

SCHWEINFURT RAIDS AND THE PAUSE IN DAYLIGHT
STRATEGIC BOMBING

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

SCHWEINFURT RAIDS AND THE PAUSE IN DAYLIGHT STRATEGIC BOMBING, by MAJ Greg Grabow, 96 pages.

Avid readers of WWII air combat will find the Eighth AAF's strategic bombing mission #84 (the Schweinfurt-Regensburg raid on August 17th, 1943) and mission #115 (the Schweinfurt raid on October 14th, 1943) to be tremendous setbacks to the daylight strategic bombing campaign of Germany. As a result of the heavy losses the Luftwaffe inflicted upon Eighth Bomber Command's heavy bombers, the daylight strategic bombing campaign was halted for over four months. The Eighth AAF could not sustain such heavy losses, in both aircraft and aircrew, and remain an effective force. During the halt in the daylight strategic bombing campaign, only targets within fighter escort range were selected so Eighth Bomber Command could receive replacement crews, upgraded aircraft, revise its strategic bombing tactics, and review its daylight strategic bombing doctrine.

This paper examines the daylight strategic bombing doctrine before and after the Schweinfurt raids to answer the question "After the costly Schweinfurt raids, the Eighth AAF paused to reset its doctrine; how was this doctrinal change accepted and what were the implications?" Initially, the heavy losses incurred during the August Schweinfurt-Regensburg raid were explained away as justified due to the "heavy" damage to both targets, the number of German fighters "shot down," and the weather which prevented 300 heavy bombers from being sent as one force - the number required for self-sustainment on deep penetration missions. This was the same mood immediately after the October Schweinfurt raid but changed drastically once monthly loss statistics were released and further examination forced the USAAF leadership into a rude awakening: unescorted bombers took seven times the loss plus two-and-a-half times the damage and the final assessment revealed Eighth Bomber Command experienced the loss of one-third of its heavy bombers each month. The upper levels of the USAAF leadership initially had difficulty accepting what the lower level leaders and aircrew knew: unescorted daylight strategic bombing was not practical in the face of determined opposition.

What were the implications? America's daylight strategic bombing campaign came within limits of defeat but the Eighth AAF was able to pause, adjust its strategic bombing doctrine, and obtain its objective of neutralizing the Luftwaffe and destroying German wartime industry.

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This thesis is dedicated to my late uncle, a B-24 pilot from the 714th Bomb Squadron, 448th Bomb Group. My parallel research into his unit helped me gain insight into his background and shed some light upon the anxiety, fear, and adrenalin that accompanied aircrew during each mission. His courage, along with the thousands of other Allied bomber crews during WWII, is what it took to complete dangerous missions against the strongest air defenses of the time; together, they changed the course of the war.

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ACRONYMS

AAF	Army Air Force
AMC	Army Material Command
AWPD	Air War Plans Division
CCS	Combined Conference Chiefs
CBO	Combined Bomber Offense
POW	Prisoner Of War
RAF	Royal Air Force
USAAC	United States Army Air Corps
USAAF	United States Army Air Force
USAFBI	United States Army Forces in support of the British Isles
USSBS	United States Strategic Bombing Survey

CHAPTER 1

INTRODUCTION

Background

By the end of summer in 1943, Germany was pushed back on two fronts: the Soviets blunted a massive German armored thrust intended to pinch off the Kursk salient while in the Mediterranean the Allies took Sicily and prepared for an amphibious assault on the Italian mainland. Italy faced unrest as Mussolini's fascist government barely held on to power and then only with Hitler's assistance. In the Atlantic, Allied convoy operations were beginning to have an effect on German "wolfpack" tactics while in England the Allies steadily built up troops and logistical support for the expected cross-channel invasion. The initiative was wrestled from the Axis but Germany was far from beaten.

Meanwhile, the Eighth AAF faced criticism at home and abroad for its inaction or slow pace of operations against German industrial targets. Considerable pressure came from top levels for the Eighth AAF Commander, Major General Ira Eaker, to fulfill the POINTBLANK Directive and mount a sustained aerial offense against German industrial targets. The Commanding General of the Army Air Corps, General Henry Harley "Hap" Arnold, and many of the USAAF leadership felt that a successful daylight strategic bombing campaign against Germany would certainly minimize the exposure of Allied ground forces to the Wehrmacht and may even negate the need for a costly cross-channel invasion.¹

The Casablanca Conference, in early 1943, almost saw the extinction of the Eighth AAF as aircraft and aircrew were nearly allocated elsewhere. Prime Minister

Churchill convinced President Roosevelt that, due to the lack of any major combat operations on the part of the Americans, the Eighth AAF would be more useful if integrated into British Bomber Command.² Upon hearing this, Eaker immediately flew down to Casablanca and met with Churchill to persuade him into giving the Eighth AAF more time. Though Churchill was not thoroughly convinced that daylight strategic bombing was feasible, he spoke again with Roosevelt and together they decided to grant Eaker more time. Eaker adamantly believed that the daylight strategic bombing campaign was the least costly and most efficient path to destroy the Axis center of gravity, their industrial infrastructure, and bring Germany to her knees. Eaker was thus under tremendous pressure to use the Eighth AAF or watch its resources reassigned elsewhere.

Throughout the summer of 1943, the Eighth AAF was building in strength and waiting for good weather to begin missions.³ By mid-August, with adequate resources built for a three hundred heavy bomber raid and favorable weather conditions, the Eighth AAF was ready for a deep penetrating strike. The August 17, 1943 Schweinfurt-Regensburg raid was the first time in which a large American heavy bomber force would strike a target, deep in Germany, unescorted as the P-47s at the time did not have sufficient range beyond Eupen, Belgium. Mission #84 became known as the “double strike mission” because it entailed two large heavy bomber forces totaling 376 B-17 Flying Fortresses, which was nearly the entire heavy bomber strength of the Eighth AAF at the time, to attack two separate targets in order to disperse fighter reaction by the Luftwaffe.⁴ To confuse German defenders, the original plan called for the Regensburg force to fly through to southern Europe and eventually land in North Africa with the Schweinfurt bomber force returning to their bases in southern England after the target

was hit. The Regensburg bomber force spearheaded the assault to fight the way into Germany's defenses while the trailing Schweinfurt bomber force would fight the way out. The targets selected for this mission were the Messerschmitt works in Regensburg, Germany, and the nearby ball-bearing factories concentrated in Schweinfurt, Germany. The force amassed to attack these targets were 376 B-17s with 268 P-47 sorties and 191 Spitfire sorties flown as escort.⁵ The 1st Bombardment Wing, led by Brigadier General Robert Williams, consisted of 230 Flying Fortresses organized into three combat groups to strike the Schweinfurt target. Once the fighter escort turned back the B-17 bombers were savaged by the Luftwaffe, with 60 bombers and 605 crewmen lost (a majority as POWs) plus an additional eleven B-17s damaged beyond economical repair.⁶ Though the aerial gunners claimed 288 fighters shot down and escorts claimed a further 32, Luftwaffe records showed only 27 fighters were lost.⁷ Despite USAAF attempts to strictly control accounting procedures, as claims were inflated due to the confusion of combat and multiple gunners claiming the same aircraft, the loss ratio was closer to three to one or three bombers lost for every German fighter.

It took nearly two months for the Eighth AAF to recover so it wasn't until the first week of October the Eighth AAF was ready to once again hit industrial targets inside Germany. In a series of missions, during what became known as the "Black Week," the Eighth AAF launched over one thousand bomber sorties against industrial targets in the German cities of Marienburg, Gdynia, and Munster with the loss of 88 bombers and almost 900 aircrew.⁸

The second Schweinfurt raid, Mission # 115, took place on October 14th when 291 B-17s from the Eighth AAF repeated the attack on the Schweinfurt ball-bearing

factories. Again, once most of the P-47 fighter escorts reached their range limit near the German border and turned back, the Luftwaffe savaged the B-17 formations. The raid ended with the loss of 77 B-17 Flying Fortresses, with 642 crewmen, while German records showed the loss of 32 fighters.⁹ Luftwaffe fighter pilots defended Germany with the same tenacity as their British counterparts did three years earlier during the Battle of Britain. Also, since the first Schweinfurt-Regensburg raid, the German homeland defenses were upgraded and better coordinated, with established defense sectors, plus an additional three hundred flak guns positioned near the city of Schweinfurt. A majority of the bombers were lost once the Allied fighter escort turned back at the German border. October 14, 1943, became known as “Black Thursday” due to the losses incurred by the Eighth AAF; this was the costliest single raid in Eighth AAF history and became the last heavy daylight strategic bombing raid into Germany by unescorted bombers.

Strategic bombing mission #84 and mission #115 were tremendous setbacks to the daylight strategic bombing campaign of Germany. As a result of heavy losses the Luftwaffe inflicted upon Eighth Bomber Command, the daylight strategic bombing campaign on Germany was put on hold for over four months as the Eighth AAF could not continue to sustain such heavy losses, in both aircraft and aircrews, and effectively mass to destroy German industrial targets. By autumn of 1943, the Eighth AAF was losing 30% in aircrews each month and this had an effect on morale. Morale plummeted within the Eighth AAF as aircrews calculated the odds to finish the twenty-five mission requirement (needed to rotate home) to be seven percent.¹⁰ During the four month halt in the daylight strategic bombing campaign, the Eighth AAF received replacement aircrews and upgraded aircraft, revised its strategic bombing tactics, and reviewed its daylight

strategic bombing doctrine. The culmination of heavy losses incurred by the Eighth AAF during the past three months made it a costly operation to launch heavy daylight strategic bombing raids into Germany by unescorted bombers. What was the USAAF leadership's reaction to the Schweinfurt raids?

Issue

Up to October 1943, one of the premises the American strategic bombing doctrine rested upon was “a well planned and well conducted air bombardment attack, once launched, can not be stopped.”¹¹ Both Schweinfurt raids proved that formations of unescorted bombers were no match for German fighters; a huge doctrinal shift in the USAAF's daylight strategic bombing strategy. The current theory of strategic bombardment was developed from the AWPB-1, which was drafted in 1941, and guided Eighth AAF doctrine into October of 1943. Did this doctrine contribute to the tremendous loss during the 1943 Schweinfurt raids or was a better German plan fought by the Luftwaffe at the operational and tactical levels? To answer this question, the next chapter focuses on the development and events which shaped America's strategic bombing doctrine up to October 1943. This thesis also looks at the USAAF and RAF coordination for the “round the clock bombing” strategy to see what effect the Schweinfurt raids had on joint operations.

The third chapter will examine the formation of the Eighth AAF from a leadership perspective, explore the budding relationship between the USAAF and the RAF, identify constraints and resource problems for the Eighth AAF, and set the stage for the Schweinfurt raids. This chapter also investigates the operational environment Eaker

faced, when he activated and formed the Eighth AAF, and considerations that may have been beyond his control and could have effected his strategic plan.

Fallout

Though many military historians seek to define the lessons learned from the 1943 Schweinfurt raids, many agree it led to the resetting of the daylight strategic bombing doctrine but they rarely discuss the implications. The focus of this thesis is to answer why the Eighth AAF leadership discounted strategic bombing lessons from earlier in the war, why the USAAF leadership was wed to a failed doctrine for so long, how a doctrine change was accepted by the USAAF, and finally identify the implications. Rarely before has such a large organization been withdrawn from combat, without any replacement unit to carry on the fight, reorganize, and sent back to complete the same mission. The fallout from the Eighth AAF strategic bombing pause is debated by military historians so this thesis will help shed light on the four month pause and give a better understanding of events often not covered in the history books.

¹ “While the theory of air power shared by the developers of the Air War Plans Division-1 (AWPD-1) held that the most efficient way to defeat Germany was to destroy her industrial capacity by aerial bombardment, they recognized there was little hope of selling victory through air power alone to Army Chief of Staff George C. Marshall and Secretary of War Henry Stimson. Consequently, they settled on a statement for the overall objective of the air effort to lean heavily toward victory through air power, but provided air support for an invasion and subsequent combined operations on the continent if the air offense should not prove conclusive.” Source: Barry D. Watts, *The Foundations of U.S. Air Doctrine: The Problem of Friction in War* (Maxwell Air Force Base, Alabama, Air University Press, 1984), 19.

² Haywood S. Hansell, *The Strategic Air War against Germany* (Washington: Office of Air History, 1986), 69.

³ Eaker was soon to find that often the major enemy the Eighth AAF faced was Europe's weather; sometimes weeks would pass before the English weather was favorable for takeoffs/landings and often missions were scrubbed because targets were shrouded in cloud cover.

⁴ Martin Middlebrook. *The Schweinfurt-Regensburg Mission* (New York, Charles Scriber's Sons, 1983), 54.

⁵ Though sources may conflict in the number of aircraft flown, damaged, or lost, I prefer Martin Middlebrook's account in *The Schweinfurt-Regensburg Mission*, as his meticulous study includes detailed diagrams and by name accounts in Appendix 1. Source: Ibid, Appendix 1.

⁶ This loss from this one raid totaled the combined loss of the Eighth AAF's first six months of operation. Source: Ibid, Appendix 1.

⁷ Ibid, Appendix 1.

⁸ Edward Jablonski. *Airwar* (Garden City, New York: Doubleday & Company, Inc., 1971), 183.

⁹ Martin Caidin. *Black Thursday* (New York, New York: E.P. Dutton & Co, 1960), 307.

¹⁰ "Before May/June of 1944, the tour was 25 missions for all crews. In May/June, an order from Eighth AAF headquarters stated effective immediately, a tour would be 30 for lead crews and 35 for the all other crews. Existing lead crews then had to fly a prorated 28 and the existing regular crews had to fly 32. Crews assigned to the Group after that effective date had to do 30 and 35." Source: 398th Bomb Group Memorial Association, available from http://www.398th.org/research/398th_FAQ.htm#anchor_mission; Internet, accessed 1 November 2007.

¹¹ This statement is attributed to Kenneth N. Walker, one of the architects on the planning team for the AWPD-1 which constituted the basic blueprint for the creation of the Army Air Forces and the conduct of the air war against Nazi Germany. Source: Haywood, 10.

CHAPTER 2

USAAF STRATEGIC BOMBING THEORY AND DOCTRINE

The advent of air power, which can go straight to the enemy's vital centers and entirely neutralize or destroy them, has put a completely new complexion on the older system of war.¹

Brigadier General William Mitchell, 1926

Birth of the Strategic Bombing Theory

Schweinfurt made the primary USAAF target list and was the target that the 1943 daylight strategic bombing doctrine was designed to neutralize or destroy.² Did a faulty strategic bombing doctrine contribute to the tremendous Eighth AAF loss during the fall of 1943 or was a better plan fought by the Luftwaffe at the operational and tactical level? The remainder of this chapter will focus on the development of strategic bombing, the source of the USAAF strategic bombing theory, and outline the USAAF daylight strategic bombing doctrine in the summer of 1943. This chapter also looks at the German plan to counter the USAAF's penetration into its airspace and provide an analysis of the coordination between the USAAF and RAF for "round the clock bombing."

Air power advocates, from both sides, saw the excessive 9,000,000 plus casualties in World War I as the end result of static trench warfare and strategic bombing promised to break that stalemate and deliver victory in a shorter time with considerably less casualties. Air power advocates developed a strategic bombing theory that held the enemy's infrastructure and population as the center of gravity supporting the war effort. The old Clausewitzian wisdom of the defense, as a stronger form of warfare, was focused on the enemy's army as the center of gravity; this was now replaced by air power which

was capable of taking the war directly into the heart of the enemy's homeland, targeting its cities and population, thus shifting the center of gravity.³ Air power advocates theorized this new center of gravity could be destroyed by strategic bombing thus negating the need for costly trench warfare. For this purpose, long range bombers could carry out the strategic bombing so out of World War I came the theory of strategic bombing, which was the basis for many nations to build their own air doctrine.

The first strategic bombing mission of World War I occurred when German aircraft dropped five bombs on the Gare L'Est in Paris on August 30, 1914. Within a year, specialized aircraft and dedicated bomber squadrons were in service on both sides. These were generally used for tactical bombing: the aim was that of directly harming enemy troops, strongpoints, or equipment, usually within a relatively small distance from the front line. Eventually, attention turned to attacking vital rear-area resources. The first-ever dirigible aerial bombardment of a city occurred January 19th, 1915, when two German Zeppelins raided London with the intention of breaking British morale. The German Zeppelin and the later Gotha bomber raids against London caused light damage and relatively few casualties while the British retaliatory raids against Cologne had the same results. But in both cases, defending fighters seemed powerless to stop the attacking bombers due to the difficulty in locating and gaining altitude in time to intercept the bombers. This experience led the British military to accept the findings of the 1921 Field Marshal Jan Christian Smut committee which recommended an air doctrine of counterattack was better than air defense so an independent air arm, the Royal Air Force (RAF), was created with the specific aim of bombing targets in Germany.⁴ As chief of the world's first independent air force, Air Chief Marshall Sir Hugh "Boom" Trenchard

organized the RAF from the ground up and established a central flying school to set and maintain standards. Trenchard dominated British air doctrine and believed the RAF must be an offensive force so he backed the development of the four-engine Handley Page bomber - created specifically for the strategic bombing of Germany. However, Britain's defense spending was severely curtailed after World War I and the War Cabinet chose to fund the Royal Navy over other services as it was felt the Navy could best defend the island so this hampered the RAF's size and aircraft experimentation.

