

Long Range Fighter Escorts: The Essential Defenders of Allied Bombers

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Aerial warfare existed in some form long before the First World War, but it was during the First World War that aerial warfare really became common. The First World War saw the use of bi-planes, tri-planes, and zeppelins as weapons to instil fear, inflict damage, and control the skies. After the First World War had ended it became clear that in future conflicts it would be essential to obtain air superiority. During the interwar period between World War I and World War II, nations including Britain, the United States, and Germany (though later in time due to the restrictions placed upon them in the treaty of Versailles) began to assemble formidable air forces as well as develop air doctrine to prepare themselves for future conflict. The issue was that air warfare at this level was new and strategists lacked the knowledge that we have today. It was a popular belief among the Allied nations that bombers could be sent on missions unescorted and return home safely. This belief was put to the test, and after sustaining high loss rates both the British and Americans came to the conclusion that this logic was flawed. While the British decided to pursue night raids, the Americans focused more on using long-range fighter escorts with their bombers. This essay will determine the impact that long range fighter escorts had on the Allied daylight bombing raids on Germany during the Second World War by examining pre-war doctrine, early war doctrine, late war doctrine, the Hamburg raids in 1943, the two Schweinfurt raids that followed the Hamburg raids in 1943, Big Week in early 1944, the Dresden raids in February, 1945, and two of the American Berlin raids (March 6th, 1944 and March 24th, 1945). Fighter escorts played a crucial role in protecting Allied bombers, and they drastically reduced loss rates on bombing missions. Due to the fact that the British switched their focus to night raids fairly early in the war, this essay will focus primarily on American raids; however, there will be some attention given to the Royal Air Force (RAF) daylight raids that were attempted in the first half of the war.

After the end of the First World War, it was clear that aerial warfare would be a major part of future warfare. Therefore, military strategists began to develop doctrine to be prepared for future conflict. Pre-World War II air doctrine primarily

focused on bombers rather than fighters. This doctrine was based on experiences from the First World War, which, due to technological innovations, did not go well for early strategic bombing operations during the Second World War. Pre-World War II doctrine focused on strategic bombing, and it was thought that bombers could complete their missions and return to base with limited casualties without fighter escorts. The reasons for this were understandable at the time. During the First World War the performance of bombers often exceeded the performance of fighters.¹ Furthermore, radar was not used in the First World War, and ground-to-air communication was difficult, so early detection of bombers and relaying information to fighters was difficult. During the First World War "fighter scouts had to fly sweeps over large areas in the hope of finding bombers—a practice that was difficult in the daytime, and doubly difficult at night. This made it possible, though risky, for bombers to operate without escorts to defend them."²

Of course, as the interwar years progressed, technology became far more advanced. Radar was available during the Second World War and ground-to-air communications were also being used. This allowed defending nations time to scramble interceptors before bombers could reach their target. It also allowed attacks to be better coordinated and more effective.³ According to Gordon Musgrove, air defenses were typically given a 30-minute and 15-minute alert signal.⁴ This was plenty of time for interceptors to get into the air and take up a strategic position to attack the enemy bombers.

¹ David Stubbs, "A Blind Spot? The Royal Air Force and Long-Range Fighters, 1936-1944," *Journal of Military History*, vol. 78, no.2 (2014): 675.

² Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution and American Ideas about Strategic Bombing* (Princeton University Press, 2002), 70.

³ Greg Grabow, *Schweinfurt Raids and the Pause in Daylight Strategic Bombing* (MA Thesis, US Army Command and General Staff College, Fort Leavenworth KS, 2008), 15.

⁴ Gordon Musgrove, *Operation Gomorrah; the Hamburg Firestorm Raids* (London: Ja Publishing Company LTD., 1981), 57.

