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Aviation at sunrise: shortcomings of the American Air Forces in North Africa during TORCH compared to the Royal Air Force on Malta, 1941-42

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Aviation at Sunrise: Shortcomings of the American Air Forces in
North Africa during TORCH Compared to the Royal Air Force on
Malta, 1941-42

By

Ryan Evans

Accepted in Partial Completion
of the Requirements for the Master or Arts

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MASTER'S THESIS

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Ryan Evans

Date: August 4, 201

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North Africa during TORCH Compared to the Royal Air Force on
Malta, 1941-42

A Thesis
Presented to
The faculty of
Western Washington University

In Partial Fulfillment
Of the Requirements of the Masters of Arts Degree

Ryan Evans
August 2010

ABSTRACT

This work examines the accidents and shortcomings inexperienced American pilots experienced during the opening days of Operation TORCH and attributes these mishaps to inadequate training and inexperience. Through a comparative approach, American training programs and text are contrasted against those of the British. By analyzing the base training methods of the RAF and observing their effectiveness when used in the North Africa and Mediterranean theatre at Malta provides a solid example where a well developed and battle exposure prove effective. This frame work served as a framework to compare the deficiencies of American airmen.

Acknowledgments

This undertaking could not have been completed without the support of a series of institutions that were essential in the access to resources. I would like to express my thanks to the members of the Seattle Museum of Flight Library and Archives, for without them I would not have had access to important primary sources essential for this work. Their friendly assistance was much appreciated, as they kept a space on a desk with a tall pile of books that I was using set aside for months on end. They were eager and helpful to search their stacks and vault for rare sources vital for my work. I would also like to personally thank the assistant curator of the Museum of Flight Library and Archives, John Little, for his efforts in searching obtaining sources as well as allowing me access to his archives outside of normal business hours. The Museum of Flight Archives made available to me countless original photographs which were also very useful. Scott Finholm the Librarian & Audio/Video Archivist of the Museum of Flight's Kenneth H. Dahlberg Military Aviation Research Center was invaluable on his assistance in digital imaging and photo copying and processing of the primary documents and manuals. I also utilized the resources in the library at the Canadian Museum of Flight in Langley, British Columbia. Their modest collection of technical flight manuals and British squadron history sources were very helpful. Douglas Tait and the rest of the museum staff were very accommodating. I was fortunate enough to be at the Canadian Museum of Flight at a

time when they flew one of their British WWII trainers and was invited to help push out the aircraft. I would also like to thank my chair Professor Louis Truschel who has been a great resource towards completing this as well as a source of inspiration and knowledge on World War II. Professor Harry Ritter has also been a great help, as he has provided great advice and council with cleaning up and organizing my writing. I would like to thank Professor Phillip Thurtle of the University of Washington who inspired me to pursue a career in teaching and encouraging me to obtain a masters degree. I would also like to personally thank Dan Bubb with Gonzaga University who has mentored me to pursue scholarship on aviation history. I would graciously like to thank my mother, Cheryl Evans, who put in countless hours aiding me in editing my work. My life long friend Brent Tower was a crucial help in refining the final draft. I obtained valuable benefit from serving in the Seattle Squadron Civil Air Patrol where I have the opportunity to fly small planes and experience aviation first hand.

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Introduction

In late 1942, the sands of Morocco and its adjacent waters became crash sites for many American military pilots and their aircraft. Operation TORCH involved an American invasion of Vichy-held ports in French North Africa, particularly in Morocco. The United States Army Air Corps and Naval Aviation suffered heavy casualties during the opening days of Operation TORCH, starting on the morning of November 8, 1942. The mistakes made by American pilots can be better understood when compared to the successful performance of the Royal Air Force. The Americans and British faced entirely different enemies, who presented them with different levels of challenges. The RAF on Malta fought against veteran and determined professionals of the Luftwaffe as well as Mussolini's Regia Aeronautica, in contrast to the less formidable Vichy forces faced by the Americans. A sharp contrast existed between the performances of the ill-trained and unprepared American air forces and the veteran British Royal Air Forces defending Malta and the critically important east-west convoy route through the Mediterranean during 1940-45. Throughout the 1940 Battle of Britain and the Axis' air siege of Malta during 1941-42 the British gained valuable experience.

The contrast between the abilities of the two Allies involved in Operation TORCH is the crux of this work. It is a comparative history that compares the actual performances of the RAF and the American air units involved in TORCH. This thesis examines and discusses the shortcomings of the American Army Air Corps and naval air arm, in particular their fighter aircraft pilots. These include the lack of proper pilot

training, the state of preparedness for combat missions, and the use of underpowered aircraft.

This study fits into the historiography of North Africa in World War II. It parallels a recent major work by historian Rick Atkinson, his *An Army at Dawn: The War in North Africa, 1942-1943*. Atkinson accurately portrays the American army in this theater as initially ill-trained and ill-equipped for war against Germany's *Panzer Armee Afrika*. In his analysis of the American ground forces, he excludes the Army Air Corps division, even though this arm was instrumental to the success of American military forces fighting in North Africa. I argue that the Army Air Corps and the United States' naval air arm all suffered from a state of inexperience and did not achieve adequate readiness for battle. I contrast the American pilots' performance in the opening of TORCH to the proficiency level attained by the British Royal Air Force by late 1942 from valuable experience gained from their ordeal on and above the Western Desert and Malta. The second part evaluates the problems encountered by the ill-equipped American fighter pilots in the invasion of North Africa during Operation TORCH.

This work uses primary sources to assess the level of the American air units' initial performances in Operation TORCH in French Morocco. The US air units played a large role in the first days of the Operation and experienced unexpected heavy losses from pilot error, inexperience, and insufficient training. In order to undertake an accurate comparative history I also turned to primary sources that contributed to accurately examine and gauge the British pilots' effectiveness. The most important source covering American pilots came from the official after action reports. These reports gave the clearest unaltered account on the losses and outcome of the sorties flown during the

opening days of TORCH. I examined and researched the after action reports of the 33rd Fighter Group and files of the naval groups involved in order to bring relevant primary source data to this work. These after action reports served as my key primary source. At the National Archives and Records Administration in College Park, Maryland (NACP), I sifted through a total of fourteen boxes of archival naval records including photographs, squadron records, action reports, and debriefing forms. The after action reports on the military operations reveal the staggering number of American planes missing in action and the large number of casualties caused by pilot error. Data from these archives contained the official record of the 33rd Fighter Group's operational history, from November 8, 1942, to February 29, 1944. In addition I turned to naval records of the Wildcats launched in the first day of the operation. Boxes containing the records broken down by squadrons VF-41, VF-9, VF-26, VF-28 yielded a wealth of data, forms, and photographs. The American carriers involved in the operation included the *USS Ranger*, *USS Suwannee*, *USS Sangamon*, and the *USS Santee*. I found archived records cataloged specifically for the *USS Santee*, *USS Sangamon*, and the *USS Ranger* at the NACP. These official records proved invaluable to my work.

Since a large portion of my thesis investigates the effectiveness of both British and American pilot training programs, I turned to other sources researching an array of original manuals and training materials used in the programs. The British flight training curriculum required texts by David Hay Surgeoner and the practical flight training manual edited by Leonard Taylor. I acquired accesses to these through the Museum of Flight archives as well as copies of materials of the American training program. Not only did I study these materials written for the cadets, I also examined the *Instructors*

Handbook of Advanced Training written by Henry Walton, an invaluable source to understand the high standards with which the instructors were expected to teach their program. The equivalent air navigation manual, *Fm 1-30 Air Corps Field Manual of Air Navigation*, used by in the American pilot training program, is a gross simplification of Surgeoner's work on the same subject. It was important to go to these sources for an accurate comparison of the two training programs as well as their conjunction with secondary sources for an accurate and well informed comparison and analysis.

This thesis utilizes information from pilots' journals and memoirs. Using material written from the pilots themselves provides a fresh perspective to uncovering their trainings effectiveness and recounting events and their actions from their own point of view. Diaries of Lieutenant Wordell and Lieutenant Seiler, two American Wildcat pilots, published shortly after TORCH, in 1943, provide insight into problems that bedeviled during the operation. Other primary works published that year include Spitfire pilot George Beurling's account of his experiences over Malta. Memoirs written later include George Barclay's account as a fighter pilot. This work appeared in print only in 1976. Lord James Douglas Hamilton assembled and published a superb collection of diaries of fighter pilots who defended Malta. The island was under siege during 1940-1943, and these aviators developed further the methods of British air combat. Their diaries reveal in great detail how they defend the island from Axis attack.

Pilots alone did not produce the only informative diaries: Lieutenant-General Lewis Brereton's diary, particularly, yielded important information regarding leadership, base structure, and operations. Along with the diary and memoirs of specific pilots, I consulted training manuals and original aircraft maintenance and operation handbooks to

obtain data on the specifications and features of their aircraft and equipment. I utilized these technical sources to uncover possible explanations of their accidents and mistakes. Archival photographs of the North African air bases provided insight on the configuration and conditions of the units. Beyond diaries, manuals, and photographs, I examined journals, speeches, and newspapers.

I explored public opinion on these topics evident in *The London Times* and excerpts from British Parliamentary Papers. These sources, although biased, provide primary perceptions of the events. Some of the articles reveal mishaps of the American air units during Operation TORCH. Along with newspapers, I utilized relevant speeches delivered by Winston Churchill. A source that directly assessed the problem of insufficient training and the high frequency of air accidents was the American GI magazine, *Yank and the Army Weekly*. One of its articles addressed the recurring regularity of Army Air Corps accidents and mishaps, with commentary from General Henry H. Arnold, the commanding general in 1942 of the US Army's air arm. When dealing with these primary sources, it was important to be mindful of their intended audience. Beyond chronological journals, Army Air Corps publications proved to be very helpful for my research. These official publications laid out the structure and organization of the American training program, which, when juxtaposed with publications from the Air Corps newsletter, addressed safety concerns connected to training. From this, the severity of America's problems surrounding training started to come into focus.

Secondary sources proved to be of great help. The majority of them dealt separately with the Americans and the British in the North African theater. I compare the capabilities and training leveled on both air forces. The contrast between the data pulled

from an array of primary and secondary sources revealed that American aviators' level of training, preparedness, hardware, and effectiveness lagged far behind those in the RAF.

Wesley Frank Craven's multivolume work is one of the most extensive works written about the air forces of World War II. Craven provided details pertaining to American training, deployment, and operations. Many squadron histories omitted statistics concerning accidents. For this reason, it is necessary to turn to diaries and after action reports to reveal the actual nature of these abundant American mishaps. John Lambert's work, *Wildcats Over Casablanca, November 1942 Operation Torch*, proved to be a particularly valuable source; it documented many of the accidents and problems the American Wildcat pilots experienced. This information was elsewhere conspicuously absent. I uncovered more American mistakes as I investigated Edgar F. Raines, Jr's, 2002 article in *Air Power History*, "Disaster off Casablanca: Air Observation Posts in Operation Torch and the Role of Failure in Institutional Innovation." These sources contributed greatly to my work, particularly when I crosschecked and reconsidered them by utilizing information from primary sources.

I approach this history from a variety of different perspectives. Accordingly, I have included an Italian source from which I translated and extracted the Italian perspective on their campaign against the British in Malta. An understanding of the unique specifications of all the fighter aircraft involved proved vital when comparing their performance against each other in combat. I gathered this information from a combination of primary sources that include the actual aircraft type manufacture maintenance manuals and the highly accurate performance specifications provided by Enzo Angelucci and Paolo Matricardi in their *Military Aircraft Encyclopedia*.

A pattern emerged from my research: America's air forces arrived in combat unprepared for war. In contrast, Great Britain's RAF employed well-seasoned tactics to achieve lethal effect. Following the 1940 Battle of Britain, the RAF benefited greatly from its experiences defending Malta and engaging the Luftwaffe and the Regia Aeronautica over the desert. These missions resulted in adaptability, a heightened level of effectiveness, and success. I found it useful to explore events surrounding the siege of Malta to comprehend the environment where the RAF responded to the challenges of defending this strategic island as well using it for offense. During the siege, the RAF managed to continue to attack Axis convoys vital to Afrika Korps offensives. Multiple secondary sources provided this information from different perspectives. Emile Bradford's *Siege Malta 1940-1943* contained invaluable charts and tables containing statistics relating to attacks and operations. Bradford also provided an extremely detailed account of the events from multiple perspectives, including those of Maltese civilians. James Holland's *Fortress Malta: An Island under Siege 1940-43* provided a framework and timeline where I could assess first-hand accounts from pilot diaries and memoirs. As I aimed to develop a comparison of the British RAF to the abilities of the US air forces, I needed to examine British aerial attack tactics, especially those relating to fighter interception and torpedo bombing from Malta. Kenneth Poolman's *Night Strike from Malta: 830 Squadron RN and Rommel's Convoys* emerged as one of the most rewarding sources for this task, as it detailed these strike missions and included diagrams and pilot accounts. Samuel Elliot Morrison's meticulously detailed work on the actions of the American Navy allowed me to construct an accurate framework on the details of the US Navy carrier operations during the opening days of TORCH.

My work, uniquely, assesses the level of performance and preparedness of the American air forces in a comparative framework involving an RAF counterpart. My comparative work reflects my research on the RAF and American air elements in actively explaining and evaluating their performance over Malta and over French Morocco. This study reveals the difference in skill and state of readiness between these fighter units. My secondary sources cover these air powers separately. I draw a stark division between the two by comparing training, combat experience, and utility. The diaries reveal that the pilots of the two Allied nations in 1942 possessed very different levels of preparedness. This thesis concludes that British military aviators by 1941 and 1942 were, generally, well trained pilots with substantial combat experience, both of which the American pilots lacked. Their inexperience and naivety regarding the reality of war made them far more likely than their RAF counterparts to make mistakes. Compared to the battle-hardened RAF, the training and performance of American air units during TORCH lagged far behind.

Prologue: Assessing Prewar Fighter Aircraft Development in Great Britain and
the United States

A number of political, economic, and ideological reasons account for the stark contrast between American and British aircraft and pilot training programs during the early years of the Second World War. Great Britain and America were at this time two very different entities, an empire and a republic, each with its distinctive traditions, economy, and emphasis in matters of defense. Historically, Britain long maintained a standing army of expertly trained professional soldiers serving its imperial aims of protecting its colonies and its home front. America's military developed in quite an opposite way and consisted largely of state militias activated only in times of war. America's peacetime standing army was quite minimal in size and often deficient in modernizing its equipment.

Geographically speaking, Britain at home had only a narrow channel to protect itself from invasion while the borders of the United States fronted on two vast oceans and a huge gulf. In the years leading up to World War II, the British decided the best way for them to defend their homeland was to develop highly advanced fighter planes that could be used in conjunction with a network of radar and expertly trained pilots who would patrol in formations and protect the coast. Following the advice of Chief Air Marshal and leader of Fighter Command, Sir Hugh Dowding, and England allocated substantial resources into forming a strong, modern, and separate air force. This involved funding of research to build planes of sufficient high quality that they could compete against the

advanced fighters of the Luftwaffe. Additionally, the standardized courses set by the leaders of the RAF benefited greatly from the circumstance that they were created with only aviation in mind. These developments were in stark contrast to America's efforts to create or bolster its program of military aviation.

The two oceans and the Panama Canal stood as America's buffers from invasion and, since, these areas were so vast, the fighter aircraft of the 1930's could not sufficiently patrol and cover them as was the case with RAF fighters over the English Channel. In this way, the United States continued to focus its military preparedness on building a massive two ocean navy around battleships even though the Washington Naval Conference of 1921-22 had restricted the capital ship tonnage of the world's maritime naval powers. America had no separate air force, for military aviation was included within the army and the navy. American naval aviation developed faster than the Army Air Corps, for it was viewed as a method to protect the fleet's torpedo and dive bombers and missions performed by its battleships and lesser surface vessels. Partly for this reason, the American-made Navy Wildcat fighter had more firepower than the land-based P-40 Army Warhawk; fighters were seen as more useful to protect the all-important surface ships. In Operation Torch Wildcat pilots performed poorly because they had not been trained nor were intended to for use against targets on the coast or land based fighters.

A major factor behind America possessing such poorly made fighter aircraft and creating a substandard training program was America's socio-economic structure. As a capitalist free market nation, America depended on private enterprise, individuals seeking personal gain, and, even under the New Deal, private businesses continued to function as

profit-seeking entities. This extended to the prewar aviation industry. Unlike countries in Europe whose governments had been rapidly developing commercial and military aviation, American aviation grew from its barnstormers, private inventors and risk-taking investors. Their advances and gains were meant to benefit their own interests and not governed at all by military contributions. Government aircraft production lacked access to their innovation. This pattern of individualism did not fulfill the army's needs for aircraft and pilot training programs, as it involved no standardized methods of producing aviators.

In the United States prior to the war, Congress had failed to adequately fund military aviation. This lack of funding dated back to 1918. At the executive level, Presidents Calvin Coolidge and Franklin Roosevelt privatized transporting air mail because the Army Air Corps experienced numerous plane crashes often caused by structural failures of its poorly developed and constructed aircraft. Vital airframe structures such as tails or wings had frequently broken off American Army planes flying mail during the interwar years. Aviation was relatively new and without adequate funding or standardized aircraft production the incentive and time for the American military to develop solid planes between 1918 and 1941 were absent.

In contrast to the operation of aviation for corporate profits, official goals for military aviation necessarily determined production figures. Many air-minded Americans, especially government officials and military leaders, strongly believed that strategic bombing was the key to winning wars. More time and energy was devoted to construct long range heavy bombers towards developing fighters. Only later in the war, during 1943, did American generals discover that development of a long range fighter plane was

essential to the success of bombing missions. This type of aircraft needed to escort and protect the bombers to and from their targets. Newer, improved models of the P-51 Mustang were rushed into production. Michael Sherry, in his *Rise of American Air Power*, discusses the prewar and the wartime debates surrounding America's funneling energy and resources towards long range bombing. This mentality set American aviators apart from those of other nations like Germany, which relied almost solely on the tactical use of its fighter aircraft. In this America's defense barrier provided by its wide oceans and supplemented by its mood of isolationism before Pearl Harbor facilitated long range strategic bombing and not short range tactical missions provided by fighter aircraft.

America uniquely among the powers of that time enjoyed vast amounts of resources and capital, despite the Great Depression of the 1930's. America's confidence in its ability to mass produce materials led to the production of poorly designed aircraft in greater numbers than could be reasonably crewed by competently trained personnel in preparation for war. America had lapsed into the mistake of relying on vast mass production of materials and setting unrealistic goals of production numbers without stepping back and considering their quality and functionality.

Political decisions placed new air bases in zones of temperate climates to better suit base occupants and their aircraft. Continental training facilities situated in difficult climates such as the desert regions of the American Southwest would have better prepared pilots for what they were to encounter over North Africa.

General James Doolittle, who prior to the war had advocated for aviation and commanded the famous raid on Tokyo in early 1942, later headed the Twelfth Air force in North Africa. He had been one of the first to develop instrument flying, although it had

not been worked into the training curriculum. Doolittle had visited Europe before the war intending to gather information on foreign air forces and, because of that, he was aware that American aircraft development lagged far behind that of other powers, including Great Britain and Nazi Germany. He was not in a position at the time to change American policy nor had he the power to implement an improved training doctrine. After TORCH, Doolittle issued a newly revised and reworked training manual to fill the gaps made so evident during this Moroccan operation.

Had America broken out of its pattern of continuing to train government pilots poorly and build inferior aircraft, it should have fared much better in its opening campaign of the European war. If America had directed its attention to the advancements in aircraft design and performance in Europe, realizing how far behind it really was, things may have turned out much differently by the time of TORCH. America, however, remained essentially isolationist from the end of the First World War; it wanted nothing to do with European conflicts. In doing so it closed itself off to advanced developments made in military aviation. Congress chose to deny significant funding towards aviation and insisted that it remain subordinate inside the division separating the Army and the Navy. These circumstances help stagnant its growth and development. On the other side of the Atlantic, the British Royal Air Force had focused much attention to its fighter aircraft and pilot training programs. The British further separated their bombers into Bomber Command, an organization with its own leadership, training, and command structure. Fighter Command enjoyed parallel features.

The RAF's projected role in the defense of its empire, the defense of its home islands, and the defense of its European allies made clear the importance of fighter

aircraft. For home defense, this meant fighters as the key tactical element. The Government fully supported the efforts and requests of the top leaders in the RAF. Figures such as Sir Hugh Dowding and Leigh Mallory led the way with their contribution towards the development of integrated tactics that best served the needs of home defense through the use of modern fighter aircraft. Sir Hugh Dowding commanded Fighter Command and established Britain's advanced network of fighter defense enhanced by the use of radar. Lee Mallory devised methods of using fighter planes in mass formations to maximize their effectiveness. The opening events of the Second World War, involving British fighters sent into combat to assist Britain's allies in the Battle of France and Britain's fighter defense against air attacks by the Germans in the Battle of Britain justified the early projections and efforts of Britain's fighter command. Due to these early efforts, Britain, by the start of the Luftwaffe's air offensive against her, was armed with the Chain Home network of coastal radar stations, together with fully modernized fighters manned by a pool of well trained pilots. The Battle of France and the Battle of Britain also generated useful survivors, veteran pilots with substantial air combat experience. This greatly benefited later RAF's operations in the Mediterranean and North Africa.

The restrictions due to America's Army Air Corps inclusion within the regular army caused American military aviation to be stifled in both funding and progress. The Army Air Corps had to share funding with the regular army. The U.S. Army generals were responsible for both ground and air operations and usually focused mainly on their infantry and armored units. Germany and Italy had superb air ministries that allowed for their sole focus on producing quality aircraft, devising purely aviation minded tactics, and

adequately equipping and training their pilots. The Royal Air Force, too, was separate from the Royal Navy and the ground forces, allowing it to mature by the standards of the late 1930's.

America's preoccupation with constructing big-gunned surface war ships and its dreams of dominating the sky with of long range heavy bombers and its history of non-standardized training created an environment in which fighter aircraft and pilot training were liable to be neglected. This thesis endeavors to demonstrate the dimension of this weakness.

Chapter 1

The RAF Moves South to North Africa and the Mediterranean

When Europe in World War II turned its attention to the sands of North Africa and the vital shipping routes of the Mediterranean, its leaders recognized that air supremacy would be vital. Earlier, during the spring 1940 French campaign, Britain's Royal Air Force faced the dilemma of splitting its forces to both assist the French and protect their homeland. Sir Hugh Dowding, the head of the RAF's Fighter Command, was extremely concerned with the rate of RAF fighter losses in its vain effort to prevent the fall of France. Following Germany's swift victory in the Battle of France, Fighter Command experienced its ultimate test that summer as the Luftwaffe attacked the British homeland. During the Battle of Britain, Dowding's Fighter Command excelled in strategic defense, aided by its Chain Home radar defense system and its technologically advanced fighter aircraft.

After repelling Hermann Göring's air assault against England, Britain prepared its air force to perform both offensively and defensively in North Africa and the Mediterranean. Dowding was no longer in control of Fighter Command; Sir William Sholto Douglas replaced him in October 1940.¹ Britain's Eighth Army in North Africa struggled, often unsuccessfully, against Rommel's Afrika Korps during 1941 and 1942. The RAF needed to acquire effective offensive tactics that could assist Montgomery's ground force's efforts against the enemy. It learned to move from a defensive use of air power to new offensive maneuvers. The new theater of operation required a tactical air

¹ Deighton, 226.

component rather than a strictly defensive one. The RAF had trouble modifying its tactics to meet the desperate situation it faced in North Africa following the initial arrival of German units in February 1941. In North Africa, the British operated in a hostile climate and environment without the aid of radar. The Chain Home radar system existed only in Britain, so the pilots devised new methods to locate and destroy targets in North Africa.

When the RAF operated beyond the British home islands, it risked severe setbacks. Additionally, Britain faced severe logistical problems in shipping Spitfires by sea to areas in the Mediterranean theater. These difficulties delayed the arrival of newer aircraft to the North African and Mediterranean area. Attacks by the Luftwaffe, Italy's Regia Aeronautica, and Axis submarines contributed to the perils of shipping the planes. Attack aircraft alone proved useless without direction and leadership. Fortunately, strong British leaders directed its air forces in the Mediterranean in such a way that made it successful.

In order to compete successfully against Axis planes, the British needed to devise a new air doctrine featuring stronger leadership. Air Marshal Tedder's direction provided the change needed to turn the tide in the Mediterranean in Britain's favor. Tedder's plans allowed for smooth cooperation with the Americans as America's air units prepared for action. Tedder's contribution in conducting harmonious relations allowed American air units to perform in separate areas of operation, despite their inexperience. His focus on concentration, flexibility, and mobility eventually led to success for his air units in the second Battle of El Alamein. Tedder's leadership also contributed to the integration of support from the Americans.

The British found it necessary to devise a solution to coordinate their work with their new and inexperienced American allies in preparation for Operation TORCH. They were uncertain whether American units could be integrated, successfully, within their operations or capable of carrying out their potential assignments. Those tasked to tackle these problems included Air Marshal Tedder and the joint chiefs, as well as the American air commanders, particularly Generals Carl Andrew Spaatz and James Harold Doolittle. Allied Command assigned limited roles to the American air units, including the naval and army fighter forces. Nonetheless, America contributed to the success of TORCH by assisting in the capture of French-held shores of Morocco, and the Algerian port cities of Oran and Algiers. The joint Allied command expanded America's role to include securing the three landing areas targeted by Operation TORCH. Allied air units under Tedder were directed against Rommel's seaborne supply line.

These new combat operations, sinking Axis shipping, as well as attacking ground targets, differed greatly from the bomber and fighter intercept missions flown by British pilots during the Battle of Britain. RAF commanders directed Britain's Desert Air Force to attack Axis communications, supply lines, and dug in positions of German ground units.² Early on, the RAF did not direct its units to cooperate with ground forces and, with minor exceptions, the navy assumed it had enough power to operate on its own, without the assistance from the RAF.³ The battleship was still thought to be invincible as the ultimate weapon on the seas, until several instances of aircraft attacks disproved this idea. In May 1941 British aircraft attacked the mammoth German battleship *Bismarck* on its maiden and final mission against Allied shipping in the North Atlantic. The Royal

² George Barclay, *Fighter Pilot* (London: William Kimber, 1976), 194.

³ A.H. Narracott, *Air Power in War*. (London: Frederick Muller Ltd., 1945), 13.

Navy Swordfish biplanes armed with aerial torpedoes disabled the *Bismarck*, leading to its destruction. The earlier British success in the Taranto attack of November 11, 1940, further demonstrated the effectiveness of airpower against capital warships.⁴ Its result stunned the Axis: obsolete British torpedo bomber aircraft sank Italian battleships. Military leaders together recognized the significant impact of aviation on the course of naval warfare. Planes could more effectively attack convoys than strike individual ships, since the latter were usually faster. These lessons carried over to North Africa, as the RAF focused on attacking Axis shipping in the Mediterranean. The Allies used ships extensively for transporting planes to the North African front. England used both their aircraft carriers and carriers lent by the United States to ferry Spitfires to North Africa in order to replace their outmatched Beaufighters and Hurricanes. The American carrier *Wasp* encountered heavy enemy resistance while transporting Spitfires to the Mediterranean.⁵ The state of Britain's aviation technology in relation to its enemies made a difference in its survival. Britain now valued its own airpower for strategic strikes as well as defense in the Mediterranean, specifically the island of Malta.

Malta occupied a highly strategic position of strategic importance for the British Empire. The British acquired the island during the Napoleonic Wars, and Britain benefited from this colony's key strategic geographic position during the Second World War. Before and during the war, the island functioned as a vital airfield and submarine base in the mid-Mediterranean, serving as the only British military outpost between Gibraltar, Alexandria, and the Suez Canal. The Axis' aerial siege of Malta started on June

⁴ Williamson Murray and Allan R. Millett. *A War to be Won Fighting The Second World War*. (Cambridge: Belknap Press, 2001), 97.

⁵ Denis Richards and Hilaray St George Saunders. *Royal Air Force 1939-1945* (London: Her Majesty's Stationary Office, 1954), 164.

11, 1940, and lasted several years. The ferocity of the air attacks against Malta presented the British with a challenge and an opportunity to enhance their defensive and offensive capacity. They branched out offensively by attacking Axis convoys, thus reducing the Afrika Korps' tactical capabilities in the desert. During the aerial siege of Malta, British pilots honed their air combat skills.

