

THE STRATEGIC BOMBING CAMPAIGN
AGAINST GERMANY DURING WORLD WAR II

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ABSTRACT

Early attempts at strategic bombing led theorists to reason that it could offer a revolutionary new means of winning wars. Airpower visionaries such as Giulio Douhet, Hugh Trenchard, and Billy Mitchell advocated a Sherman - like strategy of attrition in which air strikes on the enemy's vital economic centers would destroy his war - making capability and crush his will to resist. In the inter - war period the Air Corps Tactical School, occupied with formulating a strategic air doctrine, refined that idea, which was the central concept underlying AWPD-1, the basic statement governing strategic bombing elaborated by the Air War Plans Division of the War Department in mid - 1941.

AWPD-1 identified the key German economic targets as electric power generation, transportation nodes, and the petroleum industry. American planners believed that effective attacks on those targets demanded Daylight Precision Bombing raids. An intense six-month bombing campaign, they thought, might defeat Germany without the need of a ground invasion of Europe. After the United States entered the war and as the Anglo - American invasion of North Africa was under way, British and American leaders agreed to execute an "around the clock" Combined Bomber Offensive (CBO) to bring about the progressive destruction of the German military, industrial, and economic system.

Strategic bombing reached new levels of power and achievement during the war. The CBO undermined German war production, helped achieve air superiority, and paved the way for the Allied land invasion. Concentrated attacks on German aircraft plants, transportation centers, and oil facilities paid particularly valuable dividends. But strategic bombing failed to destroy enemy morale and it did not render a ground war

unnecessary, as the visionaries had predicted, in part because of repeated changes in target priorities and the diversion of bombers to missions elsewhere, particularly those in connection with the Normandy invasion.

INTRODUCTION

Strategic bombing throughout its history has evoked a powerful emotional response and has been the subject of much debate. Since its inception, there has been a tendency to regard airpower, particularly strategic bombing, as revolutionary in that it added a new dimension to warfare and overturned the established principles of war. Some scholars question its effectiveness and the morality of conducting strategic bombing campaigns, while advocates praise its efficiency and the reduced cost of manpower, casualties, and money.

World War II witnessed the first full application of strategic airpower in war. Allied air forces dropped nearly 2.7 million tons of bombs, flew 1,440,000 bomber sorties and 2,680,000 fighter sorties. The number of men lost in air action was 79,265 Americans and 79,281 British. More than 18,000 American and 22,000 British planes were lost or damaged beyond repair. Bombing raids on Germany destroyed 3,600,000 dwellings; approximately 20 percent of the total number of buildings in that country were destroyed or heavily damaged. Survey estimates showed some 300,000 German civilians killed and 780,000 wounded. The number made homeless reached 7,500,000.¹ Allied bombing reduced the principal German cities largely to hollow walls and piles of rubble.

What impact did all of this have on German morale, production, and the overall ability of the home front to support the war effort? Was strategic airpower a decisive factor leading to the defeat of Germany? Were the gains worth the severe losses suffered by the Allies and innocent civilians? Strategic bombing remains controversial because of the difficulty in proving its effectiveness. Success cannot be determined simply in terms

¹ United States Strategic Bombing Survey, Summary Report (European War), p. 6.

of physical damage. Evaluating the effect on vital targets requires analysis of the entire enemy system and the impact is not often immediately apparent.

The developments of doctrine, plans, the execution, and effectiveness of strategic bombing against Germany, and the Combined Bomber Offensive in particular, are the subject of this study.

CHAPTER 1

ORIGINS OF STRATEGIC BOMBING THOUGHT

“Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after changes occur.” Giulio Douhet

This chapter establishes the baseline of the development of strategic bombing thought. It analyzes the ideas and theories developed by classical airpower theorists such as Giulio Douhet, Hugh Trenchard, and Billy Mitchell during the inter-war years. Additionally, it compares their ideas, and the impact these ideas had on the faculty and students of the Air Corps Tactical School, against the theories and doctrine developed by American air planners.

General Giulio Douhet of Italy, considered the father of strategic bombing theory, was among the first people to write about the use of airpower in war. Many of his ideas and predictions were wrong, but his basic concepts and ideas are present today in strategic planning. The Persian Gulf War is an example of what Douhet predicted airpower could accomplish. His formula for victory by gaining command of the air, neutralizing the enemy’s strategic centers, and maintaining the defensive on the ground while taking the offensive in the air, was the underpinning of the Coalition strategy.¹

World War I was a protracted affair characterized by colossal damage and destruction, mass casualties, and stalemate. The outcome of trench warfare profoundly affected strategists. Appalled by the carnage, they feared that such a catastrophe would reoccur. Total war and wars of attrition seemed to be the norm for the future. Total war was more than a conflict between armies; it involved the entire human, material, and psychological resources of a nation. Nations had to be exhausted before they would admit defeat. Reaching that point, however, became increasingly difficult in the new

industrial age in which factories could produce endless supplies and implements of war. Advancing technologies in weaponry, such as the machine gun, had given the defender an overwhelming advantage. These weapons placed in prepared positions gave the defender the ascendancy in land warfare and meant that an attacking force had to be vastly superior in numbers to be successful. Military strategists strove to develop new tactics and techniques that would break the stalemate of war, create mobility, and achieve a quick, decisive, and inexpensive victory.

Douhet was a product of World War I and had witnessed the carnage that resulted when outdated tactics and strategy went up against high- technology weapons. He served first as an artillery officer and then commander of Italy's first aviation battalion in 1912.² He saw first hand how ineffective land battle had become in total wars between modern powers. He was convinced that the new technology of the machine gun, poison gas, and the aircraft made warfare between large land armies obsolete. Technology had converted land wars into defensive struggles, leading to stalemate and removing any possibility of clear-cut victory. The impact on the British civilian population from the limited strategic bombing of London by German Zeppelins greatly influenced Douhet, who saw airpower as a revolution in military technology.³

Douhet became convinced that strategic bombing would be the antidote for stalemate on the battlefield. With its complete freedom of action and direction, the airplane could operate unopposed in the third dimension. Nothing from the ground, he thought, could interfere with a plane in flight.⁴ It could fly unopposed over fortified lines of defense, making them obsolete and breakthroughs unnecessary. The use of aircraft would expand the dimensions of the battlefields to include all the lands and seas of nations at war. Aviation would go on the offensive and seize the initiative by applying

the fundamentals of war: mass, simplicity, and surprise. In this new total war, limited only by the boundaries of the nations involved, the “battlefield” would include not only actual combatants, but civilians as well. “Mercifully, the decision will be quick in this kind of war, since the decisive blow will be directed at civilians, that element of the countries at war least able to sustain themselves [sic],” said Douhet. “These future wars may yet prove to be more humane than wars in the past in spite of all, because they may in the long run shed less blood.”⁵

The “center of gravity” is a Clausewitzian concept-and defined in Army manuals as the hub of all power and movement upon which everything depends, that characteristic, capability, or location from which forces derive their freedom of action, physical strength, or will to fight-the destruction of which would deprive the enemy of the capability to wage war. Douhet saw the war as a battle of wills between the belligerent countries. He identified the will of the people as a center of gravity that could be easily manipulated through the application of strategic bombing. Air attacks would destroy the enemy’s vital industrial centers, directly targeting the civilian population, thus crushing the enemy’s will to resist, and bringing about a quick, even humane, victory.

Douhet based his strategy on several assumptions and misconceptions. First, he thought that all wars in the future would be total wars and that the defensive form of ground warfare would continue its dominance and ground engagements, therefore, would remain static. He also believed that airpower was inherently offensive and that the bomber would always get through to strike its target. Douhet saw war as a battle of wills. To bend the enemy’s will one must put him in intolerable circumstances. The best way to do that would be to attack directly the defenseless populations of his cities and great

industrial centers. In his view, civilian morale was unstable, which meant that bombardment would cause panic and possible revolt.

Douhet realized that, in order for the aircraft to become a dominant weapon, it would require freedom from the ground commander. He called for the creation of an independent air force, under the command of an aviator, which was equal in importance with the army and navy.⁶ This air force should consist of enough combat power to be proportionate to the enemy's strength and should possess maximum bombing power. Douhet went on to say that armies and navies should remain small, their primary objective being to fix and hold the enemy forces in place, leaving the air force free to maneuver and attack the enemy's vital centers.

Douhet's fundamental precept was that an air force must achieve command of the air. A country that lost control of its airspace had to endure whatever air attacks an enemy chose to carry out. As he put it:

To have command of the air means to be in a position to wield offensive power so great it defies human imagination. It means to be able to cut an enemy's army and navy off from their [sic] bases of operation and nullify their [sic] chances of winning the war. It means complete protection of one's own country. In short, it means to be in position to win. To be defeated in the air is to be defeated and at the mercy of the enemy.⁷

In order to achieve command of the air one must defeat the enemy's air force. The best way to accomplish this would be to conduct a preemptive strike against the enemy's assets while on the ground.

It is not enough to shoot down all the birds in flight if you want to wipe out a species; there remain the eggs and the nest. The most effective method would be to destroy the eggs and the nest systematically, because no species of bird can remain continuously aloft. Similarly, seeking out and destroying an enemy's airplanes while in

flight is least effective. A much better way is to destroy his airports, supply bases, and centers of production.⁸

With command of the air achieved, the next step would be to exploit that advantage and destroy the enemy's war-making capability by attacking his vital centers. Douhet realized that the key to airpower was targeting. He identified five basic target systems as the vital centers of a modern country: industry, transportation infrastructure, communication nodes, government buildings, and the will of the people.⁹

Douhet believed that the will of the people was the most important category. He was convinced that it was so intrinsically decisive, that any elaboration on the other vital centers was unnecessary.¹⁰ He reminded his readers that the true objective in war was the enemy's will and only aircraft could strike at it. In the new industrial age and era of total wars, all people were combatants and their collective will had to be broken. The most effective way to accomplish that, according to Douhet, was through urban terror bombing.¹¹ Civilian morale would quickly disintegrate under aerial bombardment, he believed, and civilians would coerce their government into suing for peace or would rise in revolt.

Douhet did not think that bombing accuracy was especially important. All attacks would be on area targets carried out by massive aerial fleets. The air force would hit multiple targets simultaneously, making a concentrated defense impossible. Heavily armored, self-reliant aircraft called battle planes would execute the attacks. The use of a mixture of high explosive, incendiary, and gas or biological bombs would create a synergistic effect. The explosives would produce rubble, the incendiaries would start fires, and the chemicals would prevent firefighters from extinguishing the flames.