Aircraft had also become much more advanced during the interwar years, and bombers were no longer superior to fighters. When comparing the statistics of the Messerschmitt (Me) 109, a common German fighter plane, to a B-17 flying fortress, a common American bomber, it is clear that fighters had the upper hand in combat. The Me 109 was faster, much more agile, and could fly higher than the B-17.⁵ The only chance a B-17 without fighter escort stood against a Me 109 was its 11-13 .50 caliber machine gun turrets, though they were not very accurate.⁶ Bombers did have a much farther range than fighters, but this did not help bombers defensively. In fact, it could be argued that it hindered their defense, as this meant that strategists thought that long-range fighter escorts were not feasible. Despite these changes in technology, the British, and later the Americans made the decision that long-range fighter escorts were not necessary or even feasible. They chose to base their decisions on the performance of fighters and bombers from the First World War, as well as the difficulty of increasing the range of fighters. This decision would cost many bomber crews their lives.

After the outbreak of the Second World War, the British wasted no time beginning their bombing campaign against the Germans. At the request of the French government, as well as the President of the United States Franklin D. Roosevelt, the British agreed not to bomb Germany itself, but rather to focus on naval targets. Their campaign involved sending Wellingtons unescorted to bomb their targets.

On December 14, twelve Wellingtons patrolling off the German coast ran into fighters....Five Wellingtons went down and another crashed on landing. The planes that returned home claimed to have shot down one German fighter. The RAF again wrongly attributed most or all of its losses to flak.⁷

That was a loss rate of forty-two percent (fifty percent if the bomber that crashed on landing is included). During the Second World War, any

⁵ Adolf Galland, Karl Ries, and R. Ahnert. *The Luftwaffe at War, 1939-1945* (London: Allen), Appendices; Peter M Bowers, *Boeing Aircraft Since 1916* (Annapolis: Naval Institute Press, 1989), 302.

⁶ Bowers, *Boeing Aircraft Since 1916*, 302.

⁷ Alan Levine, *The Strategic Bombing of Germany*, (Westport, Conn: Praeger, 1992), 22.

loss rate above five percent was not sustainable.⁸ Aircraft production was not at its highest during the early years of the war, so replacing planes and crew was difficult. A loss rate of more than five percent meant that the RAF was losing more planes and crew than they could replace. Though the British suffered an extremely high loss rate, the British decided to try again just four days later. "On December 18th, twenty-four Wellingtons went out. Two turned back; the Germans detected the rest on radar.... Then the German fighters closed in. Only ten returned home; two German fighters went down."⁹ Excluding the two that turned back, the British lost 12 of 22 bombers which is a loss rate of fifty-five percent. "There was no doubt, this time, that fighters had caused the terrible losses. If this episode was typical, daylight attacks on inland German targets without escort would be suicidal."¹⁰ The British knew that they could not continue unescorted daylight bombing raids as these loss figures were not sustainable. Ultimately, the British had three options:

It must give up strategic bombing altogether, use long-range escort, or resort to night bombing. The first choice seemed unthinkable while the second seemed to be foreclosed by fundamental engineering factors. Any fighter carrying enough fuel to accompany bombers to a distant target, it was believed, would be too heavy and maneuverable to deal with enemy interceptors...Night operations seemed the only choice.¹¹

There was, perhaps, another aspect that came into play when deciding how to reduce bomber loss rates. Bernard Boylan suggests that the decision to switch to night raids was made fairly easily because of the British "belief in the effectiveness of area bombing."¹² The British continued daylight bombing raids into 1941, but it soon became apparent that they were fighting a losing battle. The Butt Report was released in 1941, and its findings showed the grim reality of British unescorted daylight bombing. According to the report, only one in five bombers could put their

⁸ Bernard L. Boylan, "The Search for a Long Range Escort Plane, 1919-1945," *Journal of Military History*, vol. 30, no. 2 (1966), 63.

⁹ Galland, *The Luftwaffe at War*, 28; Levine, *The Strategic Bombing of Germany*, 22.

¹⁰ Levine, *The Strategic Bombing of Germany*, 22.

¹¹ Levine, *The Strategic Bombing of Germany*, 22-23.

¹² Boylan, "The Search for a Long Range Escort Plane, 1919-1945," 67.

bombs within five miles of their target.¹³ Obviously changes had to be made.