Italy also established an independent air arm with Air Marshall Giulio Douhet as the chief. Douhet emerged as one of the world's prominent air power theorists by publishing *The Command of the Air* which extrapolated bombing results from World War I to exaggerate the impact of bombing for future conflicts. Douhet concluded an independent air force, with a technologically advanced "battleplane," ensured control of the air to bomb cities, with their infrastructure and populations, into submission.⁵ He suggested bombing of cities would affect civilian morale to the extent that the psychological damage would outweigh the physical damage by twenty to one and lead governments to surrender. Douhet greatly overestimated the damage that bombs would cause and greatly underestimated the ability of a population to stiffen under aerial attack. But Italy, like the rest of the Allied powers, was war weary and this hampered defense funding for any sort of experimentation so his theories were untested.

German strategic air doctrine was hampered by a German general staff forecasting and preparing for the next major war in nearby Poland and France. Since the German general staff prepared for a war only a short distance away, air policy focused on tactical aircraft and lighter bombers. As a result, when the Luftwaffe did emerge in the

mid-1930s, its bombers were short range, lightly armed, and more suited for a tactical role. The lack of long range planning left the Luftwaffe without a heavy bomber and this would severely cripple the Luftwaffe's strategic projection.

After the experience of World War I, the American population supported a small standing military to maintain a defensive military posture. Since strategic bombing did not fit into this role, Congress saw little need for an offensive weapon within a national defensive military strategy and did not support the development of heavy bombers. General William "Billy" Mitchell was an outspoken advocate of air power and like Douhet, saw air power as the means to take the war to the heart of the enemy's homeland and directly to its population but envisioned bombers attacking strategic targets and infrastructure. Like Douhet, Mitchell greatly overestimated the damage that bombs would cause and greatly underestimated the ability of a population to resist while under aerial attack.

Mitchell became an outspoken critic of America's national military strategy that centered on the defense of coastlines by the Navy and presented air power as the means for America to protect her coastline against invasion. Mitchell presented a plan to Congress to turn the defense of America's coastlines over to an independent air service and demanded naval targets to prove the vulnerability of the battleship. Due to pressure from Congress, the navy reluctantly agreed to a demonstration and allocated several old ships, to include two battleship hulks, to Mitchell for his experiment. The tests began in July of 1921 off the coast of Norfolk, Virginia, with three ships: a destroyer, an armored light cruiser, and the decommissioned battleship *U.S.S. Alabama* and concluded with all three successfully sunk. The climax of the demonstration took place on July 21st when the

navy towed out the German battleship *Ostfriedland*; a great ship that had been the pride of the German fleet during WWI. Martin twin-engine MB-2 bombers dropped six 2,000 bombs in rapid succession with two direct hits and others landing close enough for the ship's hull plates to rip open. Twenty-one minutes after the test began, the *Ostfriedland* plunged to the bottom of the ocean. Abroad, the sinking of the two battleships was closely monitored with speculation that perhaps surface ships were considered at risk from aircraft.

Mitchell's publication of his views in *Our Air Force* and *National Defense and Winged Victory*, plus his personal attacks, made Mitchell unpopular so the War Department reverted Mitchell back to the rank of Lieutenant Colonel when his appointment as Assistant Chief of the Air Service terminated in 1925.⁶ After the crash of the Navy airship *Shenandoah* on September 3, 1925, Mitchell issued a 6,000 word statement condemning the Navy's aviation record and this brought about his court martial a mere two days later. Mitchell, expecting the court martial, viewed the proceedings as a platform to air his views to a larger audience. As expected, a guilty verdict was handed down to silence an outspoken Mitchell.

Mitchell resigned from the military and continued writing articles and books but the court martial finished him; he died in 1936, a year after the first experimental B-17 performed its test flight.⁷ Mitchell's projections on air power were over-speculative, with an over-estimation of the capacity of industry to withstand the effects of bombing and civilian morale to stiffen, but Mitchell did challenge old military paradigms and inspire other aviation advocates.

Heavy Bomber Development

Up until 1931, opposition to air power as an independent force, an isolationist policy, inter-service rivalry, and economic depression dominated the interwar background for American air power and put the development of a heavy bomber on the backburner. Aircraft were relegated to a ground support role with no long range capability. It was not until the late 1931 that any significant work towards a heavy bomber began. “In a surprising move, the new Army Chief of Staff, General Douglas MacArthur, called for the development an aircraft capable of carrying a 2,000 lb bomb load, at speeds of 200 m.p.h., to assist with the defense of America’s coastline.”⁸ This marked the shift needed for a bomber to fill a strategic role and this placed new requirements on bomber design. The requirements included the ability to evade anti-aircraft fire by flying high (which required an oxygen system), a highly accurate bombing capacity, plus possess the defensive firepower to ward off any enemy fighters it encountered.⁹ The new design called for considerably more powerful engines and this would greatly change the design of existing aircraft and provide a much needed improvement over the existing twin-engine Martin B-10 bomber. “In August of 1934, Boeing began work on a four-engine bomber, based off a civilian transport plane, called the YB-17 which immediately showed promise; the YB-17 performed a nonstop test flight from Seattle to Dayton at an average speed of 232 m.p.h. which proved faster than any standard Air Corps fighter in inventory.”¹⁰ Though the YB-17 crashed during a later test flight, Boeing worked through the mechanical issues and the Army Air Corps finally had a plane that promised to fulfill the strategic bombing role. A reporter viewing the aircraft remarked how it looked like a “flying fortress” due to its defensive armament and

thus the name stuck. The B-17's speed, range, bomb load capacity, and defensive armament fit the strategic bombing doctrine that advocated a self-sufficient, long range bomber capable of hitting enemy industrial targets.

Air Corps Tactical School and the Daylight Strategic Bombing Theory

The strategic air lessons taught at the Air Corps Tactical School in Montgomery, Alabama, reflected confidence in this new technology and proposed that great formations of self-defending bombers could fly deep into enemy airspace and attack vital economic targets without the protection of escort fighters – all without suffering unacceptable casualties.¹¹ At the time, this assessment was based upon the performance differences between bombers and pursuit planes; most bombers flew higher and were faster than pursuit planes so air tactics at the Air Corps Tactical School reflected this theory. By the mid-1930s, strategic bombing enthusiasts gained ascendancy in the school and won the debate over the proper direction for American air policy.¹² In 1935, the texts at the Air 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”¹³

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. However, by 1939 there was a huge difference as fighters were faster, better armed, and very much a threat to bombers but air tactics did not reflect the change as theory lagged behind and change was difficult for many within the Army Air Corps to accept. Another technological development often overlooked is radar. Before its fielding by the British in 1941, ground control had difficulty locating incoming bombers so pursuit aircraft could not be massed for any type of attack. The introduction of radar changed interceptor tactics as incoming formations of bombers could now expect well coordinated attacks by fighters instead of encountering lone pickets sent up in a search for the bombers.

Besides the self defending bomber concept, precision bombing was another misconception which clouded the daylight strategic bombing theory. The Norden bombsight was tested under clear conditions at the dry lake beds in Muroc, California, with bombs landing within fifty feet of the target and giving rise to the high altitude “pickle barrel” or “pin point” bombing accuracy belief. American bombardiers were confident they could hit anything at high altitude and this contributed to the USAAF’s confidence in the high altitude precision bombing portion of daylight strategic bombing. But range conditions were far different than wartime bombing in Europe as the target was often times obscured by clouds, smoke, or fog, and fighter opposition, coupled with anti-aircraft fire, restricted freedom of maneuver and imposed time constraints.¹⁴

In September 1938, Major General Henry Harley “Hap” Arnold, became Chief of the Army Air Corps and quickly worked with the War Department to prepare for war. At that time, President Roosevelt was alarmed by Hitler’s annexation of the “Sudetenland”,

Austria, and Czechoslovakia and he was concerned at the build up of the Luftwaffe so he informed Congress to strengthen the Army Air Corps. On the day Hitler invaded Poland, the Army Air Corps had only twenty-three B-17s and was unprepared to fill any strategic role.¹⁵

At this time a new four-engine bomber prototype, developed by Consolidated Air Corporation, was tested and eventually became the predecessor for the B-24. Though the “Liberator” could carry a heavier payload than the B-17, it proved slower at higher altitudes and had less defensive capability. The high Davis profile wing gave the B-24 less drag and more speed at lower altitudes than the B-17, but because of the smaller wing surface area, it was not as rugged and hits in the wings produced catastrophic results. The B-17 would form the backbone of the strategic bombing offense in Europe.

The USAAF adopts Daylight Strategic Bombing Doctrine

Both the Luftwaffe and the RAF experienced high aircraft losses early in World War II when their bombers flew unescorted missions into enemy airspace. Initial experience in Spain reinforced the Luftwaffe high command’s belief that their bombers would get through without taking into account the lack of fighter opposition encountered by pilots in German aircraft “loaned” to the Condor Legion. Indeed, General Adolf Galland referred to the defensive armament of Luftwaffe bombers “of moral value” and the British also identified serious armament weakness in their heavy bombers. The Luftwaffe learned from its experience in the Battle of Britain that daylight strategic bombing was not practicable without proper fighter escort as they lost 50% of their 1,700 bomber fleet.¹⁶ The twin-engine ME-110 was designed to fill the long range fighter escort role but was wholly inadequate for this as it lacked the necessary range and

maneuverability and found to need fighter escort itself. Likewise, due to short range, the Spitfire and Hurricane were not suited as fighter escort for RAF raids into Germany. After initial research in 1941, the British Chief of Staff Sir Charles Porter, dismissed the idea of the long range escort fighter and remarked to Churchill that the long range escort fighter was technologically unfeasible.¹⁷ Churchill remarked this closed many doors for the RAF.

Though still in its infancy, radar proved highly effective during the Battle of Britain and is credited with allowing a much smaller RAF to defeat a larger Luftwaffe. With the use of radar, ground control could converge RAF fighters to intercept incoming Luftwaffe bombers where and when needed. Early in the summer of 1940, the Luftwaffe made a series of small raids on a few of the radar stations, but the damage was over estimated and the British radar returned to operation within a few days. The Germans under estimated this new technology but would later effectively use radar as a force multiplier during Allied bomber raids into occupied Europe and Germany.

Both the RAF and Luftwaffe reverted to night bombing to make it harder for intercepting fighters to locate the bombers and cover the bomber's approach from flak gunners. Since it was difficult to locate specific targets at night, area bombing of large cities adopted by both sides. The USAAF leadership studied British night bombing and concluded the poor bombing accuracy did not warrant the results. In August of 1941, the secret British Butt Report, concluded that only one bomber in five (one in ten when bombing the Ruhr) got within five miles of the target and that one half of all bombs fell on open space; this was referred to as "agriculture bombing."¹⁸

Like the British, the Germans switched to night bombing but the lack of heavy bombers, coupled with high losses, curtailed the size of their operations. By 1942, with the Eastern Front draining military operations, the Germans transferred their air operations in the West toward a more defensive strategy hoping to inflict a high cost on any invading air armada and make the Allies think twice before undertaking the strategic bombing of Germany.

The USAAF identified the B-17 as superior to any bomber the British or Germans possessed but worked to improve identified armament deficiencies found in lend lease B-17C models. When the B-17 was tested in the mid 1930s, it was faster than interceptor fighters of the time so a later USAAF study concluded “as there was little difference in the speed of the B-17 and the German pursuit plane, when the FW-190 makes a pass at a Fortress and misses, the Fortress will be out of range before the German plane can recover.”¹⁹ While the USAAF leadership correctly concluded the B-17 was far better armed than the bombers possessed by the British or Germans, this contributed to an overconfidence that daylight strategic bombing could work without fighter escort. Without the B-17 to fill the heavy bomber role, the USAAF may have looked at its daylight strategic bombing doctrine differently.

In June of 1940, Arnold established the United States Army Air Force (USAAF) and began lengthy talks with British military staff on coordinating the effort for America’s air operations in the European Theater. Arnold fully expected America to enter the war with American bombers being used offensively in collaboration with the RAF. The debate between the two Allied air commands intensified over how the Eighth AAF should conduct strategic bombing. By 1942, the RAF Chief of Staff Sir Arthur

“Bomber” Harris, was intensifying his night bombing campaign and committed to defeating Germany by burning its cities to the ground on moonless nights.²⁰ The best use RAF Bomber Command saw for the Eighth AAF was to join the RAF on night raids. Harris suggested the Eighth AAF should integrate its bombers, as they arrived, into RAF heavy bomber squadrons as this would make American aircraft available right away for the war effort and increase the numbers of bombers Harris could send out each night against targets. Eaker was worried that if he gave the first few bombers to the RAF for night operations, for which the American crews were not trained, that soon the Eighth AAF would be subsidiary of RAF Bomber Command and he would lose any chance of implementing daylight strategic bombing.²¹ Only a few within RAF Bomber Command actually believed the Eighth AAF could carry out daylight strategic bombing.

With timely interdiction by Eaker at the Casablanca Conference in early 1943, the Combined Chiefs approved “round the clock” strategic bombing but failed to detail how this would be accomplished. It fell to Eaker, Major General Haywood “Possum” Hansell (Chair Committee for AWPD-1), and two RAF officers to turn this loose directive into strategic policy, known as the Combined Bomber Offense (CBO), into a plan so they started with a target list: premier was the German aircraft industry, second was ball-bearings (at the urging of the special assistant for air affairs, Robert Lovett), third was oil, followed by other targets in ranked order.²² For the first year and a half, little direct coordination between the USAAF leadership and RAF Bomber Command on target selection or the timing of raids to coincide for increased effects on targets. Both air forces operated more or less independently following two different strategic bombing doctrines.

The Eighth AAF initially conducted small raids, with borrowed twin-engine bombers from the RAF, and it was not until August of 1942 the Eighth AAF used B-17s in a raid. A small force of twelve B-17s, along with 108 Spitfire escorts, raided the Rouen marshalling yards causing little damage but with no losses. Both Spaatz and Eaker, ignoring the lavish escorts, were still convinced that large numbers of unescorted B-17s would be able to carry out deep raids into Germany. Spaatz believed that with only 1,500 heavy bombers and 800 fighters (to defend his airfields), the Eighth AAF should have complete aerial supremacy over Germany within a year.²³ In a letter Eaker wrote to Arnold in the beginning of December in 1942, he stated “the B-17 has demonstrated that it is the best daylight bomber which has flown in this theater because it is the only one which completely demonstrated its ability to defend itself from enemy fighters and to fly at an altitude where it does not suffer losses from anti-aircraft fire.”²⁴ At the end of 1942, the USAAF had yet to penetrate German airspace and fully test Luftwaffe air defenses. Thus, the USAAF leadership continued into 1943 still confident that the self-defending qualities of the B-17, along with the skill of the Eighth AAF crewmen, could overcome any Luftwaffe response. The USAAF leadership failed to prioritize the need for escort fighters and failed to actively push for extending the range of existing fighters.

The Luftwaffe, along with its ground network of radars and flak batteries, was prepared for the Allies and extracted a heavy toll during the Schweinfurt raids. The Germans organized their fighter defense into sectors and worked from squadron to group level to improve tactics. Also, the increase of fighters to the Western Front enabled the Luftwaffe to extend the fighter network to 450 miles. Ground to radar coordination ensured the Luftwaffe could mount up to several sorties by a single fighter against the

same B-17 formation. After the staggering losses throughout the summer and fall of 1943 by the Eighth AAF, Galland assured Goering that the problem of the Eighth AAF, along with its daylight bombing campaign, was taken care of.

The USAAF leadership did not heed two clear air lessons the RAF and the Luftwaffe learned early in World War II: first, all air operations require air superiority and without it attacking aircraft suffer unsustainable losses; and second, finding and hitting targets under anything but perfect daylight conditions presents a challenge.²⁵ Technological advances in strategic bombers during the interwar years led to an overconfidence in a daylight strategic bombing doctrine, thoroughly entrenched in the Army Air Corps by the late 1930s, so earlier lessons were overlooked. Also, before 1943, a strategic bombing offense was not practicable because the Eighth AAF did not have the necessary number of aircraft to wreak havoc on Axis industry and bring Germany to its knees.