Douhet had his earliest and greatest influence in America.¹² Many of Douhet's early writings, including translated copies of Command of the Air, were available at the U.S. Air Corps Tactical School during the 1920s and 1930s. In 1917, the United States had sent a commission to Europe to decide which aircraft were most suitable for construction in America. A member of the team, a Major Gorrell, met with Douhet's friend Count Caproni to discuss purchase rights for the construction of several hundred heavy bombers in America. Gorrell would later have a considerable influence on the initial structuring of American strategic bombing theory. His relationship with Caproni helped plant the seed for the future development of American airpower strategy.¹³

Although there are many similarities between Douhet and Hugh Trenchard's ideas, the Royal Air Force (RAF) has strongly denied that Douhet influenced the development of its theory and doctrine. Douhet advocated direct attacks against cities and the civilian population to crush morale, whereas Trenchard advocated targeting the civilian support infrastructure, i.e. transportation, communications, water, and electricity, to undermine morale of the worker and indirectly affect the will of the people to support any war effort. The British policy of area bombing came about more from necessity than from prewar theory and doctrine.

Hugh Trenchard served as the first RAF commander from 1919 to 1930. The First World War made an even greater impression on him than it did on Douhet. Witnessing the effect of strategic bombing on the citizens of London made Trenchard believe in the efficacy of strategic airpower and its ability to strike deep into the enemy's heartland and shatter his will. Trenchard stated that, "Owing to the unlimited space in the air, [and] the difficulty one machine has of seeing another," he said, "it is impossible

for the enemy and his airplanes to prevent hostile aircraft from crossing his lines and reaching their targets if the pilots have the initiative and determination to do so.”¹⁴

Trenchard based his strategic philosophy on the assumption that the effect bombing had on morale was much more devastating than the physical damage it caused. Like Douhet and Mitchell, he believed in the offensive nature of airpower. He was convinced that the bomber would always get through and that there was no need for the development of escort fighters.¹⁵ Like Douhet, Trenchard believed that air supremacy was the paramount factor in battle and had to be accomplished first by destroying the enemy's air force through attacks conducted against his airfields and support bases. Trenchard also advocated the massing of large aerial fleets under the cover of darkness to maximize the effectiveness of attacks.

The key to Trenchard's concept of strategic airpower lay in the selection of targets. He agreed that the enemy's center of gravity was the nation's will (morale). Through prolonged attacks against his vital centers, one could affect the enemy's will to resist. These vital centers included organized systems of production, supply, communications, and transportation.¹⁶ Unlike Douhet, Trenchard did not advocate the bombing of population centers with the intent to cause revolt. He rejected the concept of area bombing and called for precision attacks on specific targets. Indeed, he thought it would be immoral to target civilians directly. He assumed that the destruction of the workers' supporting infrastructure would indirectly affect the morale and will of the people.

The British concept of area or urban bombing emerged later as a result of wartime consequences and should not be associated with Trenchard's basic thesis. London was suffering from the Blitz in 1940-41 and had endured numerous defeats on the ground.

British bombers had suffered heavy losses during daylight operations and had resorted to the relative safety and inaccuracy of night operations. During this pivotal period, Air Chief Marshall Arthur Harris initiated a bombing campaign against Germany's major cities aimed to destroy enemy morale by targeting residential areas.¹⁷ Area bombing also became a retaliatory measure in response to Germany's terror bombing of British cities.

Trenchard had a substantial impact on military thinking in the United States through his association with the American Air Service and Air Corps. His commitment to the idea of strategic bombing and his argument for the need of an independent air force particularly influenced American airpower enthusiasts such as General Billy Mitchell. Mitchell formed many of his ideas about airpower from his experiences and his close relationship with Trenchard during World War I.

Mitchell is the most famous and controversial figure in American airpower history. The son of a wealthy Wisconsin senator, he enlisted in the army as a private during the Spanish American War. He quickly gained a commission, due to the intervention of his father, and served in the Signal Corps. He was an outstanding junior officer, displaying a rare degree of initiative, courage, and leadership. After the war, he became the youngest member to serve on the Army General Staff. He became interested in aviation, and in 1916 at the age of 38, he learned to fly. During WWI, he rose to the rank of Brigadier General and commanded all American air combat units in France. For his heroics in battle, he received the Distinguished Flying Cross and the Distinguished Service Medal. He worked closely with British General Trenchard, and learned of Douhet's concepts, ideas about strategic bombing, and the use of airpower.¹⁸

After the war, Mitchell served as the deputy chief of the Air Service and became the leading voice for the ascendancy of airpower. He became embroiled in battles with

the War and Navy Departments for their lack of vision regarding airpower. In an attempt to prove that surface fleets were obsolete, and to prove the capabilities of airpower, he conducted bombing tests in which he sank several battleships.¹⁹

In 1925, Mitchell was court-martialed for insubordination after accusing senior leaders in the Army and Navy of incompetence and of the “almost treasonable administration of the national defense.” Found guilty, the board suspended him from active duty for five years without pay. Mitchell chose to resign instead and spent the next decade writing about and preaching the gospel of airpower. He was the first prominent American to espouse publicly a vision of strategic airpower that would dominate future wars. In 1946, he posthumously received the Medal of Honor for outstanding pioneer service and foresight in the field of American military aviation.²⁰

Mitchell’s most lasting contribution to the development of American airpower was his vision of an autonomous air force that would conduct operations, such as strategic bombing, aimed at achieving independent results rather than simply supporting land and sea forces. Aviators, he argued, constituted an elite breed and they alone could understand the proper employment of airpower. To carry out the mission of strategic bombing effectively, he stated, it was necessary to separate aviation from the Army and Navy because they were too traditional and surface oriented. Mitchell proclaimed that bombers could win wars by destroying an enemy nation’s war making capability and will to fight, and that doing so would yield a victory that was quicker and cheaper than one obtained by surface forces.²¹ “Independent applied airpower in the form of strategic bombers could paralyze an enemy’s vital centers, thus obviating the need to confront enemy surface forces or to even advance through enemy territory on the ground,” he

argued. “The influence of airpower on the ability of one nation to impress its will on another in an armed conflict will be decisive.”²²

Mitchell based his theories about the application of strategic bombing on the premise that airpower was revolutionary in nature. He concluded that the ascendancy of the ground defensive would persist. Airpower operated in the third dimension, not bound by the limitations of ground warfare. He saw airpower as being an inherently offensive weapon that would bypass enemy lines of defense. Wars in the future would be total ones that made everyone a combatant. Based on his experience during WWI, he concluded that civilian morale was fragile and therefore susceptible to the effects of bombing.²³ Mitchell claimed that in such a war, airpower could bomb the enemy’s vital economic centers to deny him his war production facilities, fatally weakening his ability to resist and crushing his moral. Anti –Aircraft- Artillery (AAA) was ineffective and no other measures were in place to stop such an offensive; the bomber, therefore, would always get through.

Like Douhet, Mitchell asserted that, before commencing offensive operations against the enemy’s vital centers, one must obtain command of the air. Both agreed that control of the air was the prerequisite for follow-on operations. Once established, one could attack the enemy’s vital centers at will. They differed, however, on how to achieve command of the air. Douhet thought the best method was to destroy the enemy air force on the ground. Mitchell argued that air combat was also a suitable means. Attacking vital centers would compel the hostile air force to take to the air where pursuit aircraft could engage and destroy them.²⁴

Mitchell, like Douhet, identified civilian morale as the enemy’s center of gravity. Civilian will was exceedingly fragile, Mitchell thought, so once-bombed civilians were

unlikely to continue supporting the war effort.²⁵ Although he agreed all-out attacks on general populations were more humane than the devastation and suffering of trench warfare, he opposed targeting civilians directly and advocated breaking their morale through destruction of other vital centers.²⁶ Air forces would attack not so much the people themselves, but centers of production. In his view, the mere threat of bombing a town would cause evacuation.²⁷ But bombing production centers was not enough, “To gain lasting victory the hostile nation’s power to make war must be destroyed,” he said. “This means the manufactories, means of communication, the food products, even the farms, the fuel and oil and the place where people live and carry on their daily lives. Not only must these things be rendered incapable of supplying armed forces but the peoples’ desire to renew the combat at a later date must be discouraged.”²⁸

Mitchell based his targeting strategy on air attacks that would paralyze an enemy’s vital centers and its ability to continue hostilities. These centers include great cities, factories, raw materials, foodstuffs, supplies, and modes of transportation and communication.²⁹ The air force would strike immediately at the enemy manufacturing and food centers, railways, bridges, canals, and harbors reaching the heart of a country and gaining victory in war using explosive bombs and gas to cause evacuation and cessation of industry.³⁰

In contrast to Douhet, Mitchell believed that no single type of aircraft was adequate; he therefore rejected Douhet’s concept of the all-purpose battle plane and the emphasis on unrestrained air offense at the expense of any defensive measures.³¹ Mitchell favored the construction of pursuit aircraft as well as attack and reconnaissance aircraft.³² He argued that an air force should include not only the bomber, but, local air defense units, and auxiliary air units as well.³³ Mitchell was forward thinking in the use

and development of technology. He predicted the use of radar and gyroscopic instruments for guiding aircraft to targets and the use of state-of-the-art bombsites for precision strikes on targets.

Mitchell was instrumental in creating the Air Corps Tactical School (ACTS). His ideas were the underpinning of the school's curriculum and his bombing manual served as a textbook. Many of his protégés filled key positions on the faculty and promoted his vision of independent airpower founded on the bomber.³⁴ Established as a training center for the Air Corps field grade officers, the ACTS served as the unofficial center for formulating American air policies and doctrine during the interwar years. The theories and doctrine developed by the faculty and students of the ACTS formed the basis for America's strategic air war plans during WWII.³⁵

The ACTS operated on the same assumptions as Mitchell in developing the following five propositions of American air warfare:

The ultimate goal of any air attack is to undermine the enemy's morale and his will to resist. Airmen can best destroy morale by attacking the interior of an opponent's territory. Attacks against vital points or centers will not only terrorize populations into submission but also save lives. Airpower is an inherently offensive weapon that is impossible to stop. Airpower is the only tool that can undermine national morale with minimum effort and material and should be used extensively in strategic operations.³⁶

The school established the primacy of the bomber and developed its core principles of employment through the execution of High Altitude Precision Daylight Bombing (HAPDB), directed against the key nodes of an enemy's industrial-economic system.³⁷ This industrial web theory became doctrine. The ACTS went on to identify key enemy economic vulnerabilities based on a model test of the American Midwest, and developed particular target sets for destruction. These target sets included electrical

power generation and distribution, transportation networks, fuel refining and distribution centers, food distribution centers, steel and other manufacturing plants. The industrial web concept called for selective targeting to disrupt or paralyze critical sectors of the enemy economy in order to undermine his war-making capability and will to fight.³⁸

The ACTS' strategy of HAPDB came about for the following reasons.