The British had learned the hard way that unescorted daylight bombing raids would result in high casualties, and they were determined not to let the Americans make the same mistake. The Prime Minister himself addressed Mr. Harry Hopkins, an advisor to President Franklin D. Roosevelt, warning him of the dangers of unescorted daylight bombing raids, and warning him of the urgency of producing Mustang fighters with Merlin and later Griffon Engines. The message, dated 16 October 1942, stated:

I must also say to you for your eye alone and only to be used by you in your high discretion that the very accurate results so far achieved in the daylight bombing of France by your fortresses under most numerous Fighter escort mainly British, does not give our experts the same confidence as yours in the power of the day bomber to operate far into Germany. We do not think the claims of the Fighters shot down by Fortresses are correct though made with complete sincerity, and the dangers of daylight bombing will increase terribly once outside Fighter protection as the range lengthens.¹⁴

It was clear that unescorted daylight bombing raids were not feasible. The British had learned this the hard way and they wanted to prevent the United States from suffering the same fate as they had.

Unfortunately, the minds of United States Army Air Force (USAAF) policy makers were clouded by hubris towards the capabilities of their B-17 Flying Fortress bomber. The Americans strongly believed in the defensive capabilities of the B-17 flying fortress. The B-17 had self-sealing fuel tanks and was designed to be able to run on only one of its four engines,¹⁵ which were useful design features in combat as the probability of sustaining damage was extremely high. The B-17 was armed with several machine gun turrets,

¹³ Biddle, *Rhetoric and Reality in Air Warfare: The Evolution and American Ideas about Strategic Bombing*, 1.

¹⁴ Peter Gray, *The Leadership, Direction and Legitimacy of the RAF Bomber Offensive from Inception to 1945* (Birmingham: University of Birmingham Press, 2012), 205.

¹⁵ Raymond W. Wood, "Second Schweinfurt," *Great Raids in History: From Drake to Desert One* (New York: Sarpedon, 1997), 223.

and the thought was that if the B-17s flew in a tight formation they would be able to defend themselves against incoming enemy fighters by unleashing a wall of machine gun fire on incoming enemy fighter pilots. This was what bomber crews were taught during training. Corps Tactical School suggested:

Bombardment formations may suffer defeat at the hands of hostile pursuit, but with a properly constituted formation, efficiently flown, these defeats will be the exception rather than the rule. Losses may be expected, but these losses will be minimized by proper defensive tactics.

The bombardment text in 1935 also stated "escort fighters will neither be provided nor requested unless experience proves that bombardment is unable to penetrate such resistance alone." As one instructor put it, "A well-planned and well-conducted bombardment attack, once launched, can not be stopped." By the late 1930s, the Army Air Corps doctrine in the school accepted assumptions that narrowly focused the role of a self-defending heavy bomber into an operational concept of high altitude, daylight precision bombing based upon the performance differences between the bomber and fighter at the time.¹⁶ This logic was flawed as it was very difficult, if not impossible, for all B-17s to remain in formation once engaged by interceptors. The Luftwaffe had employed rockets on their interceptors, which, while inaccurate, were effective formation busters. Luftwaffe pilots would fire these rockets into bomber formations, which would cause bombers to break off from their formation. Interceptor pilots could then pick them off at will.

Furthermore, flying in formation had its own risks as well, not from interceptors, but from flak. Flak was a ground to air cannon with exploding rounds. If a target was important to the German war effort, it would, at the very least, be protected by flak, and bombers flying in tight formation were much easier to hit as they provided a bigger target as opposed to bombers that were spread apart.¹⁷

Aside from warning the Americans about the necessity of developing long-range fighter escorts, the British also tried to persuade the Americans into joining them in the practice of night raids. This resulted in the Casablanca conference being

¹⁶ Grabow, *Schweinfurt Raids and the Pause in Daylight Strategic Bombing*, 14-15.