The twenty-seven months before the United States went to war gave the USAAF time to study the effectiveness of unescorted strategic bombing but many in the USAAF leadership were infatuated with technology that contradicted past lessons, driven home from earlier in the war, to change a strategic bombing doctrine in place since the end of the 1930s. The Eighth AAF's difficulties in 1943 underline a mismatch between doctrine and conceptions on one hand and estimates of the enemy on the other; eventually the USAAF leadership came to grips with that mismatch and adjusted doctrine to utilize air power to break the Luftwaffe and damage the German economy's ability to support the war.²⁶ It took the tremendous losses from the 1943 Schweinfurt raids to warn the USAAF leadership that a change was needed to the current daylight strategic bombing doctrine.

¹ John Sweetman. *Schweinfurt: Disaster in the Skies* (New York, NY: Ballantine Books, 1971), 14.

² The “Eaker Plan,” based off the AWPD-1, prioritized targets with the top four targets in 1942 being: submarine bases, aircraft industry, ball-bearing factories, and oil production with secondary targets of synthetic rubber plants and military vehicle construction. In the spring of 1943, combined Allied naval and air power scored a victory over German U-boat operations as Allied shipping losses sharply fell. In June of 1943, submarines were moved further down the list with aircraft and ball-bearing factories shifting up the list so Schweinfurt topped the list of targets for the USAAF to strike.

³ Alan Stephens. *The True Believers: Airpower between the Wars* (Maxwell Air Force Base, AL: Air University Press, 2001), 2.

⁴ Ibid, 10.

⁵ Stephens, 4.

⁶ Ibid, 15.

⁷ The YB-17 began test flights in July of 1935. Source: David Nevin. *The Epic of Flight: Architects of Air Power* (Alexandria, Virginia: Time-Life Books, 1981), 71.

⁸ “The basis for this new design was the 1930 Martin B-10 Bomber, which was an all metal, two-engine, monoplane with an enclosed cockpit and retractable landing gear capable of a top speed of 200 mph and a bomb load capacity of 2,000 lbs. It was in this plane that Lieutenant Colonel Arnold made his famous 1934 non-stop flight from Alaska to Seattle.” Source: Sweetman, 15-17.

⁹ Already in 1928, a liquid oxygen system was introduced which allowed aircrew to exist at high altitudes. Four year later, the Norden bomb sight was developed by Mr. C L Norden. Source: Ibid., 19.

¹⁰ It was the seventeenth bomber type with the YB denoting it was a service test model. Source: Ibid., 19.

¹¹ Two of the school’s staff members and contributors to this concept, CPT Robert Olds and LT Kenneth Walker, often were at odds with another group of staff members, led by Chennault, who argued that fighter aircraft must gain control of the air. Source: MacGregor Knox & Williamson Murray. *The Dynamics of Military Revolution: 1300-2050* (New York, NY: Cambridge University Press, 2001), 183.

¹² Allan R. Millett and Williamson Murray. *Military Innovation in the Interwar Period* (New York, NY: Cambridge University Press, 1996), 124.

¹³ Ibid, 124-125.

¹⁴ While accuracy improved during the war, survey studies show that only about 20% of bombs aimed at a precision target fell within 1000 feet of the aiming point; this later increased to 30% as the war progressed. Source: Franklin D'Olier (Chairman). *The United States Strategic Bombing Survey* (New York, NY: Garland Publishing, Inc., 1976), 4.

¹⁵ Sweetman, 19.

¹⁶ G.E. Patrick Murray. *Bomber Missions* (New York, NY: Barnes and Noble, 2006), 10.

¹⁷ Knox & Murray, 184.

¹⁸ Murray, 11.

¹⁹ "ME-109 and FW-190 fighters were considerably faster than the pursuit planes of the mid 1930s but many heavy bomber advocates still considered the B-17 immune as it was faster than previous bombers and the fighter had only limited ammunition to destroy a bomber." Source: Sweetman, 30.

²⁰ Geoffrey Perret. *Winged Victory* (New York, NY: Random House, 1993), 242.

²¹ Robin Neillands. *The Bomber War: The Allied Air Offensive Against Nazi Germany* (New York, NY: The Outlook Press, 2001), 177.

²² The British experienced an anti-friction shortage when their only ball-bearing factory was bombed during the Battle of Britain in 1940; without outside sources, their aircraft production would have halted creating a crisis during the height of the battle. Source: Ibid, 244.

²³ Ibid, 244.

²⁴ Sir Charles Webster & Noble Frankland. *The Strategic Air Offensive Against Germany 1939-1945* (London, England: Her Majesty's Stationary Office, 1961), 451.

²⁵ Knox & Murray, 183.

²⁶ Millet & Murray, 139.

CHAPTER 3

FORMATION OF THE EIGHTH AAF

Activation of the Eighth AAF

Shortly after the attack on Pearl Harbor, the USAAF redesignated the Air Force Combatant Command as the Eighth Army Air Force (AAF). On January 2, 1942, Lieutenant General Henry Harley “Hap” Arnold signed the order activating the Eighth AAF and chose his close friend, Major General Carl “Tooey” Spaatz, as the commander. Spaatz established the Eighth AAF’s headquarters in Savannah, Georgia, and selected a staff to prepare for operations. The Combined Chiefs drew up plans to send the Eighth AAF to the Middle East in support of the British Eighth Army, but British reverses in Libya forced the Combined Chiefs to revise the plan of sending heavy bombers into North Africa.¹ With the uncertainty of the situation in North Africa, and the heavy Allied shipping losses in the North Atlantic, the Combined Chiefs revised their prewar plan so the Eighth AAF found itself scheduled to support the U.S. Army Forces in the British Isles (USAFBI) and ordered to form its overseas headquarters in England. Arnold sent Brigadier General Ira Clarence Eaker to England to organize the strategic bomber force and become commander of Eighth Bomber Command. Eaker arrived in England on February 20th, 1942, along with six staff officers and a large task ahead of him. Both Spaatz and Eaker looked upon the Eighth AAF as their prime instrument to test the USAAF’s daylight strategic bombing theory. Spaatz established the Eighth AAF headquarters at Bushy Park, a suburb of London, while Eaker located Eighth Bomber Command at the High Wycombe Girl’s School, close to the headquarters of RAF Bomber Command.

Even though the USAAF and the British Air Staff had foreseen this working relationship and coordinated efforts since June of 1940, a lot of work still remained before the first American planes arrived. What challenges lay ahead for the Eighth AAF before it could begin its strategic bombing campaign? This chapter will answer that question by examining the formation of the Eighth AAF with a primary focus on the USAAF leadership's perspective, explore the embryonic relationship between the USAAF and the RAF, investigate the operational environment Eaker faced when he stood up the Eighth AAF, identify constraints and resource problems for the Eighth AAF, and explore any considerations beyond Eaker's control that could have effected the USAAF's strategic bombing plan. Finally, this chapter will set the stage for the 1943 Schweinfurt raids.

The planning and coordination between Arnold and the British Air Ministry, since 1940, now paid off as promises became commitments. British construction companies immediately began work building dozens of new airfields, for the Eighth AAF, along England's east coast. The new airfields would not be built to the same high standards as airfields in the United States, but the basic comforts of these newly constructed airfields would be the envy of thousands of airmen assigned throughout the world. Seventy-five new airfields, to accommodate the Eighth AAF, would eventually be built throughout southeastern England.²

Both Eaker and Spaatz were familiar with the British Air Staff. Air Marshall Wilfred Freeman was the head of the RAF while his close friend, Air Marshall Sir Arthur Portal, was the head of RAF Bomber Command. Portal engineered the pattern night bombing of German cities, in retaliation for the Luftwaffe's bombing of London, and had

Churchill convinced this was the only practical method for RAF Bomber Command to strike back at the Germans. After the RAF's abortive attempt at daylight bombing in 1940 and 1941, Portal pointed out to Churchill that daylight bombing was too costly and the long range fighter escort was technologically unfeasible. As Churchill would later remark, Portal's gloomy assessment "closed many doors."³ In the fall of 1941, Porter became the new Chief of Air Staff and "Bomber" Harris ("Butch" to his RAF crews) took his place as Chief of Bomber Command. Harris came to his new assignment with a fanaticism for defeating the Axis by a night bombing campaign of all major German cities with over 100,000 inhabitants; in the fall of 1942, Harris finally had enough heavy bombers to launch the first RAF thousand bomber raid and targeted Cologne turning 600 acres of the city into rubble. Only Freeman and a handful of RAF officers believed the Eighth AAF could accurately bomb specific targets in the daylight effectively. Portal had his doubts, mainly because he believed the B-17 could not defend itself against German fighters, like many in RAF Command he saw the B-17 as a "flying magnet."⁴

Despite the differences in opinion, the USAAF leadership remained convinced in its high altitude daylight strategic bombing doctrine because of their faith in the B-17's technology. Eaker defended daylight strategic bombing as being five times more accurate than night bombing and claimed it would have a lower loss rate due to the greater firepower of the B-17 and B-24s.⁵ Simply put, Eaker believed the B-17 and B-24 were designed to better protect themselves. Also, a change to night bombing would require modifications in American aircraft along with a retraining of aircrews and this would require up to a year to accomplish. Despite doctrinal differences on how to best bomb Germany strategically, the RAF remained committed to assisting its new Allies.

Porter did what he could to accommodate the Eighth AAF and provide resources for the building of new bases. Likewise, Harris ordered his staff to assist Eaker as much as possible. For the first three months, Eaker stayed in a spare bedroom in Harris's home so the two could become better acquainted.⁶

The logistical planning requirements for the Eighth AAF were staggering; in order to mount a 500 bomber raid, an additional 750 bombers would be held in reserve due to repairs and services, the need for reserve aircraft, plus a force of 75,000 officers and men were needed for support operations.⁷ The Eighth's planned 1000 bomber raids only doubled the logistical requirements. Beginning in April 1942, the bulk of the Eighth's support personnel were ferried across the Atlantic in troop ships. Many of the Eighth's aircraft were flown to England on routes through Iceland and Greenland though not without some loss due to weather and navigational errors.

In July of 1942, the first B-17s belonging to the 97th Bomb Group, arrived in Polebrook, England. A month of intensive training followed with an emphasis on instrument flying due to the unforgiving English weather. Gunners practiced their skills against British fighters that performed mock passes at the bombers. Weather permitting, the Eighth AAF trained hard because aircrews knew what lay ahead.

By the summer of 1942, just as Spaatz was struggling to turn the Eighth AAF into an effective force, resources dwindled to support Operation TORCH. The Eighth AAF also competed for aircraft with the Navy, which demanded planes that could defend its fleet plus the navy had an urgent need for more cargo aircraft. As Arnold later wrote:

When asked what solution they [aircraft industry] might have for getting greater production and making more planes available, or for securing more air transports, the answer of the Navy representatives was, Stop manufacturing B-17s at the Long Beach plant and build more cargo planes. When Freeman asked what the

Navy was able to give up or help, if the AAF stopped manufacturing B-17s, the Naval officers said, "Nothing; there is nothing the Navy could give that would help any." The AAF was expected to give everything to everybody.⁸

Even though Arnold believed daylight strategic bombing was the key to defeating Germany, he had to fight against many competing sources and reluctantly diverted planes from the Eighth AAF.

The Eighth AAF Begins Combat Operations

Neither Spaatz nor Eaker were eager to throw the Eighth AAF into combat without proper equipment or training. They wanted time to build the Eighth AAF up before committing to a large raid but Arnold pushed both men into committing the Eighth AAF into some sort of action to satisfy higher command and show the Allies the USAAF was ready for action and rightly deserved the resources allocated toward strategic bombing. Arnold held a press conference to defend the Flying Fortress and to show the USAAF had confidence in not only the B-17, but in its daylight bombing strategy. The next day as if to prove the USAAF believed in its bombers and daylight bombing strategy, the Eighth AAF sent twelve of the 97th Bomber Group's B-17s into France to bomb the Rouen-Sotteville railroad marshalling yards; damage was minimal but no losses occurred as the B-17s were escorted by 108 Spitfires.⁹ Both Spaatz and Eaker did not see the large escort as a contributing factor towards the mission's success and remained convinced that large numbers of B-17s, stacked in box formations, could mass fire to protect themselves. The Rouen raid, which did little damage, boosted USAAF morale and served as a public relations success. Small, escorted raids into France, or "milk runs," continued and this gave the Eighth AAF training and experience.

By October of 1942, four more heavy bomber groups were operational in the Eighth Bomber Command.¹⁰ But just as the Eighth AAF began to gain some weight, the following month it was stripped of 1,250 aircraft and 30,000 personnel to create the Twelfth Air Force for Torch.¹¹ The Eighth AAF was left with a skeletal force that was grounded much of the time due to the winter weather. In a final blow, Spaatz was transferred December, 1942, to North Africa to be the deputy for air operations. Eaker was now the commander of the Eighth AAF and he handed Eighth Bomber Command over to Brigadier General Newton Longfellow, also known as the “Screaming Eagle,” for his nonstop ranting. Burned out, Arnold sent him home June 1st and replaced him with Brigadier General Frederick L. Anderson, a tall West Pointer known as a “ladies man.”

Growing Pains

During the first six months of operations, the Eighth AAF faced a host of logistical, equipment, and performance problems. The first 1,100 sorties were flown in good weather, against comparatively light fighter opposition, yet bombing was inaccurate due to the bombers taking evasive action, to avoid flak, when over the initial bomb release point. Once reaching the initial point, bombers were still avoiding flak by turning every fifteen seconds, all while trying to maintain altitude; bombing results were dismal despite the Norden bombsight.¹² Along with equipment shortages and personnel training issues, the Eighth AAF also identified more than one hundred defects in American aircraft which would take time to fix.

Another issue were claims submitted by the aerial gunners for Luftwaffe planes destroyed. Often, gunner’s claims were inflated due to several gunners firing at the same plane or misinterpreting an attacking plane’s throttled exhaust or vapor trails for a kill.

For example, on October 9, 1942, during the mission to bomb Lille, France, gunners claimed 102 German planes shot down when the Luftwaffe actually lost only one fighter.¹³ Based on gunner's claims, the USAAF leadership conservatively estimated a kill ratio of two or three enemy fighters shot down for every bomber lost, but the actual the ratio was closer to two to three bombers lost for every German fighter shot down. Eaker realized the aerial gunner's claims were exaggerated, but without knowing the actual ratio he remained convinced in the self-defending capabilities of the U.S. heavy bomber. Between August 17th and December 31st, 1942, the Eighth AAF flew 1,547 sorties losing only thirty-two aircraft but this was mostly against comparatively light opposition; the real test was to come.¹⁴

Eaker's optimistic outlook was not only based on these aerial gunner's claims, but on reports that the Germans possessed a single coastal fighter belt, from Hamburg to Brittany. The Eighth AAF leadership believed that once the Eighth's heavy bombers punched through this defensive belt, they would be in clear airspace the rest of the way to the target so long range escort wouldn't be necessary.¹⁵

The January 1943 Casablanca Conference almost saw the British Bomber Command absorb the Eighth AAF as Churchill convinced Roosevelt it was in the best interest of the Allies to integrate the Eighth AAF into the night bombing campaign. The RAF's leadership pointed out to Churchill, that due to the lack of any major combat operations on the part of the Americans, the Eighth AAF would be of more immediate use if integrated into British Bomber Command. Upon hearing this, Eaker immediately flew down to Casablanca and met with Churchill to persuade him into giving the Eighth AAF more time to prove itself. Eaker pointed out the Eighth AAF had a slow start due to

poor weather, inexperienced crews, logistical requirements of both the North African and the Pacific theaters, and improved German fighter tactics as explanations for the slow development of the Eighth AAF.¹⁶ Eaker convinced Churchill to give the Eighth AAF more time, but Eaker was now under a time constraint and tremendous pressure to prove the Eighth AAF could perform high altitude daylight strategic bombing and that it would work as predicted.

In the early months of 1943, the USAAF leadership felt the Eighth AAF, as an organization, was making progress but the miserable winter weather kept the bombers grounded much of the time. Weather permitting, the Eighth AAF honed its skills by training and flying escorted missions into France. By spring, with the continued flow of bombers and support personnel arriving into England, the Eighth AAF gained new strength. By April, four more heavy bomber groups, the 94th, the 95th, the 96th, and the 351st, became operational. For the first time in May, Eighth Bomber Command was able to send a three-figure strength bombing raid against the enemy. Two-hundred and ten medium and heavy bombers attacked Kiel and a combination of targets in the lowland countries.¹⁷

Throughout the Spring of 1943, German defenses improved and opposition stiffened to the Eighth AAF's incursions. Nonetheless, Eaker stated that the Eighth AAF's successes over Europe, during the first three months of 1943, underlined the validity of daylight strategic bombing in terms of an acceptable loss rate and accuracy of bombing; however, he seemed to accept fighter escort was required out to the fringes of the fighter's range but deep penetration raids would require at least 300 bombers.¹⁸ Eaker

based his conclusion from the results of the past six months with a small force of bombers.