Theoretically, modern bombers could operate at altitudes beyond the reach of defending fighters and antiaircraft artillery fire and fly faster than any existing operational pursuit aircraft. Heavily armed, most considered the B-17 capable of defending itself against enemy fighter attacks. Therefore, massed bomber formations should be able to penetrate enemy air defenses without significant losses. Navigational aids were too primitive to supplant visual, line of sight techniques requiring daylight operations. Advances in technology, especially the development of the Norden bombsight, led the ACTS to believe that daytime precision attacks by massive bombing formations against selective targets were possible.³⁹

The ACTS based their strategy on the principles of surprise, mass, objective, and economy of force. The execution of the industrial web plan called for the use of all available airpower in the conduct of a strategic bombing campaign early in the conflict, and focused on selected target groups. Unlike Douhet and Mitchell, the ACTS did not believe that command of the air or destruction of the enemy's air force was a prerequisite for conducting air exploitation operations. Therefore, in an economy of force effort, aircraft would strike at the enemy's key nodes immediately, instead of pursuing the destruction of the enemy's air force.

The recurring theme among the classical airpower theorists was that to succeed in warfare one must identify the enemy's center of gravity and attack it, and that airpower

would be the most effective instrument for accomplishing that task. Additionally, with the exception of the ACTS, all early theorists agreed command of the air was necessary for military success. John Warden stated in Planning the Air Campaign, “In all cases the enemy center of gravity must be identified and struck. The thing to look for is the place where an investment in attack will yield the greatest return. Where these can be found, they should be attacked and re-attacked.”⁴⁰

The early airpower theorists shared several common assumptions. Douhet, Trenchard, and Mitchell all assumed that future wars would be total and there would be no distinction between combatants and non-combatants. They identified the will of the people as the enemy’s center of gravity. Attacking the civilian population either directly or indirectly determined the outcome of the conflict. Douhet, Trenchard, and Mitchell all asserted that airpower was revolutionary and would be the decisive factor in future conflicts.⁴¹ All believed in the inherently offensive characteristics of airpower and its use as the instrument of choice to attack the enemy’s center of gravity. The need for the creation of an equal and independent air force is a common argument among Douhet, Trenchard, Mitchell, and the ACTS.

However, there are many weakness, flaws, and miscalculations in Douhet, Mitchell, Trenchard, and the ACTS’ strategies. All miscalculated the effect of individual bombs upon targets, and mistakenly believed that the bomber would always get through. With the exception of Mitchell, all failed to account for advances in defensive technology. All overestimated the frailty of public morale and the ability to manipulate an enemy’s will through strategic bombing alone. A serious flaw common throughout was the miscalculation of internal ability to gain intelligence and effectively conduct targeting and assess damage.

It is key to understanding these basic theories and ideas when analyzing the concepts and plans developed for the execution of the strategic air campaign against Germany. Strict adherence to these principles without detailed mission analysis would lead to catastrophic results. Conversely, failure to follow the basic principles, such as attaining command of the air before pursuing a strategic bombing campaign, would also prove costly.

End Notes

¹ Phillip Meilinger, "Guilio Douhet and the Origins of Airpower Theory," Phillip Meilinger, ed., In The Paths of Heaven, p. 1 (hereafter cited as Guilio Douhet).

² David R. Mets, The Air Campaign, p. 11.

³ Guilio Douhet, The Command of the Air, Dino Ferrari, trans., p. 34.

⁴ Ibid., p. 21.

⁵ Ibid., p. 61.

⁶ Ibid., p. 16.

⁷ Ibid., p. 36.

⁸ Ibid., p. 102.

⁹ Ibid., p. 3.

¹⁰ Ibid., p. 45.

¹¹ Melinger, "Guilo Douhet," p. 12.

¹² Ibid., p. 33.

¹³ Ibid., p. 6.

¹⁴ Phillip S. Melinger, "Trenchard, Slessor, and the RAF doctrine before WWII," Phillip Mellinger, ed., In Paths of Heaven, p. 44 (hereafter cited as Trenchard, Slessor,RAF).

¹⁵ Mets, The Air Campaign, p. 22.

¹⁶ Gary Shandroff, The Evolution of Area Bombing, p. 45.

¹⁷ Melinger, "Trenchard, Slessor, RAF," p. 71.

¹⁸ Alfred Hurley, Billy Mitchell: Crusader of Airpower, p. 12, 32.

¹⁹ Ibid., p. 35.

- ²⁰ Ibid. , pp. 42-56.
- ²¹ William Mitchell, Winged Defense, p. 394.
- ²² Ibid. , p. 414.
- ²³ Mets, The Air Campaign, p. 34.
- ²⁴ Ibid. , p. 36.
- ²⁵ Mark Clodfelter, "Molding Airpower Convictions: Development and Legacy of William Mitchell's Strategic Thought" Phillip Meilinger, ed. , In The Paths of Heaven, p. 96 (hereafter cited as the Legacy of Mitchell).
- ²⁶ Thomas Schelling, Strategy of Conflict, p. 35.
- ²⁷ Mitchell, Winged Defense, p. 414.
- ²⁸ Ibid. , p. 489.
- ²⁹ Clodfelter, "The Legacy of Mitchell," p. 95.
- ³⁰ Mitchell, Winged Defense, p. 433.
- ³¹ David MacIsaac, "The Voices from the Central Blue," Peter Paret, ed. , In Makers of Modern Strategy from Machiaveli to the Nuclear Age, p. 633.
- ³² Mets, The Air Campaign, p. 39.
- ³³ Mitchell, Winged Defense, p. 510.
- ³⁴ Clodfelter, "The Legacy of Mitchell," p. 108.
- ³⁵ Peter Faber, "Interwar U.S. Army Aviation and The Air Corps Tactical School: Incubators of American Airpower," Phillip Meilinger, ed. , In The Paths of Heaven, p. 187.
- ³⁶ Ibid. , p. 215.
- ³⁷ Ibid. , p. 211.
- ³⁸ Charles Griffith, The Quest: Haywood Hansell and American Strategic Bombing in World War II, p. 19.
- ³⁹ Ibid. , p. 15.
- ⁴⁰ John Warden, Planning the Air Campaign, p. 68.
- ⁴¹ Mets, The Air Campaign, p. 74.

CHAPTER 2

PLANNING AND WAGING STRATEGIC AIR WARFARE

This chapter covers the formulation and development of America's strategic air war plans from AWPD-1 to the Casablanca Conference, and reflects the Airman's belief about the revolutionary nature of airpower and the hope that strategic bombing could win the war on its own. Additionally, it will cover the creation of the Eighth Air Force and examine the impact its early missions had on the development of the Combined Bomber Offensive Plan. Air Force leaders would encounter early problems in implementing the strategic bombing plans. American policy of High Altitude Precision Daylight Bombing (HAPDB) would cause disagreements with the British over the proper employment techniques of strategic bombers.

The advent of airpower and the development of strategic bombing doctrine forced governments to reassess their policies of national defense and overall grand strategies. Countries were no longer immune to direct attack, and could not depend on the protection of a natural sea barrier. President Franklin D. Roosevelt (FDR) aptly warned Americans "they could no longer measure [their] safety in terms of miles on a map. As long as aircraft range continued to increase the threat of an effective air attack became greater."¹ This threat led to a new arms race as all the major powers developed policies for air rearmament. Roosevelt and Secretary of War Henry Stimson were enthusiastic about the use of aircraft in any future war. In 1938, Roosevelt authorized a provisional rearmament program of 30,000 aircraft, which Congress significantly reduced.²

The outbreak of World War II led to the development of close ties and firm commitments between the United States and Great Britain. FDR persuaded Congress late

in 1939 to repeal the arms embargo, which enabled the United States to sell military equipment to the allies on a cash-and-carry basis. In September 1940, the two countries established a joint committee to discuss and arrange sales of aircraft to Britain and achieve standardization of production. The United States expanded its own aircraft industry enormously to provide Britain the bulk of its new aircraft. Roosevelt referred to this policy as the arsenal of democracy.³ The unexpected collapse of France, followed by the Battle of Britain, convinced many American political and military leaders of the possibility of world domination by the Axis powers. The changed strategic picture led Roosevelt to move rapidly toward a policy of all-out military cooperation, short of war, with Great Britain. One critical step in that direction was the decision at the end of 1940 to hold secret military staff talks with British representatives.

The first major discussions of strategy between Britain and America began in January 1941, known as the American-British Conference (ABC 1). An essential element in the broad plan that emerged from those talks was a sustained air offensive against Germany and Axis-controlled territory, in the event America entered the war, which would precede an eventual land offensive in Europe. The British were to provide secure bases to the Americans in both Britain and the Mediterranean for the conduct of air operations. Roosevelt and Stimson supported bombing for political reasons, the most important of which was the hope that American isolationism would be easier to break down if intervention with a bombing campaign promised low casualties and expenditures for great military effect.⁴

The strategic scenario discussed, which shaped the talks, was one in which Great Britain and the U.S. stood against Germany, Italy, and Japan. The Allies deemed the

Atlantic-European Theater as the decisive point, and developed a Europe-first strategy. Offensive measures would include sustained air operations and the early elimination of Italy, with initial raids and minor offensives conducted against the continent. America would expand the arsenal of democracy to include support for all neutrals and belligerents who opposed the Axis. The ultimate objective was a build up of forces for an eventual land offensive against Germany.⁵

The (American) Joint Army-Navy Board approved the recommendations of ABC-1 and developed the subsequent American war plan known as Rainbow 5. Air strategy assumed a particular importance for the Americans because the air offensive was one of the few ways in which the United States could participate fully and quickly in the war against Germany.⁶

The increased air objectives in Rainbow 5 necessitated an expanded command structure within the GHQ Air Force. Secretary Stimson directed the placing of the air arm under one responsible head. On June 20, 1941, Army Regulation 95-5 created the Army Air Force (AAF) and established General Hap Arnold as its Chief and as Marshall's Deputy Chief of Staff for Air. Arnold established an Air Staff, removing most of the Plans Division from the office of the Chief of the Air Corps, and designated its sections as A-1 (personnel), A-2 (intelligence), A-3 (operations and training), A-4 (supply and maintenance), and Air War Plans, which consisted of four officers.⁷ The Air War Plans Division (AWPD) prepared over-all plans for the control of the activities of the Army Air Force.