Chapter 2

Aviation Technology: Axis Planes Fighting in the Desert

The tactical application of British airpower depended to some extent on its aircraft hardware and technology. In many cases, this lagged behind German fighters designed by Willy Messerschmitt. In the desert, the RAF used its second-rate planes creatively until supplied with newer models. In order to understand the limitations of British aircraft, one needs to juxtapose the RAF's planes' attributes against the technology of opposing Axis fighter planes. The aircraft flown over North Africa and the Mediterranean varied immensely depending on their many diverse assignments. This section examines the technical features of the fighter aircraft from both sides involved in the North African campaign.

The Royal Air Force faced a mixed matchup of machines above the desert. Not only did the Allies confront German aircraft, but also Italian and French warplanes. British fighter pilots overcame with little difficulty the German Stuka dive-bombers, the ME110 fighter-bombers, and the Italian air fleet, but the other German Messerschmitt fighters proved an entirely different matter. Germany used the battle-tested Messerschmitt BF-109, due to its nimbleness and speed. The twelve cylinders in the liquid-cooled engine produced 1,050 hp in 1939, and this increased to 1,475 hp by 1942. This engine allowed the fighter to scream through the sky at a top speed of 373 mph (600 km/hr).⁶ The well-designed plane could bank and turn at impressive rates, making this

⁶ Enzo Angelucci and Paolo Matricardi. *The Illustrated Encyclopedia of Military Aircraft* (Milan: Chartwell Books, 2001), 186.

agile fighter a deadly foe. By the end of the war, the BF-109K model boasted 2,000 hp with a startling top speed of 452 mph (727 km/hr). One problem with the fighter was its inadequate fuel capacity. Consequently, it did not protect the bombers on their entire missions during the Battle of Britain. In North Africa, however, the Mediterranean target areas usually fell within the striking distance of Axis air stations. Messerschmitt modified the BF-109F to meet North African needs by adding a desert survival pack and a special filter to protect the air intake.⁷ It was armed with two 7.9 mm MG 17 machine-guns in the front nose cowling and one 20mm cannon that shot through a hole in the prop spinner.⁸ The German Luftwaffe also utilized a fighter designed by Focke Wulf, one even faster than the BF-109.

The German Focke Wulf 190A-1 excelled in speed and maneuverability even against the British Spitfire. Kurt Tank designed two variations of the plane in 1937 to fulfill the German air ministry's request for a superior interceptor fighter.⁹ He contemplated whether to use an inline engine or a powerful, yet bulky radial engine. After testing and modifying the two designs in order to find a propulsion system that would not overheat yet provide the maximum performance output, the radial engine was selected. The FW 190A-1 contained a fourteen cylinder BMW 801C-1 radial air-cooled engine that produced an output of 1,600 hp.¹⁰ This massive engine gave the plane an impressive maximum speed of 389 mph (626 km/hr). These results tested a little faster than the second variation of the BF-109, which had a top speed of 373 mph (600 km/hr). For armament the FW 190 housed four cannon and two twenty- millimeter cannon spread

⁷ Martin Caidin, ME. 109 Willy Messerschmitt's Peerless Fighter (New York: Ballantine Books, 1968), 108.

⁸ Angelucci, 186.

⁹ Angelucci, 220.

¹⁰ Angelucci, 186.

across its wings. Its fold-up landing gear needed to be extended to provide prop clearance from the massive engine cowling. This proved to be a minor setback, as the solution did not provide sufficient structure for the plane. Initially, the Luftwaffe suffered problems because these planes experienced rough landings, often damaging the landing gear and the plane, but modifications corrected this problem. The FW 190A-1's limited range of 497 miles (800 km) meant that it could not fully cover bombers on long missions. The BF-109 and the FW 190 were the Luftwaffe's top fighters, while its BF-110 did not measure up to them.

The Messerschmitt BF-110 was a two engine fighter-bomber with a crew of two or three. Originally, during the Battle of Britain, the plane's moderately slow speed, despite its twin, Daimler-Benz, twelve cylinders, liquid-cooled engines which each provided 1,050hp, made it vulnerable to RAF fighters. The BF-110's maximum operational range was stretched to 680 miles (1,094 km).¹¹ The plane achieved a top speed of 336 mph (540 km/hr); its maneuverability compared unfavorably to that of the nimble single-seat fighters.¹² The plane carried heavy armament, a total of five machine guns and two twenty-millimeter cannon. Its extensive weight was a liability. It conducted turns and maneuvers sluggishly when fully loaded with three crew members, fuel, and weaponry. Clearly, the plane's weight severely limited its maneuverability. Luftwaffe pilots found the BF-110 ill-suited to fight against British Hurricanes and Spitfires; it proved disastrous in the Battle of Britain. When used in the desert, however, the BF-110 fulfilled its original intent. It served different roles, as a reconnaissance and fighter bomber. This long range airplane was versatile and well-armed, suitable for missions

¹¹ Angelucci, 86.

¹² Angelucci, 86.

above the desert. Later renditions of the BF-110, equipped with night air detection equipment, made it a night fighter. Its double engines accommodated the added weight of the night fighting equipment, making the BF-110 a logical choice for this use.¹³ The role assigned to the plane made a big difference in its value and effectiveness. The Luftwaffe employed not only these long range planes, but also superb fighters and dive bombers to assist its troops on the ground. Along with its fighters, the Luftwaffe also used dive-bombers in North Africa and the Mediterranean.

The Stuka dive-bomber became one of the most important parts of the Luftwaffe servicing Germany's tactical warfare. The Stuka contributed precision, dive-bomb strikes on the battlefield. Attempting to strike fear into enemy forces, the aircraft's wheel struts held spinners designed to shriek as the plane dived. In the weeks leading up to the Battle of El Alamein, Stukas flew around three hundred and sixty sorties. The Luftwaffe suffered from the dwindling number of Stuka planes available for use with Rommel's desert ground units, as well as for the continued attack against Malta. The reasons for this included Allied fighter superiority and anti-aircraft defenses and an increasing shortage of German pilots, fuel, oil, and other materials, due to Allied air strikes.¹⁴ The plane's slow speed caused trouble when defending against enemy aircraft. Germany modified its Ju.87 Stuka, and, by 1941, produced the Ju.87D-1. The newer Stuka incorporated a few improvements. Its designers extended the Stuka's operational range to 940 miles (1,535 km), which vastly exceeded the 490 miles (788 km) range of the first variation.¹⁵ The Ju.87 D-1 Stuka's 1,400 hp Junkers Jumo 211J-1 twelve cylinder, liquid-cooled engine

¹³ Angelucci , 220.

¹⁴ Warner Held and Ernst Obermaier. *The Luftwaffe in the North African Campaign 1941-1943* (West Chester: Schiffer Military History, 1992) , 78.

¹⁵ Angelucci, 137.

and its usual armament of up to 3,968 lbs (1,800 kg) of bombs meant that the plane could achieve a top speed of only 255 mph (410 km/hr).¹⁶ Two aviators manned the Stuka, the pilot and the gunner. Without the advantage of speed and maneuverability, the Stuka, despite its four machine guns, was at great risk when encountering enemy fighters. These disadvantages rendered the Stuka highly vulnerable to Allied fighter aircraft. While the Stuka failed in the campaign over England, over the desert it could pinpoint targets for precision bombardment.

Since the Spanish Civil War and the 1940 Battle of Britain, Germany's air arsenal included modified, battle-tested air machines. These advanced planes of the Luftwaffe seemed ready and capable to undertake operations over the desert. The primary reason the Luftwaffe shifted its attention to the Mediterranean and North African Desert was to aid its struggling Axis partner, Italy, against the British. The Italians flew planes of their own against the British, machines quite different in design and performance.

The Italian Regia Aeronautica fought the war on the Axis side from June 10, 1940, to September 8, 1943. Many sources agree that the Regia Aeronautica's assistance to the Germans' campaign against Great Britain in the Battle of Britain and against the Soviet Union in Operation Barbarossa was marginal. Italy's campaigns in the Mediterranean and North Africa, however, did inflict damage on the Allies.¹⁷ The Italian aviation industry produced fighters which possessed only limited power. Due to inadequate availability of resources, Italy maintained a force of under-supplied and ill-equipped planes. Italian technology, despite Il Duce's efforts to turn fascist Italy into a modern world power, lagged far behind that of the world's greatest powers; Italy as a

¹⁶ Angelucci, 137.

¹⁷ Giovanni Massimello and Giorgiao Apostolo. *Italian Aces of World War 2* (London: Osprey Aviation, 2000), 7.

nation faced a stark divide between its industrial North and undeveloped South. This geographic dichotomy plagued the uniformity of its air forces.¹⁸

The main Italian fighter aircraft companies, Macchi, Fiat, and Reggiane, manufactured monoplane fighter planes by 1941. The performance levels of these aircraft lagged behind those of British and German fighter planes. The Macchi C.200 Seatta, operational in the autumn of 1941, had a Fiat radial engine capable of 870 hp. It could accelerate to a top speed of 313 mph (503 km /hr.).¹⁹ Although this seems fast by 1930's standards, a British Hawker Hurricane produced 1,300 hp, with Rolls Royce engine capable of 329 mph (529 km /hr). Even more of a contrast, the Supermarine Spitfire had an engine output of 1,710 hp, with a top speed of over 408 mph, so the Italian fighter was out-matched in terms of speed.²⁰

In aerial combat, speed and engine power is everything, the force that drives evasive and aggressive maneuvers that decide life or death for a pilot. Italian planes were outmatched and outgunned, so their pilots needed to find creative ways to shoot down their technologically superior foes. Ingo Mario Castoldi designed the Macchi C.200 Saetta (Lightning) as Italy expanded its military during the mid 1930's African campaigns. Italy assigned one hundred and fifty-six C.200 Saettas to fly in the first operational assignment against Malta, during June of 1940.²¹ The Caporoni-Reggiane was yet another fighter plane in Italy's arsenal. Slightly faster than the C.200 Sertta, its 1,175 hp, liquid- cooled twelve cylinder Daimler-Benz engine allowed it to reach a top

¹⁸ Alberto, Borgiotti. *La Guerra aerea in Africa settentrionale : 1940-1941 : assalto dal cielo*. (Mucchi : Societa Tipografica Edtrice Modenese, 1972), 40.

¹⁹ Kenneth Munson, *The Pocket Encyclopedia of World Aircraft in Color Fighters Attack and Training Aircraft 1939-45* (London: Blandford Press, 1969.), 34.

²⁰ Munson, 72.

²¹ Munson, 110.

speed of 349 mph (563 km/hr).²² The Italians armed the Caporoni-Reggiane moderately with four machine guns, and the aircraft had an operational range of 684 miles (1,100 km).²³ These planes were well built, but were not as fast or as heavily armed as modern war planes of other nations. However, their durability frequently allowed them to survive aerial combat. Many of them could withstand a considerable amount of battle damage and still return to their base. These Axis planes faced a mix of British planes. The British only had a limited supply of their best fighter, the Spitfire, so they utilized many desert-modified Hawker Hurricanes. The British used many other outdated and varied type aircraft ranging from obsolete biplanes to torpedo bombers against their enemies in North Africa and the Mediterranean.

As the British engaged the Germans and the Italians, a new, unexpected “Axis” force arose as the Americans began Operation TORCH - the Vichy French. After the collapse of the French Armée de l’Air, when Germany conquered France, the Vichy French Air Force survived in southern France and in the French North African colonies. The finest fighter the French possessed, the Dewoitine D.520, could outmaneuver the early model of the German BF-109 and match its speed. This well-armed French fighter had a twenty mm cannon situated in its propeller block and four machine guns in its wings; this decisively outgunned the American P-40.²⁴ Emile Dewoitine designed and privately manufactured the plane in 1936, but the military did not adopt it until 1938. The first prototype contained a flaw in its radiator. This caused serious overheating and prevented a favorable top speed. The French later modified the Dewoitine 520 prototype

²² Angelucci, 188.

²³ Angelucci, 188.

²⁴ Munson, 56.

allowed it to enter mass production by 1939.²⁵ A 930 hp Hispano-Suiza engine powered the Dewoitine (D.520), enabling it to maintain a top speed of 326 mph (525 km/hr).²⁶ This single seat fighter plane boasted an impressive range of 605 miles (990 km), equal to a considerable stretch of shoreline aside the North African desert. Over three hundred D.520 aircraft survived the onslaught of the battle for France, and subsequently flew mostly in North Africa.²⁷ The French plane's full potential was restricted during the war, since their manufacturers were either shut down by the Germans or maintained under German directives.

The Axis fighters, along with the fighters flown by the Vichy French, were unique in their technological characteristics by nation. The Germans possessed aircraft that were generally superior to there of the British and American air forces. Out of all of the nations' air forces, however, the British aircraft proved to be the most diverse, with capabilities of torpedo-bombing, interception, fighter-bombing, and strafing. Britain's vast empire and its ordeal in the Battle of Britain caused it to develop and modify not only first-rate fighters, but also other aircraft. These played a vital role in the fight involving convoys in the Mediterranean. Although it seemed as if no nation could develop a fighter comparable to the German Messerschmitt BF-109, the British devised one that came close to being its equal, the Spitfire. The British took special care in developing its aircraft technology, so they ended up with more capable airplanes than the United States. Furthermore, the well developed aviation technology allowed the RAF to survive and develop strong tactics to succeed in the desert and over the Mediterranean.

²⁵ Angelucci, 222.

²⁶ Munson, 56.

²⁷ Munson, 128.

Chapter 3

Technology of the Allied Fighters

The RAF by 1940 possessed both excellent fighters and heavy bombers. Fighter Command possessed two main fighter aircraft, the Hawker Hurricane and the Supermarine Spitfire. These RAF fighters achieved fame when they provided the margin of victory during the Battle of Britain. Sydney Camm designed the Hawker Hurricane in 1935 as a single-seat monoplane fighter aircraft capable of a top speed of 300 mph (483 km/h).²⁸ The Hurricane flew only a moderate range, since it held sixty-six gallons in its two main fuel tanks with a reserve of twenty-eight gallons. This was greatly extended by the addition of a drop tank which increased its fuel load to two hundred and seventy-four gallons.²⁹ The Hurricane consumed fuel at a rate of roughly 56 gallons/hr.³⁰ Later models were driven by better engines. The Hurricane's speed increased steeply to 336 mph (541 km/h), with the addition of the Rolls-Royce, Merlin XX V-12 piston engine. The aircraft's design accommodated outward retractable landing gear, quite different from those other planes of the era that retracted inwards.³¹ Its landing gear was built wide and stable to make the plane easier to land when it sustained heavy damage. Another difference from other nations' planes included the location of the Hurricane's guns.

Unlike German fighters, whose armament was housed in the nose cowling, the Hurricane's wings housed its guns. British factories equipped this plane with an

²⁸ Angelucci, 184.

²⁹ John Tanner. "The Hurricane II Manual: The Official Air Publication for the Hurricane IIA, IIB, IIC, IID IV and Sea Hurricane IIB, IIC", 1941-1945 (London: Arms and Armor Press, 1976) cap 22 FS/6 of Manual.

³⁰ Tanner, Chap 22.2.

³¹ Len, Deighton, Len. *Fighter: The True Story of the Battle of Britain*. (Edison: Castle Books, 2000), 66.

impressive number of guns, which varied by model. The Hurricane Mk 1 carried eight 7.7mm machine guns, while the later Mk IIB model boasted twelve, with six in each wing. In North Africa, the RAF adopted different weapons to suit their needs in the desert. The Hurricane Mk IID of the Desert Air Force had two 40mm anti-tank cannon, enabling it to attack ground targets.³² The Hurricane had a limited range of 460 miles (740 km) confining it to a limited coverage area of operation.

Commanders cautioned the pilots assigned to fly above the desert regarding the disadvantages of the Hawker Hurricane I in comparison to the BF-109. They said, “The Messerschmitt has nearly a hundred miles an hour on us in level flight.”³³ Spirits sank further, during a Desert Air Force briefing as the commander declared, “...and diving down on us from God knows what altitude, they’d have all the advantage. Forget your dreams of glory, Ed. Put on your red wig and your false nose and learn to be inconspicuous. Save your energy for running away. That’s our game, I’m afraid.”³⁴ This applied to the Hawker Hurricane Mk I. Improved models followed, but the BF-109 still held a decisive advantage. Hurricanes, however, could easily overpower and destroy most Italian fighters, so they were assigned that role in the desert and the Mediterranean. The Hurricane was a classic, staple fighter for the RAF, which, however, needed a faster and more maneuverable plane to compete with the updated German BF-109. Their answer was the Supermarine Spitfire.

Evolved from the design of a high performance racing seaplane, the Spitfire proved to be a decisive addition to the Royal Air Force. Reginald Mitchell designed the

³² Bishop, 282.

³³ Geoffrey Moley-Mower, *Messerschmitt ROULETTE the Western Desert 1941-1942* (St Paul: Phalanx, 1993), 23.

³⁴ Moley-Mower, 23.

plane, beginning as a concept in 1933. Revised and refined many times, it became the sleek, elliptical wing fighter that finally entered service in 1938.³⁵ The plane housed a powerful Rolls-Royce Merlin II twelve cylinder, liquid-cooled engine that generated 1,030hp. The Spitfire Mark I clocked an impressive top speed of 355 mph (571 km/h), which improved in later models to 374 mph (602 km/h). By the end of the war, the Supermarine Spitfire Mk XIV raced through the skies at 448 mph (721 km/h).³⁶ Like the Hurricane, it carried its guns in its wings. The Spitfire Mk I sported eight machine guns, while the later model Spitfire Mk VB and all later versions were armed with four machine guns and two twenty mm cannon. Most pilots favored the Spitfire over other RAF fighter aircraft because it excelled in speed, maneuverability, and visibility.

Elsewhere, Britain employed a mix of fighters, often outdated, in the Mediterranean and North Africa. The Boulton Paul Defiant Mk I proved an absolute disaster during the Battle of Britain. Its slow speed proved detrimental, as did the rear-facing of all of its four machine guns. The aircraft design had the pilot flying the plane and a gunner in a back-facing turret. This turned out to be a terrible arrangement; when casualties mounted, the RAF learned the necessity of forward facing guns. The plane did have limited uses in the desert, but remained vulnerable. The twin-engine Bristol Beaufort existed as the RAF's standard torpedo bomber. It contained a crew of four and flew at a top speed of 265 mph (426 km/h).³⁷ First introduced in 1938, the plane was effective against enemy shipping. Gun turrets in the nose and rear of the plane protected it from enemy fighters. Beauforts, stationed on Malta in early 1942, attacked Axis shipping bound for North Africa. Bristol manufactured another torpedo plane, the

³⁵ Deighton, 74.

³⁶ Angelucci, 185.

³⁷ Bishop, 385.

Beaufighter. This was a dual-engine plane with a crew of two, used by the RAF to attack naval targets in the Mediterranean. It was relatively slow compared to other fighters, with a top speed of 321 mph (516 km/h). Nevertheless, the Beaufighter became the preferred choice for anti-shipping attacks, since it was faster than the Beaufort. The Beaufighter demonstrated a workhorse capability and attacked ships effectively with its 2,127 lb (964 kg) torpedo.³⁸ This plane could also be fitted with eight, under-wing unguided rockets. The Gloster Gladiator also performed as a torpedo bomber. An obsolete biplane dating from 1937, the Gladiator had a Bristol Mercury, nine-cylinder, radial, air-cooled eight hundred forty hp engine as its power plant. The plane was dangerously slow, for it could only fly, at best, 253 mph (407 km/hr).³⁹ These planes did play a large role at Malta. The Royal Air Force, equipped with high performance fighters, coastal torpedo fighters, and a separate bomber command complete with heavy bombers, provided a comprehensive aerial arsenal. The RAF utilized its diverse planes above the sea and desert.

Britain had an air fleet of varied fighters suited for air war of the early 1940's. America's fighter aircraft early in World War II proved unsuitable. The British perfected their planes to meet the challenges of the desert war. The British equipped the majority of their air fighter units with Hurricanes and Spitfires. Although the RAF flew some outdated aircraft, these were used ways that best utilized their strengths. The RAF's skillful and courageous pilots flew older planes to carry out torpedo strikes. Experienced pilots were necessary for success in this role.

The United States military's fighter units fell far behind British and German military aviation at the breakout of World War II. America lacked experienced pilots and

³⁸ Angelucci, 190.

³⁹ Angelucci, 182.

advanced fighter planes. American fighters couldn't compete with the Luftwaffe's BF 109s. The famed, North American P-51 Mustang was in its infancy as a planned aircraft and did not mature in use to its superior status until later. Nor did the Army Air Corps fly the P-47 Thunderbolt at this time. In its air arsenal in 1939, America had the Curtiss P-36C and the Seversky P-35. The P-36 could barely maintain its top speed of over 300 mph, clocking out at 311 mph (500 km/hr). The P-36's inaccurate guns were practically useless since the plane could never fly to within range of the faster, well-armed enemy planes piloted by veteran pilots.⁴⁰

By the time America entered the war, it had improved its attack aircraft. Its mainstay fighter was the Curtis P-40 Warhawk, a direct development from the Curtis P-36 Hawk, with many improvements. Some of these included a re-worked landing gear, a thirty-caliber machine gun, and a carburetor with an added air-intake scoop.⁴¹ Its armament of one machine gun on each wing proved completely inadequate compared to the heavily-armed fighters the rest of the world employed. Even Italian fighters sported more firepower than the early P-40 Warhawk model. The P-40CU, the first Warhawk model, had a maximum speed of 357 mph, completely deficient compared to the Luftwaffe fighter.⁴² This American plane's speed came from an Allison V1710-33 engine with an output of 1,090 horsepower. This first Warhawk variation lagged far behind the high standards of combat aircraft set by the Germans and the British. By March of 1941, the P-40C, also known as the Tomahawk IIB by the British, incorporated superior armament, but due to its added weight, flew slower than its preceding model.

⁴⁰ Angelucci, 193.

⁴¹ Bert Kinzey. *P-40 Warhawk in Detail* (Carrollton: Detail and Scale, 1999), 56.

⁴² Kinzey, 57.

The P-40C could achieve a top speed of only 345 mph.⁴³ The added machine guns were a step in the right direction; it now housed two fifty-caliber machine guns in the nose with four additional thirty caliber machine guns mounted in the wings. With this, the Warhawk contained at least the firepower to compete with Axis planes. In 1941, delivery of these new Tomahawks to the British made it possible for their use in North Africa to fight against the Vichy French, Italian, and the Germans. The British added armament to the plane to attack ground targets in the desert. The RAF quickly assigned the Tomahawk fighters to ground attack missions. America built eight hundred and twenty-eight Tomahawk IIB fighter planes and sent six hundred seventy-nine to the British and the rest to aid Russia and China.⁴⁴ As time progressed, many modifications were made on those American planes.

By the time of Pearl Harbor in December 1941, the American engine manufacturer Allison developed a more effective redesigned engine block for the P-40 that slightly increased its horsepower output from 1,090 to 1,150.⁴⁵ The P-40E models used an Allison engine. Despite the more powerful engine, the plane went from satisfactory to worse. The designers removed the two cowling machine guns to allow room for the larger size of the engine block. This decreased firepower severely reduced its utility as a fighter aircraft. The British renamed the plane the Kittyhawk due to its extremely different design. Allison may have produced the best fighter engine produced in America, but the British Rolls-Royce Merlin engine outperformed it since the Allison experienced trouble performing at high altitudes. The British Merlin engine had a two-

⁴³ Kinzey, 63.

⁴⁴ Kinzey, 63.

⁴⁵ Bert Kinzey. *P-40 Warhawk Part 2 P-40D Through XP-40Q* (Carrollton: Detail and Scale, 1999), 4.

staged supercharger, generating an output of 1,300 horsepower.⁴⁶ The British outfitted the P-40F with their Merlin engine, and this was the model American pilots flew in the TORCH invasion. The manufacturer fitted the P-40F with six fifty caliber machine guns, and the aircraft flew at a top speed of 364 mph.⁴⁷ As this aircraft still did not reach the standards of the top foreign fighter aircraft, American fighter pilots were at a disadvantage when they first saw action.

Although not a fighter, the Piper L-4 Grasshopper, considered a great asset to the Army Air Corps, flew as an aerial observer for artillery. The plane itself was a flimsy, underpowered, unarmed deathtrap. The Army Air Corps soon discovered that using the L-4 Grasshopper with its miniscule engine was a lethal mistake. A 65 hp, Continental O-170 four-cylinder engine with a maximum speed of 85 mph (137 km/hr) powered the plane.⁴⁸ The plane flew so slowly that it could not outrun enemy aircraft, and this allowed for extended enemy exposure due to the increased time to arrive at a destination. Its range was only 190 miles (304 km). Its civilian equivalent, the Piper Cub, remains a popular plane in civil aviation today. Two major differences between the American Air Corps' idea of aerial reconnaissance and the British were the horsepower and type of aircraft. The British understood the vulnerability of reconnaissance aircraft. They used for reconnaissance flights a modified Hawker Hurricane fitted with a camera and 1,030 hp to allow for escape from threatening enemy fighters.⁴⁹ It had a range of 460 miles (740 km) and was much better suited for covering ground than the American L-4 Grasshopper.⁵⁰

⁴⁶ Kinzy, 4.

⁴⁷ Kinzy, 51.

⁴⁸ Angelucci, 338.

⁴⁹ Morley-Mower, 45.

⁵⁰ Angelucci, 184.

In Operation TORCH, the Army Air Corps was not the only American source of air power. The U.S. Navy played a large role in the operation and used the Grumman F4F-4 Wildcat. The Wildcat took off from and landed on the deck of a carrier. By design, it landed with the aid of a tail hook that caught the arresting cables on the carrier deck in order to stop the plane. Manufacturers installed Pratt & Whitney R830-86 twin Wasp radial engines that sported fourteen cylinders into the plane. The Wildcat's air-cooled engine produced 1,200 horsepower, allowing the plane to achieve a top speed of 318 mph, slow by fighter standards.⁵¹ The plane looked tubby and awkward with its large radial engine and fat elongated fuselage. The landing gear retracted into the sides of the fuselage. The Wildcat's armament included six machine guns, and the plane achieved a flight range of 770 miles (1,240 km). The pilots considered the Wildcat's weaponry one of its best features.⁵² Based on design and performance, however, the plane proved to be ill-matched against the enemy fighters it soon faced. However, Wildcats played an integral role in the assault on Casablanca and other areas during Operation TORCH. America was in the process of building other more advanced planes for its arsenal, but these were not available in time for the North African landings.⁵³

Most of the aircraft used during Operation TORCH were inferior to German and British fighters with the exception of the twin-engine P-38 Lightning fighter, which was used in some of the later landings of Operation TORCH and in the ensuing North African campaign.⁵⁴ This American fighter had an unconventional design. The Lockheed P-38

⁵¹ Angelucci, 197.

⁵² John W. Lambert, *Wildcats Over Casablanca November 1942 Operation Torch* (St Paul: Phalanx, 1992), 2.

⁵³ Angelucci, 204.

⁵⁴ One of the advanced fighters under construction was the North American P-51A Mustang used an Allison twelve cylinder, liquid-cooled engine with an output of 1,200 hp. This engine was later replaced with the

Lightning possessed a twin-engine, was twin-boomed, a single seat fighter capable of a top speed of 414 mph (667 km/h). Two 1,475hp, Allison V-1710-111, liquid-cooled engines propelled the plane to its comparatively fast speed.⁵⁵ The P-38 Lightning had both positive and negative attributes, as did other fighters. According to Lightning pilot C.L. “Kelly” Johnson, the Lightning was a well balanced fighter; he listed fifteen positive points and fifteen negative points.⁵⁶ The guns, stacked and centered in the nose cone, packed a heavy punch. The tires possessed an adequate size diameter and they showed a configuration in a well-balanced tricycle gear layout. This pattern, according to the maintenance manuals, lent itself to easy removal and replacement. The brake system, which on other aircraft was quite difficult to replace, was simple to remove on the Lightning due to its innovative design. Since the plane sat high, the maintenance crew easily marked and determined slippage. The tall struts allowed a mechanic to duck under and get a good look. This allowed for easy maintenance of the aircraft.⁵⁷ All of these features helped the plane’s performance.

