launches four Mk 14's her way. Misjudging her speed, the first torpedo misses ahead, but the last three strike home in succession and the mortally wounded *Kaga* rolls over and sinks 10 minutes later.

*Nautilus* and her crew were awarded the Presidential Unit Citation, and Brockman deservedly received the Navy Cross.

All of the Japanese carriers except *Kaga* were hit at least once by Mk 13 torpedoes from the various TBD's of the American force, although the TBD's suffered terribly for their efforts. VT-8 from *Hornet* was virtually wiped out.

*OTL result: Nautilus scored no hits on Kirishima due to defective torpedoes. Of four Mk 14's fired at Kaga, three malfunctioned. One actually hit the carrier, but it was a dud and did no damage. Kaga did eventually sink, but only because she was scuttled by her own escorting destroyers due to her extensive damage. The brave sacrifice of the TBD crews proved to be supremely frustrating as no hits were obtained.*

***THE BATTLE OF SAVO ISLAND, AUGUST 1942***

***01:40, 09 AUGUST 1942 –*** USS *Bagley* (DD-386), having just witnessed the savaging of the Southern Force by Admiral Mikuma's cruisers and dodging shell splashes herself, makes a hard turn to port and lines up for a torpedo shot on heavy cruisers *Kinugasa* and *Furutaka,* which are headed north to take on the Northern Force. The single Mk 15 aimed at *Kinugasa* misses astern, as does one of the three headed towards *Furutaka.* The other two strike the cruiser on her starboard quarter nearly simultaneously and the two 823 lb torpex warheads detonate in a tremendous roar. *Furutaka,* her crew rapidly moving ammo about to reload for the next engagement suffers a shattering after magazine explosion, severing the hull just aft of the aircraft catapults. The stern section sinks almost immediately, with the forward two-thirds afire and listing heavily to starboard. It sinks an hour later with a heavy loss of life. *Bagley* and her crew are hailed as heroes for enacting some small level of retribution for the embarrassing defeat of the American/Australian force.

*OTL result: All four of Bagley's torpedoes miss. No Japanese ships are lost, although Chokai, Kinugasa, and Aoba take hits. Kako is torpedoed and sunk the next day by submarine S-44.*

*These are just a few examples of how the timeline may have diverged if we had employed fully tested and completely reliable torpedoes from the first day of the war. The butterflies of fate make it difficult to accurately predict what may have followed, but the end result would still be the same. The end would have come earlier, and most importantly lives would have been saved.*