To provide some realistic guidance to the office of Production Management, Roosevelt in July 1941 directed the Secretaries of War and Navy "to prepare an estimate

of the overall production requirements required to defeat our potential enemies.”⁸ The President’s directive dictated that production requirements and responsibilities follow the strategic concepts set forth in the ABC-1 agreement and the current U.S. war plans.⁹ The task of compiling the overall estimate of ground, naval, and air requirements fell to the War Plans Division of the War Departments General Staff (WDGS).

General Arnold requested that the AWPD complete the task of writing the air requirement portion of the plan, thus freeing the WDGS to concentrate on ground requirements. The War Plans Division gave the AWPD nine days to develop an estimate of the maximum number of squadrons required to garrison a great number of geographic sites and to hold as reserves of opportunity. However, the AWPD undertook the task to prepare a comprehensive air plan for the defeat of the Axis.¹⁰ The Air Staff completed “Air War Plans Division-1 (AWPD-1), Munitions Requirements of the Army Air Force” on August 12.

The War Plans Division had concluded that it would take a couple of years after the United States went to war for the Army to raise, train, and deploy the millions of men needed to invade the continent of Europe. Setting the conditions for an invasion included severely weakening the German war machine through the bombing of the German war production facilities and achieving air superiority by defeating the German Air Force. Although strategic air operations could begin on a limited scale about twelve months after the outbreak of war, the forces needed to conduct the air offensive would not reach full strength in England until approximately eighteen months after M-day (mobilization). The full six months of strategic aerial warfare would end two years after the outbreak of

war.¹¹ Therefore, the AWPDP planned a strategic bombing campaign that would reach its peak during the six months preceding the invasion.¹²

AWPD-1 was not simply a list of supplies and production requirements, but a clear expression of strategic tasks. The Air Staff planners favored a general air strategy, with a sustained and unremitting air offensive against the German war economy. This idea followed the Industrial web theory and doctrine developed at the Air Corps Tactical School (ACTS) between the wars. Members of the Air Staff disagreed with the War Department's view for conduct of the war. The Air Staff believed that such an air offensive could end the war and thus make an invasion unnecessary.¹³ The execution of this strategy called for an intensive, well-orchestrated and uninterrupted six-month campaign, once all the necessary assets were available in theater.¹⁴

Douhet had considered targeting as the most important role of the air planners. Since the ultimate objective of AWPDP-1 was to force the capitulation of Germany through strategic bombing, the selection of targets was of the utmost importance.¹⁵ The Air War Plans Division (AWPD) developed a list of 154 targets that, if destroyed or kept out of operation, would disrupt or neutralize the German war-making capability. The framers of AWPDP-1 divided these targets into primary and intermediate air objectives. They sub-divided the primary into four broad target systems, or sets, in the following order of priority: the electrical power system, the transportation systems, synthetic oil and petroleum industry, and, as a last resort, if the other targets proved ineffective, the civilian population.¹⁶

The Air Staff acknowledged that the Luftwaffe, especially the German fighter force, would have to be defeated before any invasion of the continent and possibly before

the execution of the air offensive. “The only way for a strategic air force to destroy fighter opposition” the air planners realized, “was to destroy the aircraft industry and depend on the defensive fire of the American bombers.”¹⁷ Destruction of the Luftwaffe therefore became the overriding intermediate objective, taking precedence over the primary air objectives.¹⁸ The AWPD identified eighteen large aircraft assembly plants, six aluminum plants, and six magnesium plants, the destruction of which would greatly diminish the German fighter threat.¹⁹

In developing a methodology to execute their strategy, the Air Staff adhered to the tactics, techniques, procedures, and doctrinal theory developed by the ACTS. The AWPD planners believed that heavy bombers, relying on speed, massed formations, high altitude, defensive firepower, armor, and simultaneous penetrations at many places, could make deep penetrations of German defenses in daylight hours.²⁰ They ignored the need for the development and use of long-range escort fighters in the execution of this strategy. They saw the role of pursuit aircraft as defensive in nature to protect airbases and vital areas. The Air Staff believed that the American bombers were technologically superior to any German aircraft. The AWPD planners, therefore, adopted a strategy of conducting High Altitude Daylight Precision Bombing (HADPB) raids against selected target sets.

The AWPD recruited additional assistance from the Air Staff to help with the forecasting of resource requirements to fulfill the developed strategy. Experts on bombing probabilities compiled the bombing tables and the personnel section calculated the manpower requirements.²¹ The AWPD based force requirements on a 90 percent

probability of hitting selected targets, and the total number of sorties that it would take to accomplish the task in six months at the rate of five missions per month.²²

The consolidated plan called for the production of 61,800 aircraft and required 180,000 officers and 1,985,000 enlisted personnel, totaling 2,165,000 men and women.²³ The plan established a need for production capacity to replace combat losses every five months. The heavy bomber totals equaled 11,000 and required 770 replacements a month for the air offensive against Germany alone. The AWPD completed the plan and General Arnold endorsed it on Sunday, August 12, 1941. Under Secretary of War Robert Lovett reviewed the plan and integrated its findings into the War Department's Victory Program Report.²⁴

On August 30, 1941, Arnold and Lovett presented the plan to General George C. Marshall, the Army Chief of Staff, and the rest of the General Staff. There were questions and some expressions of dissent, but Marshall was euphoric, "I think the plan has merit" he said, "and I want the Secretary to hear the plan."²⁵ On September 11, he presented the plan to Secretary of War Stimson and simultaneously sent a copy to the Joint Army-Navy Board. Stimson approved the plan and had it prepared for the President's review, while the Board incorporated its tabulations in the joint estimate.²⁶ Members of the Board accepted the air requirements set forth in AWPD-1 but were skeptical about the claims made for strategic bombardment. The Board commented, "Naval and air power may prevent wars from being lost by weakening enemy strength and greatly contribute to victory," however, "by themselves they seldom, if ever, win important wars. It should be recognized as an almost invariable rule that only land armies can finally win wars."²⁷

The AWPDP planners used a model devised by the Air Corps Tactical School (ACTS) to develop their targeting packages. The ACTS conducted a hypothetical bombing campaign against the key industrial centers in the American Mid-West and evaluated the effects and impact it would have on the U.S. economy. The AWPDP used those estimates to define similar target sets in the Third Reich, a precedence that could prove risky. As one analyst notes, “The strategic economic targeting methods formulated ran the risk of mirror imaging whereby the key nodes of one’s own industrial infrastructure became confused with the critical vulnerabilities of an opponent.”²⁸ However, later interviews with German economic minister Albert Speer and results posted by the United States Strategic Bombing Survey after the war revealed that the methodology and target selection for the most part had been right on track. The error in planning came from delays in re-attacking specific targets, insufficient bomb loads to cause catastrophic damage, and the change in target priorities from the original targets identified within AWPDP-1.

The AWPDP adopted the ACTS’ industrial web theory of strategic bombing and developed target sets based on the assumption that the German war economy was already fully mobilized and therefore vulnerable—an assumption that rested on faulty intelligence. However, in fact, until 1942, Hitler had utilized so-called “blitzkrieg economics” to fight short decisive wars. In other words, he mobilized only those sectors of the economy necessary to wage a particular campaign, a policy that helped maintain the German standard of living.²⁹ The German economy did not actually undergo full mobilization for war until 1942. The plundering of conquered countries afforded the Hitler regime the luxury of partial or sectorized mobilization until the dramatic shift in the strategic picture at

the end of 1941, when the invasion of the USSR stalled and the Fuehrer decided to declare war on the United States.

Another flaw in the industrial web theory was that it did not take into account the large stockpile of reserve material that Germany possessed. Germany had twice as many multipurpose and machine tools than Great Britain and probably still had more than the U.S. half way through the war. This does not include the vital industries and machinery Germany gained through conquest of Europe.³⁰

The target sets developed in AWPD-1 focused primarily on targets within Germany aimed at crippling the domestic economy, but Germany was essentially a continental power. As long as Hitler's European empire continued to provide the essential raw materials, work force, and even critical manufactures, the Reich's ability to wage war would not be vitally affected by the strategic bombing campaign.³¹

HAPDB placed excessive emphasis on the offensive aspects of air warfare while minimizing potential defensive strategies and technologies. The AWPD planners did not anticipate enemy technological improvements such as the radar-based fighter and AAA defensive networks.³² In general, the AWPD-1 exaggerated the effectiveness of airpower and over estimated the physical effects of strategic bombing.³³ Although the AWPD planners conceded that some targets might have to be attacked more than once to achieve the desired effects, they were overly optimistic in their analysis of the effects of individual bombs upon the targets. Additionally, they did not make thorough analysis of the tonnage of bombs required to destroy the heavy industrial equipment or take sufficiently into account the bombs on hand and the payload capacity of future bombers. Enemy public morale would also not be as fragile as American planners thought, which

meant that they exaggerated the psychological impact of strategic bombing failing to realize that bombing could easily arouse angry passions toward the attacker rather than the victim's own government.³⁴ AWPD planners ignored historical lessons from the Battle of Britain and assumed that the effect upon the German people would be different.

The most egregious error within AWPD-1 was the omission of long-range fighter escorts as an integral part of the plan.³⁵ The strategy of unescorted High Altitude Daylight Precision Bombing raids placed too much stock in the Douhetian principles of the battle plane and the speed and firepower of mass bomber formations. The inability of the bomber to defend itself, and thus to "always get through," affected the capability of the combined air forces to pursue the air offensive and jeopardized the successful land invasion.