Such beliefs made it possible for the USAAF leadership to ignore the fact that the overall loss rate for escorted bomber missions was two percent verses seven percent for unescorted missions and this meant the average bomber crew could expect to survive fourteen or fifteen unescorted bomber missions.¹⁹ This attrition resulted in a tremendous loss in experienced aircrew that undermined unit cohesion and affected morale. Since a tour at that time was twenty-five missions, if more than half were unescorted missions, survival rate for the tour was low. Once aircrews worked the survival odds out and figured the survival rate for a tour, this led to low morale which was persistent the Eighth AAF throughout 1942 and into the fall of 1943. Aircrew returning from mission after mission and witnessing the empty bunks from fellow crews developed a fatalistic view. In May of 1943, the crew of the Memphis Belle was the first to complete the twenty-five mission requirement and were immortalized in American folklore for miraculously overcoming the odds.

By spring 1943, bomber crews were training new formation tactics and implementing “bomber boxes.” The new box formation was flown by a three group wing with twenty-one planes per group. The top group flew above and slightly to the right of the middle group and the bottom group flew below the middle group and slightly to the left. Viewed from the side, each group resembled a giant wedge but from above each fortress could bomb without striking a plane below it and fire in most directions without fear of hitting another bomber. Only the lead bomber carried a Norden bombsight as the other planes in the group would release their bombs upon signal from the lead plane.

Formation flying also meant no more evasive maneuvering so the Eighth Bomber Command began “pattern bombing” which was a huge doctrinal shift.

Meanwhile, Brigadier General Frank Hunter, commander of Eighth Fighter Command, studied the fighter escort problem by flying in B-17s during missions. By the spring of 1943, the Luftwaffe began attacking in larger formations and making head-on passes at the bombers, aircrew demanded more fighter escort and preferred escort that was located only several hundred feet in front of the bomber or only seventy-five feet off the wingtip. Since the fighter escort was often shot at by their own bombers when the fighters came in to take up position, the close fighter escort practice was quickly dropped.

At the time, the Spitfire’s 125 mile radius and the P-47’s 225 mile radius offered little to the realm of possibilities concerning the escort range problem for missions into Germany.²⁰ Hope pinned on the P-38 to provide the needed fighter escort for long range missions but due to the design of its turbo chargers, the P-38 was not suited for high altitudes. The Luftwaffe was well aware of the Allied escort fighter’s range limitation and remained well out of range of the bomber formations until the escort fighters turned back; then, the Luftwaffe would commence well organized attacks against the bomber formations.

An early attempt to solve the long range escort problem came by modifying the armament on existing B-17s. In May of 1943, twelve YB-40s (modified B-17s with three more machine guns, an additional ball turret, and twice as much ammunition) made their debut in raids against the submarine pens.²¹ The USAAF Leadership hoped that a ratio of one YB-40 to two or three B-17s would provide enough protection within the bomber formations for the upcoming raids into Germany. But because of the additional weight,

the YB-40s could not keep up with the rest of the B-17 formation so the experiment was discontinued.

POINTBLANK Directive

On June 10th, 1943, the Combined Chiefs of Staff issued a directive known as POINTBLANK, which put German fighter strength at the top of target list all in a category of its own.²² The Pointblank Directive contained the following passage:

“The increasing scale of destruction which is being inflicted by our night bomber forces and the development of the day bombing offense by the Eighth AAF have forced the enemy to deploy day and night fighters in increasing numbers on the Western Front. Unless this increase in fighter strength is checked, we may find our bomber forces unable to fulfill the tasks allotted to them by the Combined Chiefs of Staff. To this end, the Combined Chiefs of Staff have decided that first priority in operation of British and American bombers based in the United Kingdom shall be accorded to the attack of German fighter forces and the industry on which they depend.”²³

The draft of the POINTBLANK plan was essentially a revision of the Casablanca directive but a much more viable plan for the Combined Bomber Offense, with the specific objective to weaken Germany air power and ensure the success of the planned cross-channel invasion. But in truth, the POINTBLANK directive did not result in a coordinated effort between the RAF and the USAAF. During 1943, Harris never bombed targets linked to the American plans. When asked by Portal why RAF Bomber Command had not linked targets to the USAAF, Harris pointed to his success in attacking German cities and was still committed to extending his night raids to Berlin; a switch to bombing aircraft manufacturing and ball-bearing factories would undermine this success. Thus,

throughout 1943, the CBO was complimentary but never coordinated. The coordination did not take place until Harris and Eaker's replacement, Major General Jimmy Doolittle, were ordered by the Combined Chiefs of Staff to coordinate in 1944.

Meanwhile, the Eighth welcomed the POINTBLANK directive because it shifted bombing from submarine pens towards "defanging" their arch enemy the Luftwaffe. The USAAF leadership reasoned that the Luftwaffe would now be forced to defend these new vital targets. Combined with what the Eighth AAF leaders conceived as an ever increasing loss of German fighters from aerial gunners after each raid, the Luftwaffe would be subject to a battle of attrition not knowing it was in fact the Eighth AAF facing attrition.

When weather cleared in July, the Eighth AAF began its "Blitz Week." In a series of daily missions, the Eighth Bomber Command unleashed raids aimed at aircraft assembly plants. Eaker hoped that multiple raids taking place at the same time would swamp the enemy defense network. The week ended with heavy loss: eighty-seven bombers with aircrew, or 6.4 percent of the total dispatched were lost and barely a scratch was made in German aircraft production.²⁴ The USAAF leadership felt something bigger and more dramatic was needed so the stage was set for the fall of 1943. Eaker stated "we will repeat this effort many times and on an ever-increasing scale."²⁵ For the USAAF leadership, who struggled so long to assert their belief in high altitude daylight strategic bombing, this was their golden opportunity.

¹ Rommel's Afrika Korps forced the British 1st Armored Division back across the Cyrenaican bulge in January 1942. From February to May of 1942, the front line settled down at the Gazala line, just west of Tobruk, with both armies preparing for offensive operations. Source: Roger A Freeman. *The Mighty Eighth: Units, Men and Machines* (New York, NY: Jane's Publishing Company, 1970), 4.

² Ibid, 4-5.

³ Allan R. Millett and Williamson Murray. *Military Innovation in the Interwar Period* (New York, NY: Cambridge University Press, 1996), 121.

⁴ Since 1941, it was difficult for the RAF to get the Luftwaffe to come up and fight (the Luftwaffe was conserving strength for the Eastern Front and North African Campaign), RAF Fighter command sent fighter sweeps over France and the lowlands hoping to engage; this accomplished nothing but the loss of three to four British planes, usually to ground fire, for every German plane destroyed. The B-17, on the other hand, might draw the Luftwaffe into the air where RAF Fighter Command could shoot German fighters down. Source: Geoffrey Perret. *Winged Victory* (New York, NY: Random House, 1993), 243.

⁵ The USAAF was facing a demand from the British Air Ministry to convert American industry over to the production of Lancaster bombers and commit the Eighth AAF to night bombing. Eaker pointed out that German night fighters were becoming more efficient plus it would take at least a year to retrain the Eighth AAF to conduct strategic night bombing operations. Source: John Sweetman. *Schweinfurt: Disaster in the Skies* (New York, NY: Ballantine Books, 1971), 60-61.

⁶ James Parton. *Air Force Spoken Here: General Ira Eaker and the Command of the Air* (Bethesda, MD: Adler & Adler Publishers, Inc., 1986), 135.

⁷ The logistical support for the Eighth AAF to conduct operations was on a massive scale. In addition to the food and logistical needs for the 75,000 personnel, 500 bombers consumed eighty tank cars of aviation fuel (for an average mission) plus needed 300 tons of equipment for support with 7,500 tons of spare parts in reserve. Source: Perret, 37-38.

⁸ Henry H. Arnold. *Global Mission* (Blue Ridge Summit, PA: TAB books Inc., 1989), 312.

⁹ Six B-17s were sent on a diversionary raid and only one plane was slightly damaged when it flew into a flock of pigeons. Eaker, flying in the lead aircraft as an observer, watched as most of the bombs impacted within the target area. Source: Sweetman, 46-47.

¹⁰ Freeman, 15.

¹¹ Perret, 247.

¹² The initial point was usually some easily recognizable ground feature ten to fifteen miles from the target. USSB survey indicates only about twenty percent of bombs were falling within 1000 feet of the aiming point. Source: Ibid. 248.

¹³ The Luftwaffe during the Battle of Britain also experienced a problem of inflated aerial claims which led Goering to underestimate the strength of the RAF and

switch the Luftwaffe's target priorities. Wesley Frank Craven. *The Army Air Forces in WWII VOL II* (Chicago, IL: University of Chicago, 1949), 222.

¹⁴ Sweetman, 49.

¹⁵ When Spaatz arrived to the Casablanca conference in January of 1943, he took a long walk on the beach with Eaker. Arnold assured him the Eighth would realize the dream of daylight strategic bombing once fighter escort arrived. Eaker assured him he did not need the long range escort as "with three hundred heavies, I will be able to strike anywhere with a low loss rate. Source: Perret, 249.

¹⁶ Haywood S. Hansell, *The Strategic Air War against Germany* (Washington: Office of Air History, 1986), 69.

¹⁷ The B-26 group, assigned to bomb Ijmuiden power station in the Netherlands, was expected by German defenses (when the 12th aircraft aborted and was detected by German radar) and heavily hit; all 11 aircraft failed to return. Appalled, the USAAF leadership shifted the B-26s from Eighth Bomber Command to Eighth Air Support Command to perform medium altitude bombing missions for the duration of the war. Source: Ken Merick. *By Day By Night: The Bomber War in Europe* (Runnymede, England: Ian Allan Ltd., 1989), 80-82.

¹⁸ Sweetman, 62.

¹⁹ Perret, 253.

²⁰ The current belly tank available to the P-47 was a huge, unwieldy two-hundred gallon ferrying tank made out of paper mache and lacked pressurization. In response to pleas from the head of the Eighth's technical service section, Colonel Cass Hough, plane manufacturers worked on a pressurized tank. Satisfactory drop tanks did not appear in numbers until early 1944. Source: Richard H. Kohn and Joseph P. Harahan. *The Strategic Air War Against Germany and Japan* (Washington D.C.: Office of Air Force History United States Air Force, 1983), 91.

²¹ The additional armor on the YB-40 added nearly an additional ton to each plane; after bombs were dropped, the lighter B-17s increased speed and the YB-40s could not keep up. All YB-40s were eventually scrapped. Source: Craven, 268.

²² Perret, 262.

²³ Martin Middebrook. *The Schweinfurt-Regensburg Mission* (New York, Charles Sciber's Sons, 1983), 7.

²⁴ Only 175 bombers were serviceable out of the 300 that started earlier that week. Source: Ibid, 5.

²⁵ Sweetman, 60.

CHAPTER 4

THE SCHWEINFURT RAIDS AND THE USAAF LEADERSHIP'S REACTION

“This air operation today is the most important air operation yet conducted in the war and the target must be destroyed as it is of vital importance to the enemy. Your friends that have been lost, and will be lost today, are depending on you. Their sacrifices must not be in vain. Good luck, good shooting, and good bombing.”¹

Brigadier General Frederick L. Anderson, Eighth Bomber Command.

Planning for the Schweinfurt Raids

Schweinfurt is a small Bavarian town known for its domestic beer, bicycle industry, and ball-bearing factories. Because of the latter, Schweinfurt promised to be an important part of the manufacturing center of gravity for the German industrial war effort during World War II. In theory, no nation could wage modern war without anti-friction bearings as the wartime industry absorbed them in every piece of equipment from small arms to military transportation. For example, the German aircraft industry consumed more than 2,395,000 ball-bearings annually (one JU-88 had 1,056 bearings in the airframe and several hundred more for the twin-engines).² Schweinfurt produced 52.2 percent of Germany's total anti-friction output and in the words of Reichsminister for Armaments Albert Speer “represented a weak link in the German industry that if the Allies discovered and exploited, could bring the German military to a halt in a matter of months.”³ The five ball-bearing factories in Schweinfurt produced a whole range of ball-bearings as opposed to other ball-bearing factories in Germany that produced only highly specialized ball-bearings required by only certain pieces of equipment. Schweinfurt

represented a bottleneck in the Axis anti-friction industry and an inviting target.

Schweinfurt made the primary target list for the USAAF to strike and the stakes were high; in theory, if the Allies could eliminate Schweinfurt, German production capability would falter, from the lack of ball-bearings, and this would shorten the length of the war and save countless lives.

Schweinfurt was a target the high altitude, daylight strategic bombing doctrine was designed to eliminate. The Eighth AAF attacked Schweinfurt on August 17th, 1943, and eight weeks later followed up with a second raid. Together, the two Schweinfurt raids cost the USAAF 96 B-17s destroyed over Europe and 965 crewmen lost.⁴ The Eighth AAF entered an attritional cycle it could not maintain and was stood down, from long range unescorted missions, for over four months while the Germans were still very much in the war. In fact, the German ball-bearing industry was able to survive the initial shock, take successful countermeasures, and boast “Es ist kein Gerat zuruck geblieben weil Walzlager fehlten” (No equipment was ever delayed because ball-bearings were lacking).⁵ What was the USAAF leadership’s reaction to the Schweinfurt raids? After a brief review of the Schweinfurt raids and events between the two raids, the end of this chapter will explore the USAAF leadership’s reaction to the raids and provide insight into the controversy that led to the four month halt of unescorted daylight strategic bombing.

By August of 1943, Eighth Bomber Command possessed enough planes to mount a 300 bomber raid and decided the time was right to strike industrial targets deep in Germany and the Eighth AAF leadership was still confident such a large force could defend itself against the Luftwaffe. The detailed staff planning to attack targets deep in

Germany entered its final stage the beginning of August. The Eighth AAF planning staff still favored simultaneous raids to surprise and overwhelm the German defenses which, when coordinated properly, did just that. The first plan, codenamed “Juggler,” called for striking two Messerschmitt aircraft assembly plants simultaneously. “Juggler” involved the Eighth Bomber Command to strike Regensburg and the Ninth AAF, flying out of Italy, to strike Wiener-Neustadt (in Austria) at roughly the same time. In theory, the two bomber formations, coming from different directions, would confuse and divide the German air defenders. Diversion raids involved the bombing of German airfields along the Dutch and French coast which included Bryas-Sud and Marckby by America B-26 bombers and RAF Mitchells and Hawker Typhoons strafing the German airfields Poix, Lille-Vendeville, and Woensdrecht. Set for August 7th, “Juggler” was post-poned due to the bad weather in England which grounded the Eighth AAF. The Ninth AAF went ahead and attacked Wiener-Neustadt achieving poor bombing results but lost only two bombers, out of the 65 B-24s that participated in the mission, due to the lack of German air defenses over Austria.⁶

Still needing a second target to strike, the Eighth AAF planners turned to another target on their list: Schweinfurt. The revised plan called for 146 B-17s, led by Colonel Curtis LeMay of the 4th Bombardment Wing, to take off from their bases in East Anglia and strike Regensburg then continue on to land at Allied airfields in Algeria; this involved a 500 mile trip to the target and another 1,000 miles to the safety of North Africa.⁷ The B-17s flying this mission were specially equipped with Tokio, or as the crews joked “Tokyo Tanks,” to give the B17s the extra range needed to reach North

Africa. After refueling, rearming, and a rest in North Africa, the Regensburg force would return to England after bombing Bordeaux, France, along the way.

Taking off shortly after the Regensburg Force was the 1st Bombardment Wing consisting of 230 bombers led by Brigadier General Robert Williams.⁸ The 1st Bombardment Wing would trail the Regensburg force by ten minutes and turn North, just before reaching Nuremberg, to attack Schweinfurt for a round trip of 800 miles.⁹ Under this plan, the Regensburg force would spearhead the assault and punch the way through the templated German fighter defense belt while the trailing Schweinfurt bomber force would fight the way out. Besides the 376 B-17s for the strike, 268 P-47 sorties and 191 Spitfire sorties were planned as fighter escort.¹⁰ Mission #84 became known as the “double strike mission” because it entailed two large B-17 bomber forces, nearly the entire heavy bomber strength of the Eighth AAF at the time, to attack two separate targets in order to disperse fighter reaction by the Luftwaffe.¹¹ The air crews were told to prepare for a mission brief on the morning of August 10th, but the mission was scrubbed late on August 9th due to poor weather. Planned for the next day, crews would again make it to their dispersal points before the same mission was scrubbed a second time due to the English weather.

German Air Defenses

It was exactly one year since Eighth Bomber Command began daylight bombing and challenging German defended airspace so German air defenses, over the western continent, were bolstered. By the summer of 1943, Luftwaffe pilots had shed the myth of the B-17 as a “flying coffin” and seriously worked out tactics which involved attacking the bomber from various angles especially from the vulnerable 12 o’clock position.