When describing the plane’s assets, the P-38 pilots said that the plane contained a lot of power with its dual, supercharged engines, low basic drag, and great maneuverability. The Lightning’s favorable slipstream effect also made it a delight to

Packard 12 cylinder engine with 1,400 hp and later, 1,510 hp to increase the P-51D model of the Mustang to a top speed of 437 mph (703 km/hr).⁵⁴ The “D” model was an improvement created from the previous models. The manufacturer’s engineers achieved this development by examining flight results during early campaigns. Another innovation the Americans added to the “D” model was a bubble canopy to provide superb pilot visibility and an increased range of 950 miles (1,530 km). The extended mileage allowed the plane to be one of the few fighters in the war possessing the capability to cover the bombers all the way to the target.⁵⁴ The “D” model did not arrive until later in the war. On the Navy side, the F4F Wildcat was replaced by the F6F Hellcat in 1943. The Hellcat outperformed the Wildcat in almost every way. It was carrier borne and served as a fighter mostly in the Pacific later in the war. These fighters did not see action during operation TORCH.

⁵⁵ Angelucci, 197.

⁵⁶ C.L. Kelly Johnson, Split-S Society P-38 Symposium 9/23/77.

⁵⁷ United States, U.S. Army Air Forces. Aircraft inspection and maintenance guide for P-38 series aircraft: RF-4 Series and F-5 Series Aircraft. P-38 Series Aircraft. Volume 1 Washington D.C.: U.S. Army Air Forces, June 30, 1944), 91.

fly.⁵⁸ This, of course, depended on the engine working properly. On the opposite side of the spectrum, the Lockheed P-38 Lightning encountered various engine problems, including backfiring, cooling, and solid fuel flow problems. There were also problems of comfort for the pilot, such as insufficient cockpit heat and a dangerous tail construction when the pilot bailed out.⁵⁹ However, the cockpit, itself, was quite spacious by World War II standards. The complexities of the P-38 Lightning presented a problem for the novice pilots tasked to fly them in the limited missions assigned to the planes in the later stage of Operation TORCH.

Having outlined the characteristics of the fighter aircraft used during the air war, I briefly describe the equipment used by the pilots; regardless of the aircraft they were assigned. Standard equipment for pilots of this era included six major components that made up the flight gear. These included, but were not limited to: helmet, goggles, fire resistant gloves, boots, parachute, and a “Mae West” (life preserver). Additional items included an oxygen-connecting hose, a mouthpiece and radio.⁶⁰ The “Mae West” was especially important when flying over bodies of water, such as the Mediterranean. The pilots utilized charts for navigation. This set of gear, when teamed up with a fueled and ammunition loaded plane, made air combat possible. Strapped into his seat and wearing his equipment, the pilot required full access to the flight controls. British programs trained their men to become proficient airmen. It took a well trained pilot to understand how to incorporate twists and maneuvers in order to capitalize on an enemy’s mistake. The hardware only allowed the platform and tools for combat as it took a skilled and

⁵⁸ Warren M. Bodie. *The Lockheed Lightning: “It Goes like Hell”* Kelsy. (Hiawasse: Widewing Publications, 1991), 257.

⁵⁹ Bodie, 257.

⁶⁰ Beurling, 60.

determined pilot to manipulate the controls and transform the airplane into a weapon. These complex maneuvers and pilot instincts played a major role in outsmarting their opponent. This could only be learned from experience. American cadets' lack of exposure and lackluster training in the appropriate aircraft decreased their combat effectiveness and put them at great risk. American pilots received fewer opportunities to practice using their equipment in flight training than did the British, since they spent so little time in their combat aircraft.

Chapter 4

Britain's Aviation Training Process

The performance deficiencies so evident among American pilots during Operation TORCH revealed, to a significant extent, the flaws of their training in military aviation. America's military flight training program in 1942 contained an overburdened and flawed protocol. Many new pilots went through the program without learning essential skills. Corresponding training programs for RAF pilots were more thorough and allowed for more flight time and a more comprehensive approach to the application of combat flight skills and knowledge.

A comparison between the course training materials of the two nations is astonishing, for the cadets of the RAF received far more detailed and in depth curriculum covering several mathematical methods and applications of advanced navigation, weather observation, and practical flight maneuvers than did their American counterparts. British publications authored by aviation navigation experts such as David Hay Surgeoner and mathematical pilot applications devised by A.F Buchan and R. Borthwick provided the British with exceptional standardized training materials. With effective hands on flight curriculum backed by excellent standardized texts, RAF cadets received outstanding instruction regardless of their RAF school locations. The majority of British cadets either learned to fly in Britain itself or was outsourced to replica schools established in Canada. Accustomed to assembling and preparing aircrew of different nationalities, the British used the same standardized training curriculum to train its pilots from all over Great Britain and its empire as well as fellow foreign Europeans. The RAF system offered

opportunities for new pilots to gain combat experience under the supervision of training supervisors who were themselves veterans of air combat. This practice infused battle proven techniques onto the new pilots. They gained further preparedness for the air war by experiencing actual combat missions during training. At the same time, the RAF avoided exposing these new pilots to high-risk operations. Veteran instructors accompanied trainees on relatively safe combat assignments. This practice was quite common. Geoffrey Moyer recalled that his training unit flew actual missions with novice Australian and South African pilots.⁶¹ This method taught trainees the fundamentals of aerial combat by providing minimal exposure to actual live fire and real threats. Frequently, these experiences instilled bravery, as well as confidence, in the airmen and sharpened their mastery of aerial combat maneuvers. These qualities were difficult to produce in classrooms alone. Trainees copied the actions of their veteran trainers. The instructors not only looked after them, but also taught them how to complete their missions safely. American pilots who trained in 1942 lacked this valuable experience, since they had not flown on actual combat missions.

Flying an aircraft is a complex activity that requires great skill, knowledge, and experience. Fighter pilots must know how to successfully and safely fly their aircraft, navigate accurately in all weather conditions, and utilize a working knowledge of air combat in order to fight and survive in the war. The American pilot training program often failed to teach its pilots rudimentary but necessary flying skills, such as landing and navigation. These deficiencies surfaced when American pilots failed to perform correct landing procedures often crashing during their initial combat missions, including sorties flown in Operation TORCH. Inexperience and lack of knowledge was the primary causal

⁶¹ Geoffrey Morley-Mower, 34.

factor of most of these accidents. The American air elements suffered from a flawed fighter pilot instruction system, while the RAF benefited from its own superior teaching methods.

The British developed, by 1942, a high quality, standard combat pilot educational system that, when combined with actual combat experience, produced superb pilots. They established many training schools in Canada, as well as in Britain. The program contained different levels to ensure that pilots mastered the mechanics of flying their aircraft in both favorable and unfavorable weather conditions. From there, students moved forward learning aerial maneuvers and combat tactics. Future RAF fighter pilots started in the Initial Training Wing (ITW). During this period, ITW pilots learned fundamentals of map reading, navigation, meteorology, airmanship, and aircraft recognition.⁶² Textbook manuals favored in 1942 for these British trainees included David Hay Surgeoner's *First Principles of Flight, 1941* and *Air Training Series Navigation and Meteorology*.⁶³ The latter focused heavily on skills of map reading and calculations of position fixing to instruct a new pilot in navigation.⁶⁴ It was important for the cadets to master these vital skills, because they focused on circumstances which could cause accidents in combat. The American training schools failed to properly teach these important skills. Aircraft recognition was important, for it prevented pilots from shooting down friendly aircraft. Map reading and navigation proved essential, especially over the desert and water where landmarks were scarce. This forced a pilot to rely on his navigational skills by utilizing time, compass headings, and maps to determine his

⁶² Beurling, 35.

⁶³ David Hay Surgeoner. *First Principles of Flight* (London: Longmans, Green, 1941), 1.

⁶⁴ David Hay Surgeoner. *Air Training Series Navigation and Meteorology*. (London: Longmans, Green, 1942) 35.

position.⁶⁵ At the ITW, British pilots not only learned these skills, but mastered them to a point to where they could be effective in combat. Cadet graduates testified that they were ahead of the curve thanks to the preparation provided by the ITW and seemed better prepared than their American counterparts, who lacked such an effective initial training phase.⁶⁶

From the ITW, the trainees moved on to the Elementary Flying Training School (EFTS). At the EFTS, they flew often to acquire the fundamentals, gaining flight exposure in all weather conditions and other situations. By intent, these maneuvers demanded proficiency from the new pilots while flying their aircraft. To prevent friendly fire, RAF cadets needed to pass an exam on aircraft recognition. It was vitally important to recognize and recall the wing span of both friendly and enemy aircraft.⁶⁷ After the EFTS, they moved to the Service Flight Training School (SFTS). The SFTS typically lasted two and a half months, a period when new pilots flew first the Tiger Moth then the Hawker Hurricane. The standard text for British instructors was the Air Publication 1732b, a standardized manual for instructors at the SFTS schools. It outlined step by step methods for instructors to teach maneuvers and aerial gunnery.⁶⁸

The Tiger Moth, the primary aircraft used in the SFTS before pilots moved on to the Hurricane or Spitfire, contained a relatively simplistic instrument panel with a dozen gauges. Tiger Moths were the light aircraft used by the British and the Canadians for their initial training. The Canadian Air Force, like the British, utilized constant flight training

⁶⁵ Air League of the British Empire *The Story of the Air Training Corps*. (London: The Air League of the British Empire, 1946), 11.

⁶⁶ Taylor, 52.

⁶⁷ Air League of the British Empire. *The Story of the Air Training Corps*, 10.

⁶⁸ Henry L. Walton. *Instructors Handbook of Advanced Training Air Publication 1732b* (Restricted Air Ministry, 1943), 1.

throughout the program and simultaneous ground courses. The Museum of Flight graciously allowed me access to a rare, limited edition copy of David J. Carter's exhaustively detailed work, entitled *Prairie Wings*. His book traced the historical background of the established RAF bases in Canada formulated by the "secret" diary of a pilot stationed at Alberta's Medicine Hat Air Base. It described the process of training both British and Canadian fighter pilots. With a follow up visit to the Langley airfield in British Columbia, I examined flyable, refurbished Tiger Moths. Based on knowledge gathered from viewing the aircraft and its specifications, along with the diaries included in Carter's book, I learned that flying these planes and imitating combat maneuvers occurred early in the training process. Their American counterparts, in contrast, studied books and learned straight and level flight.⁶⁹

British SFTS trainees also benefited from flying the actual aircraft they would use in combat after mastering the Tiger Moth, accumulating flight hours in either a Hurricane or Spitfire.⁷⁰ The Tiger Moth's speed and characteristics allowed the RAF cadets to master technique before moving on. The combination of flying this particular aircraft with their initial training in their assigned fighter made a significant difference for the air trainees, since the trainees were exposed to their eventual combat plane and flying it familiarized themselves with its unique speed and handling.

In combat, the British cadet pilot usually flew the Hurricane or Spitfire. When RAF cadets flew these aircraft, they faced half a hundred controls and instruments.⁷¹ After RAF trainees graduated from the SFTS, the final hurdle before going to war

⁶⁹ Carter, 65.

⁷⁰ Beurling, 50.

⁷¹ Spencer Dunmore. *Wings for Victory: The Remarkable Story of the British Commonwealth Air Training Plan in Canada*. Toronto: M&S 1994), 123.

consisted of operations training, which taught and perfected their air combat abilities.⁷²

These multi-tiered levels of the British pilot training system ensured that its graduates became well versed and ready for aerial combat. The system worked, and RAF pilots not only employed a great number of useful skills during combat, but were also trained to minimize accidents.

The British extended their training system to other areas within the Commonwealth and Empire. The RAF sent many of their British pilots to Canada for training, due to Canada's vast spaces, extra resources and abundance of training aircraft suitable for effective use.⁷³ England with its insular confines lacked the space required for the scale of training needed.⁷⁴ Instructors, using planes like the Tiger Moth, taught both British and Canadian cadets by employing the effective training structure the RAF used in the British Isles. One exceptional difference between the Royal Canadian Air Force (RCAF) and the RAF was that the latter kept its pilots' accomplishments anonymous, while the Canadians published the names of their pilots.⁷⁵

British cadet flight time was much more frequent compared to their American counterparts.⁷⁶ British and the Americans did share a common training aircraft referred by the RAF as the North American AT-6 Harvard, a plane also known as the Texan.⁷⁷ The Harvard, an American-made training aircraft, situated the pilot in the rear of the aircraft. This differed from the front seat arrangement in the lighter Tiger Moth. These

⁷² Leonard Taylor Ed. *The Story of the Air Training Corps*, London: The Air League of the British Empire, 1946), 32.

⁷³ Leslie Roberts. *Canada's War in the Air* (Montreal: Alvah M. Betty, 1942), 43.

⁷⁴ David J. Carter. *Prairie Wings: Royal Air Force Training Base #34, Service Flying Training School Medicine Hat, British Commonwealth Air Training Plan Alberta Canada February 1941-November 1944*. (Alberta: Eagle Butte Press 2001), 179

⁷⁵ Carter, 180.

⁷⁶ Carter, 65.

⁷⁷ Len Morgan. *The AT-6 Harvard*. (Fallbrook: Aero Publishers, 1985), 8.

planes provided British pilots with the platform to quickly master the basics so that they could move on to fly the actual combat aircraft. Their proper training on these machines minimized training accidents even though accidents did occur. In Langley, British Columbia, Canada, I was able to examine at the Canadian Museum of Flight the actual training aircraft like the AT-6 Harvard restored to flying condition. Painted yellow in order to serve as trainers so that the instructors and ground observers could spot them from the ground the new pilots spent many hours learning combat maneuvers in these aircraft.

According to Carter's research, only sixteen members of the aircrew died due to accidents on or near the Swift Current training bases situated in Saskatchewan, Canada. This number is relatively low, and adverse weather conditions and failed landings caused most of the incidents.⁷⁸ The Canadian-based schools effectively produced knowledgeable pilots who could perform well in combat. The first forty-eight fighter squadrons graduated from the Royal Canadian Air Force (RCAF) schools managed thirty-one kills in the Battle of Britain with only sixteen combat related losses.⁷⁹ Even though this was only a 0.6 kill ratio per squadron, their achievements built up the new pilots' experience. This track record, compared to the disastrous performance of American airmen, shows that the British and British Canadian air schools produced much more effective personnel.

In contrast, American pilots spent most of their time flying under-powered training aircraft and less of it in actual combat aircraft. The amount of time spent in a combat aircraft contributed a great deal to the learning process. Normally, pilots

⁷⁸ Carter, 187.

⁷⁹ Carter 178.

improved their abilities by accumulating flight experience through repetition and logging flight hours in their aircraft. A pilot arguably required more practice time in the combat plane than he needed in the trainer to obtain proficiency for basic certification. When American pilots graduated from their trainer aircraft to combat planes, they found it necessary to relearn everything according to the specifications of the new aircraft. Pilots needed to adjust to the difference in power, speed, and handling of new planes. British-trained pilots had made this shift much earlier, which gave them an advantage. The American training program differed greatly from the British program and failed to deliver skills, knowledge, and experience necessary for new pilots to survive in combat.

Chapter 5

Insufficient American Training

On paper, the American training system appeared to indicate the skills needed for a combat pilot. In actuality, it contributed to many accidents due to its flawed structure, one that prohibited pilots from gaining enough knowledge and experience to be proficient in flying complex combat aircraft. According to the official guide to the Army Air Forces, AAF, a pilot's duties included the following: "(a pilot) handles controls of plane and commands aircraft; in addition, fighter pilot fires guns, navigates, communicates with radio, sometimes directs and releases bombs."⁸⁰ However, these skills were secondary within the American structured pilot training, as America focused more on producing a greater quantity of pilots, while sacrificing their quality. The official guide to the AAF even admitted that, in 1941, the AAF Flying Training Command was small, outdated, scattered, and loosely coordinated.⁸¹ In 1942, it was split into two commands: the Flying Training Command and the Technical Command. The British employed a more effective regimental, three- tiered system. The Americans had a similar breakdown of different levels, but their requirements were less skill-based, specific, or uniform than the RAF's programs. First, the American cadets learned the technical skills of flying. After perfecting these skills, further training allowed them to fly combat aircraft. The cadets spent more time on the technical and academic aspect of air combat than actually practicing and perfecting their skills.

⁸⁰ *The Official Guide to the Army Air Forces AAF*. (New York: Simon and Schuster, 1944), 43.

⁸¹ AAF, 102.

The Army Air Force Pilot training process contained five levels of achievements. First, cadet pilots attended a ten week course of preflight school studying physics, math, and plane recognition.⁸² To the British, this was time wasted. The RAF instructors used preliminary training time to instill more practical knowledge of matters, such as navigation and weather.⁸³ The British learned math, but only as it applied directly to navigation and fuel consumption.⁸⁴ British texts on mathematics and navigation by David Hay Surgeoner integrated their content to specific functions needed for aerial combat.⁸⁵ The British felt that knowledge of weather and navigation trumped the importance of knowledge of physics for a new pilot. Unlike Surgeoner's text, the American navigational text approached navigation mathematically and lacked practical examples of applying the navigational methods to actual sorties. The US FM 1-30 Air Corps Manual on Air Navigation approached navigation with esoteric mathematical definitions and diagrams in a condensed theoretical approach for determining position from bearings.⁸⁶ Thirty pages were spent in the American navigational field manual on definitions, diagrams, formulas and vague steps compared to a fleshed out British full text that included skill application scenarios, practical navigational procedures, and several navigational aid options which could be combined for better results.⁸⁷ The American field manual failed to prepare US pilots to navigate the desolate coast of Morocco in 1942, whereas the British navigational text instructed aircrew to adapt to their environment by taking bearing on landmarks,

⁸² AFF, 104.

⁸³ "Commonwealth Air Training Plan: London Conference Tomorrow" (*The London Times*, 15 October 1942).

⁸⁴ Leonard Taylor Ed. Air Ministry. *Royal Air Force Flying Training Manual Part I-Landplanes* (Air Publication 129 London: Revised November 1937), 36.

⁸⁵ David Hay Surgeoner. *Air Training Series Navigation and Meteorology* (London: Longmans, Green, 1942), 10.

⁸⁶ FM 1-30 *Air Corps Field Manual of Air Navigation*, 1940, 28.

⁸⁷ FM 1-30 *Air Corps Field Manual of Air Navigation*, 1940.

dead reckoning, and other practically applied navigational methods taught by Surgeoner. By lessening focus on applied navigation, the American training programs contributed to accidents during the early days of TORCH.

After the preliminary stage, American cadets entered Primary Flying School, which also lasted ten weeks. Here, they spent seventy-five hours in underpowered, outdated biplanes attempting to learn the fundamentals of flying. Acquiring proficiency to fly a biplane was much easier than learning to pilot a combat monoplane capable of flying over 300 mph. Under the American training system, school work and military physical training on the ground supplemented the biplane flight exercises. Curiously, pilots received physical training equivalent to that given to ground troops when their role did not involve the same physical effort demanded for infantry. Time spent drilling maneuvers could have been better spent practicing control manipulation and air maneuvers.

After completing primary flight school, the future pilots entered Basic Flight School. This level, like all others in the American training program, lasted ten weeks. At this stage, trainees spent seventy hours flying faster planes with 450 horsepower engines. These new planes were much faster than the 125 horsepower biplanes previously flown, but still vastly underpowered compared to the aircraft the new pilots would fly in combat. Much of this training continued on the ground; the trainees devoted forty-seven hours of their time to military drill and devoted ninety-four hours to ground school.⁸⁸ Academic work and military drill comprised two-thirds of the entire American training program, leaving only a third of it available for flight experience.⁸⁹ The American training system

⁸⁸ AFF, 104.

⁸⁹ AFF, 105.

lacked a central focus on flying, whereas, in the British system, flight training was the principal emphasis.

As documented above, the American training system failed to provide sufficient experience in the air. American trainees received far less exposure to their fighter planes than their RAF counterparts. This was a major problem, because training on such aircraft was a vital part of producing proficient aircrew. Additionally, American flight training programs were overcrowded with students in 1940-1942; this decreased the effectiveness of their instructors.⁹⁰ The number of student pilots increased so quickly that the established training institution struggled to accommodate them. In 1939, the United States government set a goal of producing 1,200 military pilots a year. This number jumped to 7,000 in 1940, and further to 30,000 in February of 1941.⁹¹ Since only a limited number of trained instructors and administrators were available, this steep increase made adequate instruction difficult. To meet the demand, new facilities were necessary in order to accommodate these large numbers. The time spent constructing new establishments and expanding old schools hindered the escalating American training programs. Planes needed to be stored and taxied around the makeshift, often temporary, structures used as training facilities.⁹²

As mentioned earlier, many hours of flight training in the American program took place on the ground, in aircraft simulators. The Link Trainer was a mechanical box in which the pilot sat and learned to fly by operating the gauges swiveling on gyros.⁹³ These

⁹⁰ Ralph Boyce. Report from Gen. Arnold: "A Few Interesting Factual Highlights From the Recent Comprehensive 62 Page Report of the Commanding General of the U.S. Army Air Forces to the Secretary of War." New York: *Yank, the Army Weekly* (January 28, 1944, vol. 2 no. 32)

⁹¹ Wesley Frank Craven and James Lee Cate. *The Army Air Forces in World War II: Plans and Early Operations January 1939 to August 1942 Volume One* (Chicago: Chicago University Press, 1948), 110.

⁹² Craven, 111.

⁹³ AFF, 104

extremely primitive simulators gave a student pilot practice only with instrumentation. The machines had a limited axis of movement, which prevented the cadet from practicing complex combat maneuvers, allowing only for aspects of basic flight.⁹⁴ Since no projection of a simulated reality appeared, the pilot blindly moved the controls and speculated his imaginary attitude and position by both the gauge indicators and the limited movement of the box.⁹⁵ The Link originated in the late 1930's and, after many modifications, became the ANT-18 model. This machine simulated the North American AT-6. For the first time, a simulator trainer had the characteristics and personality of a specific aircraft programmed into the electronics.⁹⁶

As mentioned earlier, when the cadet moved on to Advanced Flying Training, flying occupied only seventy hours out of the ten week training schedule. The trainees flew six hundred horsepower, single engine AT-6s. This compared unfavorably to enemy fighters which generated over 1,000 horsepower.⁹⁷ While the British and the Canadians also used the AT-6, they did so much earlier in the training process.⁹⁸ Equipment for advanced navigation used such as directional gyro were important and taught briefly in the Pilots Manual and in alternative publication in 1940, intended for training civilian pilots but also adopted for fighter pilot hopefuls.⁹⁹ Furthermore, when the American pilots graduated from Advanced Flying Training, little time remained for them to adapt to their new aircraft. The program allotted AFT graduates ten hours to fly their actual

⁹⁴ Leslie Roberts. *Canada's War in the Air* (Montreal: Alvah M. Betty, 1942), 59.

⁹⁵ AFF, 104.

⁹⁶ Lloyd L. Kelly. *The Pilot Maker* (New York: Grosset & Dunlap, 1970), 60.

⁹⁷ Angelucci, 336.

⁹⁸ Len Morgan, *The AT-6 Harvard*. (Fallbrook: Aero Publishing), 11.

⁹⁹ *The Pilots Manual*, 32.

combat aircraft within a five week transitional period.¹⁰⁰ Only then did the new pilots fire the aircraft's guns. The American Army Air Corps grouped into fighter teams flying either P-40s or P-38s. Their time spent on the ground reduced potential flight time, which was insufficient for war beyond acquiring a basic familiarity of aircraft handling. Much more time was necessary then allotted to improve performance and familiarity of complex aerial maneuvers. Due to this, the potential for air accidents increased.

Accidents were so frequent during the American pilot training process that the Regional Safety Organization (RSO) launched a campaign of safety awareness and improvement. The RSO began this campaign through posters with visual warnings depicting accident cases. One such poster featured an airplane tail sticking out of a wrecked house with a caption noting, "A very hot pilot? A very hot pilot was Henry Hightowers who boasted of having three hundred hours. To prove this claim, he dove on his girl's house one day and crashed. They would have been married the fifteenth of May."¹⁰¹ Interestingly, accidents such as these continued to occur, caused by hotheadedness or cocky attitudes. Other captions on other safety awareness posters were closer to reality: they depicted emotional pilots unable to complete maneuvers. A hole in the ground by the airport hangers is labeled with "The stupid droop, gander my lads at the stupid droop, who knew he could manage an outside loop; halfway around it he crumpled a wing and muffed his yank on the ripcord ring."¹⁰² Such mishaps continued in combat when ill-trained American pilots conducted flight missions over North Africa. During the opening days of Operation TORCH, inexperienced American fliers ended up suffering

¹⁰⁰ AFF, 104.

¹⁰¹ SR Harris "Accidents Must Stop The Director of Flying Safety tells Why" (Washington, DC: Air Forces News Letter Public Relations Division, Publications Section Army Air Forces, Vol. 25 No. 3 May 1942),6

¹⁰² Harris, 5.

higher non-combat losses than the number of them shot down by enemy actions. The American Air Corps considered accidents a normal part of life at the Falcon training base. Thirty fatalities resulted from aviation accidents at Falcon.¹⁰³ The RSO recognized that the quick growth of the program impaired its ability to adequately train pilots. This also increased the incidence of training accidents. Such statistics should have raised concerns, as the number of American military airplane pilot deaths increased by three hundred and fifteen percent during 1942.¹⁰⁴

American pilots experienced more landing mishaps as well as mid-air collisions and failures to execute maneuvers correctly than did their British counterparts.¹⁰⁵ Seventy percent of the British fatalities occurred when their pilots attempted to land.¹⁰⁶ Nonetheless, an unorthodox landing was a rare sight, for example, for the Southern Rhodesian cadets enrolled in British standardized training format. One did occur when two Tiger Moths collided during a training landing on May 14, 1942. The pilots executed the right technique, but failed to allow for the cross wind. Thanks to the safety and thoroughness of British training, only one of the four airmen involved experienced injuries.¹⁰⁷

Realizing that the American Air Corps experienced so many problems due to aircraft accidents in pilot training, the British feared that the Americans would perform poorly in combat, possibly to the point of becoming a liability to the Allied forces. Would American pilots learn from the many mistakes they had made in training, or would the act of sending accident-prone, under-trained pilots into combat lead inexorably to disasters in

¹⁰³ Dawson, 133.

¹⁰⁴ Harris, 6.

¹⁰⁵ Dawson, 140.

¹⁰⁶ Dawson, 133.

¹⁰⁷ Alan Bramson. *The Tiger Moth Story*. (Manchester: Cassell & Company, 1964), 149.

combat? The British knew that the Luftwaffe was a powerful foe. During earlier battles, RAF pilots discovered tactics that allowed them to compete with faster and more maneuverable German planes. Could American pilots with no combat experience and poor training records become combat effective? The RAF needed more planes and pilots to combat the Axis. Lend Lease alone was not enough to defeat Germany. After Pearl Harbor, America was mobilizing for war and, one way or another, Great Britain sought to utilize its gigantic ally's manpower, planes, and supplies. America had to quickly adapt its methods and acquire experience in order to fight alongside the British. One of the most difficult problems Great Britain and America faced was how to transmit British air tactics acquired through combat to the Americans.

Operation TORCH involved the United States Army Air Force. This meant that underpowered and outclassed American built planes and inexperienced American pilots would fight in North Africa. The result shared much similarity to the difficulties the amphibious ground forces experienced, as Rick Atkinson recounted in his work, *An Army at Dawn*. Low standards for both American pilots and ground forces presented a problem when their units needed to be integrated with British troops and fighter squadrons which were much better trained. These low standards presented an even bigger internal problem as many accidents resulted. This is not an aberration in the history of American military history, which had a long legacy of using poorly trained militia or soldiers in combat. The American tradition was the exact opposite of the British long-standing policy of keeping well-trained professional soldiers. The ideology of using a militia of loosely-trained ordinary citizens driven to volunteer to defend the nation continued into World War II. The concepts and technology of World War II were new, for no significant American

record existed of naval aviation before World War II. The United States hadn't used carriers in combat prior to World War II, and the American military was still experimenting with this new technology.