One week after the Japanese attacked Pearl Harbor, the Air War Plans Division (AWPD) began developing a plan that would commit the U.S. and Great Britain to an air strategy against the Axis. AWPD-4, (Air Estimate of the Situation and Recommendations for the Conduct of War), dated December 15, 1941, advocated giving first priority to the protection of the Western Hemisphere and Britain, sustaining American forces in the Philippines, and then directing every effort toward an air offensive against the Axis in Europe.³⁶

AWPD-4, expectedly recommended that the first priority for war production be the AAF and then the sea and land forces as appropriate and consisted of three phases. Phase One involved safeguarding the U.S. and Great Britain, and extending defenses to Natal, the Cape Verde Islands, and Dakar. Phase Two dealt with waging a decisive air offensive against the Axis powers in Europe, and engaging in a defensive effort in the Far

East. The plan made concessions to support a possible land invasion of Europe if necessary. Phase Three involved the conduct of sustained air offensives against Japanese military and civil strength and the use of land forces where necessary.³⁷

Prime Minister Churchill became concerned that the Japanese attack on Pearl Harbor might force the United States to deviate from the Europe first-strategy in favor of a retaliation strategy directed toward Japan. He announced his intentions to come to Washington with his military staff for consultations on grand strategy. In response, President Roosevelt appointed a U.S. Joint Chiefs of Staff committee, that consisted of the Chiefs of Staff of the Army and Navy, and General Arnold the AAF Chief, to represent him in the Combined Chiefs of Staff Arcadia Conference, which lasted from December 22, 1941 to January 14, 1942.³⁸ The outcome of the talks was that the Combined Chiefs rejected AWPD-4's bid for air priority in war production. Instead, they recommended a sequenced victory program that prioritized the allocation of resources and increases of air, land, and naval forces, and the manufacturing of munition schedules according to individual operations. The Combined Chiefs thus accepted a modified AWPD-1.³⁹ The Arcadia Conference also established the mechanism for directing the Anglo-American war effort and took steps toward creating a unified command of combined forces in theaters of operation. The meeting established a composite Combined Chiefs of Staff consisting of the British Army, Navy, and Air Force Chiefs of Staff and their American counter-part.⁴⁰

The American-British strategy thus gave first priority to Europe. The initial mode of operations called for a combined strategic air attack by the British RAF and the U.S. Army Air Force from bases in England. The purpose of the air offensive would be to

cripple the German war machine through destruction of vital industries, undermine the national will to resist, and topple the Hitler regime if possible. The plan provided for an invasion of the continent, and sustained combined air and surface warfare. It called for the creation of massive tactical air forces to support ground operations. The proponents of strategic bombing, however, hoped that its success would make an invasion unnecessary.⁴¹ The allied strategy called for maximum effort exerted against the Axis and the diversion of minimum essential force necessary to safeguard vital interest. It called for maintaining and safeguarding vital interest and positions in the Eastern Theater to deny Japan access to raw materials vital to her war effort. Only after the defeat of the Third Reich would the Allies launch an all-out strategic offensive against Japan.⁴²

The Joint Chiefs approved dispatching a bomber force to England to join the RAF in attacks against the Axis powers in Europe. The Combined Chiefs agreed that the first two American heavy bomber groups available would operate independently in cooperation with the British Bomber Command. Speed was the watchword. Planners on both sides of the Atlantic wanted the (American) Eighth Air Force deployed at the earliest possible moment. Guidelines set forth in AWPD-1 called for the Eighth Air Force to consist of sixty combat groups, made up of seventeen heavy bomber units, ten medium and six light bomber units, seven observation units, twelve fighter units, and eight transport groups for a combined strength of 3,500 aircraft that would be available by April 1943.⁴³ Activated in January 1942, under the leadership of Major General Carl Spaatz, the Eighth Air Force began its deployment across the Atlantic in May. It comprised of a fighter command, a service command, a composite command for training, and the VIII Bomber Command under Brigadier General Ira Eaker. However, of the

heavy bombardment groups allocated to the Eighth Air Force, only the 97th was operational by August 17, 1942.⁴⁴

One thing that hindered the implementation of strategic bombing plans was the diversion of air assets to other theaters. A new Japanese threat in the Pacific, for example, forced the diversion of fifteen combat groups that were destined for Europe.⁴⁵ The Anglo-American invasion of North Africa (OPERATION TORCH) also drained resources from the Eighth. British Prime Minister Churchill opposed an early invasion of the European continent, and advocated instead operations in North Africa supported by heavy bombers at the expense of the air offensive against Germany. Churchill's goal was to protect the lines of communications to the Middle East and to position troops and material for a possible main thrust into the Balkans to forestall a Russian drive that might engulf all of Western Europe. The Joint Chiefs in Washington saw the invasion as a diversion from the main effort against German-held Europe, but President Roosevelt had to weigh their objections against the political necessity of military success in the near future.⁴⁶ The President also did not grasp the true dimensions of the air offensive against Germany that would have allowed him to stave off political demands for immediate results. The result was that, in July 1942, Roosevelt agreed to TORCH.⁴⁷

The demand on the Eighth Air Force was severe: it dispatched two fighter groups and four heavy bomber groups to North Africa, leaving only five groups of B-17s and two groups of B-24s to carry out operations in Europe. Additionally, one-third of the personnel who formed the newly created Twelfth Air Force came from the crews assigned to VIII Bomber Command. The remaining groups of the Eighth provided essential equipment, such as bomb loading equipment and transport vehicles to support

the Twelfth operations.⁴⁸ Fulfillment during 1942-43 of the United States Army Air Force's (USAAF) ambitious plans for a bomber offensive against Germany, as laid out in AWPD-1, was not possible. Indeed, the Eighth Air Force found itself limited to raids against submarine bases on the Brittany coast, and industrial targets in France.

The North African campaign reflected disagreement over strategy in Washington and mirrored confusion over the role of American bombing assets in Great Britain. When General Eaker and his advance staff landed in England in February 1942 to set up the VIII Bomber Command, Eaker had no written directive or letter of instruction describing his purpose and giving him authority to pursue it. He understood General Arnold's verbal instructions and the intent of AWPD-1, but Arnold had no authority to instruct him to implement it. When Eaker moved his headquarters near RAF Bomber Command, he encountered his second problem. Air Marshall Harris, Commander in Chief of the RAF Bomber Command, was determined that the American bombers would join the RAF in conducting night area-bombing raids against German cities. This threatened the absorption of VIII Bomber Command into the RAF Bomber Command and the abandonment of the American strategic concept of daylight precision bombing. Eaker, therefore, refused Harris' recommendations and appeals.⁴⁹

When Eisenhower and Spaatz arrived in England and assumed command of the U.S. European Theater and Eighth Air Force, respectively, in June 1942, each carried letters of instruction detailing lines of communication and directives under which all U.S. force were to operate. Eisenhower's guidance for air operations dictated gaining air superiority to prepare for and support a land invasion, without a detailed list of strategic targets or direction.⁵⁰ Spaatz, as Commander of the Eighth Air Force, possessed no

authority to make strategic air decisions. As executive agent of the Combined Chiefs of Staff, Air Chief Marshal Portal exercised broad strategic direction for air operations, but he did not designate targets or exercise tactical control over operations. Final authority for all operations rested with General Eisenhower as European Theater commander.⁵¹

Despite the uncertainties the Eighth Air Force faced, its leaders were anxious to get available bomber units into action at the earliest possible opportunity and selected target systems for the earliest phase of operations. Eaker described the job of the VIII Bomber Command as “the destruction of carefully chosen strategic targets, with a secondary purpose of determining its capacity to destroy pinpoint targets by daylight accuracy bombing and the ability to beat off enemy fighters and evade anti-aircraft opposition.”⁵² The initial daylight bombing raids focused on the destruction of submarine bases and support structures, aircraft factories, key munitions establishments, and lines of communication.⁵³

In August 1942, President Roosevelt asked General Arnold for his recommendation regarding which combat aircraft to produce in 1943 in order to gain complete air ascendancy over the enemy. Arnold turned to the AWPDP, which completed a study the following month entitled AWPDP-42: Requirements for Air Ascendancy.⁵⁴ The report differed from AWPDP-1 only in terms of the number of targets and adjustments to target priorities. The plan defined primary and intermediate objectives with corresponding target sets. The intermediate objective of defeating the Luftwaffe through the destruction of aircraft assembly plants and engine factories retained overriding priority. AWPDP-42 revised the primary target list placing U-boat factories, holding pens and bases as the first priority, followed by the German transportation system, electric

power stations, and synthetic oil plants. It added aluminum plants and synthetic rubber plants as additional target sets.⁵⁵

The Eighth Air Force had completed only six missions before the writing of AWPDP-42, none of which provided an opportunity to evaluate the defensive capability of the Luftwaffe. However, the planners still believed in the defensive capability of the bombers and saw no need for the production of long-range escort fighters.⁵⁶ AWPDP-42 confidently predicted “that our current type bombers can penetrate German defenses to the limit of their radius of operation without excessive losses.”⁵⁷

AWPDP-42 urged that Navy not receive any allocations of heavy or medium bombers from the 1943 production. This provision, together with the competition that aircraft production posed to the building of ships, aircraft carriers, and naval aircraft, caused the Navy to reject AWPDP-42 in its entirety.⁵⁸ The Joint Chiefs never accepted AWPDP-42. Roosevelt and Secretary of War Stimson, however, approved the requirements, and the plan became the pattern for expansion in the American aircraft industry.⁵⁹

Arnold hailed the survival of the idea of strategic bombing. “The principal objectives of the air forces in this new plan as well as in the old,” he pointed out to Spaatz, “are to be obtained by precision bombing.”⁶⁰ Spaatz further refined the mission of the Eighth Air Force and issued a list of specific targets for attacks in occupied France and the Low Countries. The current weakness of the force determined the choice of targets. The tactical radius of the British RAF fighters limited the choice to objectives on or near the European coast. The Priority of targets were aircraft factories, railroad marshalling yards, and submarine installations. This target list governed operations

until October 1942. The shallow penetration missions offered an excellent opportunity for the newly formed bomber units to cut their teeth and develop tactics, but the fact that all the objectives lay within friendly occupied territory raised serious political issues.⁶¹

American bombers launched their first strategic air attack in Europe on August 17, 1942 against the giant railway marshalling yard at Rouen in France. RAF fighter planes escorted them to their target. All twelve bombers reached the target and returned safely with approximately half the bombs placed within the target area. This operation presented no preparation for more distant attacks into Germany without fighter cover, and where anti-aircraft artillery was much more concentrated. Additionally, this attack did little to prove the ability of the B-17 bomber formations to defend themselves.⁶² The VIII Bomber Command flew its second mission on August 19, again with heavy RAF fighter cover. A force of twenty-four B-17s attacked the aircraft factories at Abbeville with outstanding results and no losses. The next six missions were within easy range of the British escort fighters and only shallowly penetrated enemy-occupied territory, encountering slight enemy fighter opposition.⁶³

On August 21, during an unsuccessful attempt to bomb the Wilton shipyard in France, the American bombers were late for their link up with the RAF fighters, and had a brisk battle with enemy aircraft. USAAF Headquarters recalled the bomber formation, but twenty-five Me-109s and FW-190s fighters attacked over the Dutch coast. It was the first time the B-17s had faced a concentrated fighter attack without protection from friendly aircraft.⁶⁴ During a twenty-five minute running battle, the German fighters damaged one B-17, killing one pilot and wounding five crewmembers. The bomber formation claimed six damaged enemy fighters.⁶⁵

On September 6, VIII Bomber Command conducted the first simultaneous attack on two targets by diverging B-17 bomber forces. Enemy fighter opposition was fierce and resulted in the first heavy American losses.⁶⁶ Out of the seventy-six bombers dispatched on the mission, two bombers failed to return, and seven suffered damage. Personnel losses included one pilot killed, five wounded, and eighteen crewmembers missing in action.⁶⁷ After the mission, persistent bad weather set in and forced aborts or mission delays until October 2.