During a head-on attack, with the bomber and fighter closing at speeds of more than 500 m.p.h., the front gunner had only a fraction of a second to pick up and shoot at a German plane while the fighter pilot had less than a second to engage the bomber as well. The difference between the gunner and the German pilot was target selection; the bomber's large nacelle's from the front were an inviting target and vulnerable when hit by the fighter's superior firepower of 20mm/cannon and machine guns. A well coordinated attack by three to four fighters could also divide the bomber's defensive fire. Since a B-17 carried about 7,000 rounds of .50 caliber ammunition, which amounted to about seven minutes of defensive fire, this was not much consultation while deep over enemy territory.¹² The bomber box or "Pulk" (translated as "herd") was also difficult to penetrate, so German pilots often searched for the group flying the loosest formation, for the initial attack, and then picked off stragglers.

At this stage of the war, a Luftwaffe pilot's experience varied from expert to novice. The Luftwaffe, unlike the USAAF, had no tour rotation for their pilots but granted a temporary leave of absence on an infrequent basis. A German pilot would fly until removal by death or wounds, much like in World War I. Experienced pilots were supplemented by novice pilots released from the training program, which became shorter as the war lengthened, and attrition sped up the training cycle. A German pilot was expected to finish training at his assigned unit and at the same time gain combat experience. This system maximized the use of a sparse resource Germany faced throughout the war: experienced fighter pilots.

Throughout the summer of 1943, the Luftwaffe on the Western Front was supplemented with new fighter units (some withdrawn from the Eastern Front) so the

Luftwaffe was more potent than what the Allies faced the previous spring. In March of 1943, only 120 day fighters were available for defensive action in the west; this rose to 405 single-engine fighters and 80 twin-engine aircraft (including a number of night fighters which could also make daylight attacks) for the August raid.¹³ Also of note is most of the single-engine Messerschmitt fighters were built at the Regensburg facility.

Not only was there an array of experience for German pilots, but German ground controllers were supplemented in a vastly expanded program as well. The ability of the Luftwaffe, to mass and intercept American bomber formations, depended on the ground controller's ability to interpret radar signals and successfully vector in Luftwaffe fighters. An experienced ground controller could guess the bomber's future position, vector fighters directly to that position, maximize the use of the fighter's combat time, land the fighter at a nearby airfield to refuel and rearm, and send the fighter back up to attack the same bomber formation. A single German fighter could sometimes intercept incoming and outgoing bomber formation several times during deep penetration raids.

Throughout the summer of 1943, the Germans employed ingenious techniques to improve their interception effectiveness. In addition to disguised merchantmen and fishing boats in the North Sea, reconnaissance aircraft or control aircraft reported the speed, course, and altitude of incoming bomber formations to ground controllers. Control aircraft, usually twin-engine planes, would stay just beyond the range of the bomber formation's defensive fire to coordinate fighter attacks, until relieved by another aircraft.

Considerable use was made of a few captured B-17s (slightly damaged Allied bombers/fighters, that made landings in enemy held territory, were put to use by the Luftwaffe) to infiltrate or follow bomber formations during the course of the mission.

One captured B-17, nicknamed “The Black Knight” because it was painted in an overall black finish and marked with German crosses, occasionally flew parallel to bomber formations whenever escort was not present.

Two days before the Eighth AAF set out on its most ambitious mission to date, RAF Chief of Staff Sir Arthur Portal stated the Luftwaffe was gaining in strength and warned the Combined Chiefs that unless Major General Ira Eaker received bomber reinforcements he requested, POINTBLANK would be in jeopardy and could possibly fail.

The August 17th, 1943, Schweinfurt-Regensburg Raid

During the late afternoon and evening hours of August 16th, the mission #84 folders containing raid details, went out to the various groups within the Eighth AAF. The usual pre-mission activity took place with intelligence officers reviewing every detail of the target, flak officers looking at the latest data on German ground defenses, meteorologists looking into weather data, and G-4 officers readying the necessary ordnance. Aircrews knew a raid was coming and expected a 3:00 a.m. briefing. However, there was great deal of speculation among the 4th Bombardment Wing as their additional instructions included packing an extra change of clothing, canteens, cutlery, and toiletries.

The weather over England on the morning of August 17th revised the original plan. Though the weather over the targets and North Africa looked good, there was a mist with limited visibility over the airfields in England and this delayed the start of the mission. Even though the mist did not clear, the Regensburg attack force took off 90 minutes after dawn so the bombers would reach North Africa while it was still daylight.

The Schweinfurt bombers would be held back so P-47s escorting the Regensburg attack force could return to refuel/rearm and then escort the Schweinfurt bombers. This destroyed the very essence of the original plan, to divide and dilute the enemy air defenses, but the Eighth AAF staff decided the double cover of fighter escort for 1st Bombardment Wing would neutralize the loss of surprise. Some optimists among the Eighth AAF staff suggested the Regensburg bomber force would maul the Luftwaffe to the extent that the Schweinfurt force would face few enemy fighters; how wrong they were.

It wasn't until 9:45 a.m. that the 4th Bombardment Wing was satisfactorily formed and headed out over the North Sea. By 10:00 a.m., the lead box (the 4th Bombardment Wing had formed its 139 B-17s into three combat boxes) crossed the Dutch coast when it encountered light flak.¹⁴ Eighty-seven P-47s should have rendezvoused with the bombers but the escort's coordination was off due to the mission delay and the weather; not all the escort fighters linked up with the bomber formation so the rear box was left completely unprotected.¹⁵ By 10:15 a.m., the bomber force encountered heavy flak and German fighters discovered the unprotected rear box. Concentrating on this rear box, six B-17s went down before the P-47s turned back at Eupen, low on fuel.¹⁶ Now without any fighter escort and over German air space, the bombers were completely on their own for the next three hours. Without interference, the German fighters were able to better coordinate their attacks and the 4th Bombardment Wing lost eight more bombers enroute to Regensburg. Besides single-engine fighter attacks, ME-110s fired rockets into the boxes in an attempt to break up the tightly packed formations while JU-88 night fighters dropped fragmentation bombs from above. Other ME-110 and JU-88 aircraft acted as

controllers for single-engine fighter attacks. Near the target, the B-17 gunners were low on ammunition and exhausted. In the words of one crewman, "I learned first hand a man can resign himself to the certainty of death without becoming panicky."¹⁷ The 4th Bombardment Wing, down to 122 bombers, bombed the Regensburg Messerschmitt works and reported heavy damage. Eight more bombers were lost after the 4th Bombardment Wing left the target area and all the bombers that touched down, nearly out of fuel, in North Africa. Sixty-three of the bombers that landed in Algeria were written off and left in North Africa. A majority of the remaining planes sustained damage of varying degrees during their route across southern Germany.¹⁸

As the 4th Bombardment Wing left the Regensburg target, the 1st Bombardment Wing took off now five hours behind schedule. 222 bombers crossed the Dutch coast, slightly south of the route the earlier Regensburg force took, escorted by RAF Spitfires and the rearmed/refueled P-47s from 78th Fighter Group.¹⁹ Since the German defenders expected the 4th Bombardment Wing to fly back to England, controllers massed Luftwaffe fighters for a return trip that never came. Once the German controllers realized the Regensburg force was heading toward North Africa, they quickly vectored about 300 available fighters onto the 1st Bombardment Wing. Fifty-one fighters from the 56th Fighter Group, flying P-47s and led by Colonel Hub Zemke, took a gamble and held on to their cumbersome ferrying tanks for an extra ten minutes beyond the coast, and flew fifteen miles beyond Eupen; arriving in time to catch eight unsuspecting ME-110s deploying to attack the Schweinfurt bombers.²⁰ Unfortunately, once their fuel was low and the fighter escort turned back, the 1st Bombardment Wing was savaged the rest of the journey to Schweinfurt and experienced the same treatment on the return trip. In all, the

Schweinfurt force lost thirty-six bombers shot down with eleven more written off due to extensive damage.

The Regensburg-Schweinfurt raid cost Eighth Bomber Command 60 bombers and 605 crewmen (a majority as POWs) plus an additional 87 B-17s were left behind in North Africa due to damage and the lack of spare parts.²¹ In terms of aircraft attrition rates, the Regensburg force lost sixteen percent of its bomber force while the Schweinfurt force lost nineteen percent; this was four times higher than the previous year's total.²² Though fortress gunners claimed 288 fighters shot down and escorts claimed a further 32, Luftwaffe records showed only 27 fighters were lost with an additional 15 written off after landing and 16 pilots lost.²³ Exaggerated fighter claims only boosted after action assessments. One pilot tersely reported "they were shot down in droves" while a navigator reported "I can't remember looking out without seeing them (German fighters) fall out of the sky like dirty drops of rain."²⁴ Again, inflated claims of enemy fighters shot down contributed towards an overestimation by the USAAF leadership on the attritional effect the raid had on the Luftwaffe.

Heavy damage was reported at the Regensburg Messerschmitt factory with an estimated production loss of 800 to 1000 planes or eight to ten weeks worth of production.²⁵ It should also be noted that the raid destroyed the jigs used for the fuselage of the new ME262 fighters; this set Germany's jet program back an estimated four months. "Even though the two major ball-bearing factories at Schweinfurt sustained eighty direct hits, the overall damage at Schweinfurt was light due to the five factories spread over greater distances."²⁶

The 1st Bombardment Wing was originally supposed to drop incendiaries to light the way for a RAF night attack but Air Marshall Sir Arthur Harris instead ordered a raid on the V-1 facilities at Peenemunde because the best night to attack the V-1 facility happened to fall on August 17th. The RAF destroyed the V-1 facility but lost forty bombers in the process.

The Schweinfurt-Regensburg raid initially shocked Hitler and Speer and terrified the Luftwaffe Chief of Staff, Hans Jeschonnek. Jeschonnek felt he could no longer control the situation so on the night of August 18th, he shot himself in the head. Even though the aerial photos taken after the raid gave the appearance of complete destruction, production was only temporarily halted but not stopped. The machine shops and factories at Regensburg and Schweinfurt were constructed with brick walls and asbestos roofs which collapsed under the weight of the bombing. However, once the German workers cleared the debris, much of the heavy machinery was intact or only slightly damaged and repaired. Officials at both locations were proud of their factories swift recoveries. After a further review of aircraft losses, Adolf Galland called the Regensburg-Schweinfurt raid “a disaster for the enemy.”

The losses incurred by the Eighth AAF alarmed the USAAF leadership but explained as justified because the intelligence reported heavy damage to enemy facilities and the destruction of enemy aircraft - the number one objective of the POINTBLANK directive. Reconnaissance photos showed the misleading “extensive” damage which was reported up the chain as “concentrated and heavy.” Between the aerial photographs and the after action reviews, the USAAF leadership was confident they were eroding away

the strength of the Luftwaffe and this upheld their belief in the current daylight strategic bombing theory.

Commenting on the raid, General “Hap” Arnold declared “The American idea – high altitude precision bombing - has come through a period of doubt and experimentation to triumphant vindication.”²⁷ The British Air Ministry sent a congratulatory message welcoming the Eighth AAF to the war effort and praising the serious blow dealt to the enemy. Though doubts were raised concerning the cost of the raid, the weather was offered as an explanation for the shortcoming and the bombing results erased any doubt. The weather hampered the original plan to send all 376 bombers at one time and caused a split in the force; Eaker’s requirement was for a force of at least 300 bombers to be self-sustaining for a deep penetration mission. Optimism about the current daylight strategic bombing doctrine still radiated from the USAAF leadership and all the way up the chain of command. President Roosevelt, speaking to congress, stated “Hitler forgot to put a roof over his fortress.”²⁸ Arnold indicted to Eaker that he would like to see the Eighth AAF launch a series of raids, like the Regensburg-Schweinfurt mission, to weaken the Luftwaffe and prep for the upcoming invasion of Europe. It was clear Eaker did not intend to restrict operations after the first Regensburg-Schweinfurt raid but instead enlarge the effort.

Eaker knew the Eighth AAF needed time to recover and build up toward another deep raid. Throughout September replacement aircraft were flown in (these were now the new B-17G models with the chin turrets, an adaptation from the YB-40 model) and replacement aircrews trained. A majority of targets selected throughout the remainder of August and into September were short range missions, with escort fighters along the

channel coast, meant to mislead the Germans into believing a cross-channel invasion was imminent. An invasion threat would tie down large numbers of German troops in the western continent and drain Wehrmacht troop strength in Italy and on the Eastern Front.

Arnold visited the Eighth AAF Headquarters the first week of September and was in England for the September 6th raid against the Stuttgart roller-bearing factory. 338 B-17s headed to the primary target but Stuttgart was completely clouded over.²⁹ The mission turned into a disaster as many of the bombers overshot the city and then turned back looking for a break in the clouds. German fighters, also delayed by the weather, struck the bomber force over the target area and caused heavy loss to the meandering bombers. Altogether, forty-five B-17s were lost: twenty-eight planes were shot down, twelve ditched in the channel due to low fuel, and five others were severely damaged and took refuge in neutral Switzerland and 332 men were lost.³⁰ Arnold was not impressed with the Eighth AAF's performance that day.

During the month of September, the 305th Bombardment Group worked with RAF Bomber Command to experiment with night bombing and flew several night missions; perhaps to see if it was possible for the Eighth AAF to transfer to night bombing. After eight missions, it was determined the B-17s needed further modifications and the American crews considerable training to do night bombing raids.

As the Allies were to find out, there was no longer a defensive coastal "fighter belt" extending from the North Sea to Southern France. Instead, the Germans utilized defensive "grids" and vectored fighters towards the incoming bomber formations and could direct several hundred sorties at any time from many different airfields. The German air defense network was upgraded as Goring was not pleased with the

Luftwaffe's performance during the August Regensburg-Schweinfurt raid. Goring ordered from this point on, every German pilot was expected to fly at least three sorties for every five hours B-17s were over German air space.³¹

To counter the larger raids from the Eighth AAF, the Luftwaffe began moving more fighter units from the Eastern Front to the Western Continent. The next time the Eighth AAF visited Schweinfurt, they would face nearly 800 German fighters (with a sixty-five percent increase in the number of single-engine fighters) as opposed to the 300 fighters during the August raid. The ME-110 was being replaced by the ME-210 "bomber destroyer" which had a speed over 400 mph and could hit the bombers from outside their defensive fire perimeter with both rockets and cannon. More JU-88s, armed with six 20mm cannon, were utilized from the night attack units for knocking down bomber stragglers.

There was never a question of morale among the German pilots as they were defending their homeland and with the same tenacity as their British counterparts did three years earlier during the Battle of Britain. But at the same time, the Luftwaffe's quick expansion meant a shorter training program which showed in the large influx of inexperienced pilots. While the Luftwaffe could not stop the incoming bomber raids, hope was the German defenses could impose heavy losses on the bombers and force the Allies to abandon strategic bombing, much like what happened to the Luftwaffe during the Battle of Britain several years earlier.

Since the German general staff expected another attack on Schweinfurt, over three hundred 88mm flak guns were moved from various units to near the city so now the bombers would be exposed to a flak box for nearly seven minutes over the target; this did

not include concentrations of flak batteries along the expected ingress routes.³² Also, an inner and outer ring of smoke generators was placed around the city to generate a smoke screen to further confuse the bombardiers.

By late September, large quantities of 75 gallon fuel tanks began arriving in England and the P-47 escorts increased their range to 340 miles or just inside the borders of Germany.³³ The Luftwaffe was quick to counter this new threat by attacking escort fighters as soon as they crossed the channel coast which caused the escort fighters to prematurely drop their external fuel tanks and lose precious fuel needed for long range missions.

By the first week of October, the Eighth Bomber Command was ready to once again hit industrial targets inside Germany. In a series of missions, during what became known as the “Black Week,” the Eighth AAF launched over one thousand bomber sorties against industrial targets in the German cities of Marienburg, Gdynia, and Munster, but experienced the loss of 88 bombers and almost 900 aircrew.³⁴ The decision was made to strike Schweinfurt next as reconnaissance photos showed the Germans rebuilding effort.

The October 14th, 1943, Schweinfurt Raid

The second Schweinfurt raid, Mission #115, called for 360 bombers (in three air divisions) to use two different routes to the target and was to take place on October 14th 1943, but due to the previous two weeks of aircraft losses, only 294 B-17s (in two air divisions) were available to repeat the attack on the Schweinfurt ball-bearing factories.³⁵ One group of P-47s would provide escort to each of the air divisions while another P-47 group would give withdrawal support and two squadrons of Spitfires would sweep the withdrawal route and escort stragglers.

The weather on the morning of the 14th started out in a manner the aircrew of the Eighth AAF grew accustomed. Outside some English airfields, the weather was cold and foggy, while other airfields experienced heavy rain. On the average, visibility was down to one mile under 2,000 feet. Again, the weather would delay this mission and cause problems with fighter escort rendezvous. At 3:00 a.m., mission #115 was briefed and greeted with disbelief, groans and hisses from the aircrews. In the words of one medical officer, the mention of Schweinfurt “shocked the air crews completely.” In one Group briefing:

There was a hushed silence as everyone leaned forward looking at the fateful end of the red yarn. “It’s Schweinfurt.” the briefing major said with a sardonic smile, and gives us time to think. Abruptly a buzz of voices breaks out, and one says “Sonofabitch! This is my last mission!” And it was, as he was one of those that never made it back.³⁶

Over three thousand men left from the mission briefings, traveled by vehicle or bike to their respective aircraft, prepared equipment, performed flight checks, and waited for the fog to lift. Finally, between 10:00 a.m. and 10:30 a.m., the bombers were able to take off and began forming up.