Chapter 6

Air Tactics: The Competing Methods of Air Combat

Knowledge of dog-fighting tactics prepared a pilot to destroy enemy aircraft and survive aerial combat. British pilots acquired modified tactics of aerial warfare through the dogfights they fought during the Battle of Britain. Pilots discovered new fighting methods: tricks such as approaching enemies out of the sun to catch them by surprise, swooping in from above to maximize speed, and utilizing sharp banks and loops to evade an attacker.¹⁰⁸ RAF pilots frequently used deflection shooting and with great success. This tactic coordinated shooting at an enemy in relation to the speed and angle of the shot. Another shooting skill included leading the target, which involved the distance the enemy traveled before the bullets reached his plane. The shooter aimed and fired ahead of the target to score hits.

The original *Royal Air Force Flying Training Manual*, issued in 1939 to RAF pilots in its revised form, updated the fundamentals of air combat tactics, illustrated and explained a series of maneuvers. These included, but were not limited to, the barrel, continuous, climbing, gliding, flick, the upward rolls the cartwheel, the flick turn, and the falling leaf exercise.¹⁰⁹ These exercises required specific control, speed, attitude, and altitude conditions. Through experience, both the RAF and the Luftwaffe improved their performance effectiveness in aerial combat. As the Americans remained neutral until the end of 1941, their pilots lacked such opportunities to practice and develop tactics in

¹⁰⁸ Henry L. Walton. *Instructors Handbook of Advanced Training Air Publication 1732b* (London: Air Ministry, 1943), 220.

¹⁰⁹ Air Ministry. *Royal Air Force Flying Training Manual Part I-Landplanes*. (London: Air Publications 129, Revised November 1937) Chapter 3, G1.

combat. This was one reason why American air units lacked basic tactical skills for Operation TORCH.

The German Luftwaffe included superior fighter pilots, who refined combat tactics developed during the Spanish Civil War of 1936-1939. The Luftwaffe saw this as an opportunity to experiment with different maneuvers. As stated earlier, the British also developed seasoned veteran pilots during the Battle of Britain in 1940. Such experienced pilots were an extremely important asset in aerial combat.

The RAF utilized, initially, a specific fighter formation. Its pilots flew in “vics,” a compacted, close, flying formation of upside Vs of three planes. This actually proved to be a disadvantage because the pilots lost situational awareness in this close formation. The British improved their tactics by studying German flight patterns utilized in the summer of 1940. The Luftwaffe fighter formation provided better coverage and flexibility for dog fighting, compared to Allied aerial patterns. Germany utilized a “finger of four” formation aligned in which they called a *Schwarm*, where planes lined up staggered in parings. This formation, called the *Rotten*, set the leader of each independent pair on the left side of the paring. The two fighters could maneuver independently, allowing for flexibility and maximum potent attack options.¹¹⁰ The difference between a *Schwarm* and a *Rotten* is that the latter is an enforced version with two independents pairings working together as larger unit formation. The flexibility of the *Schwarm* and *Rotten* gave Luftwaffe pilots a slight edge over the RAF.

One advantage the Allied ace fighter pilots enjoyed over their Axis counterparts was that the number of sorties flown was limited to one hundred before they were reassigned to instruct new pilots. The Americans adopted this practice later in the war.

¹¹⁰ Stephen Wilkinson. “The Star of Africa” (Aviation History November 2008) 31.

German pilots did not enjoy this luxury. Rather, the policy for German fighter pilots was “fly-till-you-die.” They stayed in continuous service unless killed or injured in a way that inhibited their flying. Erich Hartmann, the war’s top fighter ace, flew 1,250 combat sorties in which he scored 352 kills.¹¹¹ For this reason, Luftwaffe pilots accumulated as many as one thousand sorties; successful super ace fighter pilots claimed an astonishing numbers of kills. The Axis threat in North Africa caused the British to devise new methods of aerial warfare.

The RAF found it necessary to expand its tactics beyond fighter and bomber interception. It needed to develop successful methods of attacking enemy ships from the air. It was also important to gather vital reconnaissance information in order to give the ground forces better situational awareness of the location and intentions of the enemy. The RAF utilized the protective cover of night to organize its fighters. The British utilized information learned about the capabilities of its aircraft to apply their planes to new uses as they shifted units and operations to the Mediterranean and the North African desert.

America’s folly when it entered operations in this desert, contrasted with the RAF’s operational transition from the British homeland to the Mediterranean and North Africa. Decisions relative to leadership, aircraft usage, facilities, and air tactics benefited its adaptation to their new theater. The RAF made use of existing tactics and developed new ones. These included torpedo bombing, night fighting, and aerial interception. I believe these additional conventions hardened the RAF into an elite air force, one with a greater attack and defense capacity. British air power made a difference in the outcome of

¹¹¹ Wilkinson, 31.

the campaign, as they diminished enemy supplies and provided situational awareness of the battlefield from the air.¹¹²

After Great Britain's survival in the Battle of Britain, the Royal Air Ministry shifted gears as it re-assigned units to North Africa and the Mediterranean. Sir Hugh Dowding pointed to his pilots' advantages over the Luftwaffe during the 1940 Battle of Britain. He said that the home advantage allowed for easier repair and recovery of most of the planes and pilots shot down. As the British replaced or repaired the planes, their surviving pilots undertook other missions.¹¹³ In contrast, the vast distance over inhospitable terrain in the desert was equally hard on both sides, especially when aircrews survived crashes and the harsh desert conditions. Pilots carried desert survival gear; if they lived they either ended up in POW camps or were rescued by their ground forces. Dangers like scorpions, sandstorms, and heat exhaustion faced downed pilots on the vastly barren North African mainland. Well-trained pilots shot down often crash landed their planes in such a way that the trivial damage sustained by the plane could be repaired and it could be put back into service. As the British replaced or repaired their planes, their surviving pilots flew new missions.¹¹⁴ North Africa tended to be different as crash sites were, frequently, too remote for retrieval and repair.

The Royal Air Force began to perform offensive maneuvers in mid 1941 and, simultaneously, balanced defensive and offensive operations on Malta and over the Mediterranean.¹¹⁵ The RAF overcame the logistical obstacles of ferrying aircraft to

¹¹² Lieutenant-General Sir John Glubb. *War in the Desert: An R.A.F. Frontier Campaign* (London: Hodder and Stoughton, 1960)

¹¹³ Robert Wright. *The Man Who Won the Battle of Britain*. (New York: Charles Scribner's Sons, 1969), 124.

¹¹⁴ Wright, 24.

¹¹⁵ Fighter planes are predominantly used for defense and interception while the bombers, torpedo bombers and sometimes fighter bombers are used for offense.

Africa through U-boat infested waters of the Mediterranean. At this time, it needed to find new leadership after the Air Ministry fired Sir Hugh Dowding. Dowding had proved that he was an exceptional leader of the Royal Air Force; however, his defensive strategies and policies were not suitable to the North African front. In addition to new leadership for the monumental task of implementing an effective attack strategy, the RAF also needed logistical support. These called for a leader with the ability to organize and run the operation of securing and operating makeshift, under-supplied, desert air bases that constantly changed location with the forward advance. This was a logistical and operational nightmare. London appointed Air Chief Marshal Arthur Longmore to resolve it.¹¹⁶ Longmore focused on improving the maintenance and serviceability of airplanes and vehicles. He put together tactical units of fighters.¹¹⁷ Longmore faced an inherent problem in the command structure in place in the Middle East. Delay of orders from London slowed down the efficiency of the Desert Command. Political command required implementing war decisions quickly enough to be effective. To solve this problem, London on June 28, 1941, appointed Oliver Lyttelton as Minister of State in the Middle East. This allowed the war cabinet to be represented in the Middle East and their decisions to be executed without delay.¹¹⁸

Operations in the desert continued to create challenges for the command staff. Longmore encountered problems due to limited supplies and did a poor job of coordinating his attacks. While his forces faced poorly performing Italian units, Longmore failed to provide British ground units enough air cover. They struggled also

¹¹⁶ A.H. Narracott. *Air Power in War*. (London: Frederick Muller, 1945), 66.

¹¹⁷ Playfair, I.S.O. Major General. *The Mediterranean and Middle East Volume II "The Germans Come to Help of their Ally" 1941*. (London: Her Majesty's Stationery Office, 1956), 239.

¹¹⁸ Playfair, 240.

against the Afrika Korps led by Erwin Rommel, the “Desert Fox.” Longmore’s first Deputy Air Operations Chief was Air Marshal O.T. Boyd, who met an unexpected fate. When he flew to North Africa in November of 1940 to assume the deputy command, his plane came under attack by Italian fighters and crashed in Sicily. He survived, but became a POW.¹¹⁹ The deputy position was vacant until filled by Air Marshal Sir Arthur Tedder. Tedder had an important role to play, for he unseated Air Chief Marshal Longmore and became one of the RAF’s most successful air chief marshals.

¹¹⁹ Narracott, 66.

Chapter 7

Air Marshal Tedder Gives the RAF Jagged Teeth

Air Chief Marshal Arthur William Tedder implemented basic changes to Royal Air Force organization and tactics in North Africa that assured it an offensive edge. Based on secondary literature concerning Tedder and his memoirs, published as *Air Power in War*, I provide an in depth analysis of Tedder's policies and how they effected the RAF's action above the desert. The three principles in his doctrine of air power incorporated concentration, flexibility, and mobility.¹²⁰ Their application greatly increased the performance and effectiveness of the RAF in North Africa. Bombing and fighter efforts were no longer "parceled out," a disastrous strategy employed by his predecessor. Instead, Tedder combined and concentrated his air forces in a way that reflected his three principles, which also allowed more effective Allied cooperation. He realized that concentrating Allied forces was a necessary step towards victory, since unified command facilitated maximal use of available resources. Tedder's leadership not only streamlined operations, but promoted strafing and bombing runs against enemy supply convoys. Under Tedder, the RAF functioned defensively and offensively.

Tedder's second principle demanded that all squadrons became extremely flexible. He wanted each to be proficient in all types of aerial missions and able to switch between them at a moment's notice.¹²¹ He aimed to achieve skilled performances by his air crews in air/sea attacks, communication, reconnaissance, interception, defensive

¹²⁰ Narracott, 71.

¹²¹ Lord Tedder. "Air Power in War: The Lees Knowles Lectures by Marshal of the Air Force."

cover, tactical ground assault, and strategic attacks. Types of targets selected varied greatly from mission to mission. Pilots could be assigned to attack land communications, shipping ports and cargo vessels, or enemy defensive positions or support ground attacks by attacking enemy forward positions and covering the advance.¹²² Once again, experience and training enhanced the RAF's versatility in aerial operations.

Tedder's final cardinal principle, mobility, differed greatly from Sir Hugh Dowding's tactics during the Battle of Britain. Sir Hugh depended on readiness. He placed organized squadrons in specific positions in England that allowed them to scramble at a moment's notice and attack Luftwaffe formations with the aid of radar ground controllers.¹²³ In the North African desert, this would have failed and caused the airfields to be temporarily out of commission, as the Luftwaffe bombed the forward stations. Conversely had the British applied Tedder's strategy, as discussed below, to the Battle of Britain, half of the RAF's resources could have been transferred to a safer location to immediately counterstrike the enemy.¹²⁴

Tedder faced a rapidly changing front in an undersupplied desert environment and operated without the aid of an advanced network of radar stations. He completely changed the mobility and organization strategy of his predecessor in favor of a plan tailored to the RAF's new operational environment. He discarded unneeded equipment to expedite operations from the mobile air bases. His plan also minimized the ground support staff. These bases were easier to relocate to forward positions.¹²⁵ The greater flexibility of the mobile air bases in the desert under Tedder gave the RAF an advantage

¹²² Narracott, 71.

¹²³ Jullian Marcel. *The Battle of Britain July-September 1940*. (New York: The Orion Press, 1965), 33.

¹²⁴ Lord Tedder. *With Prejudice: The War Memoirs of Marshal of the Royal Air Force* (Boston: Little, Brown, 1966.),15.

¹²⁵ Narracott, 71.

by not limiting the units to a fixed area of operations. During the Battle of Britain, the amount of support ground staff was extensive, including communicators and radar operators. It proved close to impossible to relocate all of these resources.¹²⁶ Tedder divided the ground staff into two; half of them were posted to a group prepared to move to a forward position and the other half left to operate the air base.¹²⁷ Tedder arranged proportions in such a way that two distinct and fully operational air bases could be established and maintained. This allowed the British to occupy forward airfields and quickly staff them. As the front line moved and the RAF acquired new airfields, it conserved precious fuel by shortening the flying distance to enemy targets.

The RAF tasked Tedder with a variety of missions to prepare for the crucial Second Battle of El Alamein. It demanded detailed information regarding the locations of enemy positions through reconnaissance, all the while preventing the enemy from locating British positions. The RAF also sought to eliminate Axis bombing attacks on Allied shipping carrying supplies and reinforcements through the Mediterranean.¹²⁸ The next step, equally important, was to attack Axis shipping lines and land convoys to prevent Rommel from obtaining adequate supplies for his units in Western Libya, Cyrenaica, and Tunisia.¹²⁹

The British used their island colony of Malta as a strategic position, one that offered them an ideal strike capability on Axis shipping en route from Italy to North Africa. The island served as an offensive stronghold with a submarine base and units of Wellington bombers and Beaufighter fighter planes. These aircraft decimated Axis

¹²⁶ Narracott, 70.

¹²⁷ Narracott, 71.

¹²⁸ Narracott, 71.

¹²⁹ Narracott, 71.

shipping.¹³⁰ As the situation in Malta under Axis air attacks worsened, Tedder devised ways to strike at the enemy's supply line. On the African side, British Beaufighters became the leading fighter-bombers to combat attacks on Rommel's supply columns of Opel trucks and supply depots containing food and ammunition.¹³¹ Tedder turned next to attacking Axis troops, by bombing and strafing their lines and bases with British fighters. RAF fighter bombers attacked Axis air fields at El Daba, Fuka, and Maaten Bagush.¹³² These missions proved vital to the outcome of the Battle of El Alamein. Rommel attacked the Eighth Army with a depleted force and was defeated due in part to British air operations. The RAF integrated strategic and tactical missions under a cohesive unified command, controlled and coordinated air strikes, and defense and reconnaissance missions.¹³³ This contrasted with American forces' movements, which separated their air force by function from ground units, and failed to connect its air arm to operations by its ground forces.

Due to soured Anglo-French relations in 1942, the British decided that the Americans would be better suited to deal with the territory held by the Vichy French. The North African theater was split into areas, each assigned to commanders reporting to Air Chief Marshal Sir Arthur Tedder and Air Marshal Sir Arthur Coningham. American General Carl Spaatz ran the joint Anglo-American Northwest African Air Force, which divided into three subdivisions consisting of coastal, strategic, and tactical commands. Air Vice-Marshal Sir Hugh Pugh Lloyd headed the coastal command, responsible for

¹³⁰ Gavin Lyall. *The War in the Air the Royal Air Force in World War II*. (New York: William Morrow and Company Inc. 1968), 180.

¹³¹ Narracott, 72.

¹³² Narracott, 73.

¹³³ Narracott, 74.

attacking, shipping, and protecting its vital ports.¹³⁴ General James Doolittle, with his much publicized background in bombers, headed the strategical command. The African campaign used mostly the last of the three subdivisions. Coningham headed the tactical command and later joined with the Desert Air Force, commanded by Air Commodore Harry Broadhurst. This occurred after the tactical air force finished supporting the Eighth Army on the ground. The tactics successfully employed by the British allowed them to disrupt enemy convoys, defend strategic positions, and maintain Allied air superiority over the desert.

¹³⁴ Narracott, 75.

Chapter 8

Hunting Convoys: The RAF's Offensive Successes

Logistics was the key to fighting in the desert. Due to its vast distances supply lines were easily overstretched. Rommel overstretched his; lack of support rendered his forward units vulnerable. Supplies needed to be shipped from Axis controlled ports and moved by truck convoys through the desert to the ground troops. These convoys were inviting targets to the British Desert Air Force. It struck Axis convoys and depots; consequently Rommel faced shortages of ammunition, food, oil, and other supplies. The close proximity of the British-held airbases on Malta to Italian shipping supply routes gave the former great strategic importance. Between August 27 and September 4 of 1941, Royal Air Force aircraft based on Malta sank six Italian cargo ships en route to resupply Axis troops in North Africa. Later, another three ships were sunk by British submarines and sea mines.¹³⁵

The RAF skillfully struck enemy shipping, despite the outdated aircraft available to them. Its pilots were proficient night fliers. The Fleet Air Arm and the 830 Squadron records reveal the great impact of Malta-based torpedo planes. Their attacks on Axis convoys greatly diminished the amount of supplies reaching the enemy. The 830 Squadron flew Fairy Swordfish and Albacore torpedo bombers. Although slow and obsolescent, these planes proved to be effective in sinking enemy vessels, especially under the cover of night. By 1942, their efforts sunk 400,000 tons of Axis shipping,

¹³⁵ Denis Richards and Hilleary St George Saunders. *Royal Air Force 1939-1945*. (London: Her Majesty's Stationary Office, 1954), 230.

hampering Rommel's efforts in the desert.¹³⁶ Swordfish aircrews operated outdated and under-serviced equipment yet still managed to sink their targets. Later in the year, the British ran into more and more opposition from escort destroyers and suffered increased Swordfish losses.

On January 27, 1941, Sub-Lieutenant Pat Chambers flew as the lead pilot of a flight against Axis convoys in the Mediterranean. This sortie consisted of six Swordfish biplanes, each armed with a torpedo. At an altitude of 10,000 feet, Chambers spotted a convoy of German ships steaming towards the African mainland.¹³⁷ Twelve miles from the water-borne targets, the airplanes hooked a wide turn. This maneuver expended much time, due to the slow turning radius of his aircraft. Nonetheless, the Sub-Lieutenant released his torpedo after his systematic dive, and it sank a 3,950 ton German merchant ship registered under the name *Ingo*.¹³⁸ Chambers' wing man, Campbell, bombed the cruiser *Duisburg*, the *Ingo's* 7,500 ton escort. Their attack exemplified the Royal Air Force's successful tactical attacks on Axis shipping. The six planes were lucky, since the slow Swordfish biplane presented a vulnerable target to all Axis fighter types. Fortunately too for the British attackers, the German ships lacked sufficient air defense guns. This and other successes against Axis shipping ensured that Rommel's units ran short of supplies. Also, these missions gave British pilots experience in advanced tactics of aerial warfare against ships. American pilots lacked such opportunities to gain skills in combat prior to Operation TORCH. This difference elevated the British pilots into a class above American pilots, not only in combat experience, but in versatility of aerial combat

¹³⁶ Poolman, 87.

¹³⁷ Poolman, 43.

¹³⁸ Poolman, 43.

skills. British actions against German convoys greatly benefited the Eighth Army, their ground forces fighting in the desert campaign.

Efforts of the Royal Air Force against Axis supply line set back Rommel's advance. Lack of fuel stopped or delayed Rommel on multiple occasions. Logistics is the lifeblood of all military operations. The RAF sank or damaged a crucial amount of shipping. According to Craven, the British air effort attacked Rommel's supplies so thoroughly on one occasion that only three days of rations for his units remained. This misfortune affected his attack from El Agheila in January 1942, as it forced Rommel to supplement his meager supplies by capturing or raiding British supply dumps.¹³⁹ As the amount of supplies reaching German ground troops diminished, they resorted to drastic and risky alternative measures increased.

One of these involved Junkers Ju-52 transport planes. The Germans loaded them with supplies and flew them across the Mediterranean to Africa. These aircraft normally deployed paratroops. Revealed in a series of archival photographs, the packing of the Ju-52s reflected creativity on the part of their German crews. They positioned ammunition belts around drums of fuel and stacked boxes of supplies to maximize their load.¹⁴⁰ The Luftwaffe accumulated stocks of aircraft fuel in Cyrenaica to support Rommel's approaching May 26th offensive, but, due to its prolonged scale, that supply quickly evaporated. Pressure from Allied attacks on Axis shipping hindered their resupply effort to such an extent, that the Afrika Korps' supplies were exhausted by the end of June. This also forced the Luftwaffe to downsize its air effort.¹⁴¹

¹³⁹ Craven, 9.

¹⁴⁰ Ned Throne North Africa Special Collection, Box 4, Folder 79. J9281-5-28/LC

¹⁴¹ Tatum, 143.

Without fuel and ammunition, a modern army could not operate efficiently. In this case, the Afrika Korps was over-extended and vulnerable to air attack. Still, Rommel needed fresh supplies. In August of 1942, provisions dispatched to re-supply Axis forces in North Africa amounted to 100,000 gross tons. The RAF, USAAF, and the Royal Navy sank 80,000 tons, four-fifths of it. Allied air forces alone accounted for forty percent of this loss.¹⁴² This was due, in part, to RAF attacks against Axis ports. Harbors presented choice targets for air attacks. They were often set ablaze and temporarily rendered unusable for handling cargo ships.

Britain's government saw that the tactical air policies implemented by Tedder for attacking Rommel's supplies produced results against Rommel, but the British took the good news with reserve. According to one official British source, a report from Mollie Panter-Downs in *London War Notes*, dated September 13, 1942, London's attitude towards the likelihood of defeating Rommel remained optimistic, even though the British realized the "Desert Fox" would persist in his efforts against the Eighth Army.¹⁴³ The public was more pessimistic due to earlier misinformation it had received concealing British setbacks at the hands of the *Afrika Korps* in the desert. Specific evidence regarding Malta indicated the effectiveness of Royal Air Force efforts there. Although the public lacked a precise understanding of the severity of damage suffered on Malta from Axis air attacks, they were informed of the courageousness and of the RAF pilots and air defense units on the island.

¹⁴² Craven, 31.

¹⁴³ Mollie Downes-Panter. *London War Notes 1939-1945*. (New York: Farrar, Straus and Gioux. 1945), 243.

Chapter 9

The Experiences of the Desert Air Force

The superior quality of pilots in the RAF derived in part from their defensive air maneuvers, which resulted in their high survival rate. Combat perfected RAF tactics. Its pilots developed into war-hardened veterans. The desert campaign developed some exceptional leaders in the RAF, such as fighter pilot and squadron leader George Barclay. Barclay took over command of No. 238 Squadron in the El Alamein campaign. A bold leader, likable to his crew and fellow airmen, Barclay was a model RAF officer. Seeking to perfect his air combat performance, he worked out wing formation tactics and strategies in his diary.¹⁴⁴ His diary, combined with operations records books provides insight into his experience.

Promoted on October 3, 1941, to Flight Lieutenant, he transferred to Hornchurch where he assumed command Flight No. 611 Squadron, a unit that later played a significant role in the First Battle of El Alamein.¹⁴⁵ Barclay and his squadron arrived ahead of their supplies and planes at Maryut, Egypt. As the planes arrived and the squadron readied itself for operations, the situation in Tobruk deteriorated so badly that its garrison surrendered to the Germans on June 19, 1942. The loss of Tobruk forced the 8th Army to retreat east behind the El Alamein lines.¹⁴⁶ The British 238th faced a seasoned, well-equipped enemy in the struggle for air supremacy. The Luftwaffe's veteran aces, equipped with superior fighters, inflicted heavy losses on Barclay's

¹⁴⁴ George Barclay, Ed. Humphrey Whynn *Fighter Pilot*. (London: William Kimber 1976), 84.

¹⁴⁵ Barclay, 180.

¹⁴⁶ Barclay, 188.

squadron. Barclay himself died in action on July 17, 1942, leading flight of Hurricanes against a group of twelve J-87 Stukas protected by fighter escort. Despite Barclay's defensive maneuvers, a BF 109 shot him down.¹⁴⁷ From his diary, we learn how British fighter leaders utilized their extensive knowledge in combat.

These gallant RAF pilots fought well but needed American pilots to reinforce their strength during North African campaign. A technical problem delayed the American air units scheduled to arrive in North Africa by the end of June 1942 to assist the RAF Desert Air Force. These units flew missions without support from their ground and maintenance personnel. This forced the British to allocate maintenance personnel to service the newly arrived Americans.¹⁴⁸ This burdened Tedder, who already limited the number of ground personnel in order to make bases flexible and easy to relocate. He acted to increase their number.¹⁴⁹

Britain's efforts to integrate inexperienced American pilots into their units caused real problems. Despite the difficulties these allies attempted to work together and established a joint headquarters to command both ground and air forces. The commanders of the British Eighth Army and Western Desert Air Force cooperated in targeting Axis forces. Within the Western Air Force, Air Vice-Marshal Arthur Coningham led the No. 211 Group, which included fighter squadrons. The RAF sent Royal Engineers to build forward aerodromes, protected by armored-car units and anti-aircraft guns. Sir Arthur's group flew Hurricane fighters, as well as obsolete American P-

¹⁴⁷ Barclay, 197.

¹⁴⁸ Craven, 15.

¹⁴⁹ Memo for Sec., WDGS and Flag., Hq. CINC US Fleet, from Lt. Col. Holms, Asst. Sec., JCS, 8 July 1942.

40 Tomahawks and the improved Kittyhawk fighters.¹⁵⁰ Tedder kept his force as mobile as possible to maintain its flexibility for attacking targets of opportunity. The American 66th Fighter Group participated in operations leading up to the second El Alamein Battle, late in 1942. The 57th Fighter Group and 12th Bomber Group trained and worked in cooperation with RAF units.¹⁵¹ Unfamiliar with combat over the desert and fresh from training, the Americans seemed, nonetheless, eager to fight. Their units faced many obstacles.

The Italian forces in North Africa continued to experience humiliating defeats stretching back to the beginning of their African campaign in mid-1940. The Italian Air Force lacked the experience and advanced planes the Luftwaffe enjoyed. A postwar Italian source reveals that Mussolini's air force suffered from underdeveloped planes and inefficient organization.¹⁵² Their best fighter plane, the Macchi MC 200, came closest to equaling the British Hawker Hurricane.¹⁵³ Italy's poor performance prompted Hitler to provide assistance. Luftwaffe units arrived in North Africa. The Hawker Hurricane, superior to Reggio Aeronautica planes, then faced the better performing BF109. The Hurricane was vulnerable due to its wing-mounted main fuel tanks. A single hit could ignite the sloshing combustible liquid, which could envelop the pilot in a tunnel of flames.¹⁵⁴ This resulted in heavy losses on the British side. When the Luftwaffe shot down one RAF pilot on September 14, 1941, he escaped the wreckage severely burned and was taken prisoner. The Luftwaffe unit involved wrote his squadron a note disclosing

¹⁵⁰ Craven, 29. and The American made Curtis P-40 Tomahawks were renamed by the British when modified and put into service with the RAF as the P-40 Kittyhawk Fighter.

¹⁵¹ Craven, 27.

¹⁵² A Borgiotti C Gori. *La Guerra Aerea In Africa Settentrionale 1940-41 assalto dal cielo*. (Societa tipografica editrice modenese, Mucchi, 1972.), 8.

¹⁵³ Ring, 218.

¹⁵⁴ Moyley-Mower, 63.

the condition of Lt. Byers and that he would recover in a German hospital in Derna.¹⁵⁵

The Germans under Rommel generally treated British prisoners of war with respect.

British pilots, when healed and liberated, often flew again.

The turning point in the fight for air supremacy occurred during the Crusader offensive in late 1941. The RAF used the addition of high flying Spitfires its advantage. When the Eighth Army struggled on the ground at El Alamein, RAF fighters relinquished their original objectives to focus on Axis bombers. The first RAF squadron to arrive and fight in the first Battle of El Alamein, the misused 73rd Squadron, was ordered to strafe Axis ground units relentlessly.¹⁵⁶ Later, the Desert Air Force improved its tactics in order to provide greater assistance to the ground troops. Axis aircraft frequently disrupted Allied efforts in assisting the army. BF109 units shot down 1,400 British planes between April 1941 and December 1942, while the RAF claimed 1,200 kills and the USAAF another fifty. Even though the Luftwaffe shot down more planes, neither side fully achieved air superiority, due to their immense losses. Axis aircraft losses on the ground far exceeded Allied losses. During Crusader, the British pilots in combat above the desert adopted, successfully a variation of the finger of four formations, using the German tactics.¹⁵⁷ When attacking convoys, the British used a technique called the defensive circle. This tactic proved effective until the German ace, Hans-Joachim Marseille, discovered a way to turn it into a death trap for British pilots.¹⁵⁸

The Luftwaffe's high numbers of air kills were achieved mostly by a few expert aces, particularly Hans-Joachim Marseille. He alone shot down one hundred fifty-eight

¹⁵⁵ Morley-Mower, 62.

