The Navy's Escort Carrier Offensive

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In the spring of 1943, U-boats became the prey when U.S. aircraft carriers built on merchant-ship hulls entered the Battle of the Atlantic.

With the outcome of Germany's all-out U-boat assault on shipping still seemingly much in doubt, the U.S. Navy deployed an improvised weapon in the Battle of the Atlantic in March 1943—the auxiliary, or escort, carrier. Convoys crossing the North Atlantic lacked air support in the mid-ocean area, which was beyond the range of land-based Allied aircraft. Although barely a third the displacement of the fleet carriers fighting in the Pacific, escort carriers used in close support of the convoys were able to close the mid-ocean gap. But when the "baby flattops" were cut loose from their convoys to pursue the U-boats wherever they may be, the Battle of the Atlantic's wolves became the prey.

The U.S. Navy's escort-carrier program got its start in December 1940. On the 13th of that month, Rear Admiral William F. Halsey, the U.S. Fleet's commander, Aircraft, Battle Force, sent a letter to Chief of Naval Operations Harold R. Stark expressing his concern that the entry of the United States into the European war would require all six of the Fleet's aircraft carriers to be deployed immediately. This, in turn, would severely restrict both the training of naval aviators and the service's ability to transport Army and Navy aircraft to overseas bases. To overcome these handicaps, Halsey recommended the procurement of "suitable merchant vessels and their earliest conversion to auxiliary aircraft carriers." 1

Interestingly, just a week later, President Franklin D. Roosevelt, in a memo to Admiral Stark by FDR's naval aide, Captain Daniel Callahan, proposed that, in order to increase convoy protection, a 6,000- to 8,000-ton merchant vessel capable of attaining a speed of at least 15 knots be converted into an experimental carrier equipped with a flight deck that could accommodate ten helicopters or ten planes with low-landing speeds. 2 While Admiral Halsey's proposal had called for the creation of auxiliary carriers to be used for noncombat purposes, President Roosevelt's concept was for a carrier that could help provide antisubmarine protection to convoys at sea.

Following a series of January 1941 meetings principally in the CNO's office, it was decided that two Maritime Commission diesel-powered C-3 merchant ships, the SS Mormacmail and Mormacland , could be provided for conversion into carriers; the U.S. Navy would receive the first ship and the Royal Navy the second. Convinced that the conversion process should take no more than three months, Roosevelt pushed for immediate action. Delivered to the Newport News Shipbuilding and Drydock Company's yard on 17 March 1941, the 10,000-ton Mormacmail was converted to the Auxiliary, Aircraft Escort Carrier USS Long Island (AVG-1).

Commissioned on 2 June, she had a flush flight deck extending 362 feet abaft and above the pilothouse, a catapult installed to launch planes off her port bow, and a single elevator. Designed to carry 16 carrier scouting planes (SOCs), she was also armed with two 3-inch/50-caliber guns on her forecastle and a single 5-inch/51 gun at her stern. Following flight-testing on board the carrier later that summer, in September 1941 the Bureau of Ships authorized adding 77 additional feet to her flight deck by extending it forward over the pilothouse. 3

Even as the Long Island was undergoing conversion, in late April 1941 the British Admiralty requested that the United States convert six C-3 merchant hulls into “fighter carriers” for Royal Navy use. The first of these, the Mormacland , began conversion at Newport News in early May, and after delays caused in part by requested British design changes, she was finally commissioned on 17 November 1941 as HMS Archer . She was equipped with the longer 440-foot flight deck, a single elevator, and an overhung navigation bridge. 4 The other five C-3 hulls allocated to the British were under conversion as well, and four of these—HMS Avenger , Biter , Dasher , and Tracker —were completed and delivered between the end of March 1942 and end of January 1943. The fifth converted ship went instead to the U.S. Navy and was commissioned on 3 March 1942 as the USS Charger (eventually designated CVE-30). 5

In the days following the Japanese attack on Pearl Harbor, the Navy’s Auxiliary Vessels Board recommended the requisition of 24 additional merchant hulls of the Puget Sound steam-turbine design for conversion as auxiliary aircraft carriers in the Navy’s Fiscal Year 1942 building program. Following Navy Secretary Frank Knox’s approval, on 30 December 1941 the Maritime Commission agreed to release 20 of its C-3 freighter hulls to the Navy for this purpose. Ten of these were assigned to the U.S. Navy, while the other ten were allocated to the Royal Navy; as completed they became Auxiliary Aircraft Carriers (ACVs)—later Escort Aircraft Carriers (CVEs)—6 through 25. 6

The ten assigned to the U.S. Navy were Bogue -class carriers (after the USS Bogue [ACV-9]). Although built on the same C-3 hulls as the earlier auxiliary aircraft carriers, they embodied alterations that the Admiralty had been recommending since before work on HMS Archer had begun in 1941. Four of these ten ships—the Bogue , Card , Core , and Croatan —would go on to play important roles in the Battle of the Atlantic as “Hunter-Killer” carriers.