¹⁷ Musgrove, *Operation Gomorrah: The Hamburg Firestorm Raids*, 49.

called in January 1943. The purpose of the Casablanca conference was to explore all the possibilities of Anglo-American co-operation, including strategic bombing. Not surprisingly, the Americans and the British did not initially agree. Despite the warnings from the British, the Americans remained adamant that their bombers could penetrate deep into Germany, bomb their targets, and return to base while incurring a minimal casualty rate. Though the Americans refused to join the British in night bombing (likely due to Roosevelt's opposition to area bombing and the Norden bombsight's ineffectiveness in the dark), this stubbornness did present an appealing opportunity. With the British bombing at night, and the Americans bombing during the day, the Allies could be bombing targets in Germany at all times. "The conference agreed that a combined bomber offensive should be the aim."¹⁸ The Casablanca conference was an important step in the Allied bombing campaign during the Second World War as the combined bomber offensive put a massive strain on German air defences.¹⁹

With their now combined offensive, the RAF and Eighth Air Force began to plan their next targets. They decided to attack the German city of Hamburg. The code name for this operation was *Operation Gomorrah*. Hamburg was Germany's second largest city and Europe's largest port.²⁰ Hamburg was of high value to Germany during the Second World War.

The industries in Hamburg were a major factor in German war production and included aircraft plants, a variety of

machinery plants, and shipyards. The latter produced more than a third of all the U-boats built in Germany during the war. It also contained oil plants and refineries which were vital in creating lubricants.²¹

The RAF and Eighth Air Force had a number of serious issues that could have potentially turned Operation Gomorrah into a disaster. The first issue was the serious risk that the Americans were taking. Ignoring all advice from the British, the Eighth Air Force was sending in a fleet of bombers unescorted by long-range fighters in broad daylight. The second issue concerning the United States was that they did not have enough bombers to hit all of the designated targets.²² Furthermore, the RAF was having trouble hitting their targets at night, yet, despite these issues, the raid went ahead as the Strategic Bombing Survey deemed that the potential damage that could be done to Germany would be catastrophic for their war effort.²³ The city of Hamburg was bombed either at night, day, or sometimes both, from July 24th to July 30th 1943 and then again on August 2 to August 3 1943.²⁴ Despite not having fighter escorts, the loss rates for the Hamburg raids were quite low, well below the five percent that was acceptable. Furthermore, most of the city was destroyed. The combination of very dry, hot, windy weather and the incendiary bombs dropped by the Allies created a firestorm that killed an estimated 45,000 people and destroyed approximately fifty-six percent of the city's residential units as well as 436 public buildings.²⁵ The Americans had ignored the warnings from the British by sending in their bombers unescorted during the day, yet unlike the British, they did not suffer the same high casualty rates that the British suffered during the first two years of the war. The reason for this was not the defensive capabilities of the B-17 bomber, but rather luck.

Most of the sorties flown during the Hamburg raids were in perfect weather for bombing. Secondly, there had been issues with the German detection systems. Gordon Musgrove provides an

¹⁸ Musgrove, *Operation Gomorrah: The Hamburg Firestorm Raids*, 48.

¹⁹ David MacIsaac, *Strategic Bombing in World War Two: The Story of the United States Strategic Bombing Survey*. (New York: Garland, 1976), 14-15; Ken Delve, *Bomber Command 1936-1968 An Operational and Historical Record* (Barnsley: Pen & Sword Ltd, 2005) 32; John Buckley, *Air Power in the Age of Total War* (Bloomington and Indianaopolis: Indiana University Press, 1999), 158; Martin Middlebrook, *The Nuremberg Raid* (Barnsley: Pen and Sword Aviation Ltd, 2009), 16-17; R.J. Overy, *The Air War 1939-1945* (New York: Stein and Day, 1980), 73; Biddle, *Rhetoric and Reality in Air Warfare: The Evolution and American Ideas about Strategic Bombing*, 215.

²⁰ Levine, *The Strategic Bombing of Germany*, 59; Musgrove, *Operation Gomorrah: The Hamburg Firestorm Raids*, 48; Horst Boog, Germany and the Second World War in *The Strategic Air War in Europe and the War in The West and East Asia 1943-1944/5* (Oxford: Clarendon Press, 1990), 44-45.

²¹ Levine, *The Strategic Bombing of Germany*, 59.

²² Levine, *The Strategic Bombing of Germany*, 59.

²³ Levine, *The Strategic Bombing of Germany*, 59; Boog, "Germany and the Second World War," 44-45.