¹⁵⁶ Christopher Shores and Hans Ring. *Fighters Over the Desert* (New York: Arco Publishing Company, Inc. 1969), 191.

¹⁵⁷ Ring, 219.

¹⁵⁸ Ring, 232.

Allied planes and became a menace over the desert.¹⁵⁹ Out of the actual 1,300 odd air victories claimed by the Luftwaffe over the desert, fifteen pilots accounted for 674 kills, with the top fifty-three pilots accounted for 1,042 of those victories.¹⁶⁰ The German aces produced this imbalance of air to air kills because of their extensive experience and frequency of air combat. The lop-sidedness of these victory figures was due, too, to the nature of German air combat tactics. Their fighters flew in pairs or fours that allowed the lead fighter to accumulate kills, while protected by his usually lesser experienced wingman. The Luftwaffe was as a dangerous opponent and posed a serious threat to the Desert Air Force. The Axis forces continued to attack also in the Mediterranean, concentrating on Malta.

In the skies over North Africa, British pilots improved many different tactics concerning aerial combat, including night fighting. The night operations in the second battle of El Alamein, at the landing ground Burg-el-Arab on October 27, 1942, involved Hawker Hurricanes.¹⁶¹ The RAF's goal was to hit the enemy at night behind his lines, to prevent Axis planes from attacking the Eighth Army. The British Desert Air Force utilized this technique with some success and learned the value of attacking grounded enemy planes under the cover of night. This strategy generated a new mentality for pilots, as targets now appeared impersonal; the speck on the ground belonging to a truck, boat, and a grounded aircraft showed little signs of humanity compared to a dogfight where one was faced with an opponent at roughly equal terms in a life and death struggle. Fortunately, these night raids encountered minimal air resistance.

¹⁵⁹ Stephan Wilkinson. "The Star of Africa," *Aviation History*, (November 2008, 25-31), 25.

¹⁶⁰ Shores, 220.

¹⁶¹ Chaz Bowyer. *Hurricane at War*. (London: Ian Alan Ltd. 1974), 114.

The versatile nature of the RAF Fighter Command allowed for a variety of tactics that played to the strengths of their aircraft. One strong difference between British and American pilots was that often the former alone possessed the necessary skills to perform at night. The RAF pilots' advanced training served them well, as they could fly and navigate in the dark. The Americans did not capitalize on the potential advantages of striking at night even later in the war, as American generals insisted on daylight bombing raids. These often ended in disaster. RAF Bomber Command and parts of RAF Fighter Command shared the ability to strike at night.

Unlike the British, the United States air forces experienced a peaceful home front situation; no enemy posed a threat to America's shores prior to the surprise attack on Pearl Harbor in December of 1941. Without this challenge, American air combat effectiveness failed to develop prior to TORCH. Without experiencing bombs falling on American target areas, American air units neglected significant operations, including development of fighter tactics to intercept bombers, construction of air defense networks, and pilot-training with actual flight combat scenarios. Isolationism prevailed among American society. These mistakes were evident at Pearl Harbor, where American misunderstanding of preventive measures led to the elementary mistake of grouping fighter aircraft together and openly on airfields, thereby creating ideal targets for the attacking Japanese. General Walter Short commanding on Oahu thought such clustering a wise choice, since he incorrectly concluded that sabotage was the serious threat. In reality, his action made it possible for a few bombs to demolish his warplanes. Had American forces experienced intense bombing, as had the British on Malta, they would have known to spread out their aircraft to minimize the chance of destruction. My

secondary sources agree that Britain's previous air combat experience factored into its successful performance in the desert and Mediterranean. The United States needed to learn the lessons acquired by the British through air operations on Malta and over the Western Desert.

Chapter 10

Malta: Supreme Air Experience of Survival and Convoy Elimination.

The RAF developed tactics and strategies to defend Malta from invasion, as well as attack enemy shipping convoys. Its defense of Malta and attacks on Axis convoys impacted the war in the Western Desert. Hardships endured by service men on Malta strengthened their resolve, as they survived relentless enemy bombing. RAF personnel stationed on Malta became battle-hardened, innovative, and experienced.¹⁶²

Malta's naval port submarine base and strategically significant airfields were key assets for Britain's war effort. The Hal Far airfield, opened in 1929, located in the southernmost part of the island, was designated Malta's RAF station. Both this station and, later, the airfield in the island's center at Ta'Qali used grassy and stony fields. Surfaces such as these made operations difficult under rainy conditions.¹⁶³

Malta was an important island to hold and had a long history including its great siege of 1564 by the Turks. In 1814, the British acquired Malta through the Treaty of Vienna.¹⁶⁴ Malta's naval base opened roughly at the same time as the Suez Canal, in 1869.¹⁶⁵ Malta's strategic and geographic position rendered it vital to British policy. The Axis powers targeted Malta because of its advantageous location for both the Royal Air Force and the Royal Navy. Malta's natural harbors provided an excellent submarine base,

¹⁶² Lord Tedder. *With Prejudice: The War Memoirs of Marshal of the Royal Air Force*. (Boston: Little, Brown, 1966.)

¹⁶³ Poolman, 22.

¹⁶⁴ Bradford, 28.

¹⁶⁵ Poolman, 21.

and its airstrips allowed possible strikes against the Axis shipping bound for North Africa.¹⁶⁶

For a prolonged period, Malta withstood constant bombardment by Axis bombers. The arrival of the Luftwaffe in early 1941 added greatly to the effort began in 1940 by Mussolini's air force. Stuka dive bombers hit British shipping with lethal accuracy.¹⁶⁷ The Italians, with German support, continued their brutal attacks not only on Allied shipping attempting to re-supply Malta, but on the island itself.

Under the pressure of bombardment, the British improvised methods for their survival. Key headquarters were moved into caves, and efforts commenced to counter the aerial attacks. The British dug their headquarters into the underground rock. Lord Gort, Malta's Governor-General, met with ACM Tedder, General Timberlake, and General Brereton to discuss the state of the island's defense.¹⁶⁸ The Royal Malta Force needed to test the structural integrity of the aerodromes of the island's air bases to prepare them to withstand further bombardment. They ordered Gladiator Fighters to fire on select buildings to determine if their defenses were adequate for protecting aircraft and fuel. If the bullets got through, they redoubled their efforts to reinforce these structures. The island's defenders also imposed curfews to help protect base personnel from Axis planes during night raids.¹⁶⁹ While the pilots often received credit for defending the island, the largely unsung heroes were the ground crews who constantly fueled, armed, inspected, and repaired the aircraft.^{170 171}

¹⁶⁶ Collier, 75.

¹⁶⁷ "Malta's Part in Convoy War: Tripoli Route in Danger," London Times, October 15, 1942.

¹⁶⁸ Brereton, 170.

¹⁶⁹ Kenneth Poolman. *Faith Hope and Charity: Three Planes against an Air Force*. (London: William Kimber, 1954), 69.

¹⁷⁰ George F. Beurling and Leslie Roberts. Fw. Air Marshal W.A. Bishop RCAF. *Malta Spitfire the Story of a Fighter Pilot*. (Toronto: Farrar & Rinehart, Inc. 1943), 117.

Since the Axis implemented a tight blockade on Malta, food on the island became scarce; Malta's most serious problem was its shortage of food, as supply convoys had an extremely tough time getting through the Axis lines. George F. Beurling, a Spitfire pilot based on Malta, also wrote in his memoirs that he and fellow British airmen ate food they dubbed "siege grub": bully beef in many different creative variations supplemented with Maltese cabbage.¹⁷² Everyone ate "siege grub" regardless of rank, for at the time it was the only nourishment available however, the sergeant pilots lived in relative comfort in fairly large private homes.¹⁷³ Many of the Maltese hid in caves during bombardments. Despite the problems from shortages of food, ammunition, spare parts, and fuel for the aircraft, the RAF on Malta operated three hundred aircraft. Unless supply convoys arrived, this would be impossible and Malta could be starved out.

As Malta eagerly awaited relief, it faced problems beyond the enemy bombers. Fliegerkorps X, General Geisler's anti-shipping unit, included JU 87, JU 88, and ME 110 aircraft. It attacked the island furiously throughout the month of January of 1941.¹⁷⁴ Stuka dive bombers created chaos for Maltese civilians. These planes banked to set up their attacks, and then, without warning, plummeted towards the earth targeting houses and civilians. As they executed their attacks, the metal screamers on the wheel pants howled a deafening sound meant to strike fear in the hearts of its victims on the ground. They also dove at a steep 70 degree dive for precision bombing. The bombs contained metal scabbards from German bayonets to achieve a whistling effect, a practice used

¹⁷¹ George F. Beurling, a Spitfire pilot, acknowledged the ground crew's importance in his memoirs.

¹⁷² George F. Beurling and Leslie Roberts. Fw. Air Marshal W.A. Bishop RCAF. *Malta Spitfire the Story of a Fighter Pilot*. (Toronto: Farrar & Rinehart, Inc. 1943), 122.

¹⁷³ Beurling, 122.

¹⁷⁴ Poolman, 37.

exclusively by the Luftwaffe.¹⁷⁵ The twin engine JU 88 delivered heavier bomb loads at typically 30 degree dives with up to 2,000 kilograms of explosives.¹⁷⁶ After the Stukas returned to Sicily on January 9, 1941, they left three Wellingtons damaged beyond repair at Luqa.¹⁷⁷ These dive bombers made it difficult for the British to ship relief supplies to the island. Their attacks continued throughout the year.

In March of 1942, the Luftwaffe began a yet more focused set of attacks. Luftwaffe *General Fieldmarschall* Albert Kesselring and *General der Flieger* Paul Deichmann implemented a plan of attack to disable and destroy the important military targets, the airfields, port, and submarine base on Malta. Its first priority was to eliminate the British fighters on the ground by means of surprise attacks at the air base located in Ta Kali. The next objectives were the bomber and torpedo-planes based out of Luca, Hal Far, and Calafrana. German aviators also sought to map out the effects bombing the docks and harbors of the Valletta naval base.¹⁷⁸ On March 20, 1942, the Luftwaffe conducted the first carpet bombing of the war in the Mediterranean, targeting Ta Kali. This assault paled in comparison of scale to the immense carpet bombing that followed.¹⁷⁹ German pilots were well-trained. The Italian pilots seemed more apathetic in their philosophy. They functioned less efficiently as a team compared to the Germans.¹⁸⁰

Malta lacked effective defensive aircraft. German BF-109s outmatched Malta's Hurricanes and attacked relentlessly, in wave after wave. The island's defenders needed the Supermarine Spitfire to compete with the high performance BF-109s. The British

¹⁷⁵ John Little, Assistant Curator & Research Team Leader, The Museum of Flight, Seattle WA, April 6, 2010.

¹⁷⁶ Little, April 6, 2010.

¹⁷⁷ Poolman Night Strike, 37.

¹⁷⁸ Cajus Bekker. *The Luftwaffe War Diaries*. (New York: Double Day and Company. 1968), 237.

¹⁷⁹ Bekker, 238.

¹⁸⁰ A Borgiotti C Gori. *La Guerra Aerea in Africa Settentrionale 1940-41 assalto dal cielo*. (Societa tipografica editrice modenese, Mucchi, 1972.), 23.

command on Malta was so desperate to obtain Spitfires that it accepted a shipment of fifteen in 1942 painted in the wrong camouflage scheme. While Malta needed aircraft painted in a sea pattern with dark and light blues, it received instead planes dressed in desert hues of brown and beige.¹⁸¹ Nonetheless, many sources highlight the great relief of the pilots who had been defending Malta with outmatched planes when the newly arrived Spitfires alleviated their strain and substantially raised their morale level. However, tactical use of the planes proved not to be a decisive factor in the overall protection of the RAF's Maltese air bases.¹⁸² Courage, persistence and tenacity of the pilots and Maltese people won the campaign; they survived against heavy odds.

Germany's air units in the Mediterranean were dispersed over six general areas: Tripolitania, Tunisia, Italy, Sicily, Sardinia, and the Aegean, which included Greece. Their total force was eight hundred ninety Axis aircraft, two hundred eighty of which were fighters.¹⁸³ The Luftwaffe stationed many of its planes in Italy, Sicily, and Sardinia, around three hundred and ninety aircraft. That number included ten dive bombers, two hundred seventy bombers, and eighty fighters. These planes were based within close striking distance of Malta.¹⁸⁴ Tripolitania and Tunisia contained the second largest grouping of Luftwaffe planes, with one hundred fifty and one hundred forty planes respectively.¹⁸⁵ This deployment of German planes meant that Malta could anticipate bombings of much greater magnitude. The *Wehrmacht* faced great difficulty in managing the flow of its resources. While they put relentless pressure on the British at Malta, they

¹⁸¹ James, Holland. *Fortress Malta: An Island under Siege 1940-43*. (New York: Miramax Books, 2003), 232.

¹⁸² Holland, 233.

¹⁸³ Tantum, 250.

¹⁸⁴ Tantum, 250.

¹⁸⁵ Tantum, 250.

were fighting on multiple fronts and found it difficult to supply and keep up their air strength in the Mediterranean theater.¹⁸⁶ The Luftwaffe transferred many bombers from the Mediterranean to the Eastern Front despite its need for them in operations against Malta. Its core bomber fleet dwindled away as Berlin transferred two hundred eighty-five aircraft to Russia within the short span of two months.¹⁸⁷ In the African desert, the Afrika Korps under Rommel won victories; particularly in blunting British attacks but often could not exploit these triumphs due to its lack of supplies.

The Italians and Germans targeted Malta with systematic and often around the clock aerial bombardment. The location of Italian airfields only sixty miles off the coast of Malta allowed easy access for Axis bombers to strike the island.¹⁸⁸ Malta's defenses did not include a radar-based intercept infrastructure. The island relied instead on visual observers. Early in the air raids only four outdated Gladiator aircraft protected Malta. These biplanes remained at full readiness on a twenty-four hour basis. However, the official report on Malta revealed that only three of them survived the first engagement. This left the entire defense of the island dependent on three archaic aircraft, named respectively *Faith*, *Hope*, and *Charity*.¹⁸⁹ The bombardments took lives and destroyed important infrastructure. Six Royal Malta artillerymen died during one Axis bombardment of the island.¹⁹⁰ Further attacks produced numerous additional military casualties. British troops stationed at Fort St. Elmo fired rounds desperately at incoming

¹⁸⁶ Faber, 210.

¹⁸⁷ W.H. Tatum IV and E.J. Hoffschmidt. *The Rise and Fall of the German Air Force 1933 to 1945*. (Old Greenwich: WE Inc. 1969), 218.

¹⁸⁸ Phillip Guedalla. *Middle East 1940-1942 A Study in Air Power*. London: Hodder and Stoughton, 1944), 182.

¹⁸⁹ The Minister of Information Air Ministry. *The Battle Of Malta The Official Account of the R.A.F in Malta, June 1940 to November 1942*.

¹⁹⁰ "10,000,000 Gift to Malta: A Special Tribute to Gallantry" *The London Times*, 11 November, 1942.

Italian bombers, until many met their deaths.¹⁹¹ Axis bombs struck Valletta, the Maltese capital, an average of eight times daily. In April of 1942, the Axis dropped over 6,728 tons of bombs on the island.¹⁹² On April 7, 1942, Malta endured its 2000th raid in a succession of attacks that appeared endless.¹⁹³ Malta's defenders received the George Cross from King George VI for endurance and resilience during the bombardment on April 15, 1942.¹⁹⁴ While the King formally recognized Malta for the anguish it withstood, the attacks continued.

With German planes and support supplies sent to Russia, the Germans faced great difficulty in sending sufficient support needed in the North African and Mediterranean. The limited supplies sent were allocated to bolster the efforts of Rommel and, for this reason, the Italian forces made up the greater part of the forces attacking Malta.¹⁹⁵ The limitations on available aircraft and materials challenged Albert Kesselring while serving as the commander and chief of the south Luftwaffe forces designated to bomb Malta. Kesselring reported that losing planes on the Eastern Front negatively impacted his operations in the Mediterranean. In a letter in early April, 1942, Kesselring wrote that the Luftwaffe was highly successful in suppressing Malta. In the long run however, due to the weakening of his available Mediterranean forces, he foresaw that his decreased air strength would not keep Malta suppressed.¹⁹⁶ On May 21, Hitler postponed indefinitely his scheduled invasion of the island. This also ended Malta's aerial siege. Hitler's termination of 'Operation Hercules' can only be understood by considering the

¹⁹¹ Ministry of Information. *The Air Battle of Malta. The Official Account of the R.A.F in Malta, June 1940 to November 1942.* (London: His Majesty's Stationery Office 1944), 8.

¹⁹² Collier, 74.

¹⁹³ Tedder, 25.

¹⁹⁴ Collier, 80.

¹⁹⁵ Giovanni Massimello and Giorgio Apostolo. *Italian Aces of World War.* (London: Osprey, 2002) , 20.

¹⁹⁶ Faber, 210.

costliness of the earlier Operation Marita, the 1941 German airborne assault on Crete. On May 20 of that year, Germany invaded Crete by landing its 7th Airborne Division on the island by gliders and parachutes. These Luftwaffe troops suffered heavy casualties, yet managed to take the island. During this operation, the Luftwaffe enjoyed the luxury of complete air superiority. Five hundred transport aircraft and one hundred gliders, packed with German airborne troops, descended on Crete. The few and widely spaced Greek air fields clogged up with the heavy German traffic of one hundred eighty fighters, two hundred eighty bombers, one hundred fifty dive bombers, and forty reconnaissance aircraft.¹⁹⁷ German parachutists filled the sky; 22,750 elite German troops landed on Crete. Although they succeeded, the Germans suffered heavy casualties. The 7th Airborne experienced more losses in the Crete operation than the Wehrmacht did in its earlier mainland invasions of Greece and Yugoslavia combined.¹⁹⁸ During the initial hours of combat on Crete, the German units suffered fifty percent casualties. Operation Marita cost Germany around 11,375 men.¹⁹⁹

Marita's shockingly high casualty rate appalled Hitler; he chose not to use airborne units for his future invasions. He also prioritized his resources. Hitler considered Russia a far more important goal than Malta or Egypt. He refused to commit large forces against Malta at this time and insisted on transferring units to the Eastern Front. He assumed the Italians could suppress the island, and planned to deploy German forces there in late July. If the Germans had used paratroops, an airborne assault on Malta would most likely have succeeded. The British defenders stationed on Malta could not defeat the

¹⁹⁷ Murray Williamson and Allan R Millet. *A War to Be Won; Fighting the Second World War*. (Cambridge: Belknap Press. 2000), 106.

¹⁹⁸ Murray, 108.

¹⁹⁹ Chris Bishop and Chris McNab. *Campaigns of World War II Day by Day*. (London: Amber Books, 2006), 48.

elite German paratroops since they lacked the quantity of small arms sufficient for defense. While Axis commanders believed that their efforts were reducing Malta to submission, the British survived there and continued to strike Axis convoys.²⁰⁰ Many of the supplies sent to North Africa never arrived because of British attacks by aircraft based on Malta.

The aircrews stationed on Malta remained in a constant state of war, through missions against convoys or defending the island from continuous attack and bombardment. The non-commissioned officers enforced heightened air base security by conducting patrols of the installation armed with loaded revolvers.²⁰¹ Their patrols kept order to the fragile situation of limited supplies and constant bombardment. These hardships increased the resolve of the pilots to protect the island. Personnel were successful in reconstructing damaged hangers and moving aircraft over a shelled tarmac. The constant bombings remained so fierce that returning aircraft stationed in Malta often had to deal with combat over their airfields. One episode involved of a group of Swordfish returning to Malta, after its night convoy raid, while the base was under attack by the Luftwaffe. Due to the timely presence of Hurricanes, the BF-109s were driven off, and heavy losses among the obsolete Swordfish bombers were avoided. The available records indicate that the majority of the planes survived, however they did not specify the number of losses. The planes that landed safely folded their wings to minimize target surface area exposed to overhead attack. Despite these precautions, a follow up attack by

²⁰⁰ Ministry of Information. *The Air Battle of Malta. The Official Account of the R.A.F in Malta, June 1940 to November 1942.* (London: His Majesty's Stationery Office, 1944), Multiple Pagination.

²⁰¹ Poolman, Kenneth. *Night Strike from Malta: 830 Squadron RN and Rommel's Convoys.* (London: Jane's Publishing Company, 1980), 25.

JU-88s destroyed two of the Swordfish parked on the ground. This illustrates the real risk involved in basing planes at an airfield under constant pressure of attack.²⁰²

BF-109 pilots classified the slow moving Swordfish formation as easy targets. The group of Swordfish flew between “friendly” ground fire and the firepower of the BF-109s.²⁰³ Malta desperately needed additional fighter planes to protect its torpedo bombers. Improvising with outdated aircraft and equipment proved effective; despite being outnumbered, the few fighters allotted to protect the torpedo planes kept the enemy fighters away from the bombers. Only later when more advanced planes, such as Spitfires, arrived, did the RAF on Malta conduct its air operations relatively unhindered.

The British relied heavily on American shipping to move its fighters and supplies to Gibraltar and into the Mediterranean and North African theaters of operation. Mechanics found that engine spare parts for the new types of fighters were in short supply. The improved Hurricane II fighters slowly replaced older models, although they paled in comparison to the Spitfire, a truly exceptional fighter against its German opponents. The British had great difficulty shipping Spitfires to North Africa due to its elongated wings, appendages too long to fit on the elevators of most conventional aircraft carriers. In June, Britain’s Middle East Air Force included five hundred and fifty-nine planes divided into thirty-four squadrons. Four hundred and nineteen of these were newer, up-to-date models. As shipments arrived on carriers, they replaced obsolete aircraft and increased the number of available British planes.²⁰⁴ The British had seven hundred and eighty newer planes out of total eight hundred forty-six aircraft in the

²⁰² Poolman, 147.

²⁰³ Poolman, 146.

²⁰⁴ Playfair, I.S.O. *The Mediterranean and Middle East Volume II The Germans Come to Help their Ally*. (London: Her Majesties Stationary Office, 1956), 289.

adjacent theaters by mid-October. Organizationally, its air arm expanded to fifty-two operational squadrons.²⁰⁵ Although the arrival of Spitfires was welcomed, they provided little relief at first, as the Germans destroyed the first shipment within seventy-two hours of its arrival. Due to the vulnerability of the planes on Malta's cratered airfields and the difficulties and inabilities of the ground crews to repair bombed planes, German bombers destroyed or rendered the Spitfires useless.²⁰⁶ Improved defenses were required for the survival of the next Spitfires shipped to the island. After this was accomplished, Spitfires played a dual role, attacking Axis convoys and defending Malta from Axis air attacks.

Shipments between Gibraltar and Alexandria included cargos of food, petrol, ammunition, parts, aircraft, and oil. Their voyage followed a route of eight hundred miles across the Mediterranean, but Malta was only a few minutes flight time from Axis airfields.²⁰⁷ This perilous journey was necessary to deliver vital supplies to Malta. Shipping planes by sea was also very risky. Producing and delivering aircraft was costly, yet the RAF needed desperately to import newer model planes for use in Malta and the Desert Air Force. In August 1942, a convoy of fourteen ships involved in the largest such relief operation, code named Operation Pedestal, sailed for the island. Pedestal intended to provide Malta with the oil and other supplies desperately needed for its survival.²⁰⁸ Among these vessels, the oil tanker remained the most crucial, due to the island's dire fuel situation. The aircraft carrier *HMS Eagle*, loaded with new model aircraft to relieve the losses endured on Malta, escorted the convoy. The British originally built *Eagle* to serve as a seaplane platform in 1919, one of the earliest full deck carriers in the British

²⁰⁵ Playfair, 289.

²⁰⁶ Bradford, 220.

²⁰⁷ Phillip Guedalla. *Middle East 1940-1942 A Study in Air Power*. London: Hodder and Stoughton, 1944),

²⁰⁸ Bradford, 253.

fleet.²⁰⁹ It lacked the modernity and the space of newer American carriers. *Eagle* came under attack by U-boat and Axis dive bombers early in its voyage. The enemy targeted the carrier because its cargo provided the island's best defense. On August 11, 1942, the Luftwaffe struck the slow moving convoy and sank nine ships, including the *Eagle*.²¹⁰ Only five ships in the convoy reached the island, and all of them had sustained heavy damage.²¹¹ Yet again a relief convoy intended for Malta met with disaster. Fortuitously, the oil tanker survived the onslaught and provided Malta with fuel necessary to continue air operations. This supply of fuel extended the island's life expectancy by ten weeks.²¹²

Tedder worried that severe losses among convoys sailing to resupply Malta would disastrously impact the fighting spirit and effectiveness of personnel garrisoned there. He replaced General Dobbie as the British commander on Malta with General Gort.²¹³ While Tedder hoped to reestablish morale among the men, problems remained. Acts of insubordination and disregard for the chain of command continued during General Gort's watch. Reports of decreased morale on Malta convinced Tedder that a defensive, defeatist atmosphere dominated the garrison on Malta.²¹⁴ Gort tried very hard to keep his defenses alert, a difficult task, as the pilots and antiaircraft gunners operated under extremely stressful conditions.

Historians disagree whether the arrival of the Spitfires on Malta made a large difference to its defense. The *London Times* claimed that they did, emphasizing the numbers of downed aircraft attributed to the Spitfires and other aircraft based on Malta.

²⁰⁹ George Howe. *Mediterranean Theater of Operations Northwest Africa: Seizing the Initiative in the West*. (Washington D.C., Center of Military History), 73.

²¹⁰ Lord Tedder. *With Prejudice: The War Memoirs of Marshal of the Royal Air Force*. (Boston: Little, Brown and Company, 1966), 27.

²¹¹ Tedder, 344.

²¹² Bradford, 273.

²¹³ Tedder, 344.

²¹⁴ Tedder, 345.

This assessment relied on results from the time period after the ill-fated shipment from the *Wasp*. Flying from Malta, the RAF lost thirty-four aircraft but managed to shoot down two hundred and four Axis aircraft in the renewed attacks that began in early October of 1942.²¹⁵ On October 11 alone, Maltese-based Spitfires destroyed eight of the fifty-eight attacking Luftwaffe bombers along with seven Axis fighters. In this raid Malta suffered a death toll of eighty, as well as total destruction of four hundred and sixty-nine buildings.²¹⁶ With much of its civil and military infrastructure pulverized, it was unclear how long Malta could survive. On October 13, 1942, the *London Times* reported eight kills by the defending aircraft, contributing to a total of fifty-six enemy aircraft destroyed in the month of October.²¹⁷ These numbers reflected the tenacity of the British pilots who held out against the onslaught of enemy air attacks. The *Times* carefully crafted its coverage to deemphasize, or at times omit, news of British military failures and losses, for they deemed them too negative for public knowledge.

Malta continued to endure intense bombardment from Axis aircraft late into 1942, during the Allies' preparation for Operation TORCH. On October 15, 1942, the *London Times* claimed that the success of Malta-based planes in disrupting Axis shipping convoys were a probable cause of its continued bombardment by the Axis.²¹⁸ The *Times* also disclosed that the official German report boasted the destruction of fifteen Allied aircraft and effectively damaged British aerodromes. However, it implied that Malta was inadequately defended.²¹⁹

²¹⁵ Ministry of Information, 90.

²¹⁶ Ministry of Information. *The Air Battle of Malta. The Official Account of the R.A.F in Malta, June 1940 to November 1942.* (London: His Majesty's Stationery Office 1944), 90.

²¹⁷ "Axis Defeat At Malta: 48 Aircraft Lost in Three Days" *London Times* 14, October 1942.

²¹⁸ "Malta's Part in Convoy War: Tripoli Route in Danger," *London Times*, 15, October 1942.

²¹⁹ "Malta's Part in Convoy War: Tripoli Route in Danger," *London Times*, 15, October 1942.

While such news coverage failed to reveal to the British public the severity of the Maltese ordeal, the garrisons on the island endured. As Malta survived, RAF pilots gained skills necessary to conduct attacks on Axis convoys. While RAF pilots improved their flight skills, the RAF soon had to cope with underpowered American planes, which arrived to replenish its strength. Later, inexperienced American pilots were sent into battle. These pilots were ill-equipped to face a well trained experienced enemy.