As incorporated into the final design, the alterations to the ships included an estimated top speed of 19 knots; a wider, sturdier flight deck that was 442 feet, 3 inches in length and 80 feet, 10 inches in width; stronger arresting gear; and a longer hangar deck that allowed the installation of two elevators. The carriers could accommodate up to 38 aircraft, but 18 to 21 planes were ususally embarked for combat operations. Another notable change was the addition of a small island rising above the flight deck but built out over the side of the ship to keep the landing area clear of obstructions. The island featured an open bridge, lookout platforms, a chart house, and cabins for the captain and the navigator. 7

By the spring of 1943, Admiral Ernest J. King, commander-in-chief, U.S. Fleet and chief of Naval Operations (COMINCH/CNO), had become convinced of the need to improve the complicated command relationship that existed between the Navy and Army on antisubmarine-warfare (ASW) matters. From March to May, the COMINCH staff was busily studying how to best improve this situation. 8 As part of their efforts, on 6 April King appointed Rear Admiral Francis S. “Frog” Low, a highly experienced submarine officer, to be his assistant chief of staff for antisubmarine warfare, and ordered the staff to put all ASW business under his direction. 9

On 20 May, following a period of extended correspondence among the members of the Joint Chiefs of Staff, King established the 10th Fleet at his headquarters in Washington to take over all U.S. antisubmarine activities, including the operational control of U.S. Army Air Forces and Navy ASW aircraft. 10 King, as COMINCH, initially assumed the duty of commander, 10th Fleet. Although it was thought at the time that another admiral would be brought in to take over the assignment, an appropriate candidate was not available, and as a result King remained the fleet’s commander for the duration of the war. Meanwhile, Admiral Low, who was appointed the 10th Fleet’s chief of staff, handled the day-to-day operational oversight of the Navy’s war against the U-boats in the Atlantic, even as Atlantic Fleet Commander-in-Chief Royal E. Ingersoll and the American coastal Sea Frontier commanders dealt with the actual details of these operations. 11

Thoughts of eventually using auxiliary carriers offensively against the U-boats had been germinating within the COMINCH staff during the spring of 1943. In one of Low’s first memos written upon joining the staff, he had advocated including one auxiliary carrier in each surface-support group at the earliest possible date and using support groups not only for fortifying the defensive screens of convoys but also for “killer operations.” 12 Similarly, in a preliminary document on plans for setting up the 10th Fleet sent to the Joint Chiefs on 27 April, King commented on using mobile forces, which included ACVs and their escorts, for missions that included, “in due course, [to] operate directly against U-boat concentrations, etc.” 13

The key to using escort carriers effectively against U-boats, however, was determining the submarines’ approximate cruising locations in an area that comprised many thousands of square miles of ocean. This is where successes in Allied communications intelligence (COMINT) came into play. The Allies had been locked out of reading U-boat radio traffic for most of 1942 after Germany’s U-boat High Command (BdU) had ordered the addition of a fourth wheel to the Enigma cryptographic machines used when communicating with its Atlantic and Mediterranean submarines. But in January 1943, a combination of breakthroughs enabled Allied code-breakers to read U-boat radio traffic promptly. This provided the Admiralty and COMINCH headquarters with accurate information on current dispositions of U-boat groups. 14

One aspect of this vital knowledge that proved particularly significant to COMINCH was the at-sea locations of the large German U-tankers sent out to refuel other U-boats. Each Type XIV “ Milch (milk) cow” U-boat could keep several submarines operating off the coast of the United

States for about twice as long as would otherwise be possible. The small 500-ton Type VIIC U-boat, for example, could spend an average of only 16 to 20 days on patrol. If it could be refueled at sea, however, its time on patrol could increase to between 32 and 36 days. 15