Sixty B-24s from the 2nd Air Division were to fly a diversionary raid toward northwestern Germany but due to the weather, only twenty-four made it to the rendezvous. After circling for thirty minutes, it was decided that the twenty-four B-24s, along with their fifty-six P-47 escorts, would perform an uneventful feint over the North Sea as far as the Frisian Islands.³⁷ This feint failed to draw the attention of German ground controllers so this meant more German fighters, from JG2 and JG26, were available for the raid against Schweinfurt.

The poor weather increased orbiting time as the B-17s circled to form up. Some aircraft lost their way to the assembly lines and failed to form up completely while others turned back due to mechanical trouble. One bomber ran off a taxiway and became mired in the mud. Still, other bombers spent too much time circling which consumed fuel and these aircraft needed to jettison some bombs over the channel to make the 460 mile round trip and this would decrease damage to the target. Worse yet, because of the delay due to weather, some of the fighter escort failed to meet up with the bombers or made the rendezvous too early burning precious fuel in the process. The 305th Group was eight minutes late and had to take the low position in the 4th Combat Wing of the 1st Air Division; it would suffer later for its tardiness. The 1st Air Division crossed the Dutch coast with 151 B-17s while the 3rd Air Division, trailing thirty minutes behind, crossed the coast with 143 B-17s.³⁸

Luftwaffe fighters from as far away as Rostock (on the Baltic coast) and Doberitz (west of Berlin) were vectored towards the incoming bombers. The 353rd Fighter Group, which was flying cover for the 1st Air Division, was bounced by Luftwaffe fighters over Belgium and had to turn to engage. With the escort either stripped away from the bombers or turning back due to low fuel, more than one hundred twin-engine fighters, rocket armed fighters, and a squadron of Stukas, hit the 1st Air Division with a heavy concentration on the 305th Group. Stukas first attempted air-to-air bombing with timed fuses but were unsuccessful. Some other unusual German aircraft were reported by the bomber crews: one or two FW-189 "Owl" observation aircraft, HE-111s and HE-177s used for rocket attacks, four-engine FW-200 Condors used for spotting, and small HE-113 fighters were seen for the first time in action.³⁹ Since the Stukas failed in their aerial

bombing effort, twin-engine fighters lobbed rockets into the formation and knocked down a few bombers but more importantly loosened up the tight formations so single engine fighters could engage the bombers. Again, attacks were well coordinated and done simultaneously from several different angles on selected bombers. The 305th took a pasting as it lost twelve of its bombers on the way to Schweinfurt and the remaining three bombers joined the 92nd Group flying above it (another bomber was lost on the way to the target leaving only two bombers from this group to return to England). The 91st Group, leading the 1st Air Division, got off relatively light and hit Schweinfurt before the fog generators could be turned on. Most of the bombs from this Group landed on or close by the ball-bearing factories. One bomber, from the 95th Group, fell out of formation to avoid debris from another B-17 that sustained a direct flak hit. Upon recovering, the bomber found itself right over the target and released all ten bombs within the Mean Point of Impact (MPI). After Brigadier General Curtis LeMay confirmed the story with strike photos, the crew received a commendation.

The 3rd Air Division, following thirty minutes behind the 1st Air Division and on a more southerly route to Schweinfurt, experienced fewer German fighter attacks than the 1st Air Division. German air controllers were initially confused by the 1st Air Division's southerly route, but would quickly adjust and concentrate their effort on the 3rd Air Division during the bomber's regress. The Luftwaffe pilots that had attacked the bomber formations on the way into Germany were now rearmed/refueled and ready to renew the onslaught. A "very intense attack" by more than 160 single-engine fighters, backed by twin-engine ME-110, ME-210, and JU-88s, was reported by the bomber crews

immediately after leaving Schweinfurt.⁴⁰ A majority of 3rd Division's bomber losses occurred on the trip back.

Over England the weather had grown worse with a combination of drizzle, rain, and the lack of visibility which dropped to less than 100 yards. This weather kept most of the fighter cover, needed for the return trip, grounded. Returning B-17 crewmen anxiously scanned the skies for friendly fighters but none came. The weather over France was clear and with no fighter escort present, some German fighters from JG2 chased B-17s out over the English channel. Despite the ferocity of the attacks, no bombers turned back which was a tribute to the Eighth AAF.

The Schweinfurt raid ended with the loss of 77 B-17 Flying Fortresses (about 25% of the force) along with 642 crewmen (over 18%); while gunners claimed 104 Luftwaffe planes, German records showed the loss of 32 fighters and a further 20 damaged.⁴¹ As with the first Schweinfurt-Regensburg raid, a majority of the bombers were lost once the Allied fighter escort turned back at the German border. Only thirty-three bombers remained unscathed, or a mere 12% of the force.

Reaction to the Schweinfurt Raids

Soon after the bombers landed, "good bombing results and possible total destruction of target" was sent to Allied news agencies. On the same day, Eaker sent a cable to Arnold stating, "there is not the slightest question that we now have our teeth in the Hun air forces neck" and likened the German defense in the second Schweinfurt raid as "the last final struggle of a monster in its death throes."⁴² Arnold was pleased with the bombing results and announced to the press "Now we have Schweinfurt!"⁴³ Arnold maintained he was prepared to send the necessary replacement aircraft believing the

Eighth AAF was wearing the Luftwaffe to the breaking point. Even RAF Chief of Air Staff Sir Charles Portal, normally cautious about daylight bombing, declared “The Schweinfurt raid may well go down in history as one of the decisive air actions of the war, and it may prove to have saved countless lives by depriving the enemy of a great part of the means of resistance.”⁴⁴ This public display covered what the USAAF leadership was beginning to realize after looking deeper into Eighth Bomber Command’s losses to include the previous three months. Unescorted bomber missions took seven times the loss and when October’s numbers were added in, the figures were more grim.

At Eighth AAF Headquarters, the mood was gloom as no one believed that Eighth Bomber Command could lose one hundred heavies a week and remain an effective fighting force. October 14, 1943, became known as “Black Thursday” due to the losses incurred by the 8th AAF; this was the costliest raid in Eighth AAF history and became the last heavy daylight strategic bombing raid into Germany by unescorted USAAF bombers. For the month of October, a total of 214 bombers had been lost or 10% of those dispatched. The damage rate, for both major and minor repair, was an additional 42%. Together, the losses and damages amounted to over half and at this rate an entirely new bomber force would be required every three months to maintain the daylight strategic bombing campaign. The October Schweinfurt raid made the USAAF leadership look hard into their monthly mission/loss statistics.

Eight days later, on October 22, 1943, the unescorted daylight strategic bombing campaign against Germany were put on hold as the USAAF leadership realized the Eighth AAF could not continue to sustain such heavy losses, in both aircraft and aircrews, and remain an effective force. While Eaker may not have known the true extent

of the damage caused by the second raid on Schweinfurt, he must have wondered if the losses really outweighed the results.

Again, Eaker hoped that Harris would follow the second Schweinfurt raid with a night attack on the ball-bearing factories by RAF Bomber Command. Harris did not follow up on the raid as he did not want to dilute his current strategy of razing major German cities plus Harris argued Schweinfurt would have been too distant and too small of a target for his crews to find in the darkness. Harris failed to mention that RAF Bomber Command had been flying as far as Berlin since 1941 and the fire lit town of Schweinfurt would have been easy to find on the clear night of October 14th – 15th. Furthermore, Harris also stated the Germans had probably dispersed the facilities after the first raid; in this respect, he was right. Still, the opportunity to coordinate and inflict further damage on Schweinfurt was missed.

Inwardly, Arnold had been slowly growing impatient with the performance of the Eighth AAF and the second Schweinfurt raid sent his anger into a furious pitch. Eaker had always been more cautious in the way Eighth Bomber Command was used and intended to build operations up gradually while Arnold was in favor of putting every plane into action every day the weather allowed.⁴⁵ Arnold expressed his displeasure at the mission rates of the Eighth AAF and wondered why a larger percentage of available assets were being used in other theaters. Twelve days after the second Schweinfurt raid, Arnold's roving inspectors reported back that Eaker was scheduling too many missions against comparatively "easy" targets at the end of each month (to keep monthly mission statistics high and the loss statistics low) so the Luftwaffe was receiving a reprieve.

Arnold openly questioned Eaker's targeting priorities and saw a lack of aggressiveness in the way Eighth Bomber Command was used.

The constant fight for resources and to prove the validity of daylight strategic bombing left Arnold desperate for results. This caused Arnold to travel extensively as he considered his personal presence needed at any pending crisis. Arnold experienced two heart attacks that year, one in February 1943 and the other in May of 1943, severe enough to require hospitalization. Though a heart attack was grounds for Arnold's release from military service, President Roosevelt granted an exception to policy to keep Arnold on. Even though Arnold worked with Eaker for many years prior to the start of the war and considered him a close friend, the inspector's report forced him to take action.

When Arnold traveled to Cairo in December for the Combined Chief's (CCS) conference, he recommended Eaker be relieved as in Arnold's view, "Only a new commander divorced from day to day routine can achieve results."⁴⁶ However, Portal defended his friend by explaining poor weather conditions existed over England and that "air operations in Europe and the Pacific can not be compared as in no other part of the world are our bomber forces up against 1,600 German fighters over their own country."⁴⁷ Nonetheless, Arnold had made up his mind.

Worried that two different American commands that would lead to two different opinions on how to best defeat Germany, the Combined Chiefs created the U.S. Strategic Air Forces in Europe (USSTAFE) headquarters and Brigadier General Tooey Spaatz was given overall command of Army Air Forces in Europe. This ensured the control of the heavy bombers, in both the Eighth AAF and the Fifteenth AAF, remained in American hands.

Portal informed Eaker of Arnold's negative comments at the Cairo meeting and Eaker knew the reason behind Arnold's impatience. Eaker was sent to Italy to command the Mediterranean Allied Air Forces (MAAF) while Brigadier General Jimmy Doolittle was sent to command the Eighth AAF. After being fired, Eaker wrote to his former mentor General Fechet, "A severe shock which was heartbreaking."⁴⁸ Despite his negative comments, Arnold sent Eaker a cable stating "Your new assignment pays tribute to your talents as an organizer and a leader."⁴⁹ Two days after Christmas, Arnold sent Doolittle the message "This is a MUST.....destroy the Enemy Air Force wherever you find them, in the air, on the ground, and in the factories."⁵⁰

¹ This was the message delivered at the Eighth AAF mission briefings on the morning of October 14th, 1943. Source: John Sweetman. *Schweinfurt: Disaster in the Skies* (New York, NY: Ballantine Books, 1971), 128 -129.

² Ibid, 69.

³ Franklin D'Olier (Chairman). *The United States Strategic Bombing Survey* (New York, NY: Garland Publishing, Inc., 1976), 26.

⁴ This total represents B-17s and crewmen lost over Europe attacking the Schweinfurt target. The total lost for the Regensburg-Schweinfurt August raid was 60 B-17s with 601 crewmen missing (either dead or prisoners of war) and 11 B-17s later scrapped due to damage. During the October Schweinfurt raid 60 B-17s were lost over Europe with 605 crewmen, 5 more B-17s crash landed in the channel or over England, and 12 more B-17s were written off due to damage. Source: Alan J. Levine. *The Strategic Bombing of Germany* (Westport, Connecticut: Praeger Publishers, 1992), 101-105.

⁵ D'Olier, 29.

⁶ The raid took place August 13th, 1943. Source: Geoffrey Perret. *Winged Victory* (New York, NY: Random House, 1993), 264.

⁷ Martin Middlebrook. *The Schweinfurt-Regensburg Mission* (New York, NY: Charles Scriber's Sons, 1983), 31.

⁸ Ibid, 31.

⁹ Ibid, 31.

¹⁰ Multiple sorties were flown by the same escort fighters as they had time to return to their airfields in England, rearm and refuel, then take off to meet the bomber formations heading home. Source: Ibid, Appendix 1.

¹¹ Ibid, 54.

¹² Perret, 279.

¹³ Ibid, 261.

¹⁴ The 4th Bombardment Wing was down to 139 bombers as more bombers aborted before reaching the Dutch coast. Source: Sweetman, 105.

¹⁵ Perret, 266.

¹⁶ The P-47s had no losses as all returned to their respective bases, Source: Perret, 266.

¹⁷ Sweetman, 107.

¹⁸ Ibid, 266.

¹⁹ Twenty-four B-17s aborted the mission and the 4th Fighter Group, flying P-47s, failed to rendezvous. Source: Middlebrook, Appendix I.

²⁰ If the enemy fighters would have caught Zemke's planes with the external ferrying tanks, they could have easily been shot down but Zemke's gamble paid off. Source: Perret, 268.

²¹ The loss of crewmen includes those on returning aircraft balanced against those picked up by air-sea rescue. The total includes 87 B-17s left behind in North Africa because of damage or the lack of spare parts; many of these aircraft were repaired and later served with the 12th AAF. The loss from this one raid totaled the combined loss of the Eighth AAF's first six months of operation. Source: Middlebrook, Appendix 1.

²² Sweetman, 116.

²³ Middlebrook, Appendix I.

²⁴ Sweetman, 119.

²⁵ Ibid., 266.

²⁶ D'Olier, 29.

²⁷ Ibid., 118.

²⁸ In President Roosevelt's speech to congress. Source: Sweetman, 12.

- ²⁹ Sixty-nine B-24s also flew a diversionary raid. Source: Perret, 272.
- ³⁰ Sweetman, 122.
- ³¹ Perret, 274.
- ³² This is an estimate. Sweetman, 128.
- ³³ The 75 gallon tanks actually held 85 gallons. Source: Ibid., 124.
- ³⁴ Edward Jablonski. *Airwar* (Garden City, New York: Doubleday & Company, Inc. 1971), 183.
- ³⁵ The Air Bombardment Wings were now renamed Air Divisions; sometimes with the “Air” being dropped. Source: Ibid, 184.
- ³⁶ Wally Hoffman. *Reality....Remembering Schweinfurt, Planes and Pilots of World War Two*. Jordan Publishing (online). <http://home.att.net/~ww2aircraft/schweinfurt.html>; Internet, accessed December 20th, 2007.
- ³⁷ Sweetman, 128.
- ³⁸ Ibid., 129.
- ³⁹ The pilots for the HE-113s were inexperienced in handling them and according to one American pilot “they got the hell shot out of them.” In addition, the 92nd Group reported seeing four P-47s flown by enemy pilots but the P-47s did not open fire. Source, Ibid., 132.
- ⁴⁰ Ibid., 138.
- ⁴¹ Total losses include fifty-eight shot down by fighters, two lost to flak, five which crashed in England, and twelve which would never take off again but were fit only for the scrap heap. So out of the entire force that made the actual attack, only thirty-three bombers were unscathed. Including the crewmen from the shot down aircraft, retuning bombers brought back five dead and forty-three wounded for a loss of 642 crewmen (includes the dead, the injured, and a majority which were taken prisoner). Source: Jablonski, 185.
- ⁴² Eaker revised his opinion within a week following the dispatch. Source: Sweetman, 143.
- ⁴³ Anderson issued a public statement “The entire works are now inactive. It may be possible for the Germans to restore twenty-five percent of normal capacity, but even that will require some time.” Source: Martin Caidin. *Black Thursday* (New York, NY: E.P. Dutton & Co., Inc., 1960), 287.

⁴⁴ Sweetman, 142.

⁴⁵ Arnold did not think much of Eaker's staff and criticized bitterly to Frank Andrews, the ETO Commander. Source: Perret, 280.

⁴⁶ James Parton. *"Air Force Spoken Here: General Ira Eaker and the Command of the Air"* (Bethesda, MD: Adler & Adler Publishers, Inc., 1970), 3.

⁴⁷ Ibid., 333.

⁴⁸ In all fairness, Eaker's slow cautious approach would have allowed time for the P-51 fighter, and long range external drop tanks for the P-47s, to arrive before embarking upon costly raids. Eaker remained a three star general until his retirement in 1947, Source: Perret, 282.

⁴⁹ Parton, 343.

⁵⁰ Perret, 282.

CHAPTER 5

THE PAUSE IN DAYLIGHT STRATEGIC BOMBING

Lessons

The second raid on Schweinfurt proved what the first raid suggested: daylight strategic bombing by unescorted bombers was impracticable. The second Schweinfurt raid was the climax to an expensive week: four large raids, between October 8th and October 14th, resulted in the loss of 152 bombers with another 6% receiving heavy damage.¹ By the fall of 1943, one-third of Eighth Bomber Command's heavy bombers were being destroyed each month and the Eighth AAF was no longer in control of the air but in danger of not being able to continue attacks at all. Thus, the second raid on Schweinfurt finally crushed the idea of the self-defending bomber.