As Malta remained an important area of operation, the war in North Africa raged on. In late October and early November of 1942, the lengthy Second Battle of El Alamein occurred on the African mainland as Malta suffered heavy attacks by the Luftwaffe.²²⁰ These renewed attacks continued later in November, as the joint invasion of Morocco and Algeria by Britain and the United States was approaching. After the November 7 and 8 TORCH landings, Malta was used as an Allied reconnaissance platform for determining Axis positions in Tunisia.

With such intense air combat over Malta, it is a wonder why American pilots were not sent sooner to assist in the defense of the island. This action could have provided valuable combat experience to the American pilots, while at the same time, affording relief for overworked RAF pilots. This deployment was not considered by the Allies as America focused on the task of training and preparing its forces.

²²⁰ Ministry of Information, 94.

Chapter 11

American Aid: Help or Hindrance?

The Malta-based RAF pilots' constant exposure to combat set them apart from the green American aviators. Both the Mediterranean and North African desert were harsh and unforgiving to airmen. The RAF pilots on Malta worked with outdated, under-equipped aircraft at air stations subjected to frequent bombardment. RAF pilots based in the desert coped with unrelenting flies, heat, and sand. Classroom instruction could not effectively teach coping methods for operations in these conditions. Through their flight experience and exposure to these adverse conditions, RAF pilots became battle-hardened. The British airmen tended to perceive their green American counterparts as overeager for action and oblivious to the harsh conditions of the war.²²¹ America's neutrality had sheltered American pilots from the wartime realities faced by the RAF. While America remained neutral, the RAF's participation in the 1940 battles of France and Britain exposed it to modern air warfare. Afterwards, RAF pilots were, predominately, seasoned veterans had developed valuable skills and tactics through combat, experience which set them well above the level of preparedness of their American counterparts. Not only did the Americans, at this time, lack the fighting experience and skills that the RAF acquired through combating the Axis, their level of training was not equal to the training of new British pilots, from instructors who were survivors of the 1940 and 1941 air battles.

²²¹ Eric Bentley, Beauman, . *Winged Words; Our Airman Speak for Themselves*. (London: William Heineman, 1941), 22.

The British believed that American pilots needed to learn how to conduct their air operation as modern warfare from the RAF, since America's isolationism engendered a state of military un-preparedness. The few American pilots fortunate enough to have been shipped to Britain before TORCH received such training. This gave them an advantage, but they still lacked the skills to even attain a survivable level of readiness. The Royal Air Force training program required an intense and rigorous training regiment, including several months of flight time in actual combat aircraft. American pilots flew either Hurricanes or Spitfires for the short time they trained with the RAF.²²² It would take a complex, costly campaign, to elevate America's green pilots to the level of those flying in the RAF.

Many analysts from both Axis and Allied countries thought the entrance of the United States would bring great change to the war, since America possessed immense quantities of personnel and resources.²²³ The United States' failure to advance its military technology in order keep up with the high standards of the rest of the world, especially in the areas of tanks and fighter aircraft, was one of its more prevalent war-related problems. Furthermore, American fighter units lacked the training and experience needed to fight a modern air war. The machines, tactics, and strategies of air combat had developed significantly since America's involvement in the First World War. Without engaging the Luftwaffe in combat, American pilot trainees learned theory and practiced maneuvers without the assistance of air war veterans.

The British knew that the American Air Force's inexperience left its pilots unable to defeat the Luftwaffe. Churchill's chief military representative in Washington, Sir John

²²² Wesley Frank Craven. *The Army Air Forces in World War II Volume Two Europe: TORCH to Pointblank*. (Chicago: University of Chicago Press, 1949), 51.

²²³ Atkinson, 16.

Dill, informed London that American military forces “are more unready for war than it is possible to imagine.”²²⁴ Untested, obsolete planes and equipment plagued America in its effort to function on an equal level with its ally. The battered British war machine benefited from years of fighting, its performance improved through combat. The aircraft delivered from America to Britain through the Lend Lease Agreement needed to be modified for desert use. Even then, these American fighter planes could not compete with those of the Luftwaffe’s fighters.²²⁵ Despite those problems, Great Britain desired the United States as an ally, for they needed its manpower and war materials. The British realized they could not alone defeat Germany and Italy, so they sought American involvement.

The unique environment in the North Africa theater presented several challenges. The physical environment seriously impacted military operations. Wide expanses of flat desert, with few landmarks, made navigation difficult. Pilots needed to use their maps and navigation methods successfully in order to fly to the correct coordinates on specific missions. The desert’s heat depleted the strength of pilots, both in and out of their cockpits. Most American military training aimed for deployment in moderate climates ideal for aviation. Without experience in desert survival, fighting there demanded major adjustments for American pilots and troops alike.

The harsh environment of the North African theater posed challenges to the airplanes as well. Aircraft modifications were necessary to operate in the desert. Under the Lend Lease Agreement, the RAF received numerous American-made aircraft shipped for use in North Africa. This program supplied the British Desert Air Force with

²²⁴ Atkinson, 8.

²²⁵ Craven, 29.

American fighters, such as the Curtiss P-40 Warhawk. The British modified the P-40s further for desert combat, based on what they learned during combat against the Luftwaffe during the Cyrenaica campaign.²²⁶ The poorly constructed P-40 proved ill-suited to the desert environment. The American-manufactured planes frequently crashed; accidents due to mechanical errors occurred.²²⁷ The British faced another problem when they found that the American planes arrived without spare parts or mechanics. This created difficulties for repairing the aircraft. American and British parts were incompatible. Also, the planes were difficult to deliver.

Limitation of the aircraft's flight range made the delivery by air problematic. The distance required the planes to be shipped, rather than flown, to Egypt. When the planes arrived at their destination, the British found them untested and improperly prepared for war. The American manufacturers failed to provide specifications needed for their planes to compete against Axis aircraft. One reason for this is American aircraft manufactures did not consider any input from their British counterparts during the testing of the planes. Britain's aviation manufacturers took what they learned from combat and modified their aircraft to improve their performance. The RAF regarded American planes which did not live up to its standards as a hindrance.

²²⁶ Hill, 150.

²²⁷ Craven, 5.

Chapter 12

The Air War in the Desert

As more American planes arrived in North Africa, the Luftwaffe maintained its advantage over the Allies. Its air bases, situated in Italy, were much closer to Libya. Allied shipping routes for delivering new aircraft to this front were long and treacherous. Ships either threaded the needle, the narrow Strait of Gibraltar that separates Europe from Africa, or journeyed around the Cape of Good Hope, almost circumnavigating the continent of Africa before entering the Mediterranean through the Suez Canal.²²⁸ This led to long lapses between shipments. Consequently, shortages were a daily reality to Britain's desert air units.

When their surface transports faced destruction in the Mediterranean, the British used submarines to transport supplies. These could deliver only small loads of fuel and ammunition. The pilots found it necessary to conserve these items, and this decreased their combat effectiveness.²²⁹ Otherwise, the Desert Air Force was cut off from receiving equipment. Since many convoys failed to arrive, the British enlisted local seafarers to transport supplies.²³⁰ Although this makeshift solution provided a limited flow of supplies, it was not an adequate substitute, for their loads, too, were limited. Limited provisions meant improvised air bases. Under-supplied airbases in the North Africa provided little in the way of comfort for their personnel. Airmen stationed on Malta enjoyed very few amenities due also to constant Axis air strikes.

²²⁸ Hill, 149.

²²⁹ Lyall, 179.

²³⁰ Lyall, 222.

RAF bases on the North African mainland featured harsh living conditions, including fly-infested tents baked by the desert sun. Pilots endured such hardships beyond fighting in the sky. Visual images of air bases in North Africa, from original archival photographs, show British and American outposts appearing underdeveloped in comparison to the more permanent Axis bases; the latter boasted paved runways and hangers. The former lacked concrete taxiways or parking spaces. Orderly rows of planes parked on the flat desert ground stand in the background, as pilots line up in formation for roll call. The aircraft were located some distance away from ground equipment and large fuel drums. This spacing was necessary, as it prevented the danger of losing the planes if the fuel ignited when hit.²³¹ Tents dotting the sandy wasteland served as command headquarters, planning centers, and sleeping quarters. These meager conditions were among the hardships awaiting the Americans in the desert.

Due to the sand, heat, and storms, operations carried out over the desert were difficult. These conditions put great strains on the aircraft and the men assigned to maintain them. Sand entered the engines through air intakes. It transformed lubricating oil into a harmful paste, which caused nightmares for maintenance personnel.²³² British base personnel grew resourceful. Mechanics employed alternative measures to adapt aircraft to the harsh desert environment. They used specially designed filters to solve the sand menace. These filters added drag, decreasing the overall performance of the aircraft.²³³ Personnel found water and food in short supply in the desert. Water was especially valuable. It filled vehicle radiators to prevent overheating; this took priority

²³¹ Ned Throne. North Africa Special Collection, Box 4, Folder 79.

²³² Christopher Shores and Hans Ring. *Fighters over the Desert*. (New York: Arco Publishing Company, 1969), 9.

²³³ Kevin Delve. *The Story of the Spitfire: an Operational and Combat History*. (London: Greenhill Books, 2007), 105.

over its use for bathing.²³⁴ Flies infested the environment everywhere and proved a constant irritant to the men. The desert was extremely hot in the day and grew cold at night. The metal planes became incredibly hot from the scorching sun, another desert condition which made maintenance and handling difficult. The British air bases on Malta were faced with much greater severe supply shortages than those in the North African desert. Dire conditions prevailed, even during special events such as visits from generals and base inspections.

Malta, while not plagued by the sands of mainland North Africa, experienced supply shortages and inadequate base conditions. On November 14, 1942, American Lieutenant-General Lewis Hyde Brereton presented the first ace of the 57th group, Lieutenant Layman L. Middleditch, with the Distinguished Service Cross at a base on Malta.²³⁵ The general wrote in his diary about the unusual appearance of the makeshift uniforms worn by the men during a formal ceremony, testifying to the difficulty of shipping supplies to the fighting front. Cooks used flour sacks as substitutes for aprons. Mechanics went shirtless due to the shortage of coveralls. Chuckling, the general also pointed out that toilet paper was such a scarce commodity that pilots often stuffed rolls in their flight suit pockets.²³⁶ The aviators and ground crews of the RAF learned to cope with these extremes and, enduring these hardships, grew tougher and more resourceful.

These conditions grew even more unbearable when Allied soldiers discovered that American equipment was ineffective. Through the Lend Lease agreement, and later, during American deployment in TORCH, the British rushed untested American weapons

²³⁴ Shores, 9.

²³⁵ Lieutenant General Lewis H. Brereton, *The Brereton Diaries 3 October 1941-8 May 1945*. (New York: William Morrow, 1946), 169.

²³⁶ Brereton, 169.

and equipment to the battlefield with disastrous results. Beyond flawed airplanes, American sent tanks to the British, including M4 Shermans. This vehicle often proved to be a death trap up against German Tiger tanks and the 88 flack gun that Rommel used to great effect as an antitank weapon. The medium tank Sherman was, nonetheless, a significant improvement over other American tanks supplied to the British, Grant and Lee armored fighting vehicles. However, the Sherman's medium armor was highly vulnerable.²³⁷ The American War Department rushed this tank into production, with its 74-mm main gun mounted on a rotating turret.²³⁸ According to historian Rick Atkinson, the Sherman's shell failed to puncture the armor of the German Tiger tank even at point blank range, while the Tiger's larger round could easily ignite the Sherman tank's ammunition stores from a range of over a mile.²³⁹ In February 1943, Rommel's panzers devastated American armor at Kasserine Pass.²⁴⁰ In just two weeks at the front in Tunisia, American units lost a total of one hundred twenty-four tanks.²⁴¹ This pattern held true as well for some of the American aircraft used in the North African campaign. The British knew that their desert models of the Hawker Hurricane and the Supermarine Spitfire matched or outclassed most German planes, and the RAF pilots preferred these over American aircraft. After learning of their ineffectiveness the RAF noted concerns about receiving American manufactured planes. British commanders understood that inexperienced American pilots flying technically inferior aircraft invited disaster. Britain nonetheless welcomed their assistance. When America entered the war in December

²³⁷ Bishop, 34.

²³⁸ Bishop, 35.

²³⁹ Atkinson, *Ike's Dark Days*, 47

²⁴⁰ Rick Atkinson. *An Army at Dawn: The War in North Africa, 1942-1943 Volume One*. (New York: Henry Holt, 2002), 369.

²⁴¹ Atkinson, 234.

1941, the British eagerly anticipated fuller assistance. Although America sent obsolete aircraft and novice pilots, war-weary British forces needed such manpower and additional resources.

London faced a difficult dilemma in deciding how to best utilize the incoming American air units. The British feared that America deployed its air elements abroad regardless of their state of readiness. Most American units allocated for deployment lacked a requisite level of training and preparation. In order to compensate for American deficiencies, the British planned for American bombing units to attack ports thought to offer minimal resistance. Vichy French forces defended these ports. Meanwhile, the Allied command tasked the RAF units to confront battle-hardened German forces deployed in the east. The RAF, having proven itself in Malta and North Africa, was capable of carrying out such missions with lower losses than the untested American air units. While the British held strongly to their belief that American pilots received poor training and were, in late 1942, ill-suited for combat, the RAF needed assistance to mount efforts against the Axis in North Africa and the Western Mediterranean. Washington did not agree with the British that the Allies should focus their efforts on North Africa. Roosevelt and his military leaders, General George Marshall and Admiral Ernest King preferred an early assault on Nazi-occupied France. This hampered the planning process, as Churchill and his commanders sought to convince the Americans that this was premature in 1942.

Chapter 13

Operation TORCH

Winston Churchill met with President Franklin Roosevelt in Washington, D.C., at the ARCADIA Conference in late December of 1941 to discuss Allied war strategy. Churchill explained the advantages of waging a North African campaign to the other leaders.²⁴² The American military leaders, hesitant to commit forces to North Africa, viewed the area as having far less strategic importance than Europe. Africa seemed to them an illogical military objective; the Americans labeled it a side show. While American leaders wanted to liberate Europe quickly by first directly assaulting Hitler's Atlantic defenses on the French coast, Churchill aimed to protect Britain's imperial interests in Egypt, Gibraltar, and Malta. He argued that the best way to get into Europe was through the "soft underbelly" of Italy. His primary defensive goal was to prevent Hitler from obtaining Middle East oil. The British firmly believed that the Allies should not yet assault the West European mainland due to the Luftwaffe's control of the European skies. Also, the British regarded Hitler's coastal defenses as too strong to overcome, and believed that the Western Allies lacked the experience, strength and equipment to undertake a successful invasion along the French Atlantic coast.²⁴³

Churchill believed that operations in North Africa could serve as a suitable opportunity for American troops to gain combat experience. This rationale extended to pilots, because North Africa, unlike the European mainland, with its relative absence of

²⁴² Rick, Atkinson. *An Army at Dawn: The War in North Africa, 1942-1943*. (New York: Henry Holt, 2002), 13.

²⁴³ Murry, 299.

anti-aircraft units, seemed a more suitable field of operation for newly trained pilots. In addition, waging a North African campaign from both west and east provided the possibility of cornering the Afrika Korps in Tunisia, once Anglo-American troops landed on the Maghreb's opposite side in Morocco. This projected operation developed into Operation TORCH, a sizable Anglo-American invasion of northwest Africa scheduled to begin on November 8, 1942. Admiral Andrew Cunningham knew that the under-trained American units lacked the preparation necessary to be successful in the onset of the full scale operation that faced them. Nonetheless, he believed in the importance of acting without delay, in spite of their deficiencies. He stressed the importance of swift action for the success of the operation as a whole. Action had to be taken quickly in order to trap the Germans and Italians. Samuel Elliot Morison cited Admiral Cunningham's written response to his direct feeling and position on this matter:²⁴⁴

No officer commanding a unit will ever be satisfied that he has had adequate preparation and training until his unit is trained and equipped down to the last gaiter button. There are times in history when we can not afford to wait for the final polish. I suggest that it should be made widely known to all units that for "TORCH" particularly we could not afford to wait, and that the risk of embarking on these large-scale operations with inadequate training was deliberately accepted, in order to strike while the time was ripe. We must now push forward our training so that such a situation can not again arise.²⁴⁵

Andrew Cunningham made an important point: the state of improperly trained and unprepared American units demanded British assistance. Throughout the fighting, Admiral Cunningham assumed that the American air forces would improve through combat. He deemed such war experience as the most effective way for unprepared American forces to learn how to fight. The operations could not be postponed past

²⁴⁴ Samuel Elliot Morison. *History of United States Naval Operations in World War II Volume II: Operations in North African Waters October 1942-June 1943* (Boston: Atlantic-Little Brown, 1947), 32.

²⁴⁵ Admiral Cunningham. "Lessons of Operation Torch" (February 7, 1943), 1.

November, for winter conditions on the beachheads would then prohibit them. Suitable weather would not resume until the following year.²⁴⁶ This meant that the Allies had to launch the operation in November regardless of how inexperienced and unprepared the Americans were for combat.

Preceding the TORCH landings in French Morocco, Oran, and Algiers, the Allied command agreed to assign the United States Army's Twelfth Air Force and groups of American carrier-based naval aircraft to provide cover over the invasion beaches and assist the seizure of airfields. This was the initial phase of a highly complex operation involving the Anglo-American allies.²⁴⁷ When planning TORCH, American generals decided which American air units to assign to cover specific landing areas. General James Doolittle took aerial command of the Casablanca area. He requested air support from the 33rd Fighter Group, a unit of P-40s thought to be sufficient to achieve local air superiority when combined with naval fighters.²⁴⁸ While General Doolittle projected confidence in America's untested airmen, he planned for the unexpected by employing significantly more pilots than required by the operation. This overcompensation gave his green pilots a numerical advantage over their opponents.

In preparation for Operation TORCH, the Allies positioned their land aircraft and aircraft carriers in designated areas. By September of 1942, the Twelfth Air Force, commanded by Doolittle, assumed control of two newly arrived American P-38 groups.²⁴⁹ These planes flew from Britain nonstop to Gibraltar following a meandering route around Iberia, due to the political complexities of Spain's neutrality. This lengthy,

²⁴⁶ Morison, 33.

²⁴⁷ Caravan, 41.

²⁴⁸ Caravan, 25.

²⁴⁹ Bodie, 135.

twelve hundred mile journey to the operations deployment area demonstrated the sheer, long-range capabilities of this exceptional fighter.²⁵⁰ In order to make this arduous trip, each aircraft carried two 165 gallon fuel tanks to extend its range. According to the maintenance and operation manual, installing the tanks was a fairly simple and straight forward procedure. Each tank attached directly to the plane's underbelly.²⁵¹ Other American fighters, the P-39s and P-40s, required the use of drop tanks to make the long trip. Following the arrival of the P-38 Lightnings, one hundred twenty-five Bell P-39 Air Cobras flew to Gibraltar. Later, P-40s flew to the same deployment area to assist in attacks on the ports targeted during Operation TORCH.²⁵² American air commanders rushed planes overseas to England and other staging areas for use in Operation Torch and subsequent action during the North African campaign. The biggest question was how American aircraft would measure up in combat against the Luftwaffe. With green pilots, the full potential of the aircraft would remain unknown until engaged in actual battles.

Due to problems they faced using American aircraft through the Lend Lease, the RAF already depreciated American hardware. Lend Lease planes gained a bad reputation with British mechanics. Foreign mechanical construction and layout of instrumentation of the American aircraft confused British pilots and lessened their performance when flown by RAF pilots.

American units involved in Operation TORCH faced, initially, not Germans or Italians, but Vichy French opponents. This unlikely circumstance derived from both the soured relations between the French and British at this time and the control of the Vichy

²⁵⁰ Bodie, 136.

²⁵¹ United States, *U.S. Army Air Forces. Aircraft Inspection and Maintenance Guide for P-38 Series Aircraft: RF-4 Series and F-5 Series Aircraft. P-38 Series Aircraft.* (Volume 1, Washington D.C: U.S. Army Air Forces, June 30, 1944), 54.

²⁵² Bodie, 137.

regime over French military units in North Africa. The latter sympathized and/or collaborated with the Nazis. In a series of miscommunication and distrust, a violent incident destroyed the earlier fragile partnership between England and France. In “Operation Catapult,” an attempt to prevent the French fleet from falling into German hands, a British fleet on June 20, 1940, opened fire on French naval units stationed at Mers-el-Kebir on the Algerian coast. This unfortunate clash resulted in the destruction of this French fleet.²⁵³ Most seriously, the operation resulted in 1,297 dead and 354 wounded French sailors.²⁵⁴ This event so poisoned French-British relations that it compelled the Allies to send American units to invade French-controlled regions of North Africa. Mers-el-Kebir discouraged the British from undertaking further action against the French, providing an opportunity for green American forces to face an opponent less proficient and determined than the Afrika Korps. The Allies assigned these areas to American air units; they were the obvious choice to face the anti-British Vichy French, who as yet held no grudge against the Americans.

At first, the green American air units without the aid of the RAF experienced great difficulty facing the French pilots. The American air units’ level of training caused frequent preventable accidents during the initial phase of the TORCH air operations. These air operations succeeded only because of superior Allied numbers in aircraft over those of the French defenders. The TORCH air operations plan issued on September 20, 1942, required the American Twelfth Air Force to attack the widely separated Vichy-held ports of Casablanca and Oran in preparation for the invasion. Dividing the air support weakened the operation. Military historian Wesley Craven argued that the Allied decision

²⁵³ Irwin J Kappes. “Mers-el-Kabir: A Battle Between Friends” (Military History Online: May 15, 2003), 22.

²⁵⁴ Kappes, 43.

to split the air commands into two groups, each with its commander and operating in different target areas, segregated and diluted their strength and impact.²⁵⁵ The divided air command encountered trouble in coordinating air operations. Furthermore, the unified naval command could not successfully communicate to both air commands.

Air Marshal Sir William Welsh and General Doolittle headed the separate Allied air commands. Welsh took charge of the Eastern Air Command (E.A.C.), which included RAF air units commissioned to assist in the attack on Algiers and Tunis. The British E.A.C. provided air support for the operation to seize Algiers and move towards Tunis, involving the capture of the harbors of Bougie, Philippeville, and Bone.²⁵⁶ The Western Air Command, consisting of the American Twelfth Air Force and naval air units, concentrated on supporting of the landings at Oran and Casablanca. General Doolittle brought his Twelfth Air Force into the Western Air Command. It was three times larger than the E.A.C.: the Twelfth Air Force consisted of 1,244 aircraft, while the E.A.C. contained only 454 planes.²⁵⁷ The planners realized it would be more effective to use the navy's carrier aircraft to provide initial support for the landings rather than relying on naval bombardment alone. The American naval aircraft would be the initial air assets committed until secured coastal aerodromes permitted for the Twelfth Air Force and the E.A.C. to take over.²⁵⁸ The tasks assigned to the naval planes included clearing the skies of enemy fighters and strafing enemy airfields to expedite advances by the ground forces. Use of the carriers created a distinct advantage for the Allies. Aircraft returned to the carriers when they finished their mission, unlike land-based planes. The French-

²⁵⁵ Craven, 53.

²⁵⁶ Rust, 5.

²⁵⁷ Craven, 54.

²⁵⁸ Carver, 55.

controlled landing areas needed to be secured by ground units before land-based fighters could operate in North Africa.

As attack plans developed, American logistical mishaps threatened to undermine the success of the operation. Shortages of aviation fuel, ammunition, oil, and spare parts kept planes operating. American commanders, unfamiliar with the logistics of managing air units, committed grave mistakes by allocating resources disproportionate to the forces attached to Operation TORCH. Command expected the American Twelfth Air Force to receive supplies from the Eighth Air Force Service Command. Failure at this made creation of its own service command necessary. This seriously depleted the Eighth Air Force's resources, leaving it undersupplied for the operation.²⁵⁹ The Eighth Air Force reported that it lost at least seventy-five percent of its supplies to the Twelfth Air Force.²⁶⁰ The British developed a more efficient method of allocating resources to each unit with its own built-in control, preventing resources from being taken away from their respected units without direct orders from command.²⁶¹

²⁵⁹ Wesley Frank Craven. *The Army Air Forces in World War II: Volume Two Europe: Torch to Pointblank August 1942 to December 1943* (Chicago: University Of Chicago Press, 1976), 65.

²⁶⁰ Craven, 65.

²⁶¹ Morley-Mower, 147.

Chapter 14

American Baptism by Fire

The Twelfth Air Force played a restricted role in the TORCH landings. Its air units involved the initial heaviest fighting included the 97th and 301st Groups. These consisted of American bombers escorted by P-38 Lightnings of the 1st and 4th Fighter Groups, and Spitfires of the British 31st and 52nd Groups.²⁶² Navy Wildcats engaged in the majority of the air combat. The Navy assigned its Wildcats to provide air cover for the American landings and to neutralize enemy airfields in anticipation of the arrival of American ground troops. Once secured, these airfields would host the planes of the Twelfth Air Force.

The Wildcats attacked the coasts over Casablanca on the morning of November 8, 1942.²⁶³ To the east the British feared that the Germans would commandeer the French warships based in Algeria. At Oran, French forces counterattacked with fifty-five Dewoitine 520s launched from La Senia.²⁶⁴ The French D.520 flew at a maximum speed of 332 mph (534 km/hr), slightly faster than the American F4F Wildcat's top speed of 318 mph.²⁶⁵ The air station at Port Lyautey, Morocco, held twenty-five Dewoitine 520's and eleven Martin 167 French bombers. Twenty-three French fighters stationed at Casablanca threatened the American landing forces.²⁶⁶

²⁶² Craven, 59.

²⁶³ John W. Lambert. *Wildcats Over Casablanca November 1942 Operation Torch* (St Paul: Phalanx, 1992), 5.

²⁶⁴ John Keegan. *The Times Atlas of the Second World War* (New York: Harper Row Publishers, 1989), 112.

²⁶⁵ Charles Catton. *The World War II Warplanes Guide* (New Jersey: Hartwell Books, 2001), 108

²⁶⁶ Tillman, 171.

The RAF commanders regarded the French air force as a lesser threat than the Italians and assumed the green American pilots would be able to defeat it. American pilots struggled when fighting the French in their initial baptism of fire. The Wildcats arrived and met Vichy resistance. The Vichy French air strength in Morocco totaled around two hundred aircraft, distributed among seven airfields. American sources, pilot diaries, and after action reports, described the resultant air battles. One pilot, Ed Seiler, flew a Wildcat protecting the Allied landings.²⁶⁷ During his first combat sortie, he engaged multiple French fighters over Casablanca. His flight of Wildcats managed to silence gun batteries shelling the landing forces. While doing so, they came under attack by five French fighters. The Wildcats could outmaneuver, but not outrun, Dewoitine 520 fighters.²⁶⁸ The American planes' payload of heavy bombs impeded their performance by slowing them down; their ordinances also rendered them less maneuverable.²⁶⁹ Nevertheless, on this mission, the Americans managed to shoot down two French planes. As the battle raged in the sky over the beaches, French bombers flew out to sea to threaten the American armada. Wildcats flying combat air patrol noticed the danger and destroyed the bombers before they could threaten the US carriers, destroyers, support ships, and transports.²⁷⁰ The American naval fighters, early in the operation, also eliminated a number of French aircraft and cleared the enemy airfields from threats to the Allied forces.

²⁶⁷ Lieutenant MT Wordell USN and Lieutenant EN Seiler USNR. *Wildcats over Casablanca* (Boston: Little Brown, 1943), 76.

²⁶⁸ Munson, 56.

²⁶⁹ Lieutenant MT Wordell USN and Lieutenant EN Seiler USNR. *Wildcats over Casablanca* (Boston: Little Brown, 1943), 76.

²⁷⁰ Seiler, 76.

Attacking the French Moroccan airfields proved to be more difficult than anticipated. During their attack on Cazes airdrome in Casablanca on November 8, American Navy Wildcats encountered tough aerial resistance from Vichy aircraft, including D.520s and imported P-36s.²⁷¹ The Dewoitine 520s, grouped in formation to challenge the Allied aircraft. The American planes destroyed other French planes, those caught on the ground, in strafing attacks.²⁷² Out of 1420 rounds of ammunition loaded onto each of the Wildcats before battle, the trigger sensitive green American pilots fired an average of 904 rounds, yet scored few hits on their targets.²⁷³ One of the French planes shot down Lieutenant Charles A. Shields; he opened his canopy and bailed out. As he parachuted from his Wildcat, French ground forces fired on him. He replied with his pistol.²⁷⁴ The Americans also suffered casualties from friendly fire, undeveloped navigational skills, and unfamiliarity with aircraft handling and maneuvers.