Because so much of the U-boat fleet was composed of shorter-range submarines, targeting the U-tankers could significantly reduce the operating radius of the overall force. It was for this reason that King pushed to use U-boat location information derived from COMINT to attack Germany's refueling subs. On 27 April, he sent a highly classified message to Britain's First Sea Lord, Admiral of the Fleet Sir Dudley Pound, that stated:

While I am equally concerned with you as to the security of "Z" [i.e., communications intelligence] information it is my belief that we are not deriving from it fullest value[.] The refueling submarine is the key to high speed, long range U/boat operations[.] To deprive the enemy of refuellers [sic] would at once decrease the effectiveness and radius of entire U/boat deployment[.] With careful preparations it seems not unlikely that their destruction might be accomplished without trace[.] 16

Although the Admiralty could not be persuaded to accept this idea, King moved ahead with it on his own volition.

Early Contact with the Enemy

The Bogue , commanded by Captain Giles E. Short, was the first U.S. Navy escort carrier to be deployed in the Atlantic for convoy support. Operating out of Iceland and Newfoundland beginning in early March 1943, the Bogue ; her embarked squadron, Composite Squadron (VC) 9; and her accompanying flush-deck destroyers patrolled in support of eastbound Allied convoys but had little success finding and attacking U-boats. Their luck changed in May. At twilight on the 21st, while the Bogue and her escorts were steaming westbound as part of Convoy ON-184, Lieutenant Commander William M. Drane, CO of VC-9, spotted the surfaced U-231 some 60 miles ahead of the convoy. After pushing his TBF Avenger into a low-angle glide, Drane released his four depth bombs over the U-boat's conning tower as she was submerging. Her bridge wrecked, the submarine was forced to head back to France for repairs.

The next day proved even more eventful for the escort carrier's airmen. Following partially successful attacks by VC-9 pilots on two U-boats on the morning of 22 May, that afternoon Lieutenant (junior grade) William F. Chamberlain, running down a high-frequency direction-finder (HF/DF or "Huff/Duff") signal from the Bogue , sighted U-569 just 20 miles astern of the convoy. His Avenger loosed four depth bombs that landed close to her conning tower, and she submerged. Some 30 minutes later, the damaged submarine resurfaced and was greeted by the Avenger flown by Chamberlain's relief, Lieutenant Howard S. Roberts. He delivered an accurate spread of depth bombs. U-569's bow rose high in the air before she plunged to an estimated depth of 350 feet. Blowing all her tanks, her skipper, Kapitänleutnant (Lieutenant) Rudolf Bahr, surfaced the boat and allowed the crew to jump overboard before scuttling her. The escort carriers had claimed their first kill. 17

In every regard, May was proving to be a disastrous month for Grossadmiral Karl Dönitz's U-boat campaign in the North Atlantic. That month the deployed subs had sunk only 42 Allied ships while in turn losing 38 of their number, largely to attacks from land-based aircraft. 18 These unsupportable losses forced U-Boat High Command temporarily to abandon its offensive in those waters, and on 24 May, BdU ordered nearly all of its submarines to leave the North Atlantic and head to an area about 750 miles southwest of the Azores, in order to intercept a U.S.-Gibraltar convoy on or about 1 June.

On the 26th, 17 of the U-boats were directed to organize into a wolf pack designated Group Trutz (Defiance) and to form a patrol line within a specific area. The Allied COMINT organizations had managed to decrypt the initial order the same day it was sent and eventually decrypted the 26 May message on 7 June. 19 The valuable intelligence not only allowed the British and Americans to divert potentially endangered convoys around the newly established patrol line but enabled them to redeploy the carrier escort groups that had been defending the North Atlantic convoys to the newly threatened area. 20

Acting on the intelligence, Atlantic Fleet headquarters directed the Bogue group to sail south, with orders to carry out offensive operations in support of North African convoys. The escort carrier departed Argentia, Newfoundland, on 31 May, in company with four flush-deck destroyers, for her first independent operation as a Hunter-Killer carrier. After she reached her initial patrol station, it was several days before her aircraft spotted potential targets. On the afternoon of 4 June, however, VC-9 Avengers surprised and attacked three German submarines— U-228 , U-641 , and U-603 —in separate actions. Unfortunately, the subs, which were positioned at the southern end of the Trutz patrol line, received only minor damage from the aerial attacks and all escaped.