Some Air Division commanders had seen the looming crisis as early as July 1943, but now even the higher echelons of the USAAF leadership saw the handwriting on the wall. One week later, on October 22nd, Brigadier General Fred Anderson, commander of Eighth Bomber Command, stood the unescorted strategic bombing campaign down. "We can come up," he explained, "only when we have our fighters with us."²

The year 1943 provided lessons rather than achievements for the USAAF. As Eighth Bomber Command stood down, it was time for the USAAF leadership to reexamine their strategic bombing doctrine. What adjustments were needed to the strategic bombing doctrine and what were the implications?

The problem facing the Eighth AAF's leadership was that vital German targets lay beyond fighter escort range and once the escorts turned for home, the Eighth's heavy bombers were engaged on the Luftwaffe's terms over German territory which indicted

the Luftwaffe actually had air superiority over Europe the fall of 1943. The USAAF leadership now recognized that air superiority was needed before daylight strategic bombing could take place.

During the halt in the daylight strategic bombing campaign, the Eighth AAF received replacement aircrews and upgraded aircraft (heavy bomber strength went from twenty to twenty-five groups), revised its strategic bombing tactics, and reviewed its daylight strategic bombing doctrine. The call to change the 1943 daylight strategic bombing doctrine was a difficult one to make as it called for a shift in air theories nurtured by the Air Corps Tactical School nearly a decade earlier. Major General Hap Arnold wanted to resume POINTBLANK objectives but now believed “the immediate scrapping of some outmoded tactical concepts and the closer coordination between all elements of our commands, and the more effective use of our resources will yield better results.”³ Even Arnold now recognized the need to drop a fundamentally flawed doctrine based upon faulty assumptions and the end result was the heavy loss of aircrew and aircraft. The Schweinfurt missions were the proof needed for the Eighth AAF leadership to re-examine its daylight strategic bombing doctrine.

RAF Bomber Command did not follow-up on the second Schweinfurt raid so the opportunity to inflict irreversible damage to the German anti-friction industry was lost. With the exception of the Hamburg raid earlier that year, RAF Bomber Command and the Eighth AAF did not coordinate the “around the clock bombing” campaign envisioned at the 1943 Casablanca conference. The United States Strategic Bombing Survey claims that a coordinated effort by both RAF Bomber Command and the Eighth AAF could have brought Germany’s anti-friction industry to a temporary standstill. As it stood, it took

new Eighth AAF leadership plus a direct order, from Air Marshall Sir Charles Porter to RAF Chief of Staff Sir Arthur Harris, to coordinate and work together on the POINBLANK targeting list later that year.

Once the Eighth AAF restarted its daylight strategic bombing campaign in February 1944, Schweinfurt was revisited utilizing a combined bombing strategy. On the night of February 24th, 1944, RAF Bomber Command targeted Schweinfurt. The next morning Eighth Bomber Command, this time escorted by long range fighters, followed up with a daylight raid. Again that night, RAF Bomber Command committed a consecutive night raid that added to a total of 3,000 tons of high explosives onto the Schweinfurt ball-bearing facilities. The CBO was now better coordinated and could have achieved devastating results. Unfortunately, Harris was correct in assuming the Germans dispersed their anti-friction industry by this time as the VFK Works transferred 549 vital machines (from all five factories) to new locations.⁴ Thus, the damage from these consecutive raids was not what the Allies hoped.

Speer asserted after the war that German ball-bearing production could have been brought to a complete standstill for four months if: all ball-bearing factories were attacked at the same time, the attacks were repeated three to four times at intervals of fourteen days each, and each reconstruction attempt had been attacked every eight weeks by two consecutive heavy raids.⁵ The necessary CBO coordination against the antifriction industry came too late and to sustain such pressure against this target would have been a strain on Allied bomber resources at the time plus the bombing results would not have been devastating due to the anti-friction dispersion. Once both Allied bomber

commands began CBO coordination on other target selections, the effort would pay big dividends by the end of 1944.

Solutions and a Shift in Doctrine

It was apparent to the USAAF leadership that long range fighter escort was needed and this would be answered in the upcoming months. In the summer of 1943, America's aircraft production was focused on bombers first, reconnaissance aircraft second, and "other air force activities" third.⁶ The second Schweinfurt raid changed aircraft production priority to fighter production with a focus on the P-38 and the P-47 at the time. Arnold ordered all P-38 and P-47 fighter groups deploying overseas to be sent to Britain but it took time to receive aircraft, train aircrews and emplace the necessary technical support.⁷ In the meantime, Major General Ira Eaker sent Eighth Bomber Command out on relatively short missions, within fighter escort range, encountering bad winter weather much of the time instead of the Luftwaffe. But when the Luftwaffe was encountered, the P-38 Lightning had trouble handling the highly maneuverable German fighters due to the Lightning's turbochargers performing badly at higher altitudes in the high humidity and colder temperatures. The P-38 performed well at lower altitudes in the Mediterranean and Pacific Theaters, but was not suited for colder temperatures found at higher altitudes in north and central Europe. The USAAF leadership pinned hope that the P-38 would be the solution to the long range escort problem but mechanical difficulties blocked that option.

A more successful solution to answer the call for increased fighter escort range came in the form of external auxiliary fuel tanks for fighters. As early as 1942, the Eighth AAF inquired whether jettisonable fuel tanks could be made available for the P-47 but

the solution was foolishly delayed by the industrial bureaucracy and the lack of emphasis by the USAAF leadership. Meanwhile, local sources in England were tapped to produce a limited quantity of 75 gallon tanks for both the Spitfire and the P-47. Due to the shortage of wartime material in Britain, these 75 gallon tanks were often made of inferior material and had mechanical issues at higher altitudes. By August of 1943, Army Material Command (AMC) was still experimenting at a slow pace with external tanks but had yet to produce its own model. It took a desperate plea by the Eighth's technical service section chief, Colonel Cass Hough, to get the external fuel tank program kick started. Due to further political pressure applied by the Combined Chiefs, a suitable 150 gallon drop wing tank was quickly developed. In September of 1943, the monthly production of 150 gallon wing tanks for the P-47 was only 300; by December it was 22,000. If the tasking was taken seriously a year earlier, this one innovation could have decreased bomber losses during the fall of 1943 but emphasis arrived too late. As Brigadier General Hume Peabody would put it, the auxiliary tank problem indicated "a lack of forward thinking."⁸ By early 1944, the 150 gallon wing tanks had a significant impact on the fighter escort solution.

Also by late fall of 1943, the P-47 received technical upgrades, which included an improved paddle bladed prop and a water injection boost kit, which greatly improved horse power and overall performance.⁹ The P-47 could now out-climb its main adversary, the FW-190, and with a new gyro-stabilized gunsight would have a better chance of obtaining hits. The P-47, a seven ton plane equipped with eight fifty caliber machine guns, had its combat range greatly increased by the new 150 gallon droppable wing tanks

and performed a majority of the escort missions in early 1944 that swept the Luftwaffe from the skies.

Even though the USAAF leadership placed a lot of faith in the P-38 Lightning, it was an entirely new plane that would take center stage for fighter escort duty. The origins of the P-51 are curious enough; in April 1940, the British Air Commission approached North American Aviation for a contract to build Curtiss fighters for the RAF. The company suggested an entirely new plane be built and presented the NA-73 Mustang powered by an Allison engine – a prototype completed in only 127 days. The British Air Commission was delighted with the quick turn around and awarded North American with a contract. Before the Japanese attack on Pearl Harbor, 620 Mustangs were shipped to the RAF and made their debut during the Dieppe Raid in the summer of 1942.¹⁰ However, due to the underpowered Allison engine, their performance was not particularly impressive. For this reason, the P-51As were confined to low level tactical missions.

In May of 1942, trials were made with five P-51 aircraft outfitted with Rolls Royce Merlin 61 engines in an attempt to improve performance. The results with using these existing components were phenomenal, the P51B (production model) had improved performance at all altitudes especially above 33,000 feet obtaining speeds of 440 m.p.h.. Further adjustments in the controls resulted in improved maneuverability which led to an aircraft equal to or superior, in many aspects, to what the Luftwaffe could offer at the time. North American Aviation received a contract to build the more effective Merlin-61 engine and mate this to its successful airframe in North American's aircraft manufacturing facilities.

By June 1943, 145 P51Bs were shipped to England but served in a reconnaissance role.¹¹ Sixteen days after the October Schweinfurt raid, Arnold ordered all P-51Bs in England to be withheld from the reconnaissance role, transfer to the fighter escort role, and top priority was given to North American Aviation to produce more Mustangs.¹² The British also agreed that all RAF squadrons, scheduled to convert to P-51 Mustangs, would support Eighth Bomber Command. It was not until the summer of 1944 that P-51s squadrons were ready for combat in numbers so the weight of the spring 1944 air battles fell upon the P-47.

When Lieutenant General Jimmy Doolittle took command of the Eighth AAF in December 1943, he made two important changes which at first were unpopular with the heavy bomber crews. First, he increased tours from 25 to 30 missions which upgraded aircrew experience and provided additional cadre for the build-up in new aircrews. Second, despite violent protests from Bomber Command, Doolittle released additional fighters from escort duty to seek out the Luftwaffe whether located in the air or on the ground. Under the old fighter escort system, the fighters would rendezvous with their respective bomber formation to give coverage but the fighters would have to constantly weave, to match the bomber's speed, and this burned precious fuel. Doolittle's new system called for relays of fighters to take turns covering the bombers while at the same time taking advantage of each type of fighter's strength. The Spitfires would escort the bombers from the channel out to 100 miles then the P-47s would take over for the next 150 to 200 miles. Finally, the P-38s would escort the bombers for another 150 to 200 miles. Together, this phased escort system would provide coverage out to 450 miles. As a rule, only one-third of fighters needed to stay near the heavy bombers and escort fighters

were rotated in by relays so precious fuel would not be burned by weaving to match the heavy bomber's speed.¹³ The arrival of the P-51B Mustangs in numbers, along with 150 gallon wing tanks, would stretch fighter escort coverage out to 600 miles which was more than enough to reach Berlin.¹⁴ Doolittle's new escort system was devised to give the bombers maximum coverage while at the same time striking the Luftwaffe where it hurt.

Once a fighter group finished its escort task, it could drop down to lower altitudes to strafe enemy airfields. This change in tactics, combined with the increase in Allied fighter escort range, would have a huge impact on the Luftwaffe and disrupt the German practice of rearming and refueling for additional sorties against heavy bombers and eventually account for an irreversible attrition on Luftwaffe pilots. For the first time, Eighth Fighter Command was released to perform their true offensive role.

By April 1944, Eighth Fighter Command was ordering new low level fighter sweeps, some in conjunction with bomber missions, deep into Germany. By design, low level fighter sweeps were to catch German aircraft landing, taking off, or on the ground. When heavy or medium bombers were available, the bombers would release ordnance over the German airfields to help neutralize anti-aircraft fire before the fighters strafed. As the spring months wore on, the effects on the Luftwaffe became noticeable as the Luftwaffe was knocked off balance and air superiority turned over to the Allies. At the same time, the German general staff made a serious mistake which threw away any chance of the Luftwaffe regaining air superiority. In face of mounting pressure from the new fighter sweeps, the Germans withdrew their fighters back into Germany in an effort to find a haven and concentrate on Allied bomber formations. By doing so, the Luftwaffe lost its chance to strike Allied escort fighters near the channel and force them to drop

their auxiliary tanks early. As it stood the P-47s, and later the P-51s, increased their combat radius further into Germany and soon there was no where for the Luftwaffe to hide.

The Germans recognized their fall 1943 victory over the Eighth AAF and many on the German general staff believed they stopped the Americans from attacking inside the borders of Germany. Although some Luftwaffe commanders, including General Hubert Weise (who commanded the air defenses of central Germany) were clearly worried, Goring and his staff believed it was impossible for Allied fighters to escort bombers east of Brunswick so they focused their operations on attacking unescorted heavy bombers. Because of this faulty escort range assumption, the Luftwaffe would later be unable to quickly change tactics or equipment (by this time German twin engine fighters were more vulnerable than the heavy bombers of the Eighth AAF) to meet a renewed escorted strategic bombing campaign which began with “The Big Week” on February 19th, 1944. During this time, immense damage was done to German aircraft factories but more importantly large numbers of German aircraft, along with more valuable German pilots, were lost due to the new fighter escort tactics. The heavy bomber raids on the German aircraft industry did not reduce production of aircraft (by this time the German aircraft industry had dispersed and production actually rose), but Eighth Fighter Command reduced the fighting capacity of the Luftwaffe by depriving it of pilots. Beginning February, the Luftwaffe lost thirty-three percent of its fighter force and more importantly, something which became increasingly difficult to replace, twenty percent of its pilots.¹⁵

Under this pressure, the Luftwaffe was quickly attrited. In January of 1944, the Luftwaffe lost 1,115 fighters, in February 1,118 fighters, and in March 1,217 fighters.¹⁶ By spring of 1944, Luftwaffe fighter squadrons in the West were severely understrength and in a state of disorganization. By April, the Luftwaffe's fighter strength dropped to its lowest levels and the fall out was felt during the Allied invasion of France on June 6th, 1944, when the Luftwaffe could mount only 80 ineffectual sorties against the Allies 2,457 fighter sorties. Eighth Bomber Command served as the anvil in which the escort fighters could now hammer the Luftwaffe.

The determination to continue daylight strategic bombing, with revised conditions, solved the POINTBLANK crisis and was one of the most important decisions of the war. The USAAF revised its nearly decade old air theory, of bomber self-sufficiency, and utilized a foundation of air superiority as a basic task before embarking upon daylight strategic bombing. Contrary to any expectations, it was a combination of drop tanks, coupled with Doolittle's strategy of releasing some fighters from escort duty, that produced a change for the USAAF's daylight strategic bombing. The P-47 performed a majority of the early 1944 missions that swept the Luftwaffe from the skies. The P-51 Mustang, which came in numbers later that spring, delivered the coup-de-grace to an already sick organization. In the span of a few short months, the Eighth AAF secured the air superiority needed before May 1st, 1944, which was the scheduled invasion of France. A renewed and better coordinated CBO eventually crippled Germany's military production capacity. It was the second Schweinfurt raid that kick started adjustments to a nearly decade old air strategy and led to a solution on a mass produced scale

¹ The 6% heavy damage rate is from the allocated 1342 heavy bomber sorties flown that week. Source: William Emerson. *Operation POINTBLANK: A Tale of Bombers and Fighters* (Washington, D.C.: Office of the US Air Force History, United States Air Force, 1988), 4.

² Ibid., 4.

³ Sir Charles Webster. *The Strategic Air Offense Against Germany* (London: Her Majesty's Stationary Office, 1961), 42.

⁴ This accounted for 27% of VFK's total machinery in Schweinfurt. Source: Martin Caidin. *Black Thursday* (New York, NY: E.P. Dutton & Co., Inc., 1960), 302.

⁵ Ibid., 296.

⁶ Emphasis was also placed later on North America's P-51 production. Source: John Sweetman. *Schweinfurt: Disaster in the Skies* (New York, NY: Ballantine Books, 1971) 154.

⁷ Bernard Boylan. *Development of the Long Range Fighter Escort: United States Air Force Study #136* (Maxwell Air Force Base, Alabama: 1955).

⁸ Emerson, 17.

⁹ The water injection kit boosted speeds by thirty miles per hour. Source: Geoffrey Perret, *Winged Victory* (New York, NY: Random House, 1993), 286-287.

¹⁰ Though capable of 388 m.p.h. at 5,000 feet, performance dropped off sharply above 15,000 feet. The cause for the drop in performance was the Allison V-1710 engine, which was underpowered. Source: Webster, 79.

¹¹ Ibid., 81.

¹² It wasn't until December of 1943 that the P-51s were ready to fly as fighter escort in any numbers. Source: Sweetman, 154.

¹³ Alan J. Levine. *The Strategic Bombing of Germany: 1940-1945* (Westport, Connecticut: Praeger Publishers, 1992), 118.

¹⁴ It wasn't only the external wing tanks that gave the P-51 its extra range, it was much easier on fuel consumption than the P-47 which guzzled gas at the rate of two gallons per minute rising to three during combat. By the end of war, additional internal tanks would give the P-51 a combat radius slightly more than the B-17. Source: Perret, 284.

¹⁵ G.E. Patrick Murray. *Bomber Missions* (New York, NY: Barnes and Nobles, 2006), 14.

¹⁶ Franklin D'Olier (Chairman). *The United States Strategic Bombing Survey* (New York, NY: Garland Publishing, Inc., 1976), 9.