²⁴ Levine, *The Strategic Bombing of Germany*, 60-62; Lee Kennett, *A History of Strategic Bombing* (New York: Charles Scribner's Sons, 1982), 146-147.

²⁵ Levine, *The Strategic Bombing of Germany*, 61; David H. Lippman, "Allied Aerial Destruction of Hamburg During World War II," *Historynet.com* (1998).

account of these troubles:

The sirens had sounded at 1440 but it proved to be a false alarm. Suddenly, however, the drone of bomber engines could be heard to the south of the river. There had been no air-raid warning and the defences had not received the usual 30-minute and 15-minute alert signals, nor indeed any advance warning that enemy aircraft were approaching.²⁶

This meant that German interceptors did not have the usual time to get airborne and take up a tactical position to be able to effectively engage the approaching enemy bombers. The issues with the German detection systems can be attributed to the use of WINDOW.²⁷ WINDOW is a defensive tactic which involves tossing stacks of metal foil, which were cut to be about 25cms in length, from the bombers while they were in the air.²⁸ These pieces of metal appeared on radar, making it near impossible for radar operators to locate planes. This helped to contribute to the success of the Hamburg raids; however, it did not take the Germans very long to figure out how to deal with WINDOW. Though the use of WINDOW proved to be effective, it cannot be solely credited for the survival rate of the bombers.

Both the Americans and the British were lucky in terms of the number of fighters that were available in the area, which were surprisingly low. Given the importance of the city of Hamburg to the German war effort, one would think that the city would have been protected by large numbers of fighters. The bombing of Hamburg definitely did not help to reinforce the notion that the Americans needed to develop and implement long-range fighter escorts, but luck would not always be on their side, as proven by the Schweinfurt raids.

The Americans had planned two separate raids on Schweinfurt and Regensburg, code name: Operation Pointblank. The Americans suffered horrific losses on both of these raids. The cities of Schweinfurt and Regensburg had factories that produced large numbers of ball bearings. Ball-bearings were essential components of machinery, particularly in their engines of vehicles such as trucks, tanks and air planes. It was thought that if the RAF or the Eighth Air Force could eliminate

the German supply of ball bearings, or at least severely hinder it, then they would reduce the number of German aircraft in the sky and the Allies would then gain air superiority. For this reason, Schweinfurt and Regensburg were chosen as targets. Schweinfurt was attacked two separate times. The first Schweinfurt raid took place on August 17, 1943 and the second, known as Second Schweinfurt, took place on October 14, 1943, a day that became known as 'Black Thursday'.²⁹ The first raid consisted of 376 unescorted bombers dispatched and 315 that found their target. Of the 315 bombers that left for Schweinfurt and Regensburg, 60 were lost due to the Luftwaffe.³⁰ This translates to a loss rate of approximately nineteen percent. Despite the high loss rates, the Eighth Air Force decided to try raiding Schweinfurt again in the month of October. This time, the bombers were escorted by fighters; however, they were not yet equipped to be long-range fighter escorts (i.e. no drop tanks). Therefore, they had to turn back before the bombers reached Schweinfurt. The results of second Schweinfurt were even more grim than the first raid. Out of 291 B-17s that left for Schweinfurt, 60 were lost.³¹ This translates into a loss rate of approximately twenty-one percent. Initially, these numbers were not known to the Eighth Air Force, but once they were, Ira Eaker, commander of the Eighth Air Force, knew that changes had to be made, as they showed the harsh reality of the consequences of sending bombers into enemy air space unescorted by long-range fighter escorts. The findings of these statistics were that "unescorted bombers took seven times the loss plus two-and-a-half times the damage and the final assessment revealed that Eighth Bomber Command experienced the loss of one-third of its heavy bombers each month."³² The accounts of bomber crews who flew in the Schweinfurt raids show the desperate need for long-range fighter escorts. A bomb group commander who flew in the first Schweinfurt mission said, "It was like lining up the cavalry, shooting your way in and

²⁶ Musgrave, *Operation Gomorrah: The Hamburg Firestorm Raids*, 57.