The following morning, though, one of Commander Drane's new F4F Wildcat–Avenger teams spotted U-217 cruising on the surface, just 63 miles from the Bogue . In a coordinated attack, the fighter, piloted by Lieutenant Richard S. Rogers, dove in for repeated strafing runs on the submarine's deck. Lieutenant (junior grade) Alexander C. McAuslan, flying the Avenger, then came in to deliver a lethal pattern of depth charges from an altitude of just 100 feet. The stern of Kapitänleutnant Kurt Reichenbach's boat rose high out of the water before the vessel quickly plunged down into the depths. 21

Because Reichenbach's submarine had been the southernmost one in the Trutz line, the Bogue group lost further contact with the U-boats and turned east to support eastbound Convoy UGS-9. After several days in which no submarine activity was detected, Captain Short decided to look for new targets. On the afternoon of 8 June, VC-9 planes were in the air responding to a submarine communication picked up on the Bogue 's HF/DF set when Kapitänleutnant Helmut Manseck's U-758 was spotted traveling on the surface only ten miles to the west of the group. This boat was the first German sub equipped with a quadruple mount of 20-mm antiaircraft guns in order to fight it out with attacking aircraft. The armament

proved successful, and despite the fact that four VC-9 planes attacked U-758 during the course of that afternoon, the damaged sub eventually escaped.

Responding to Manseck's request for help, that same day BdU ordered U-460 and U-118 to respond. Both subs met up with the damaged U-758 by 10 June, and U-460 then escorted her safely back to port. However, the Allies decrypted BdU's earlier message on 11 June, creating a new opportunity.

In the late morning of 12 June, one of the Bogue 's fighter-bomber teams sighted U-118 —a 1,600-ton Type XB minelayer/supply boat on tanker duty—traveling on the surface just 20 miles astern of the Hunter-Killer group. In all, seven of VC-9's planes took part in attacking her before Korvettenkapitän (Lieutenant Commander) Werner Czygan's boat finally broke apart and sank. 22 As a postwar communications-intelligence study commented on the Bogue group's victory, "This was the first of a mounting number of refueler sinkings which . . . not only kept [the U-Boat] Command's plans throughout the summer in a constant state of uncertainty, but permanently wrecked the supply system on which his strategy was based." 23

The USS Core, soon to be designated CVE-13, was the second escort carrier to achieve success against U-boats. 24 The Core , commanded by naval aviator Captain Marshall R. Greer and escorted by three destroyers, had headed out of the Chesapeake Capes on 27 June on her first war cruise. For the next two weeks her group provided escort support for Convoy UGS-11, but on 11 July CINCLANT headquarters directed the Core to leave UGS-11 and take over escort responsibilities for westward-bound Convoy GUS-9, which had been under the protection of the carrier group headed by the Santee (CVE-29), a Sangamon -class escort carrier.

Early in the afternoon of 13 July, one of the Wildcat-Avenger teams from the Core 's VC-13 sighted the wake of U-487 , a 1,600-ton Milch cow, cruising some 760 miles southwest of Santa Maria in the Azores. Although surprised by the sudden arrival of the two American aircraft, German gunners quickly recovered and managed to shoot down the Wildcat flown by Lieutenant (junior grade) Earl H. Steiger, even as the accompanying Avenger dropped charges that straddled the U-boat's foredeck. A second team from the Core , with VC-13 CO Lieutenant Commander Charles W. Brewer flying the Wildcat, was soon overhead. While Brewer dove in for a strafing attack, his companion dropped four depth bombs that exploded close aboard the sub. Blasted into the air, Oberleutnant (Lieutenant [junior grade]) Helmut Metz's U-487 then sank steeply by the bow.

The Core 's offensive effort was not yet over, however, because at dawn on 16 July, Lieutenant Robert P. Williams, one of the pilots who had attacked U-487 , spotted a German submarine on the surface less than 30 miles from GUS-9. Diving from a covering cloud bank, he planted four depth bombs that holed her hull near the conning tower and quickly sent Kapitänleutnant Günther Müller-Stöckheim's U-67 , a 740-ton sub, down into the depths. 25

Captain Harold F. Fick's Santee was the second escort carrier to draw blood that July. When her carrier group was relieved of supporting GUS-9 on 12 July, it had been directed to sail

toward the Azores to seek out U-boats operating in those waters. The Santee 's composite squadron (VC-29) was the first escort-carrier outfit equipped with a new antisubmarine weapon: the Mark 24 mine, the intentionally deceptive designation for an airborne acoustic-homing torpedo subsequently nicknamed "Fido."