Widespread instances of catastrophic navigational error occurred during TORCH. Lieutenant Ernest, Wood Jr., flew his Wildcat over the coastline and engaged the French under of the cover of his wingman, Ensign Andrew B. Conner, Jr. The pair tackled a large force of Dewoitine 520s and utilized evasive maneuvers they had learned in training. They managed to shoot down one French plane, but Ensign Conner got lost due to his lack of navigational skills. He ran out of fuel searching for his aircraft carrier.

²⁷¹ The French forces in North Africa had a collection of the standard French fighter the Dewoitine 520 but also used a few Allied P-36s that it had obtained from other trade means.

²⁷² Raymond Danel and Jean Cuny. *Le Dewoitine D.520* (Paris: Editions Lariviere, 1974), 142.

²⁷³ Fighting Squadron 41 VF41 Reports November 24, 1942. WWII Action of Operation Reports. RG 38. NACP.

²⁷⁴ Lambert, 8

Ensign Braun also could not navigate back to the ship and just as Ensign Conner did, ditched his Wildcat in the Atlantic.²⁷⁵

Another example of American mishaps occurred when Squadron Air Group 29 lost an entire flight of four planes from both mechanical failure and navigational miscalculations. More experienced American pilots suffered mechanical failures due to mistakes made by haphazard ground crew preparation and a lack on their part of preventative and reactive malfunction remedy procedures. Lieutenant George Trumpter broke away from combat due to failing oil pressure and disappeared. The Squadron leader, Lieutenant Commander John T. Black, experienced trouble during takeoff with broken landing gear, yet flew his mission. When he attained a critical fuel level he turned back, abandoning the rest of his flight. Lack of fuel and broken undercarriages forced the rookie ensigns who filled Black's formation to ditch in the Atlantic.²⁷⁶ This cost the carrier four undamaged aircraft. The four remaining green pilots failed to locate their carrier, *USS Santee*, due to their limited navigational skills. Without their flight leaders, their situation was hopeless. Their rushed training ignored or overlooked rudimentary skills involving navigating back to their carrier. Many had to ditch. Lt. Hammond Cassidy, Andres Bold and Ensign Ball experienced problems and landed at the *USS Suwannee* because they lacked sufficient fuel to fly to their assigned carrier. This example of poor fuel management is one of many indicators of deficient American training.²⁷⁷ Improper training, inexperience, and faulty equipment led to the widespread accidents and problems among American air units during Operation TORCH.

²⁷⁵ Lambert, 13.

²⁷⁶ Lambert, 22.

²⁷⁷ Report of Flight #2 November 8, 1942. WWII action of Operational Reports. RG38, NACP.

The pilots encountered difficulties apart from navigation. Lt. Hammond Cassidy, Andres Bold and Ensign Ball mismanaged their fuel consumption and landed at the *USS Suwannee* instead of flying the additional distance to their assigned carrier. This further example of failed fuel management is one of the indicators of the grave effects of the incomplete American training program on rookie American airmen during TORCH.²⁷⁸

Two planes crashed during takeoff on the *USS Santee*. Even more precarious than takeoffs, carrier landings presented pilots with their biggest challenge. One F4F attempting to land approached at a dangerous angle and crashed into the deck. The impact ripped apart the plane's tail section. The pilot had very little experience landing on carrier decks during his training. Such mishaps, caused by American airmen's misjudgment and undeveloped skills, reduced the *Santee* to nine remaining working aircraft from its initial complement of thirty.²⁷⁹

These American pilots who engaged the French developed specific perceptions about this enemy. They described the Vichy pilots as prideful, yet chivalrous. For example, two Wildcats ended up in the ocean because of their pilots' misjudgment in combat maneuvers and or high probability to commit friendly fire or mid air collision. The loss of the two wing men allowed for a French Dewoitine 520 to shoot down Lieutenant Wood. As the bullets ripped apart the oil cooler lines, his plane began to descend towards the blue water. As Wood struggled with the dying plane, he looked to his right and glimpsed what he perceived as a French pilot gloating over his victory. He could see the Frenchman grinning wildly and waving as his plane tumbled towards the sea. Wood's plane hit the water hard. He squeezed out, inflating his "Mae West" flotation

²⁷⁸ Report of Flight #2 November 8, 1942. WWII action of Operational Reports. RG38, NACP.

²⁷⁹ Lambert, 22.

device.²⁸⁰ Once pilots ditched in the water, the Navy attempted to recover them.

Destroyers, submarines, and other friendly vessels rescued a number of downed airmen.

Despite the setbacks and casualties suffered by the Wildcat units, American pilots achieved some success. On November 8, the American Wildcat Unit VF-41 claimed thirteen aerial kills, also one probable. In addition, they destroyed six enemy planes, and damaged eight on the Cazes airfield.²⁸¹ Due to the inexperience of the American Navy pilots, the cost was heavy, as seven Wildcats were shot down. Three additional planes went missing under unknown circumstances.

Even though the Americans remained the designated force against the Vichy French, some British units engaged the French defenders of their North African ports. The RAF in TORCH performed much better than the Americans. Although they suffered losses, they neutralized the Vichy airfields more efficiently. They did, however, make mistakes since they had trained to fight specifically German aircraft and needed experience to understand and overcome French planes and tactics. In one instance, pilots of four Spitfires mistook French planes for Hurricanes at Tafaroui airfield. They wrongly assumed that this airfield was under British control. As the Spitfires prepared to land, they encountered four Dewoitines. These French planes attacked and brought down one of the Spitfires, killing its pilot. The other Spitfires reacted by shooting down the three remaining Dewoitines.²⁸² The group of Spitfires easily destroyed a column of French Foreign Legion light tanks with their 20mm cannon, obliterating these targets.²⁸³ The

²⁸⁰ Lambert, 14.

²⁸¹ Lambert, 14.

²⁸² Lt. Carver, Doolittle to Arnold, 19 Nov. 1942; Hq. 12th (AF Daily Intel Rpt. 10 Nov. 1942), 72.

²⁸³ Carver, 73.

British pilots utilized their knowledge of air and ground battle tactics to quickly neutralize the airfield, while suffering only the one loss.

Although the Twelfth Air Force played a minimal role in the assault phase of Operation TORCH, it introduced American pilots to combat. On November 11, the carrier operations ended with a ceasefire, as the local Vichy French command capitulated. The difficulties that America's naval fighter plane operation experienced paled in comparison with the absolute failure the experimental air observation post program endured. In a severe case of friendly fire, the American naval ships in the TORCH invasion armada almost completely destroyed a group of American light reconnaissance aircraft by "friendly fire."

The Western Task Force, commanded by Major-General George S. Patton, Jr., covered the Moroccan coastal invasion. Patton assigned unarmed, forward observer L-4 planes to coordinate his artillery fire. Launched from the deck of the *USS Ranger*, these planes attempted to provide guidance for direct fire support from the air for the ground divisions moving into Casablanca.²⁸⁴ The L-4's wood construction rendered it highly vulnerable. The slow, single engine L-4s had a similar construction to the civilian Piper Cub model.²⁸⁵ In preparation for the invasion, the American Navy packed these planes in crates on board an aircraft carrier so quickly that the pilots and crews were unable to examine them in training, let alone fly them.²⁸⁶

The unusual appearance of these light aircraft confused the U.S. Navy. The L-4 planes did not appear in the Navy's airplane identification recognition books, and naval

²⁸⁴ Edgar F. Raines Jr. "Disaster off Casablanca: Air Observation Posts in Operation Torch and the Role of Failure in Institutional Innovation" (*Air Power History*, Fall 2002), 20.

²⁸⁵ Raines, 20.

²⁸⁶ Raines, 25.

gunners never viewed them prior to the TORCH landings. Consequently, many L-4s fell victim to friendly fire during TORCH. On November 9, at 14:25, the light cruiser *USS Brooklyn* failed to identify three L-4 observation planes and opened fire on them.²⁸⁷ Soon the entire fleet in the area opened fire, with its 20mm antiaircraft gun. One airplane took a direct hit, and the round pierced its pilot's leg. It spun out of control and crashed on the coast, bursting into flames after the pilot made a successful escape by bailing out and parachuting into the ocean.²⁸⁸ The two other planes were damaged and crash landed behind enemy lines. The Vichy French captured the downed pilots. Unaware of their existence and silhouette, the naval gunners had assumed the L-4s were hostile.

American carrier-borne aircraft from the *Santee* attacked an airfield at Casablanca. Before Operation TORCH, these American carrier pilots failed to log the minimum requirement of two hundred hours of training in the F4F Wildcat. Even worse, some had conducted only twenty-five carrier landings far short from the usual fifty.²⁸⁹ Others in the group had accomplished only eighteen carrier landings on the carrier *Santee*. At sea, they spent the last two weeks before the battle not flying.²⁹⁰ Despite their pilots' insufficient flight training, the Wildcats successfully assisted the ground forces in capturing the airfield by clearing the air threats strafing ground defenses and parked aircraft. As a whole, the flight of Wildcats managed to destroy eight of ten French aircraft on the ground, in addition to setting fire to the surrounding hangers. They, however, failed to conserve fuel. Although their commanders instructed them to return to the

²⁸⁷ Raines, 24.

²⁸⁸ Raines, 27.

²⁸⁹ Barrett Tillman. *The Wildcat in WWII* (Annapolis: The Nautical & Aviation Publishing Company, 1983), 170.

²⁹⁰ Tillman, 170.

carrier once their fuel dropped below the minimum level, the airmen ran their fuel tanks so low that they had no choice but to land on the airbase they had just attacked.

The Army Air Corps fared no better, as it suffered great losses due to mishaps. According to the American after action reports of the 33rd Fighter Group, accidents occurred frequently during the operations on November 8th and 9th. These documents reveal that the 58th, 59th, and 60th groups lost a total of twenty-seven aircraft during the initial stage of the operation.²⁹¹ Pilot error was attributed to eight of these recorded losses. In specific individual report accounts, the pilots blamed the loss of their aircraft to unsatisfactory runway conditions. In contrast, five Navy Wildcats piloted by more experienced aviators touched down safely on the same airfield.²⁹² The pilots taxied their planes over to the enemy's fuel depot to gas up. During takeoff, however, three of the five planes crashed.²⁹³ Carrier pilots normally took off assisted by a head wind, with their ship turned into the wind before launch, negating the need for a cross wind takeoff. This was another example of rushed and incomplete training taking its toll. Non-combat casualties far exceeded those caused in combat by the enemy. Operational losses accounted for twenty-three Wildcats on the first day of TORCH, with more losses following during the operation.²⁹⁴

Many Americans were so eager to fight and proud that they flew sorties in formations consisting entirely of inexperienced pilots. By late November, only half of the American planes in North Africa were air worthy; nearly half of the Allied planes lost in

²⁹¹ "Aircraft Lost and Damaged by Cause for Period 1942" 33rd Fighter Group Operational History Vol. 1 10 November 1942- 29 February 1944 Mediterranean Theater of Operations. National Archives and Records Administration College Park Maryland. January 31, 1945.

²⁹² Headquarters 33rd Fighter Group 58th, -59th-60th Squadrons A.P.O 210 individual after action report records, November 10, 1942. National Archives and Records Administration College Park, Maryland, 1942.

²⁹³ Monro MacCloskey. *Torch and the Twelfth Air Force* (New York: Richards Rosen Press, 1971), 116.

²⁹⁴ Tillman, 174.

North Africa were due to crashes and accidents caused by pilot error.²⁹⁵ According to an article in *Yank, the Army Weekly*, American aviation training accidents often occurred. It revealed that General Henry H. Arnold, the commanding general of the U.S. Army Air Force, admitted this. Due to the need for secrecy, he had not revealed the full extent of these mishaps. Instead, he conveyed to the press a mythical figure that claimed a decreased training accident rate: ninety-five out of one hundred pilots, he asserted, completed their twelve months of aerial training unharmed.²⁹⁶ In *Army at Dawn*, Rick Atkinson described the Allied Air command as “disorganized, poorly coordinated, and split by rivalry and national chauvinism.”²⁹⁷

Elsewhere, the RAF tried to ease the American pilots into combat by inserting a few of them into unit flights of British aircraft. The British felt that the American Air Forces diluted the strength of their battle-tested and effective Desert Air Force air arm as the two forces integrated. The common British perception of their American counterparts included such adjectives as “inexperienced,” “overconfident,” and “stubborn.”

American pilots did not share the level of exposure of RAF aviators. The British had endured and survived years of war while America remained neutral. The Americans did not replicate the same level of proficiency and familiarity of the battle-tested British aviators. To the fresh American pilots, war was an unknown, often either frightening or romanticized. Since they had yet to experience combat, no coping mechanisms were in place to deal with the emotional trauma of warfare. A few of the new Wildcat pilots appeared fearful when entering combat against the Vichy French. One of these,

²⁹⁵ Atkinson, 184.

²⁹⁶ Ralph Boyce. Report From Gen. Arnold: “A Few Interesting Factual highlights from the Recent Comprehensive 62 page report of the Commanding General of the U.S. Army Air Forces to the Secretary of War.” New York: *Yank, the Army Weekly* (January 28, 1944, Vol. 2, No. 32), 9.

²⁹⁷ Atkinson, 184.

Lieutenant (J.G.) Charles Shields, confessed to the other pilots in his flight, “Gosh, I’ll never forget the fright I had when those Vichy boys were peppering me, and I could hear the bullets smacking against the armor plate, a decidedly insalubrious experience.”²⁹⁸

Insufficient training left American pilots mentally unprepared for combat.

Pilot mistakes continued to plague the American air arm. The Twelfth Air Force suffered many wrecks due to pilot error during Operation TORCH. On November 10, 1942, the US Naval escort carrier the *Chenango* launched 78 AAF P-40s to commence air operations from the newly acquired air field at Port Lyautey, Morocco.²⁹⁹ Seventeen American P-40s out of a group of fifty-eight crashed while attempting to land on their airfield, located near Casablanca, on November 10, 1942.³⁰⁰ This group lost another plane the next day, also from a failed landing. These mishaps were attributed to pilot inexperience.³⁰¹ On the same day the Army Air Corps attempted to launch P-40s from an American carrier with disastrous results.³⁰² Out of the seventy-seven planes of the 59th Squadron ordered to fly to Port Lyautey, two crashed on take-off and one simply vanished.³⁰³ The British regarded many of the American P-40 pilots as too green for dogfights; instead these pilots received simpler assignments, such as strafing runs. These missions called for attacks on enemy trucks, roads, bridges, railroads, supply dumps, and gun emplacements. While these tasks presented less risk than engaging enemy fighters,

²⁹⁸ Wordell and Seiler, 295.

²⁹⁹ Roy A. Grossnick. *United States Naval Aviation 1910-1995*. Washington D.C.:Naval Historical Center Department of the Navy, 1997), 121.

³⁰⁰ Ken Rust. *Twelfth Air Force Story* (Temple Bay: Historical Aviation Album Publication. 1975), 7.

³⁰¹ Rust, 7.

³⁰² Robert Baker Jr. *Headquarters 33rd Fighter Group 58th-59th-60th Squadrons APO 210 After Action Report* (National Archives and Records Administration College Park, Maryland), November 1942.

³⁰³ Robert Baker Jr. *Headquarters 33rd Fighter Group 58th-59th-60th Squadrons APO 210 After Action Report* (National Archives and Records Administration College Park, Maryland), November 1942.

they too generated casualties. Colonel Peter McGoldrick died during one of these lower risk assignments.³⁰⁴

Although under-training contributed greatly to American air arm casualties, equipment was also to blame. The aircraft in America's arsenal in late 1942 were unsuited for combat against the Luftwaffe. The underpowered P-40 and the untested P-38 Lightning were the signature aircraft flown in late 1942 by the American Twelfth and Fifteenth Air Forces. The P-40 Warhawk could not compete with the latest version of the Messerschmitt BF-109. P-40 pilot Colonel Baseler commented: "A P-40 couldn't outrun a Messerschmitt, couldn't out-climb one, so you got bloody old having to wait for the other guy to get tired before you could go home."³⁰⁵ These shortcomings presented American pilots with a challenging learning curve before new and better performing aircraft came into service.

After ground troops captured enemy airfields under the cover of naval fighter aircraft, the Army Air Corps moved in. The achievements and performance of the American Twelfth Air Force in the official AAF Guide are highly inflated and misleading. This primary source exaggerates the effectiveness of the Twelfth Air Force. It claims that the Twelfth Air Force played a decisive role in relieving the dangerous situation at Kasserine Pass. In fact, while Rommel's veterans slaughtered American forces in the February 1943 Battle of Kasserine Pass, the Air Force played no useful role.³⁰⁶ The official AAF guide indicates that there was an inherently biased view to portray the American air units in a positive light. The document further claims that, in a three month period starting in November of 1942, the Twelfth Air Force destroyed more

³⁰⁴ Ernest R. McDowell. *The P-40 Kittyhawk* (New York: Arco Publishing, 1968), 18.

³⁰⁵ McDowell, 20.

³⁰⁶ Official AAF Guide, 287.

than four hundred enemy planes.³⁰⁷ Their total operations, in combination with the Fifteenth Air Force, ranging from November 1942 to March 1, 1944, included 199,179 total sorties flown. On these missions, Allied planes dropped 106,567 tons of bombs. The two air forces lost 1,473 planes in aerial combat while allegedly shooting down 2,959 enemy planes.³⁰⁸ The government manipulated and inflated these numbers by including probable and suspected kills in the totals. It also omitted the cases of airplane losses attributed to mishaps and accidents, which distorted their statistics. The accounts of losses from primary journals reveal the number of casualties were far greater than portrayed in the official records.

Contemporary records purposefully manipulated numbers to record a ratio of more enemy planes destroyed than American losses. When this evidence is contrasted with primary documents, we see a much different picture. The pilots over-inflated numbers by including claims of probable kills and exaggerations. The list of planes lost does not entirely explain the cause of these casualties. As revealed in the diaries of both American naval and air corps pilots, inexperience or mechanical failure directly contributed to the loss of many American planes.³⁰⁹ Many pilots, unable to find their carriers, ran out of fuel and ditched their planes in the ocean. The escort carrier *Santee* alone lost six aircraft due to mishaps and more to others reducing its fighter force to nine operational aircraft.³¹⁰ Other pilots crashed into carrier decks, damaging or destroying their aircraft. These losses contributed to American setbacks. Accidents related to

³⁰⁷ Official AAF Guide. 287.

³⁰⁸ Official AAF Guide, 287.

³⁰⁹ Lieutenant General Lewis H Brereton, *The Brereton Diaries 3 October 1941-8 May 1945* (New York: William Morrow, 1946), 173.

³¹⁰ Lambart, 22.

inadequate training and pilot error continued to plague American pilots of the Army Air Corps and the Navy after the North Africa invasion.

On November 14, 1942, headquarters tasked a squadron made up of twelve American P-40Fs to assist a ground attack on Rabat. The squadron consisted of J Squadron replacements that lacked any combat experience. Second Lieutenant Marvin Carpenter, one of the P-40 pilots, got separated from his squadron and, due probably to his insufficient navigational training, never returned to base.³¹¹ On November 19, eleven days after the initial invasion, Second Lt. Kenneth R. Smith died when he crashed his damaged P-40 Wildcat after colliding in the air with a fellow countryman, whose pilot's plane luckily survived.³¹² The American Air Forces did not immediately record these numbers because losses that resulted from accidents reflected negatively on the naval air arm's reputation, and they deemed such losses unrelated to combat. This information further illustrates American air units' unpreparedness for combat and its excessive numbers of accidents and losses.

Beyond America's unpreparedness in flight training, air tactical doctrine was so seriously flawed that American fighter planes provided little support to ground units. However, the mere sight of airplanes over the battlefield increased morale among ground units. As long as the troops recognized planes bearing their country's markings flying overhead, they drew comfort. Often, however, these planes were on reconnaissance missions.³¹³ The RAF conducted an offensive air campaign over Libya in late 1942 that

³¹¹ Robert Baker Jr. *Headquarters 33rd Fighter Group 58th-59th-60th Squadrons APO 210 After Action Report* (National Archives and Records Administration College Park, Maryland), November 1942.

³¹² Robert Baker Jr. *Headquarters 33rd Fighter Group 58th-59th-60th Squadrons APO 210 After Action Report* (National Archives and Records Administration College Park, Maryland), November 1942.

³¹³ Morley-Mower, 74

crippled Axis forward ground positions. This cleared the way for the British 8th Army.³¹⁴ In contrast, American air support for the ground units often failed to materialize. On the rare occasions when planes did support ground troops, they sometimes mistook friendly troops for the enemy.

Air coverage almost remained non-existent for the American ground troops in the desert. United States air units often failed to coordinate with ground units. American troops landing on the eastern beaches of French Algeria in Operation TORCH dealt with German aircraft after they moved toward Tunisia. German dive bombers constantly tormented American ground troops. When friendly aircraft appeared over American troops at Medjez-el-Bab, a major instance of “friendly fire” occurred. The battered company of American tank destroyers at first welcomed the sight of eleven twin-boomed P-38 Lightnings at first, until their pilots swooped down and executed five strafing runs, almost completely destroying the unit. The strike killed five soldiers and wounded sixteen. It obliterated most of the company’s vehicles and antitank weapons.³¹⁵ The pilots flying the Lightnings failed to recognize their own troops, even though the soldiers gleefully waved and cheered from the ground. A properly trained and experienced pilot could identify the silhouettes of his own nation’s tanks and equipments. Again, American pilots lacked this knowledge. As the ground units advanced against the enemy, they expected support from coordinated allied air cover. Tragically, American pilots failed to coordinate with these ground forces. The Stuka, an aircraft highly vulnerable to enemy fighters attacked Allied ground units unopposed.

³¹⁴ Russell Hill. *Desert War*. (New York: Alfred A Knopf, 1942), 144.

³¹⁵ Rick Atkinson. *An Army at Dawn: The War in North Africa, 1942-1943* (New York: Henry Holt, 2002), 201.

The number of American accidents and cases of friendly fire continued to increase during the North African campaign. On February 3, 1943, American planes bombed the United States' supply train at Sened Station in Tunisia. Based on this incident, British Air commanders commented in disgust that American pilots proved to be both poor map readers and ineffective bombers. Not only did the American pilots mistakenly strike their friendly target, their aim was so inaccurate that they missed by five hundred yards.³¹⁶ These continuing incidents underscored the United States Army Air Force's poor state of preparedness for the campaign. Mistakes resulting so frequently from inadequate training and other factors cost American lives and hampered Allied efforts.

American air units made many mistakes during Operation TORCH. They failed to coordinate their efforts with those of the land forces. In contrast, the British understood the importance of communication and cooperation between army and air units. British Army generals visited RAF bases to ensure that base commanders were effectively providing cover for ground troops. The army required the RAF to perform reconnaissance missions over forward enemy positions, provide tactical air support, and attack enemy supply lines. The commander of the British Eighth Army possessed the authority to command air missions. On November 26, 1941, the Eighth Army's commanding general, General Cunningham, tasked RAF's No. 451 Squadron to strike targets.³¹⁷ RAF commanders, in conjunction with the Army generals, designed sorties in North Africa to help the army. As experts analyzed photographs of the target areas of interest, they provided feedback to the RAF. This method proved effective in the desert.

³¹⁶ Atkinson, 316.

³¹⁷ Morley-Mower, 145.

The dangers and suffering associated with war shocked many ill-equipped, green American pilots. Fates of downed pilots included burning to death, stranding in the desert, or drowning in the Mediterranean. Atkinson recognized that the poor performance of American servicemen in Operation TORCH called for a response by Allied leaders. Eisenhower acknowledged this situation and unified his administration towards a common goal: compensating for casualties and clearly executing the agreed directive.³¹⁸ Operation TORCH and the subsequent fight in eastern Algeria and Tunisia gave American pilots the opportunity to learn from their mistakes and adapt new techniques and skills. The performance of the American air forces parallels Rick Atkinson's negative assessment of the ground units' shortcomings in Operation TORCH. Poor training and inexperience led American air and ground units to perform poorly in Operation TORCH. Inadequate equipment contributed to this. The American army outfitted units with lightly armored outdated tanks, and the Air Corps flew underpowered aircraft. American tanks and anti-tank guns could not easily penetrate enemy armor with their shells, and most American aircraft could be easily outmaneuvered and overtaken by enemy fighters. In addition to insufficient equipment, troops and pilots suffered from inadequate training.

According to Eisenhower, TORCH provided a learning experience as well as a baptism by fire for American airmen. Eisenhower reflected on this when he wrote: "TORCH revealed profound shortcomings in leadership, tactics, equipment, martial élan, and common sense."³¹⁹ His words revealed the truth of the situation. The American military entered TORCH severely unprepared and poorly organized. American

³¹⁸ Atkinson, *Ike's Dark Days*, 49.

³¹⁹ Rick Atkinson. "Ike's Dark Days." *U.S. News & World Report*, Vol. 133, 16, October 28, 2002, 42.

coordination and use of air power did not meet expectations of the Allied Command. The American generals radically overhauled their tactics and relations between air and ground forces based on lessons they learned from TORCH. General Hap Arnold established a new air doctrine of tactics derived from the mistakes and lessons of TORCH. In his Field Manual 100-20, published on July 21, 1943, he stated the basic principle that land and air power existed as co-equal independent forces. He stressed the importance of achieving air superiority, as it played an important role in protecting ground forces.³²⁰

Britain and America recognized the importance of Allied cooperation and their leaders discussed methods for future improvement. During Operation TORCH, the British and American air units and commands failed to work together. America's attempts at aerial reconnaissance and air artillery observation largely failed. Communication during TORCH was erratic and slow. To remedy this problem, the Americans applied the wireless telegraph to the battlefield.³²¹

Due to their usefulness in the desert, the fighter bombers played a key role. The planes had the capability of attacking enemy airfields as well as enemy fighters. In order to achieve effective use of its fighter bombers, command needed to employ battle trained pilots. The Allies found strafing attacks to be costly due to exposure to ground fire, as well as the higher a probability of collision at such low altitudes. After their initial landings in Northwest Africa, the Allies depended on their air power to push into Tunisia. The Twelfth Air Force suffered 2,000 aircrew casualties in the Tunisian campaign, which

³²⁰ MacCloskey, 179.

³²¹ MacCloskey, 178.

began on November 12, 1942, and ended on May 13, 1943.³²² These numbers included 404 pilots killed, 423 wounded, and 1,173 captured or missing throughout the campaign. American land forces suffered 11,984 casualties, with 1,986 soldiers killed.³²³

Combat usually developed survival instincts and tactics in the pilots, traits unobtainable any other way. After Operation TORCH, air operations continued in the desert, and American pilots gained experience. Even so, they still required British assistance. In Cairo, on June 11, 1943, Air Chief Marshal Tedder ordered three more American air groups to join the Ninth Air Force. The RAF deployed six additional flights to patrol the area to add security for the American 9th Air Force.³²⁴ The British strongly believed that the Americans needed extra support, as evidenced by their poor performance in Operation TORCH. General Dwight D. Eisenhower hoped exposure to combat would develop the fighting spirit of American ground troops and pilots.³²⁵ In reality, American air units continued to suffer from numerous accidents.

These setbacks contributed to the low expectations shared among the leaders of the American air forces. General Doolittle viewed the appalling losses suffered by the American Twelfth Air Force in an after action report on November 30 with disappointment but not surprise. It reported eight planes shot down by enemy aircraft, twelve destroyed by friendly and enemy ground fire, and an unprecedented forty-nine planes lost to accidents and unknown causes.³²⁶ Doolittle admitted that he expected that “wastage from crashes, disappearances, and internments would be high in TORCH.”³²⁷

³²² MacCloskey, 181.

³²³ Atkinson, 536.

³²⁴ Brereton, 189.

³²⁵ Rick Atkinson. *Army at Dawn* (New York: Henry Holt, 2002), 249.

³²⁶ Craven, 121.

³²⁷ Craven, 121.

Knowing the consequences of sending an inexperienced air force into battle, Doolittle understood that it was the only available option.