²⁷ Kennett, *A History of Strategic Bombing*, 146; Boog, "Germany and the Second World War," 46.

²⁸ Boog, "Germany and the Second World War," 44.

²⁹ Brian Todd Cary, "Operation Pointblank: Evolution of Allied Air Doctrine During World War II," *HistoryNet.com* (1998).

³⁰ Cary, "Operation Pointblank: Evolution of Allied Air Doctrine During World War II;" MacIsaac, *Strategic Bombing in World War Two: The Story of the United States Strategic Bombing Survey*, 16.

³¹ Cary, "Operation Pointblank: Evolution of Allied Air Doctrine during World War II."

³² Grabow, *Schweinfurt Raids and the Pause in Daylight Strategic Bombing*, iv.

then shooting your way out again."³³ Another had said, "We had no trouble until the P-47s left, then all hell broke loose. Between the Rhine and the target our formations were attacked by at least 300 enemy aircraft."³⁴ Bombers who flew in the Schweinfurt raids faced unnecessarily high numbers of fighters. This should have been expected. After the Hamburg raids, the Germans realized just how vulnerable they were, and took steps to augment their defenses, which the Americans were aware of, however, they were clearly too late to act on it.³⁵ If the Schweinfurt raids had long-range fighter escorts it would have alleviated some of the pressure off of the bombers and likely reduced the number of casualties as well.

After the disastrous Schweinfurt raids, Eaker immediately ordered that all unescorted daylight bombing raids deep into German air space be suspended.³⁶ The Americans would wait until long-range fighter escorts were available and "good weather made the raids viable."³⁷ It would be several months before the Eighth Air force could resume its strategic bombing campaign. During this time, Ira Eaker was relieved of his duty as commander of the Eighth Air Force and was sent to take command of air operations in the Mediterranean.³⁸ Eaker's replacement was Major General James Doolittle. During the first year that Doolittle took over as commander of the Eighth Air force, the issues that prevented the implementation of long-range fighter escorts began to be solved. American productivity was increasing, the battle of the Atlantic was turning in favor of the Allies which made it easier to ship goods produced in America to England, and drop tanks to extend the range of fighters were produced and tested in 1943.³⁹ Perhaps a contributing factor to the long amount of time that it took to develop long-range

fighter escorts was the amount of money invested into the air force. According to the United States Strategic Bombing Survey, the United States only allocated 35% of its war production to its air force, in comparison to 40-50% for Britain and 40% for Germany.⁴⁰

Finally, on the 20th of February, 1944, during 'Operation Argument,' also known as 'Big Week,' the Eighth Air Force was ready to test out their new bombing strategy; bombers escorted by P-38 Lightnings, P-47 Thunderbolts, and P-51 Mustangs. Big Week was a massive combined operation between the United States Strategic Air Forces (USSTAF) and the RAF. "More than 3,800 USSTAF bombers and 2,351 from RAF bomber command dropped between them nearly 20,000 tons of bombs on German fighter factories and associated industries, the British at night, the Americans by day."⁴¹ The purpose of Big Week was to do as much damage to the Luftwaffe as possible by trying to prevent future aircraft from being built and shooting down existing aircraft. The Americans and the British were relentless in their attacks during Big Week. "For six straight days, massive attacks against enemy aircraft facilities and twelve synthetic oil plants resulted in 225 Luftwaffe pilots dead and 141 wounded."⁴² The reason why the Luftwaffe casualty rate was so high during Big Week is because P-51s and P-47s now provided long range escort or bombers and while doing so they were given permission to fly ahead to search out and destroy any enemy aircraft. "The German losses during Big Week equates to about one tenth of their interceptor pilots."⁴³ The loss rates for the Americans were not low either. The Eighth Air Force lost 254 bombers,⁴⁴ which equates to a loss rate of approximately 6.7%. While this is significantly lower than what was expected, this is still a significant loss. Even though Bombers taking part in raids during Big Week did have fighter escorts, their loss rates were still above the early war rate of what was sustainable by almost two percent. At this point in the war, aircraft

³³ Wood, "Second Schweinfurt," *Great Raids in History: From Drake to Desert One*, 229.