On the morning of 14 July, one of VC-29's Wildcat-Avenger teams sighted Oberleutnant Gerd von Pommer-Esche's U-160 cruising some 150 miles northeast of the group. Using a new tactic developed for effectively using the homing torpedo, the Wildcat pilot made successive strafing runs, which caused the sub to dive. The Avenger, flown by Lieutenant (junior grade) John H. Ballentine, then released the Mark 24 just ahead of the surface swirl left by the diving boat. The torpedo quickly found its target, and U-160 sank to the bottom with all her crew.

The morning of 15 July proved to be equally lucky for the Santee 's aviators. Kapitänleutnant Werner Witte's 740-ton boat, U-509 , was spotted on the surface some 180 miles south of Santa Maria. Despite throwing up a heavy barrage of flak, the sub was forced to dive after four strafing passes by the accompanying F4F fighter. Lieutenant (junior grade) Claude N. Barton then loosed his Fido. Upon hitting the water, it rushed toward the noise produced by the boat's propellers, and the exploding submarine quickly sank. The fascinating new weapon that had claimed its second victim was already being distributed to the Allies on both sides of the Atlantic. 26

The fourth CVE to achieve success as a Hunter-Killer carrier was Captain Arnold J. Isbell's USS Card (CVE-11). Aviator "Buster" Isbell and his ships had been providing close support to U.S.-Gibraltar convoys in June and July, but in early August the Card group was directed to hunt for enemy submarines. On 30–31 July BdU had radioed two of its subs— U-66 and U-664 —to rendezvous with U-117 , a Type XB boat on refueling duty, but the Allies had decrypted the orders on 1 August. One of the Card 's Wildcat-Avenger teams sighted U-66 on the afternoon of 3 August, but the ensuing attacks failed to seriously damage the boat.

Just before midnight three days later, U-66 met up with U-117 . The next morning, 7 August, a single Avenger from the Card 's VC-1 spotted the two submarines steaming in parallel while carrying out refueling some 83 miles west of the carrier group. The pilot, Lieutenant (junior grade) Asbury H. Sallenger, dove and delivered a brace of depth bombs, which straddled U-117 , and then machine-gunned her deck before gaining altitude to hover out of range. He had radioed for support, but before help arrived U-66 dove and escaped. But Korvettenkapitän Hans Werner Neumann's U-117 was not so lucky. Unable to successfully submerge, the boat was attacked by two newly arrived Avengers, whose depth bombs ruptured her fuel tanks, and the sub sank to the bottom.

The Card 's aircraft scored a second kill on 9 August, when a newly devised three-plane team, consisting of one Wildcat and two Avengers, sighted a surfaced submarine busy recharging her batteries. Kapitänleutnant Adolf Graef's U-664 was hit by one of two 500-pound bombs dropped by one of the two TBFs and after beginning to dive was blown back to the

surface by the explosion of two depth bombs set for shallow detonation that had been dropped by the second Avenger. Graef eventually ordered the boat to be abandoned before she sank.

The escort carrier's third kill on that cruise occurred on 11 August, when one of her Wildcat-Avenger teams caught Kapitänleutnant Hans-Joachim Drewitz's U-525 on the surface. Driven to submerge by strafing, she was finished off by a Mark 24 dropped into her wake. 27

The Hunter-Killer offensive that had been so successful during the summer of 1943 continued throughout that fall. By the end of 1943, the escort carriers had sunk 24 German submarines, including five U-tankers. 28 And CVE offensive operations were no less effective during 1944 and into 1945. As Admiral Low stressed in an October 1944 10th Fleet memo, "It is important to note that the CVE support groups accounted for about 60% of all U-boats sunk by U.S. forces in the Atlantic and Mediterranean during the six months April through September 1944." 29

During the final year and a half of the European war, other CVE Hunter-Killer groups also earned their places in the history of the Battle of the Atlantic. The Block Island (CVE-21) carrier group sank the first of an eventual seven U-boats in late October 1943. But on the night of 29 May 1944, U-549 torpedoed and sank the Block Island —the only U.S. carrier lost in the Atlantic during the war. The group formed around the Croatan (CVE-25) also managed to sink seven U-boats in April, June, and July 1944 and April 1945. Other Hunter-Killer groups included the ones headed by the Guadalcanal (CVE-60), which sank three U-boats and successfully captured a fourth, U-505 ; Mission Bay (CVE-59); Solomons (CVE-67); and Wake Island (CVE-65).