The daylight bombing campaign reached a minor climax on October 9 in a bomber raid against the heavy German armament, steel works, and transportation network at Lille.⁶⁸ It was the first large-scale American mission. One hundred and eight bombers launched to attack the primary target, and seven B-17s flew a diversionary sweep to Cayeux. A combined effort of American and British fighters provided escort for the mission. During the mission, the Eighth Air Force lost four bombers and an additional forty-six received damage. Allied fighters and bomber gunner crews downed four enemy fighters, although crews made exaggerated claims of damaging or destroying over twenty-five enemy fighters. The bombers dropped 167 tons of 500-pound high explosive bombs on the target areas.⁶⁹ Although the American aircraft experienced numerous technical difficulties and bomb dispersion was not accurate, the British press praised the raid as a great victory for the American bombers. Ground observation credited the attack with completely stopping work at the Hellemmes textile factory and causing severe damage to the power station, boiler works, and turbines at the Fives-Lille steel establishment.⁷⁰

Overall, the American strategic bombing of German-controlled Europe during 1942 and early 1943-produced little visible progress. The forces available were inadequate to achieve decisive results. The effects of the bombing campaign were gradual, cumulative, and during the course of operations rarely measurable with any degree of assurance. Bombers returned repeatedly to strike targets that they seemingly had destroyed before. The lack of a clear focus and visible evidence of success, combined with the mounting aircraft losses and casualties, began to affect the morale of the bomber units. Crews found a sense of accomplishment only in the completion of their twenty-fifth mission, which brought relief and rotation out of the theater.⁷¹

While the USAAF strove to perfect the tactics for executing HADPB, the value of these raids came under debate in Britain. The basic question was whether American bombers could make effective daylight attacks without prohibitive losses. The British repeatedly urged that America abandon its policy of HAPDB and join Bomber Command in the execution of night assaults.⁷² “I noticed that the Americans had not yet succeeded in dropping a single bomb on Germany,” Churchill commented in January 1943.⁷³ The British complained about the number of aborted American missions, the low number of missions flown, and about the appearance that Britain was carrying the weight of the air offensive against Germany. Eaker countered the criticism by pointing to the diversion of Eighth Air Force assets to support other mission requirements-assets that industry had not yet been able to replace. Weather, too, had hindered bombing operations, he asserted.⁷⁴ At the Casablanca Conference in January 1943, the Allies agreed to meet and discuss these issues and to refine the objectives of a continued air strategy and prepare for the eventual invasion against Germany.

End Notes

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CHAPTER 3

CASABLANCA AND THE COMBINED BOMBER OFFENSIVE

In January 1943, at the Casablanca Conference in North Africa, Roosevelt and Churchill along with the Combined Chiefs of Staff met to discuss the future conduct of the war. There was sharp disagreement between the Allies over the proper strategy for defeating the Axis. At the time of the conference, it had become apparent that a bombing offensive would not reach a sufficient scale for airpower alone to achieve decisive results, and that an invasion of the continent was necessary to bring about the defeat of Germany.¹ Airpower advocates still believed that, if given the appropriate assets and time, strategic bombing could bring about the collapse of the Germany. However, the overall grand strategy of the Anglo-American alliance called for an invasion. What remained was determining the role strategic bombing would play in that strategy and the order of priority it would receive.²

The British had become concerned about the slow build-up of American bomber forces and the lack of attacks on targets within Germany. The Combined Chiefs of Staff (CCS) set about developing a strategy that would integrate the capabilities of both the American and British bomber forces into a combined effort. However, differences arose about the method of executing such a strategy.

The German defensive network had thwarted the attempts of Bomber Command to conduct daylight-bombing raids. Additionally, American and British planners disagreed over the principles of target selection. British analysts did not place much stock in the American concept of attacking individual key industries that represented a bottleneck in the German economy. Air Marshall Harris referred to this group of selected

targets as panaceas, and stressed that only by night area-bombing could the Allies reach their targets and bring destruction to the German economy. The failure of early American attempts at daylight precision bombing to produce decisive results added credence to this argument. Harris took his case to Churchill, who urged Roosevelt to have the American bomber forces join RAF Bomber Command in conducting night area bombing raids.³

General Eaker, commander USAAF VIII Bomber Command, argued that the American bombers were not equipped or trained to carry out night raids. Furthermore, by pursuing independent operations the two forces could complement each other and provide continuous pressure on Germany. Eaker succeeded in persuading the Prime Minister to reverse his position and to give the USAAF VIII Bomber Command the opportunity to prove their contention. “How fortuitous it would be if we could as you say, bomb the devils around the clock and give them no rest,” Churchill commented.⁴

The strategy for air operations developed by the CCS and issued in the Casablanca Directive stated that: “The U.S. and British bomber forces would conduct a joint U.S.-British air offensive to accomplish the progressive destruction and dislocation of the German military, industrial, and economic system and undermine the morale of the German people to the point where the capacity for armed resistance is fatally weakened. *This means weakened to a point to permit initiation of final combined operations on the continent.*”⁵ The Casablanca Directive made it clear that airpower was not to attempt to win the war on its own, but produce the conditions by which the armies could achieve victory. Since RAF Bomber Command was already fully engaged in the air offensive

against Germany, the burden of planning the combined bomber offensive fell on the USAAF.

General Arnold formed a Committee of Operations Analysts (COA) to conduct scientific analysis of the industrial objectives in Germany whose destruction would weaken the enemy most decisively in the shortest possible time. The committee identified sixty such targets and nineteen target systems. The COA stated that the expected results would be cumulative and that, once adopted, the plan required relentless execution.⁶ The systems suggested by the committee consisted of the German aircraft industry, ball bearings, petroleum, grinding wheels and crude abrasives, non-ferrous metals, synthetic rubber, submarines, military transport vehicles, and the transportation system.⁷

On March 8, 1943, the COA reported its findings to General Arnold. After Arnold and his advisory council favorably considered the report, he forwarded it to the United Kingdom for coordination with British authorities and the Eighth Air Force. A committee consisting of representatives from the (British) Air Ministry, the Ministry of Economic Warfare, the RAF, and the Eighth Air Force reviewed the report and developed a final list of primary air objectives that included seventy-six targets in six systems, broken down into intermediate, primary, and secondary objectives.⁸ The committee recognized that the destruction of the Luftwaffe was necessary for effective strategic bombing and for a successful invasion. Therefore, the committee gave its destruction overriding priority as an intermediate objective. The priorities of the primary air objectives were German submarine yards and bases, the ball bearing industry, and

petroleum production. The committee designated synthetic rubber plants, and military transport vehicles as secondary air objectives.⁹

After the determination of the principal targets, there remained the task of developing an operational plan to accomplish their destruction. For this purpose, General Eaker appointed a committee composed of British Air Commander Sidney Bufton, Brigadier General Haywood Hansell, Brigadier General Fred Anderson, and staff officers from the Eighth Air Force. He instructed the committee to resolve the forces required to accomplish the air war objectives and develop the chronological order in which the attacks would take place.¹⁰ The Eaker Committee concluded that the projected bomber strength would execute the plan in four-phases. During Phase One (April - July 1943), missions would focus on the submarine yards that were within the range of available fighter support. During Phase Two (July - October 1943) the combined offensive would concentrate 75 percent of its effort on the destruction of fighter assembly plants and aircraft factories within a 500-mile radius, and 25 percent against submarine facilities. In Phase Three (October 1943 - January 1944) the Allies would dedicate 1,746 available bombers to all tasks, while in Phase Four (begin early 1944) the 2,702 projected bombers would be limited only to their operational radius.¹¹

In developing the Combined Offensive Plan, Eaker stressed the need for integration and cooperation between American and British bomber forces. “The most effective results from strategic bombing,” in Eaker’s opinion, “would be obtained by directing the combined day and night efforts of the U.S. and British bomber forces to all-out attacks against targets which were mutually complimentary, in a campaign to undermine decisively a limited number of selected target systems. The American

bombers would bomb specific industrial objectives by day, and the RAF would attack by night the cities associated with these objectives, the timing to depend on the tactical situation.”¹²

Eaker secured the endorsement of the Joint Chiefs of Staff, and then the Combined Chiefs of Staff (CCS) approved the plan at the Trident Conference in May 1943. Sir Charles Portal, acting as executive agent, issued a directive to proceed with what they now called the Combined Bomber Offensive Plan (code name OPERATION POINTBLANK), to culminate with a cross-channel invasion projected for 1 May 1944.¹³

POINTBLANK failed to assign overall operational responsibility for integrating the combined efforts of the two bomber commands. At Casablanca, the (CCS) assumed that the chief of the RAF Air Staff would supervise the combined offensive as the agent of the CCS, but no system was in place to ensure coordination between the two forces. At Trident, the CCS agreed that, “While the forces of the British Bomber Command would be employed in accordance with their main aim in the general disorganization of German industry their action would be designed as far as practicable to be complementary to the operations of the Eighth Air Force.”¹⁴

General Arnold wrote to Portal urging the creation of a central organization that would be responsible to coordinate the bombing efforts of both bomber forces. On June 10, 1943, a separate directive established the Combined Operational Planning Committee. The committee consisted of representatives from RAF Bomber and Fighter Commands, Eighth Air Force Headquarters, VIII Bomber and Fighter Commands, and an Air Ministry representative was available for liaison with the British Air Staff.¹⁵ The committee was concerned with the coordination of tactical plans for specific combined

operations, to be prepared well in advance of requirements, and to examine the tactical execution of these plans. It was advisory in nature only, with no executive authority. Responsibility for the conduct of operations remained with the commanders concerned. It dealt primarily with the daylight bombing campaign, and became merely a liaison with the Americans on tactical questions that might be common to both commands.¹⁶

The CBO plan and the separate directive purposely avoided committing the RAF to rigid adherence to the objectives set forth; as far as practical the actions of the RAF would complement those of the Eighth Air Force. The British and American forces thus proceeded to engage in bombing the enemy according to widely divergent operational theories. The RAF hoped to bring about a general disorganization of the German economy by attacking civilian morale as the primary objective. Meanwhile, the American bomber forces pursued the disruption of the German economy and military industry through precision attacks as specified in the CBO plan. The execution of the bombing offensive, therefore, became more divided in nature than combined.¹⁷