³⁴ Wood, "Second Schweinfurt," *Great Raids in History: From Drake to Desert One*, 229.

³⁵ Edward Jablonski, *Air War*, 4 vols. (Garden City: Doubleday & Company, Inc., 1979), 2: 155.

³⁶ Ian Dear, and M. R. D. Foot, *The Oxford Companion to World War II*. Oxford (Toronto: Oxford University Press, 2001), 102.

³⁷ Dear, *The Oxford Companion to World War II*, 102.

³⁸ Biddle, *Rhetoric and Reality in Air Warfare: The Evolution and American Ideas about Strategic Bombing*, 225.

³⁹ Overy, *The Air War 1939-1945*, 150; Biddle, *Rhetoric and Reality in Air Warfare: The Evolution and American Ideas about Strategic Bombing*, 225.

⁴⁰ Anesi, Chuck, *The United States Strategic Bombing Survey*, *Anesi.com*, 1997, 1.

⁴¹ Dear, *The Oxford Companion to World War II*. Oxford, 102.

⁴² David T. Zabecki, *World War II in Europe: An Encyclopedia*. Garland Reference Library of the Humanities. Military History of the United States, vol. 6, (New York: Garland Pub., 1999), 102.

⁴³ Zabecki, *World War II in Europe: An Encyclopedia*, 1508.

⁴⁴ Dear, *The Oxford Companion to World War II*, 102.

production was significantly higher than it was in the first two years of the war, so the sustainability rate was likely higher as well. Still, the fact that even though they had fighter escorts and they still suffered a loss rate above five percent shows that the safety of bombers could not be guaranteed. However, the fact that the loss rate of Big Week was over twelve percent less than the loss rate of Schweinfurt shows the impact that fighter escorts had on reducing the loss rate of bombers. It is also important to remember that Big Week was a week-long event consisting of many raids, whereas the Schweinfurt raids were two large scale raids over two days with several months separating the two. With a sufficient number of long-range fighter escorts equipped with drop tanks now in service, the USAAF decided to launch attacks on Berlin. The USAAF launched several raids on Berlin in a little over a year, including one on March 6th, 1944 and another on March 24th, 1945. The outcomes of these raids varied.

On the March 6th raid, the Americans launched 660 bombers which were escorted by P-47 Thunderbolts and P-51 Mustangs.⁴⁵ The bombers and fighters of the USAAF encountered heavy resistance from Luftwaffe fighters and lost sixty-nine heavy bombers, which is a loss rate of approximately 10.5%. The March 24th raid on Berlin went a little more smoothly in terms of keeping losses low. Despite encountering as many as thirty Me 262 jet fighters, which were much faster than the P-51 Mustang, the more agile Mustangs were able to defend the bombers and keep 139 of the 148 bombers safe, which translates to a loss rate of approximately 6.1%.⁴⁶ Both raids had fighter escorts, yet there were approximately 4.4% more bombers lost during the first raid. This shows that while fighters did help to keep loss rates down, luck was also a contributing factor.

In the last few months of the War, the Allies bombed the German city of Dresden. It is true that during the last few months of the war the Allies had air superiority and Germany was quickly losing the war. According to David Irving, however, this did not make Dresden an easy target. "The fighter force was indeed numerically diminishing, and the fighter crews were tired and reaching breaking point. But the area that they were required to defend was also

rapidly shrinking, and the invading armies rolled the Reich frontiers further and further into Germany."⁴⁷ Dresden was also an important city to Germany during the war. Contrary to popular belief, Dresden was a strategic military target. Dresden was a transportation hub, a node for resupply and sustainment for the eastern front, a communications hub, an armed camp, a host of several factories which produced goods for the German war effort, and it stood in the way of the Russian advance into East Germany.⁴⁸

Dresden was bombed relentlessly by both the RAF and the Eighth Air Force. The RAF made the first two bombing runs over Dresden, and successfully completed their mission without even encountering a single enemy fighter. Fighters were fueled and ready to go, sitting on an air field only five miles away; however, they were never given the order to take off as communications in and out of Dresden were jammed, which was the work of specialized RAF planes outfitted with equipment capable of jamming radar.⁴⁹ The Eighth Air Force was given the task of completing the third bombing run of Dresden. The American bombing run was "the third blow to the city within fourteen hours."⁵⁰