Admiral King and his 10th Fleet staff had been enthusiastic about using escort carriers to track down and sink German submarines from the outset. The key factor that made the concept operationally feasible, however, was finding a way to determine where the U-boats could be found. This is where the British and American cryptanalysts' ability to overcome the Enigma cipher machine used by BdU for communicating with the German subs played such a valuable role. With cueing from current COMINT information, the escort carrier groups were directed to the specific areas where the U-boats were operating at particular times.

The initial carrier-plane–U-boat actions proved a learning experience for the American aircraft involved. But the end results were successful beyond what could have been expected. In all, escort-carrier groups sank 53 U-boats during the war and helped to decimate Germany's force of U-tankers. 30 It was an amazing accomplishment that became the final chapter of the Battle of the Atlantic.

1. Confidential letter from Commander Aircraft, Battle Force, U.S. Fleet to the Chief of Naval Operations, serial 01078, 13 December 1940, quoted in typed draft (with penciled corrections) titled "The Escort Carrier Program," 9; "Tenth Fleet CVE-DE Programs Manuscript & Notes 667" Folder, Box 78, RADM Samuel E. Morison Papers, Operational Archives, Naval History and Heritage Command [hereafter cited as OA, NHHC].

2. Confidential memo from Captain Daniel J. Callahan to Admiral Stark, 21 December 1940, cited in “The Escort Carrier Program,” 10.

3. “The Escort Carrier Program,” 11–20.

4. Ibid., 23–24.

5. Ibid., 25n.

6. Ibid., 28; and Norman Friedman, Aircraft Carriers: An Illustrated Design History (Annapolis, MD: Naval Institute Press, 1983), 169.

7. “The Escort Carrier Program,” 29–30.

8. Memorandum from Vice Admiral F. S. Low to Admiral Ernest King, “Resume of Anti-Submarine Operations Against the German U-Boats in World War II,” 28 October 1944, 4; binder labeled “Anti-Submarine Operations [—] Resume of Anti-Submarine Operations Against the German U-boat WW II. A History Prepared Under the Direction of VADM F.S. Low (October 1944)”; Ser. 11, Box 13, Fleet Admiral Ernest J. King Papers, OA, NHHC.

9. “Chronology,” [2], Enclosure O, “Tenth Fleet” Folder, Box 34, Tenth Fleet ASM Division Subject File, Records of the Chief of Naval Operations, RG 38, National Archives and Records Administration, College Park, Maryland [hereafter cited as NARA II].

10. See, for example, “Rear Admiral Low on the Tenth Fleet [—] Conversation 13 September 1943,” 1, “The Destroyer Escort Program 564” Folder, Box 63, Morison Papers, OA, NHHC.

11. Memo from VADM Low to ADM King, 28 October 1944, 5–6.

12. Memorandum from F. S. Low for Commander in Chief, United States Fleet, Subj: “Appreciation of the Anti-Submarine Situation,” no serial, 20 April 1943, 2–3; “The Destroyer Escort Program 564,” Folder, Morison Papers, OA, NHHC.

13. Memorandum from Commander in Chief, United States Fleet to Joint Chiefs of Staff, no serial, 27 April 1943, 1; “King Papers April 1943” Folder, Box 3, King Papers, OA, NHHC.

14. For information on the situation during 1942, see F. H. Hinsley, with E. E. Thomas, C. F. G. Ransom, and R. C. Knight, British Intelligence in the Second World War: Its Influence on Strategy and Operations , vol. 2 (New York: Cambridge University Press, 1981), 176–79. With regard to the changed situation in January 1943, see SRH-368, “Evaluation of the Role of Decryption Intelligence in the Operational Phase of the Battle of the Atlantic [—] U.S. Navy OEG Report #68,” (LO) 2271–52, 1952, 039; “SRH-368” Folder, Box 149, World War II Command File, OA, NHHC.

15. “Evaluation of the Role of Decryption Intelligence,” 009.

16. Message from COMINCH to Admiralty, Personal from Admiral King to the First Sea Lord, 281628, 27 April 1943, “Anti-Submarine Operations.”