Conclusion: Lessons Learned

In contrast to the highly trained and experienced RAF pilots, American airmen, especially those who flew fighter aircraft during Operation TORCH, were inexperienced and unprepared to such an extent that accidents and mishaps occurred. My research augments Rick Atkinson's work, *An Army at Dawn*, the first part of his Liberation Trilogy. In many ways these two arguments parallel each other. While my discussion is centered on aircraft, Atkinson's work discussed ground forces. Much in the same way as American airmen, Atkinson concluded that the American ground forces' unpreparedness and insufficient training caused poor performance and unnecessary casualties during the opening day of Operation TORCH, starting with the initial invasion on November 8, 1942. Atkinson laid particular emphasis upon the frequent American calamities that occurred throughout the operation. He concluded that these incidents influenced a rethinking of American strategy and its implementation in modern warfare. I have taken his premise and applied it to the American air units involved in the opening days of TORCH and their performance. Most specifically, the U.S. Navy's carrier launched F4F Wildcats, P-40s, and the few P-38 Lightnings flying for the United States Army Air Corps. I also include in my analysis the performance of ill-fated L-4 observation planes, which could not fully fulfill complete their mission, are also included in my analysis.

My conclusion also parallels that of Atkinson, in explaining why the Army Air Corps and the United States Naval aviators, who experienced so many losses attributed to pilot error, inexperience, and faulty training. Samuel Elliot Morrison's meticulously detailed work on the actions of the Navy provided a solid resource for the full understanding of the aircraft carriers' role in the operation which launched the Wildcats.

Morrison provided empirical evidence that allowed me to arrive at my conclusions. This work also served as a reference for locating the specific squadron numbers which led me to the archival records. These records contained after action reports, which documented the overwhelming number of accidents involving the aircraft based on the carriers. Norman Gelb's findings highlighted the half trained and deficiently equipped quality of American Forces going into Operation TORCH. Information taken from after action reports further solidified my hypothesis.

Based upon a wide variety of primary sources, including the original after action reports, accounts from the VF-41, VF-9, VF-26, VF-28 Squadrons of F4F Wildcats, and diaries of Wildcat pilots flying combat sorties, I conclude that American pilots were not ready for combat on November 8, 1942. In order to place into context the American pilots' unpreparedness, I turned to British pilots' experience and training to offer a contrast. I examined the casual factors behind the pilots' deficient performance by comparing the fighter pilot curriculum materials and pilot training textbooks of the American air forces to their British RAF counterparts' more refined and detailed training texts and training materials. I drew upon a wide array of secondary, primary, photographic, and oral sources. These primary materials, key secondary sources, records of the training facilities, and pilot and cadet safety magazines uncovered the severity of training mishaps, as well as the substandard level of American pilot training when compared the RAF's battle tested methods.

My research and thesis fits into the scholarship on Operation TORCH and the war in the Mediterranean. They provide a fresh look at the Air Forces involved and the ill-

trained state of the American pilots. My thesis falls into a consensus with other works on the subject, especially Atkinson's, which agree that the American Military endured mistakes because of their unpreparedness. American aviation during Operation TORCH suffered from rushed and inadequate training, parallel to the shortcomings of ground and naval forces, as described by secondary sources. Just as Atkinson demonstrated that America's ground troops were tested prematurely, during TORCH and the subsequent North African campaign, aviation at sunrise fared no better.

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Finholm, Scott. Librarian & Audio/Video Archivist, The Museum of Flight, Seattle WA, April 5, 2010.

Little, John. Assistant Curator & Research Team Leader, The Museum of Flight, Seattle WA, April 6, 2010.

Mark R. Sumner. WWII Veteran US Airborne Infantry Battle of The Bulge, National Holocaust Museum, Washington, D.C., April 17, 2010.

Harrison, Ben World War II Navy, retired, March 23, 2010. Served during 1943 in the United States Navy.

Research Institutions

Canadian Museum of Flight, Langley Airport, Langley, B.C., Canada.

Kenneth H. Dahlberg Military Aviation Research Center. Museum of Flight, Seattle, WA.

Maxwell Air Force Base. Air Force Historical Research Agency, Research Division, Organizational History Branch.

Museum of Flight Research Center, Harl V. Brackin Library & Archives, Seattle, WA.

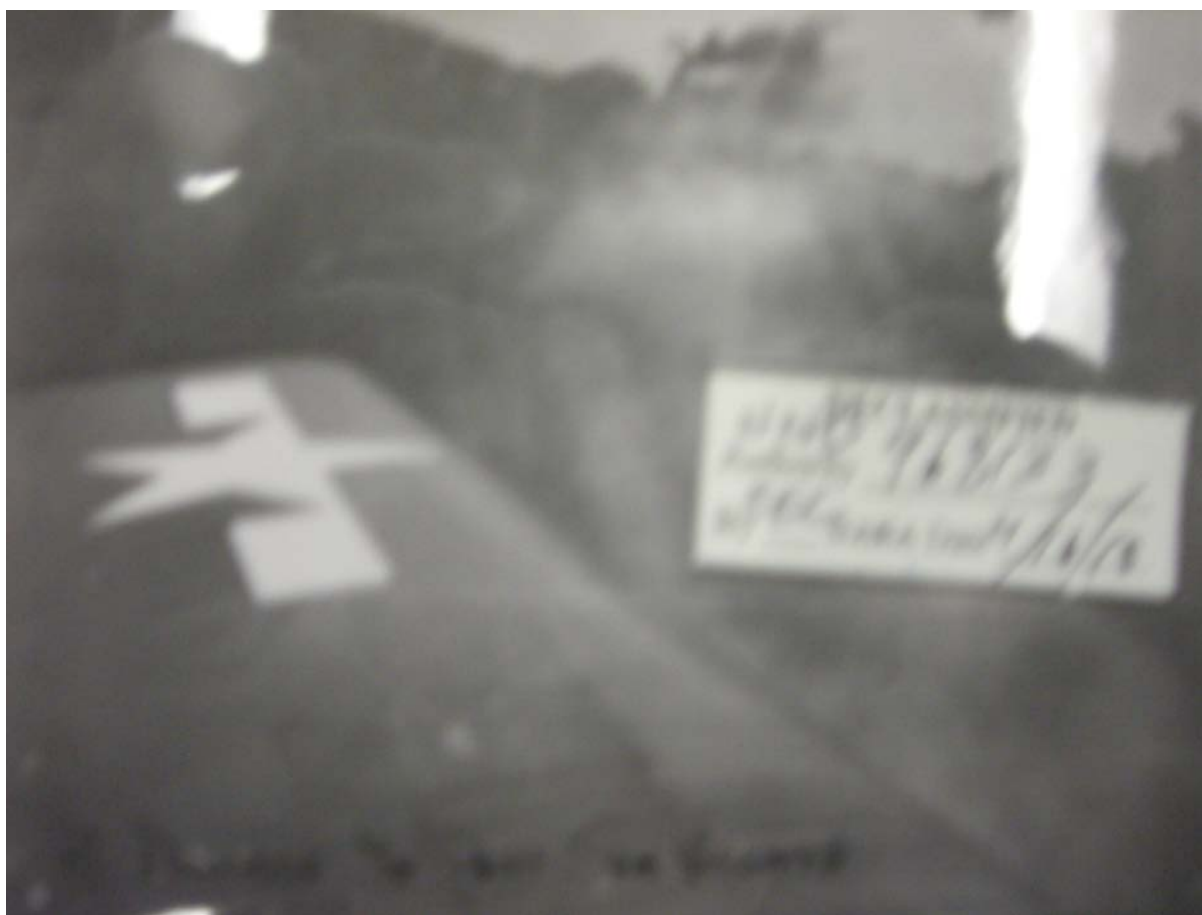
National Archives at College Park, College Park, MD.

National Air and Space Museum, Steven F. Udvar-Hazy Center, Virginia.

Smithsonian National Air and Space Museum, Washington, DC.

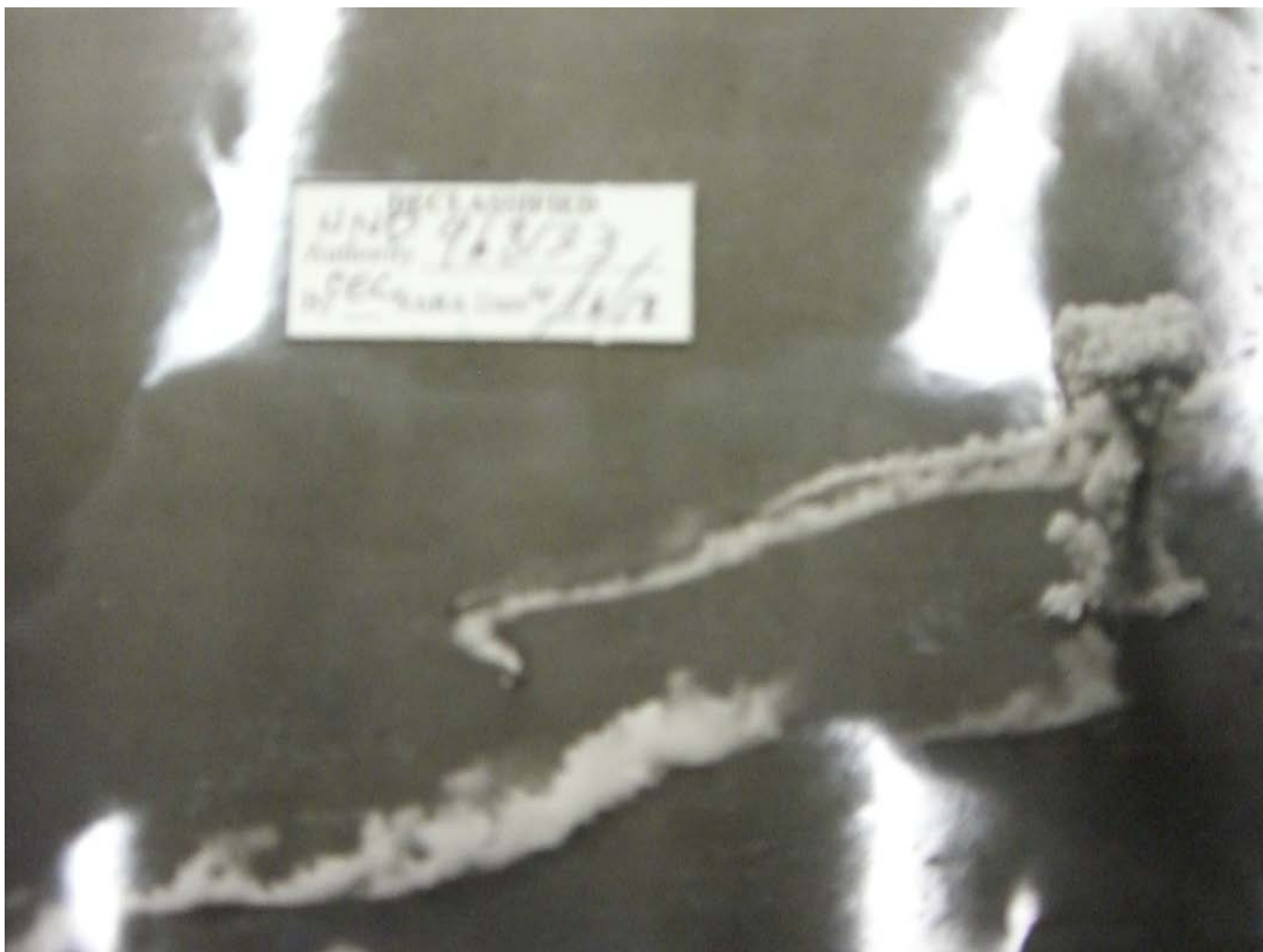
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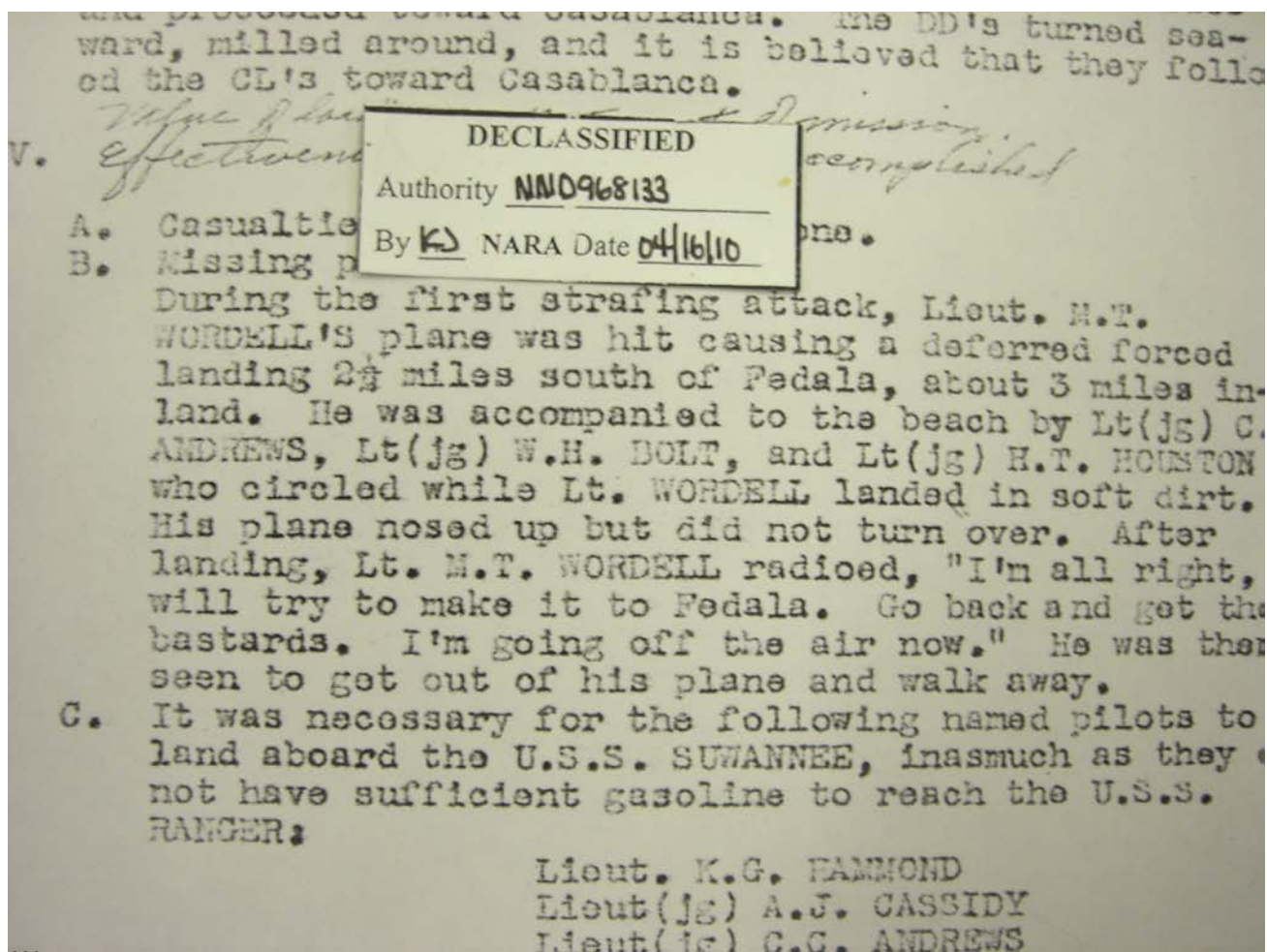
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³²⁸ Fighting Squadron 41 VF41 Reports November 24, 1942. WWII Action of Operation Reports. RG 38. NACP.



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³²⁹ Fighting Squadron 41 VF41 Reports November 24, 1942. WWII Action of Operation Reports. RG 38. NACP.



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Mishap Report of incidence when Lt. Wordell mismanaged fuel and was forced to land on the mainland.

³³⁰ Fighting Squadron 41 VF41 Reports November 24, 1942. WWII Action of Operation Reports. RG 38. NACP.



Italian Macchi C.202 Folgore fighter used in North Africa Photo taken by Ryan Evans
Smithsonian National Air and Space Museum April 2010



Supermarine Spitfire Photo taken by Ryan Evans Smithsonian National Air and Space Museum April 2010



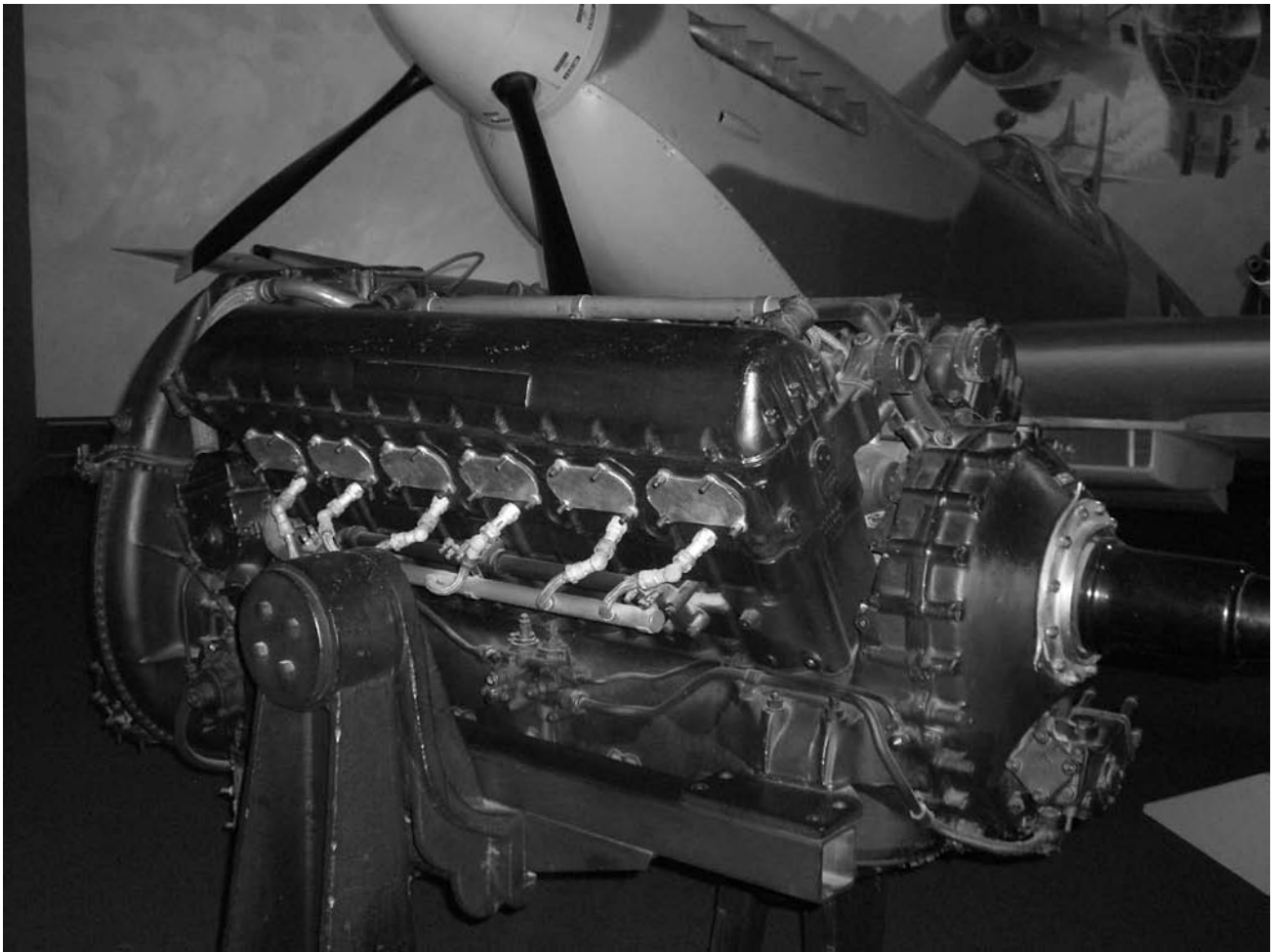
Messerschmitt BF-109 Photo taken by Ryan Evans Smithsonian National Air and Space Museum April 2010



Grumman F4F Wildcat Photo taken by Ryan Evans Smithsonian National Air and Space Museum April 2010



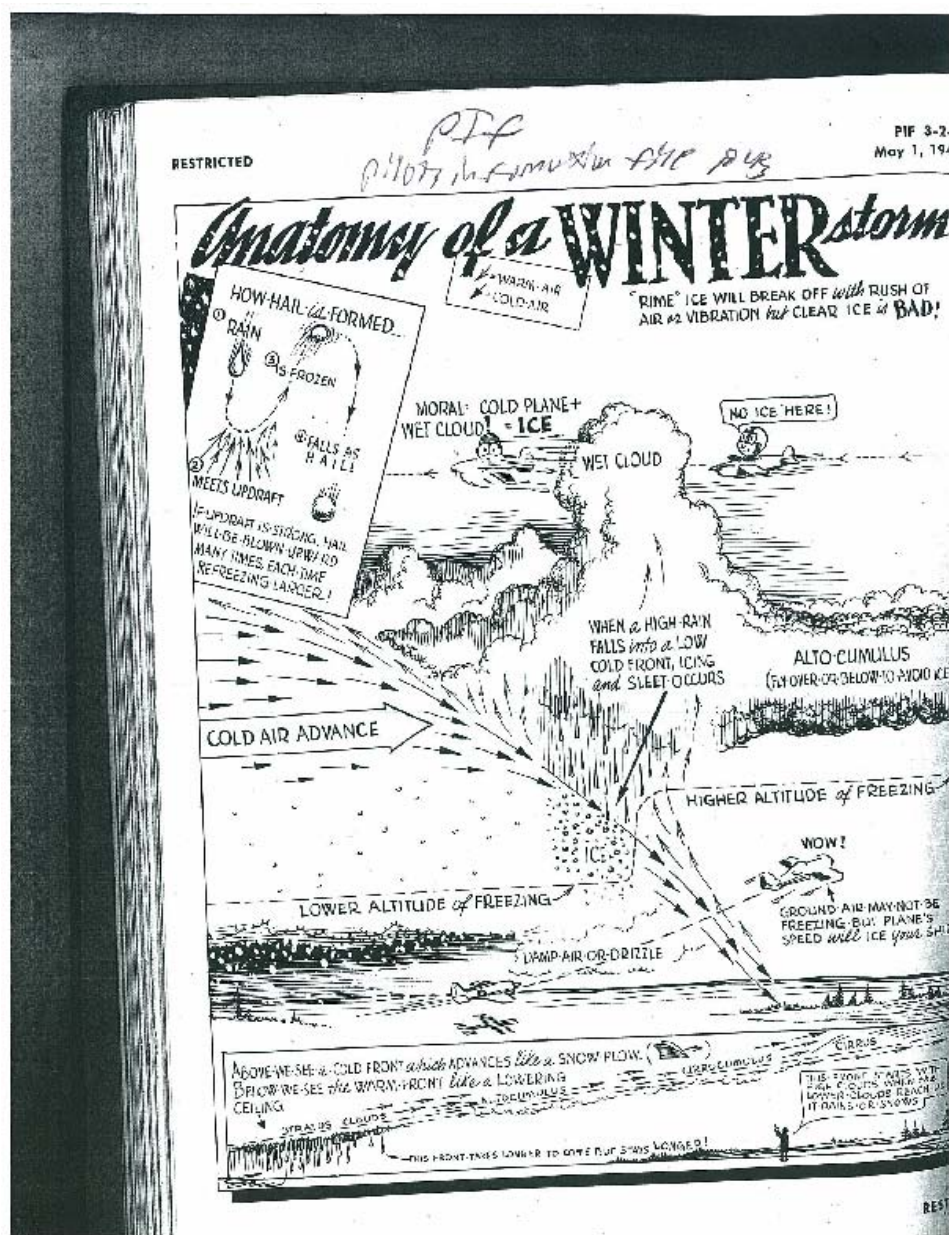
Grumman F4F Wildcat Photo taken by Ryan Evans Smithsonian National Air and Space Museum April 2010



Spitfire's Rolls-Royce Merlin Engine Photo taken by Ryan Evans Smithsonian National Air and Space Museum April 2010



P-40 Warhawk Photo Credit Ryan Evans National Air and Space Museum Steven F. Udvar-Hazy Center, Virginia.



Later, after TORCH, American manuals became more elaborate in instructing maneuvers in weather and later taught how to correct the mistake made by pilots in knowledge of crosswind takeoffs and the mechanics of weather.

PIF 1943³³¹

³³¹ A.A.F. Regulation NO. 62-15 *Flying Safety Pilots information file*. War Department Headquarters Army Air Forces. Washington DC. April 9, 1943.

U.S. Navy Air Combat Casualties Operation TORCH

Name/Rank	Air Unit	Date	Remarks
Lt. (j.g.) S.M. Amesbury	VF-9	11/9	KIA
Lt. (j.g) Charles V. August	VF-41	11/8	Parachuted, POW
ARM Geo. Biggs	VS-41	11/8	KIA
Lt Cdr. John T. Blackburn	VGF-29	11/8	Ditched, rescued
ARM Durward Balkley	VGS-29	11/8	Wounded
Lt. (j.g) G.M. Braun	VF-9	11/8	Ditched, wounded, rescued
Lt. G.H. Carter	VF-41	11/8	Ditched, wounded, rescued
AOM Jack Carter	VGS-27	11/10	KIA
Ens. A.B. Conner	VF-41	11/8	Ditched, rescued
Ens. Charles Dougherty	BB. Mass	11/8	Shot down, POW
Ens. Charles Duffy	VS-41	11/8	KIA
ARM Robt. C. Ethridge	BB Mass	11/8	Shot down, wounded, POW
Ens. Alfred Fecke	VGF-29	11/10	Force landing Safi, nosed over damaged plane on landing
Ens. Uncas Fretwell	VGF-29	11/8	Force landing Safi, nosed over
Lt. T.A. Grell	VF-41	11/8	Ditched rescued
AOM Walter Gorka	VGS-27	11/10	KIA
Lt. (j.g.) Mayo Hadden	VF-9	11/9	Wounded
ARM Alfred Hann	VGS-29	11/8	Crashed takeoff Santee, rescued
AOM Geo. Hinckley	VGS-29	11/10	Wounded
S. Harry P. Kimball	VGS-29	11/8	Crashed takeoff Santee, rescued
ARM Herman Ludwig	VGS-29	11/8	Crashed takeoff Santee, rescued
ARM Robert K. McConnell	VGS-29	11/9	Wounded
Ens. A.L Menard	VF-9	11/9	Crashed on Ranger

Ens. C.E. Mikronis	VF-41	11/8	Parachuted, wounded, POW
Ens. William P. Naylor	VGF-29	11/8	Force landing Mazagan, POW
Ens. Robt. O'Neil	VGS-27	11/10	KIA
ARM Aubra Patterson	VS-41	11/8	KIA
Ens. Robt. Paterson	VGF-29	11/8	Force Landing Mazagan, POW
Lt. (j.g.) Donald C. Rodeen	VGS-29	11/9	AA, crash landing, wounded, POW
Lt. William Staggs	VGS-29	11/9	Wounded
AMM Enoch Tarsilla	VGS-29	11/9	AA, crash landing, POW
Lt. (j.g.) Chas. A Sheilds	VF-41	11/8	Parachuted, POW
Ens. John Thompson	VGS-29	11/10	Forced landing Safi
Lt (j.g.) Geo. Trumpter	VGF-29	11/10	KIA
Ens. Edward VanVranken	VGF-29	11/8	Force landing Mazagan, POW
Ens. Chas. Warnstaff	VGS-29	11/8	Crashed takeoff Santee, rescued
Ens. T.M. Wihoite	VF-9	11/8	KIA
Lt T.H. Winters Jr.	VF-9	11/8	Wounded
Lt. M.T. Wordell	VF-41	11/8	Crash landed, wounded, POW

U.S. Navy Aircraft Losses All Causes Operation TORCH

Carrier Air Group	Aircraft Type	Number Lost
Ranger	F4F-4	12
	SBD-3	3
	Total	15
Suwannee	F4F-4	3
	TBF-1	2
	Total	5
Sangamon	SBD-3	2
	TBF-1	1
	Total	3
Santee	F4F-4	10
	SBD-3	4
	TBF-1	7
	Total	21
All Carrier Groups	Total	44

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