Although Dresden had already been hit hard, the Americans had a bit less luck on their side than the RAF. While the RAF was able to bomb their targets without opposition from enemy fighters due to communication problems, the Eighth Air Force bombers encountered several German Fw 190s. The Fw 190 was second in performance only to the Me 262 jet fighter, and was more than capable of taking down a B-17 flying fortress. "The 356th Fighter Group had an encounter near Chemnitz (about 35 miles outside of Dresden), during which P-51s claimed one enemy aircraft shot down from a pack of twelve Fw 190s."⁵¹ The

⁴⁷ David John Cawdell Irving, *The Destruction of Dresden*. 2nd ed. (London: W. Kinmer, 1963). 105.

⁴⁸ Conrad C. Crane, *Bombs, Cities, and Civilians, American Airpower Strategy in World War II* (Lawrence, KS: University Press of Kansas, 1993), 113; David L. Bashow, *Soldiers Blue: How Bomber Command and Area Bombing Helped Win the Second World War* (Winnipeg: 17 Wing Winnipeg Publishing Office, 2011), 53.

⁴⁹ Bashow, *Soldiers Blue: How Bomber Command and Area Bombing Helped Win the Second World War*, 144-145; Kennett, *A History of Strategic Bombing*, 158.

⁵⁰ Bashow, *Soldiers Blue: How Bomber Command and Area Bombing Helped Win the Second World War*, 148.

⁵¹ Fred Taylor, *Dresden, Tuesday, February 13, 1945*. 1st Perennial ed. (New York: Harper Collins, 2005). 438.

⁴⁵ Jablonski, *Air War*, 4: 61.

⁴⁶ Daniel L. Haulman, "A Tale of Two Missions: Memmingen, July 18, 1944 & Berlin, March 24, 1945," *Air Power History* Vol. 57, no. 4 (2010), 26-39, 38.

356th then had another encounter with several Fw 190s. The following is from a report of the encounter which, according to Taylor, was filed immediately after the Dresden raid: "At 12:35 3 Fw 190s were observed to make a pass at a bomb group to which 356 was not assigned. One flight attacked the enemy aircraft... These e/a may also be the ones reported by a bomb group as attacking them in the target area."⁵² This shows the effectiveness of long-range fighter escorts. A group of B-17 flying Fortresses would not stand a chance against a Fw 190; however, the P-51 Mustang was a superior aircraft to the Fw 190, and the 356th fighter group, in their P-51 Mustangs, were able to protect bomber formations during the Dresden raids and even score a kill. There was only one reported American bomber lost during the Dresden raid.⁵³ Given the fact that a bomber formation had been attacked by a group of Fw 190s, had the Dresden raids not had fighter escorts, the loss rates could have been quite different. When Bernard Boylan is discussing the lack of long-range fighter escorts in the early years of the war, he states: "That this problem was not solved before 1941 is to be regarded as the most serious error in the pre-war planning of the AA."⁵⁴

There is no denying that long-range fighter escorts made a significant impact on the Allied daylight bombing effort during the Second World War. While they did not really affect RAF loss rates as they had switched to night raids fairly early in the war, long-range fighter escorts drastically reduced the loss rates during daylight bombing raids. The Eighth Air Force went from suffering loss rates upwards of twenty percent, to suffering loss rates under seven percent, and in some cases even under one percent. However, it is important to know that having long-range fighter escorts was not a guarantee of safety. Big Week illustrated that it was possible to incur high loss rates even with fighter escorts. The reverse is also true, not having fighter escorts was not a guarantee of high loss rates either, as illustrated by the statistics of the Hamburg raids. Clearly, luck was also a big factor in Allied bombing raids. However, it is clear that having long-range fighter escorts drastically increased the odds of incurring low loss rates.

⁵² Taylor, 438.

⁵³ Addison and Crang, 66-68.

⁵⁴ Boylan, 57.

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