17. Philip Karl Lundberg, “American Anti-Submarine Operations In The Atlantic, May 1943–May 1945” (Ph.D. diss., Harvard University, 1954), 56–58; and Samuel Eliot Morison, The Atlantic Battle Won, May 1943—May 1945 , vol. 10 of History Of United States Naval Operations In World War II (Boston: Little, Brown and Company, 1956), 80–81.

18. Ministry of Defence (Navy), [Gunter Hessler], German Naval History, The U-Boat War in the Atlantic 1939–1945 , Facsimile Edition with Introduction by Lieutenant Commander Andrew J. Withers, M.A., Royal Navy (London: Her Majesty's Stationery Office, 1989), vol. 2, January 1942–May 1943 , 112n.

19. SRH-008, "Battle of the Atlantic," vol. 2, n.d. [May 1945], [132]; "SRH-008" Folder, Box 120D, World War II Command File, OA, NHHC.

20. "Evaluation of the Role of Decryption Intelligence," 040.

21. Lundeberg, "American Anti-Submarine Operations," 66–68; and Morison, The Atlantic Battle Won , 110–12.

22. Lundeberg, ibid., 68–71; Morison, ibid., 112–14; and William T. Y'Blood, Hunter-Killer: U.S. Escort Carriers In The Battle Of The Atlantic (Annapolis, MD: Naval Institute Press, 1983), 55.

23. SRH-008, "Battle of the Atlantic," vol. 2, [137].

24. The designation ACV was changed to CVE (for Aircraft Carrier, Escort) effective 18 July 1943.

25. Lundeberg, "American Anti-Submarine Operations," 81–82; and Y'Blood, Hunter-Killer , 76–77.

26. Lundeberg, ibid., 82–83; and Morison, The Atlantic Battle Won , 118.

27. Lundeberg, ibid., 87–90; Morison, ibid., 109–10, 122–24; and Y'Blood, Hunter-Killer , 82–91.

28. Sea-Based Antisubmarine Warfare 1940–1977 , vol. 1, 1940–1960, 2nd ed. (Alexandria, VA: R. F. Cross Associates, 17 February 1978), 38; Box 1301, Post I Jan 1974 Command File, HHHC.

29. Memorandum from VADM Low to ADM King, 28 October 1944, 6.

30. See Appendix II, "Submarine Sinkings by Escort Carrier Groups," in Y'Blood, Hunter-Killer , 282–83.

The U.S. naval aviators who flew off escort carriers in search of U-boats were trained in the art of antisubmarine warfare. But they also relied on "lessons learned" by fellow Navy fliers to increase their chances of successfully attacking enemy submarines.

The following instructions are perhaps the earliest such Battle of the Atlantic lessons based on the experiences American escort-carrier aviators. Titled "A Discussion of Anti-Submarine Tactics," they were included as Enclosure A in the USS Bogue 's report on furnishing air cover for Convoy ON-184 from 15–26 May 1943. During that period, Composite Squadron (VC) 9 was deployed on board the Bogue and made the first U-boat kill by U.S. escort-carrier aircraft. The author of the instructions, which are published here with minimal editing, was not listed, but he probably was Lieutenant Commander William Drane, VC-9's commanding officer.

The TBF is considered an excellent antisubmarine airplane in view of its depth-charge capacity, endurance, and speed. The latter is a very important item that permits the plane to deliver its

attack before the submarine can submerge. This speed also exposes the plane to AA fire for the shortest possible period. This squadron to date has sighted and attacked eight submarines, and every attack was made with the submarine still on the surface. The endurance is of considerable value in permitting the plane to remain on station a reasonable time to await relief. The only disadvantage to this type of airplane is its size when used on ACVs; however, this is not a serious handicap in view of its many favorable qualities.

The .30-caliber tunnel gun has been removed from the planes of this squadron while on antisubmarine patrol, and the tunnel window used for photographing the attack. There appears to be no necessity for these guns on this type of duty in the North Atlantic.

German submarines have recently started using two 20-mm guns for attacking aircraft. Three attacks on separate submarines on May 22, 1943, encountered this AA fire. It is therefore recommended that at least two and preferably four .50-caliber guns be mounted in the TBF wings. This appears necessary for this duty and would no doubt be of considerable value in other types of duty.