From January 21, 1943 until the issuance of the CBO plan and directives on June 10, 1943, the Eighth Air Force continued experimental operations to adjust its tactics and procedures for the execution of daylight precision raids. A lack of resources seriously curtailed the capability of VIII Bomber Command and it was not until March that it could consistently launch a force of more than 100 bombers. The Eighth Air Force continued to conduct operations against the German submarine yards and bases, in accordance with the directive issued in October 1942 and the priorities established at Casablanca. A shortage of bombers limited these operations to the coast of France and the Low Countries, where fighter support was available.¹⁸

American bombers attempted to extend the scope of their operations into Germany proper, thus testing the quality of enemy opposition. The first attack by the Eighth Air Force on Germany took place on January 27, 1943, when General Eaker dispatched ninety-one bombers to attack the submarine bases at Wilhelmshaven. Fifty-three bombers dropped their load on the target area and only three B-17s were lost during the attack. The American bombers had received their baptism by fire over Germany beyond the range of escorting fighters.¹⁹

By April 1943, Eaker was convinced that his daylight bombers had proven their ability to penetrate German defenses. He therefore directed VIII Bomber Command to begin to carry out precision attacks against key elements in the German war economy producing submarines, aircraft, ball bearings, oil, synthetic rubber, and military vehicles as dictated in the priority target list developed by the COA. Bomber Command, however, in April had just 337 heavy bombers, and had an average of only 153 operational at any given time. The scarcity of aircraft therefore limited penetration attacks into Germany to the coastal areas of Wilhelmshaven, Emden, Vegesack, Bremen, Flensburg, and Kiel.²⁰

The Eighth Air Force also lacked a long-range escort fighter to accompany the bombers to the target area. American bombers could not avoid the German fighters in daylight, nor outrun them. The B-17s had to depend on mutually supportive massed formations - and the firepower and accuracy of their gunners - to keep the German fighters at bay.

On June 11, 1943, VIII Bomber Command launched 168 bombers to strike the Wilhelmshaven submarine facilities, and suffered a loss of eight aircraft. Missions to

Bremen and Kiel two days later resulted in a loss of 26 out of 122 bombers and 26 out of 60 respectively, for loss rates of 21 and 43 percent.²¹ But the worst was yet to come, especially since German resistance had stiffened considerably.

Indeed, the growing strength of the German fighter arm cast a shadow over the Allies' hopes for a successful invasion and continuation of the Combined Bomber Offensive. By June of 1943, German production of fighters had risen to over 1,000 a month. The heavier Allied bombing attacks had resulted in a greater concentration of enemy fighters, so at this time 70 percent of the Luftwaffe's fighter force was in the Western Theater of operation. Germany established five fighter defensive belts across the occupied territories and Germany proper. Radar early warning systems linked together with ground stations directed the German fighters to targets. Each ground station controlled a fighter within a box and a belt consisted of a whole series of these boxes touching each other. Additionally, a continuous searchlight belt covered the Ruhr integrated with anti-aircraft guns.

Consequently, from June 1943 to the spring of 1944, the destruction of the Luftwaffe became the main objective of the Combined Bomber Offensive. The CCS made that clear in a directive to the Allied bomber forces giving first priority to centers of German aircraft production. The Eighth Air Force was to attack the principal airframe factories and those making critical components, such as ball-bearings, while the RAF attacked those industrial towns in which there was the largest number of aircraft component factories, specifically targets east of the Ruhr and farther inside Germany.²²

The Eighth Air Force faced the difficult problem of striking factories and installations inside Germany without fighter escort, with a newly formed and

inexperienced bomber force. Additionally, because of early bombing attempts, the German aircraft industry had dispersed and subdivided into small units. Large aircraft and component factories lay far inside German territory and heavily protected.²³

On July 28, 1943, VIII Bomber Command made its deepest penetration yet into Germany. A small force of 39 bombers attacked the AGO Flugzeugwerk at Oschersleben, a major producer of German FW-190 fighters, which resulted in a four-week loss in production. The day operation cost VIII Bomber Command 15 B-17s and crews.²⁴ The P-47s of VIII Fighter Command prevented further bomber losses. Equipped for the first time with jettisonable belly tanks, 105 P-47s met the returning bombers 260 miles from the English coast. Their appearance thirty miles deeper into Germany than ever before caught a force of sixty German fighters by surprise. The Thunderbolts shot down nine of their adversaries and drove the rest away. One P-47 failed to return.²⁵

The Air Staff planners and officers of the Eighth Air Force had professed confidence that the American heavy bombers could fight their way through German defenses. Nevertheless, their hopes died out as missions over German soil beginning in early 1943 ran into stiff resistance. It became evident that, in order for daylight strategic bombing to continue, some sort of escort was indispensable. The makeshift 205-gallon paper tanks used during the mission on July 28 were unsuitable above 22,000 feet. The plan was to use them to enable the fighters to cross the Channel, climb to 22,000 feet, and then jettison them before entering enemy territory. This process, however, produced only a slight increase in range and tests began in August to develop a pressurized droppable tank that would extend the range of fighters to 340 miles and beyond.²⁶

On August 17, the American bomber force celebrated its first anniversary of operations by mounting the largest attack and deepest penetration to date. Eaker launched 376 B-17s against two of the most critical targets: the ball-bearing plants at Schweinfurt, which were producing over 40 percent of Germany's ball-bearings, and the Messerschmitt factory in Regensburg. A force of 146 B-17s set off to attack the Messerschmitt factory and 230 bombers headed for Schweinfurt. The German defenses went on alert and 300 fighters guided by radar intercepted the flight. Thirty-six bombers were lost on the Regensburg mission and twenty-four disappeared over Schweinfurt, for an overall loss rate of 19 percent. One hundred total aircraft were damaged or destroyed compared to a loss of only twenty-five German fighters.²⁷

The VIII Bomber Command did not attempt another mission of that size until September 6, when it sent 407 bombers against the aircraft and ball bearing factories at Stuttgart. A diversionary flight of 69 B-24s flew over the Northern Sea. The weather hampered the mission, but 262 bombers succeeded in reaching and bombing the target. Of those that reached the target area, 45 aircraft were lost.

A second raid on Schweinfurt in mid-October signaled the end of unescorted daylight bombing. Almost 300 bombers, in two separate flights, returned to Schweinfurt where German fighters again intercepted them. Although 220 bombers made it to the target and inflicted heavy damage, 60 bombers, each with a crew of ten, were shot down and another 138 damaged. Crewmembers called that day, October 14, "Black Thursday." Morale was low and for little wonder: aircrews were incurring a higher casualty rate than any other branch of U.S. forces.²⁸ The results from other bombing missions that same week were less severe, but still grave: 152 bombers were lost out of 1,342 sorties flown,

for a loss rate of 11.3 percent. An additional 42 percent sustained major or minor damage. Over 1,500 crewmembers went down with their planes or were lost to enemy POW camps. The total losses did not include wounded or killed crewmembers that returned with their planes. Air Force leaders concluded, "We can no longer afford to launch sorties without fighter escort." The high-loss rate of unescorted bomber operations thus had brought about the curtailment of further deep penetration into Germany. American bombers would have to contain operations within the umbrella range of friendly fighter cover and recuperate from its losses until long-range fighters were available.²⁹

The daylight bombing campaign had reached a crisis. The Eighth Air Force simply could not gain air superiority over Germany until it had a long-range fighter escort. A few P-38 Lightning and the P-47 Thunderbolts were in theater in late October, equipped with two of the new 75-gallon pressurized wing tanks, which extended the planes operational radius to 520 miles. But the plane that eventually solved the problem of long-range escort was the P-51 Mustang, a fighter of exceptional endurance and capability even when loaded with heavy supplies and fuel. The first newly equipped P-51s Mustangs, with a maximum range of 1800 miles, joined the Eighth Air Force in November 1943.³⁰ To defeat the German fighter force, General Spaatz reverted to Billy Mitchell's original concept and ideas. Escort tactics took on a distinctively offensive character. Previously ordered to stick with the bombers, beginning in early 1944 fighter pilots were encouraged to leave the formations and seek out and destroy the enemy fighters in air-air combat.³¹

The CBO had reached the end of its planned second phase. It became a matter of utmost concern to determine whether it had accomplished its objectives, and if the timetable remained the same for the planned invasion. The QUADRANT papers, which contained the overall estimates of the CBO, stated that by forcing the enemy to concentrate a large portion of his air force in the western front in a defensive campaign, the bomber offensive had made a major strategic contribution and that daylight attacks were actually succeeding in striking the vitals of the German aircraft industry. The Luftwaffe was in a vulnerable position now, but the opportunity to neutralize it, if missed, might never recur. The Eighth Air Force felt confident that it could accomplish the goal of destroying the Luftwaffe if given the time to build up the necessary force.³² But Air Marshall Portal stated bluntly that POINTBLANK was a full three months behind schedule, which meant that the planned cross-Channel invasion (OVERLORD) would have to be delayed. The build-up of the Eighth Air Forces' required strength was also seriously behind schedule. The Eighth had only received 816 heavy bombers out of the planned 1,068 aircraft agreed upon at Trident. The British and American planners thus became more conscious of the need for accelerating and intensifying the bombing campaign.³³

To bring the Eighth's assets up to the desired level, America doubled its production efforts and curtailed the diversion of aircraft to other theaters. Arnold and Spaatz, to ensure the most effective exploitation of the CBO, recommended to the JCS a reorganization and build-up of the U.S. strategic air force in the Mediterranean. As a result, the JCS directed General Spaatz to place the Fifteenth Air Force, consisting of twenty-one heavy bomber groups and seven long-range fighter groups, along with the

Eighth Air Force, under a central U.S. Strategic Command to support the CBO. The Fifteenth Air Force would augment the Eighth's efforts by striking at industrial areas and selected targets in southeast Germany.³⁴ Portal argued against Arnold's proposal to combine the Eighth and Fifteenth Air Forces into a single command because he thought it would interfere with coordination between the British and American bombing efforts. But, since the matter was an American issue, he pledged to give the plan his full support once the CCS had agreed to it.³⁵

The added bomber strength and long-range fighter escorts revitalized the strategic air war. On January 11, 1944, the Eighth Air Force conducted its first attacks into Germany since October 1943 with P-38 and P-51 escorts. A large Force of B-17s and B-24s set off to bomb aircraft industrial targets in and around Brunswick, Oscherleben, and Halberstadt with thirteen operational fighter groups in support. The attack force faced the strongest German fighter opposition to date.³⁶ The weather deteriorated and over half the bombers and the majority of the fighters returned before reaching their targets. Since the bombers were attacking different cities, the Mustangs had divided into different groups to support the attack. The 354th Fighter Group arrived alone over Brunswick with its 44 P-51 Mustangs and staved off determined enemy attacks upon the remaining 220 bombers. During the ensuing melee, the P-51s shot down fifteen enemy planes without suffering a single loss.³⁷ Major James Howard, commander of the Squadron, came across a formation of Me-110s about to attack a B-17 bomber group. He at once dived on the enemy planes and single-handedly broke up their attack. With six probable kills, he received the only Medal of Honor given to a fighter pilot in air combat over Europe.³⁸

General Arnold and General Eaker were buoyed by the Eighth Air Forces' newfound success in inflicting damage on the German industry and the Luftwaffe. The presence of fighter escorts had taken the Germans by surprise and proved effective. Over a two-month period, the American P-51s reduced the German fighter force by nearly 44 percent.³⁹ In addition to providing bomber escort, the American fighters conducted tactical raids on German airfields, supply depots, and transportation nodes.⁴⁰ But the Allies had underestimated German powers of recuperation in the past, and the deadline for the Normandy invasion was fast approaching. The CCS prepared to step up the pace of the CBO.