CHAPTER 6

CONCLUSION

“Despite their fear and terror, no matter how cruel the test, no matter how many giant bombers writhed in flame, no matter how many formations split apart and plunged earthward, there was no question but the survivors would continue - no American bomber force, once committed to battle, ever turned back.”¹

Martin Caidin, *Black Thursday*

Acceptance of Doctrinal Shift

Up until October 1943, the premise of the daylight strategic bombing doctrine rested upon “a well planned and well conducted air bombardment attack, once launched, cannot be stopped.”² This became theory embedded in air doctrine nearly a decade earlier within the Air Corps Tactical School curriculum and was reinforced by overconfidence in the heavy bomber technology of the time. CPT Harold L. George, part of the Air Corps Tactical Staff, went so far as to write “the spectacle of huge air forces meeting in the air is the figment of imagination of the uninitiated.” This thought, along with the earlier “pin point” precision bombing test results from Chino, California, set the direction for a daylight strategic bombing doctrine that America entered WWII with. By 1943, the USAAF leadership learned that “strategic” bombing was not as accurate under combat conditions as first thought; plus, both Schweinfurt raids proved that formations of unescorted bombers were no match for fighters and this shift had a huge impact on the USAAF’s daylight strategic bombing doctrine.

Did the pre-1943 daylight strategic bombing doctrine contribute to the tremendous loss during the 1943 Schweinfurt raids? In essence, the USAAF overconfidence in their daylight strategic bombing theory contributed to the Schweinfurt

raid losses but it took the Schweinfurt raids to bring to light the shortcomings in the daylight strategic bombing doctrine and force adjustments accordingly. The twenty-seven months before the United States went to war gave the USAAF time to study the effectiveness of unescorted bombing but much of the USAAF leadership was infatuated with the current theory and refused to accept lessons learned earlier in the war.

Reaction to Doctrinal Shift

What was the USAAF leadership's reaction to the Schweinfurt raids? The heavy losses incurred during the August Schweinfurt-Regensburg raid were explained away as justified due to the "heavy" damage to both targets, the number of German fighters "shot down," and the weather which prevented 300 heavy bombers from being sent as one force - the number required for self-sustainment on deep penetration missions. This was the same mood immediately after the October Schweinfurt raid but changed drastically once monthly loss statistics were released and further examination forced the USAAF leadership into a rude awakening: unescorted bombers took seven times the loss plus two-and-a-half times the damage and the final assessment revealed Eighth Bomber Command experienced the loss of one-third of its heavy bombers each month. The upper levels of the USAAF leadership initially had difficulty accepting what the lower level leaders and aircrew knew: unescorted daylight strategic bombing was not practical in the face of determined opposition.

How was the strategic bombing doctrinal change accepted by the USAAF leadership? Initially, the upper levels of the USAAF leadership had difficulty accepting change in doctrine unlike the generals in World War I refusing to believe anything but a mass infantry assault proceeded by artillery preparation could dislodge entrenched enemy

troops. Like the generals of World War I, the USAAF leadership experienced heavy cumulative losses and found change necessary. The USAAF leadership found themselves at a loss when daylight strategic bombing failed and now had to justify the enormous expenditure in both men and material. The United States Army Air Corp required candidates to be in the top 11.1 percent of the initial qualifying battery of exams and endure a multitude of testing throughout the flight program with roughly two-thirds not passing.³ Simply put, the airmen lost during the Schweinfurt raids were the physically and mentally best America could offer. Also, Arnold was fighting to keep the Eighth AAF resourced at what other services, especially the Navy, thought was an enormous expenditure with very little to show for the effort.

The fallacy behind the 1943 daylight strategic bombing doctrine rested upon the concept of the self-defending bomber; a theory disproved at Schweinfurt. The theories developed earlier at the Air Corp Tactical School were finally tested in combat and came up short. The pre-1943 daylight strategic bombing doctrine grew in the mid-1930s, before the introduction of radar and when pursuit planes were slow and under armed compared to heavy bombers of the period. The theory of over flying an enemy's forces to strike vital industry was simple and attractive. But now the upper levels of the USAAF leadership realized, after heavy loss, they needed air superiority before the Eighth's heavy bombers could destroy German industry. Arnold and Eaker began to relook at the technical stumbling blocks to long range fighter escort and placed priority on a solution. Too late, emphasis was placed on external fuel tanks and North America's P-51 Mustang. The entire daylight strategic bombing campaign was put on hold until a satisfactory answer to the long range escort problem was found.

In the meantime, the USAAF leadership looked to Eighth Fighter Command for operational solutions. Doolittle's changes in fighter tactics were initially met with dismay by Eighth Bomber Command but was the correct strategy needed to achieve POINTBLANK's main objective: the destruction of the Luftwaffe. The loosening of the fighters from the bombers, plus the low level fighter sweeps, disrupted the Luftwaffe's entire structure by the attrition of German pilots and replacements. Within months, the balance of air power shifted heavily towards the Allies favor and was never regained by the Luftwaffe for the duration of the war.

Implications

What was the fallout? The heavy bomber losses throughout the fall of 1943 was the fallout from the failure to obtain long range fighter escort earlier for the heavy bombers. Initially, the Eighth AAF adopted a daylight strategic bombing doctrine which did not heed the call for fighter escort once three hundred heavy bombers "punched" through the templated German fighter defenses. Too late, the P-38 was rushed in to fill a role it was not mechanically suited for and Army Material Command's (AMC) sluggish progress on expendable drop tanks was taken off the back burner. A technological impact readily accepted throughout all levels of the USAAF were the effects of additional internal and external fuel tankage on the P-47 which increased its range from an initial 175 miles to 400 miles and put it in range of most targets in western Germany. The P-47 remained the workhorse of the Eighth AAF which laid the groundwork to resume daylight strategic bombing and saved operation POINTBLANK. The P-47 was supplemented by the P-51 Mustang, in numbers by the summer of 1944, which exploited the victory. Also, the USAAF's disinterest in the P-51 Mustang prevented the plane from

being in action six months earlier and at a crucial time.⁴ Expendable drop tanks and the need for long range escort fighter were requested before the initial Schweinfurt raid but the second Schweinfurt raid was a wake up call to speed up the process.

Was the Combined Bomber Offense (CBO) coordinated and did this have an impact on the Schweinfurt raids? The CBO of 1943 did not work because one partner refused to participate while the other was temporarily stalled by the Luftwaffe. With two different bombing strategies, one concentrating on the area bombing of large German cities and the other focused on precision bombing of key industries, it was difficult to align Allied strategic bombing efforts towards a common goal and as a result German targets could have been put out of commission earlier. The Combined Bomber Offense (CBO) had to be coordinated to gain net results. It took a direct order from Air Marshall Sir Charles Porter, to RAF Chief of Staff Sir Arthur Harris, and new Eighth AAF leadership to coordinate and work together on the POINBLANK targeting list with results seen by 1944.

Another faulty basis of the strategic bombing doctrine was target selection and POINTBLANK's objective of directly attacking aircraft production. Hitler and Speer were expecting the second raid on Schweinfurt but still alarmed by the damage done to the ball-bearing factories. Speer had been pushing for the decentralization of critical German industry since 1942; the Schweinfurt raids helped to speed up the process. Though grim on the surface, German anti-friction industry quickly adjusted and recovered. Hidden ball-bearing stocks throughout Germany helped eased the temporary loss while the anti-friction industry rebound and grew steadily over the next eleven months. Kessler discovered over eight million ball-bearings existed outside the

production facilities and quickly distributed four and a half million ball-bearings to firms in need.⁵ After the war, German experts estimated that even if the anti-friction industry had been completely destroyed, it could have been rebuilt from scratch in about four months time.⁶

There were other targets which would of had a more direct impact on the German military industry. One was attacks against the four German synthetic rubber plants; the Germans had enough rubber for a few months and the attack on Huls in 1943 showed how vulnerable the rubber plants were.⁷ Another vulnerability of the German military industry was the ammunition/explosive manufacturing industry as seventy percent was made in seven plants.⁸ Though the impact on the Axis oil refinery industry is well known because of the release of the United States Strategic Bombing Survey (USSBS), many oil refineries were located beyond escort range and it wasn't until 1944 when these targets were hit and this had by far the biggest impact on the German war effort.

When the Allies invaded France in the summer of 1944, they enjoyed unchallenged air superiority and a Wehrmacht crippled by fuel shortages. The last large German offense of the war, the Ardennes Offense, was focused on capturing large stocks of Allied fuel to keep the Wehrmacht rolling but the failure to capture large stocks of Allied fuel caused the offense to stall. The German aircraft industry was well dispersed by the fall of 1943 but the shortage of German pilots is what caused the Luftwaffe to wither. Eventually, the strategic bombing campaign caused the entire German industrial effort to grind to a halt and even if the Allied armies did not cross the Rhine or the Oder, armament production was at a complete standstill and the German armies would have collapsed by June or July of 1945.⁹

Schweinfurt was not the lynch pin in the German industrial war effort as Special Assistant for Air Affairs Robert Lovett hoped for. The British experienced a shortage of anti-friction bearings during the Battle of Britain in 1940, when their ball-bearing factory was damaged during a Luftwaffe raid, but unlike the German anti-friction industry it was not well dispersed to begin with. At no time did the German industry suffer from the lack of ball-bearings and the Germans did not even have to resort to Swedish or Swiss ball-bearing sources to supplement their own.

The anti-friction industry was the type of target daylight strategic bombing was designed to destroy but the German anti-friction industry was far too dispersed for Eighth Bomber Command to destroy, with the assets of the time, in one successful blow. Also, the Germans had additional stocks/outside sources and within four months time could have rebuilt the industry from scratch so ball-bearings were a renewable resource. In all, from August 1943 to the end of the war, the Axis anti-friction industry in Germany, Italy, France, and Austria was hit by more than forty CBO raids with 12,000 tons of bombs dropped – two-thirds or 8,000 tons of bombs were dropped on Schweinfurt alone.¹⁰ The effort expended on the anti-friction industry, especially on Schweinfurt, did not justify the enormous expenditure in man power and resources to neutralize a target. Overall, the bombing of Schweinfurt did not alter the course of the war.

The raids on the oil refinery industry had a much more drastic effect on the Wehrmacht and Luftwaffe but many refineries in 1943 lay beyond fighter escort range and as demonstrated during the 1943 Ploesti raids, resulted in the high loss of heavy bombers. A CBO strategic bombing campaign which would of had the greatest effect on the German military would have targeted the German ammunition/explosives

manufacturing industry; even with the heavy Allied bomber resources of 1943, this would have had a crippling effect.

During the course of World War II, the United States lost some 16,000 airmen and thousands of planes and America's daylight strategic bombing campaign came within limits of defeat but the Eighth AAF was able to pause, reevaluate and adjust its strategic bombing doctrine, and obtain its objective of neutralizing the Luftwaffe and destroying German wartime industry.

Also, by 1943, the strategic bombing campaign was tying down an enormous and increasing German force for a defensive effort to include 1.5 million Soldiers, airmen, and civilians plus aircraft, antiaircraft guns and equipment which forced Germany into an attritional war it could not win.¹¹ This effort could have been used in Russia, the Mediterranean, or reinforcing the coastal defenses in France which could have prolonged the war. The downfall of the initial daylight strategic bombing doctrine rested upon the upper level of leadership within the USAAF which ignored earlier lessons of unescorted bombing and kept applying a failed unescorted daylight strategic bombing strategy even when evidence showed it would not work. It took severe losses before they adjusted their method.

¹ Martin Caidin. *Black Thursday* (New York, NY: E.P. Dutton & Co., Inc., 1960), 306.

² Haywood, S. Hansell. *The strategic Air War Against Germany* (Washington: Office of Air History, 1986), 10.

³ Mark K. Wells. *Courage and Air Warfare* (Portland, Oregon: Frank Cass, 1995), 7.

⁴ Alan J. Levine. *The Strategic Bombing of Germany, 1940-1945* (Westport, Connecticut: Praeger Publishers, 1992), 197.

⁵ German sources show the anti-friction industry quickly recovered and was not affected by the October Schweinfurt raid. Source: Sweetman, 150.

⁶ Franklin D'Olier (Chairman). *The United States Strategic Bombing Survey* (New York, NY: Garland Publishing, Inc., 1976), 122-123.

⁷ Levine, 197.

⁸ Nitrogen production was concentrated in fewer plants with eighty percent in just two plants and the destruction of these plants would have led to vital shortages for nine months to a year. Source: Levine, 198.

⁹ Levine, 194.

¹⁰ Caidin, 297.

¹¹ Levine, 193.

BIBLIOGRAPHY

- Arnold, Henry H. *Global Mission*. Blue Ridge Summit, PA: TAB books Inc., 1989.
- Boylan, Bernard *Development of the Long Range Fighter Escort: United States Air Force Study #136*. Maxwell Air Force Base, Alabama: 1955.
- Caidin, Martin *Black Thursday*. New York, NY: E.P. Dutton & Co., Inc., 1960.
- Craven, Wesley Frank *The Army Air Forces in WWII VOL II*. Chicago, IL: University of Chicago, 1949.
- D'Olier, Franklin (Chairman) *The United States Strategic Bombing Survey*. New York, NY: Garland Publishing, Inc., 1976.
- Douhet, Giulio *Aerial Warfare: In the Command of the Air*. Washington, DC: USAF Warrior Studies, 1983.
- DuBuque, Jean H. *The Development of the Heavy Bomber: 1918-1945*. (Maxwell Air Force Base, AL: Air University Historical Division, 1951.
- Freeman, Roger A. *The Mighty Eighth: Units, Men and Machines*. New York, NY: Jane's Publishing Company, 1970.
- Hansell, Haywood S. *The Strategic Air War against Germany*. Washington: Office of Air History, 1986.
- Hoffman, Wally *Reality....Remembering Schweinfurt, Planes and Pilots of World War Two*. Jordan Publishing (online).
<http://home.att.net/~ww2aircraft/schweinfurt.html>; Internet, accessed December 20th, 2007.
- Emerson, William *Operation POINTBLANK: A Tale of Bombers and Fighters*. Washington, D.C.: Office of the US Air Force History, United States Air Force, 1988.
- Ira Clarence Eaker, Arlington National Cemetery Website, available from
<http://www.arlingtoncemetery.net/iraeaker.htm>; Internet, accessed 1 November 2007.
- Jablonski, Edward, *Airwar*. Garden City, New York: Doubleday & Company, Inc. 1971.
- Kohn, Richard H., Joseph P. Harahan. *The Strategic Air War Against Germany and Japan*. Washington D.C.: Office of Air Force History United States Air Force, 1983.

- Knox, MacGregor, Williamson Murray. *The Dynamics of Military Revolution: 1300-2050*. New York, NY: Cambridge University Press, 2001.
- Levine, Alan J. *The Strategic Bombing of Germany: 1940-1945*. Westport, Connecticut: Praeger Publishers, 1992.
- Merick, Ken *By Day By Night: The Bomber War in Europe*. Runnymede, England: Ian Allan Ltd., 1989.
- Middlebrook, Martin *The Schweinfurt-Regensburg Mission*. New York, NY: Charles Scriber's Sons, 1983.
- Millet, Allan R., Williamson Murray *Military Innovation in the Interwar Period*. New York, NY: Cambridge University Press, 1996.
- Murray, G.E. Patrick *Bomber Missions*. New York, NY: Barnes and Noble, 2006.
- Neillands, Robin *The Bomber War: The Allied Air Offensive Against Nazi Germany*. New York, NY: The Outlook Press, 2001.
- Nevin, David *The Epic of Flight: Architects of Air Power*. Alexandria, Virginia: Time-Life Books, 1981.
- Parker, Geoffrey *The Cambridge History of Warfare*. New York, NY: Cambridge University Press, 2005.
- Parton, James *Air Force Spoken Here: General Ira Eaker and the Command of the Air*. Bethesda, MD: Adler & Adler Publishers, Inc., 1986.
- Paul, Wilfred J. *The Army Air Forces in WWII VOL I*. Chicago, IL: University of Chicago, 1949.
- Perret, Geoffrey *Winged Victory*. New York, NY: Random House, 1993.
- Stephans, Alan *The True Believers: Airpower between the Wars*. Maxwell Air Force Base, AL: Air University Press, 2001.
- Sweetman, John *Schweinfurt: Disaster in the Skies*. New York, NY: Ballantine Books, 1971.
- 398th Bomb Group Memorial Association, available from http://www.398th.org/research/398th_FAQ.htm#anchor_mission; Internet, accessed 1 November 2007.
- Watts, Barry D. *The Foundations of U.S. Air Doctrine: The Problem of Friction in War*. Maxwell Air Force Base, Alabama: Air University Press, 1984.

Webster, Sir Charles, Noble Frankland *The Strategic Air Offensive Against Germany 1939-1945*. London, England: Her Majesty's Stationary Office, 1961.

Wells, Mark K. *Courage and Air Warfare* Portland, Oregon: Frank Cass, 1995.

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