The type of attack preferred by this squadron is to use cloud cover, sun, or other elements to the maximum for concealment. The attack is made in a long power glide at maximum speed when at considerable distance; however, on approaching the vicinity of the submarine the speed must be reduced to 180–200 knots to reduce the possibility of a ricochet. One submarine possibly escaped this squadron because of ricochets, although the flat-nosed depth charges were used and dropped with the plane in nearly a 20-degree dive and making only 200 knots. In the final stage of the attack it is recommended that the wheels be lowered to reduce the speed to 160–170 knots, then raised to clear the tunnel window for the photographs.

The plane is pushed over to about a 20-degree dive and steadied on the point of aim when the depth charges are dropped. The advantage of this final push over and steady aim permits the bombs to be dropped with remarkable accuracy. Another advantage is that the aim is steady long enough to permit the emergency release to be pulled after the firing button to ensure that all bombs have dropped. This is standard procedure in this squadron.

The best angle of attack is believed to be from 10 to 20 degrees from the centerline of the submarine and preferably from astern. A beam shot is avoided if absolutely possible. The speed of the TBF has permitted ample time so far to choose attack position, especially when concealed in the clouds.

The depth charges are set for a depth of 25 feet and a spacing of 75 feet. This large spacing is a compromise between our previously favored 50 feet and the 100 feet recommended by the Fleet Air Arm Anti-Submarine School, Balleykelly, Northern Ireland, which all TBF pilots of this squadron attended. This spacing seems to be ideal for our type of attack, since our dive far shortens this interval considerably. Also if the submarine has already disappeared it makes a longer spread over the possible submarine's position, thus increasing the chances of hitting.

During the approach the pilot and radioman must check all switches in addition to the other routine requirements for dropping charges. When the radioman has completed his required duties he mans the camera at the tunnel window. The turret gunner uses the gun camera on all attacks to supplement the large camera. He also uses the turret gun if personnel are in the conning tower.

After dropping the depth charges, the plane makes a sharp left turn to facilitate observation and the taking of photographs. After marking the area and completing the contact report, the plane climbs to sufficient altitude to permit the carrier to check its position briefly by radar. The contact report is made during the approach, if time permits. This is important in that the ship will have a submarine warning in case the plane should get shot down.

It is assumed that the dawn and dusk patrols are the most important patrols to the welfare of the convoy and that submarines are most likely to be encountered on these flights. The experience of Bogue aircraft to date regarding submarine defensive tactics seems to be for them to remain on the surface and fight back. In view of possible antiaircraft fire, it is desirable that fighter planes accompany the TBF aircraft on these particular flights if conditions permit. If fighter support is used it is mandatory that some policy be laid down to coordinate the action of the fighter aircraft upon sighting and during the approach and attack. Without this discipline the missions are doomed to failure.

Some facts must be borne in mind: Two planes in formation can be seen at far greater distance than a single plane. Observation from the aircraft by the additional pair of eyes does not greatly intensify the search since the attention of the fighter pilot must be directed toward station keeping. Maneuverability of a fighter is one of its prime assets, but radical maneuvers of an aircraft will attract the attention of surface observers more readily than a plane on a steady course. Maneuvers often condense the vapor in humid air, greatly facilitating detection. Concealment is a primary factor in antisubmarine search. Fighters must not destroy advantages.

It should be appreciated that except for the possibility of antiaircraft fire, the antisubmarine aircraft could complete the mission on its own, and therefore, the fundamental mission of the fighter is to counteract AA action, and that action will only develop during the latter and crucial stage of the approach. The responsibility for control of the fighter must rest upon the antisubmarine aircraft since it has the responsibility of the fundamental mission. There should never develop a situation in which the action of the fighter results in the failure of a successful attack.

While it is desirable to close distance as quickly as possible when a submarine is sighted, excessive speed in the final stages must be avoided, as discussed previously. If the fighter dashes madly in without signal and drives the submarine down prematurely, those few sacred seconds might spell defeat. The antisubmarine aircraft may wish to use clouds, sun, or other means of concealment during the early stages of the approach. The fighter must not

compromise this strategy. The situation will dictate the strategy, and the antisubmarine aircraft must dictate the action.

During the approach the fighter should ease out on the beam of the antisubmarine aircraft about 500 to 1,000 yards and on signal when about 1,500 yards from the objective increase speed and strafe the submarine from three to five seconds before the depth charge attack. Interference with the depth-charge attack must be avoided.