During the week of February 19, 1944, the Allies launched what they hoped would be the fatal blow against the Luftwaffe. The Americans executed 3,800 bomber sorties and dropped 6,000 tons of bombs, out of the combined USAAF-RAF effort of 19,177 tons, against all the major German aircraft production plants. The RAF, for its part, undertook 2,351 sorties against five industrial cities. Fighter escort sorties numbered 3,700. Two hundred and twenty-six American bombers were lost for a loss rate of 6 percent per mission, while the RAF suffered a 6.6 percent loss rate during night operations. Total fighter losses were twenty-eight planes.⁴¹

The United States Strategic Bombing Survey reported that the operations against the aircraft industry had resulted in damage to 75 percent of the buildings responsible for 90 percent of German aircraft production.⁴² The "Big Week" campaign undoubtedly deprived the Luftwaffe of many badly needed airplanes, but the Allied estimates of the impact of the air onslaught were too optimistic. By February 1944, the German industrial dispersal program initiated after the raids in early 1943 was having a cushioning effect.

More importantly, the bombs dropped by American aircraft were not powerful enough to destroy vital machine tools, which the Germans were often able to retrieve from the ruins. Nonetheless, although German production eventually recovered and even rose above pre-February levels, production plunged following “Big Week” and the next months total was less than half what had been planned.⁴³

For the Luftwaffe the air battle proved to be disastrous, not because of aircraft losses, but through the loss of well - trained experienced pilots. It is estimated that the Luftwaffe’s losses in February, accelerated by “Big Week,” amounted to 33 percent of its total number of single-engine fighters and 20 percent of its fighter pilots. Intercepted secret communications indicated that, from January through May 1944, the Luftwaffe lost 1,684 pilots.⁴⁴ This forced Germany to replace those experienced pilots with youth who had half the usual training time. These new pilots seemed noticeably more interested in avoiding contact with the American fighters than shooting down bombers. American fighters, moreover, downed 440 German planes in air-to-air combat and destroyed close to 9,000 enemy fighters on the ground through tactical air raids during this same period.⁴⁵ As a result, when the Allies went ashore at Normandy in June there were only 300 German fighters available to contest the landing.⁴⁶

By April 14, the CBO had resulted in Allied air superiority and achieved its intermediate objective of minimizing the Luftwaffe threat. The strategic attacks on fighter production in 1943 may have succeeded in containing the German fighter force at a size that permitted the close tactical victory of February 1944. Precision bombing was the instrument and occasion for achieving victory, but the formal victory was tactical and relied on the primacy of American fighter aircraft.

Breaking the backbone of the Luftwaffe in February 1944 opened the door over the Reich for pursuit of the primary air objectives of the CBO.⁴⁷ The bomber commands now had the force necessary to bring about the destruction of the German military and industrial complex. However, only three months remained until the planned invasion of Europe, and support for the Allied ground operational goals would divert the strategic bombers from pursuing the air offensive.⁴⁸ The CBO would have to wait and follow the invasion, instead of preceding it as planned.

Eisenhower had become concerned over the lack of unity of effort between the two bomber commands and stressed the need for unity of command during the conduct of OPERATION OVERLORD. As he put it, "I am anxious to have there a few senior individuals that are experienced in the air support of ground troops, otherwise a commander is forever fighting with those air officers who regardless of the ground situation, want to send big bombers on missions that have nothing to do with the critical effort."⁴⁹ The operational control of air assets in the development of the overall air plan for OVERLORD was another issue of paramount importance to Eisenhower. In a message to General George C. Marshall, in March 1944, he insisted that, "responsibility in operational control and the authority for coordination of all efforts must lay in the hands of the Supreme Commander." That meant, he added, that "authority for operational control of forces allocated to OVERLORD whether engaged in the conduct of close operations or deep penetrations (tactical or strategic) will reside with me."⁵⁰

The basic strategic decision about the employment of air assets in support of OVERLORD was decided on March 25, 1944. General Eisenhower met with all the major figures concerned with the application of airpower, at the Air Ministry in London.

Arthur Tedder, Eisenhower's Deputy Commander for OVERLORD, and the planners at Supreme Headquarters Allied Expeditionary Forces (SHAEF), submitted a plan for a systematic assault on the railway centers of North-Western Europe to facilitate the invasion. Spaatz, however, argued that the strategic bombers could better support the invasion by conducting sustained operations against the German oil production facilities.⁵¹ But, the planners contended that time was the issue and that long-range strategic bombing inside Germany could have no favorable effect on the battlefield at Normandy. Target analysis experts agreed that the German stocks of oil were such that the effects would be delayed four or five months. Eisenhower, therefore, agreed with Tedder and approved the transportation plan.⁵²

On April 14, the CCS formally turned over control of all forces to Eisenhower, as Supreme Allied Commander, for preparation and support of the invasion of Europe (OPERATION OVERLORD).⁵³ The heavy bomber forces offered the firepower necessary to breach the so-called "Atlantic wall"- German fortifications along the French Coast - destroying the enemy's interior lines of communication, and enabling Anglo-American ground troops to break out of the beachheads.⁵⁴ Since Eisenhower expected enemy opposition on the landing beaches to be "far greater than anything we have encountered in the European war," he realized that, "we will be dependent upon the bombardment effect of our heavy bombers to help us both tactically and strategically."⁵⁵ On D-Day the bombers would conduct heavy attacks on the beach defenses ahead of the landing craft. After the troops were ashore, the bombers would operate against hostile communications and airfields to delay and harass land reinforcements. Eisenhower advocated a concentrated air offensive against the rail transportation systems, the internal

communication networks in France, and the coastal German battery positions. That meant, he insisted, that all Allied air forces would have to be devoted exclusively to that purpose.⁵⁶

The air offensive in France proved decisive. Out of the ten German coastal batteries, only one was able to open fire during the invasion. Air attacks rendered German transportation and communication networks almost completely inoperable. German officers interviewed after the war tended to single out Allied airpower as the main reason for the success of the invasion. As one German officer recalled,

Your strategic bombing of our lines of communication and transportation resulted in our being unable to move our reserves in time and prevented our troops from ever coming into effective tactical deployment against your forces. . . . Without this strategic bombing and your gigantic aerial coverage of the landings of your troops, your invasion ships and barges would have been sunk or driven out to sea, and the invasion would have been a dismal failure. . . . We had forty divisions in position of readiness and your bombing of road nets, transportation and lines of supply made it impossible to move our troops rapidly, if at all.⁵⁷

Within a few days of the invasion, Eisenhower directed the strategic bomber force to begin the campaign against the Germany synthetic oil plants and petroleum industry. This operation also served to divert the remnants of the Luftwaffe away from the invasion force to defend the German industrial fabric. By the end of June 1944, the Reich's production of aviation fuel had been reduced to a trickle and the Luftwaffe had to rely on accumulated stocks. Its defeat was now an accomplished fact.⁵⁸

After the invasion, Eisenhower retained control of the bomber forces for several weeks and employed them to provide direct support to the fighting in Normandy. "By September 20th the winter weather will be upon us, at which point air operations will

become spasmodic,” he stated in a memorandum to General Walter Smith, “Air operations represent the only area where we enjoy superiority, therefore we must strive to maximize its use.” He added that “the direct attack against Germany is of secondary priority, and that all air forces are to be concentrated toward the close support of ground troops, smashing the communications lines, and the neutralization of Crossbow (V-1 and V-2 weapons).”⁵⁹ The Allies began carpet –bombing enemy concentrations and prepared the way for the final break-through of the German lines. German staff officers serving in France afterwards described the terrifying immobility of the battlefield. “The troops could not move. . . . [and] the communications systems broke down; artillery and anti-tank pieces were knocked out; and tanks were immobilized in craters or beneath heaps of dirt and debris; the effect on morale was shattering.”⁶⁰

On September 14, Eisenhower returned control of the strategic bombers to their respective commanders to resume the air offensive. The air defenses of Germany had crumbled. With the Luftwaffe now combat-ineffective, the Allies had command of the air and the freedom to pursue the destruction of the German interior. The Allied ground advance into France eliminated the German’s early radar warning systems and made possible the placement of the RAF navigational aide ground stations on the continent, which extended the range of operations.⁶¹

During the last year of the war, the bomber campaign came of age. A single attack by a single group often did as much damage as an attack by the whole command in the previous year.⁶² The bombing of Germany was relentless: the Allies dropped 1.18 million tons of bombs, out of the total 1.42 million tons for the war, during the last year.⁶³ The continuous day and night bombing raids had a tremendous impact on the German

war-making capability. They dramatically reduced the production of synthetic oil, chemicals, and explosives. The attacks on the German transportation debilitated the railway and waterway systems. “The war is over in the area of heavy industry and armaments, from now on the material preponderance of the enemy can no longer be compensated for by the bravery of our soldiers,” Albert Speer, Reich Minister of Armaments, gloomily remarked in January 1945.⁶⁴

Speer rightly added air power had played a crucial role in bringing the Reich to its knees. Nevertheless, it did not achieve the aviator’s dream of rendering unnecessary the bloody struggle on the ground. Indeed, the ultimate fact was that the armies still had to win the war on the ground.

End Notes

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CHAPTER 4

THE EFFECTIVENESS OF THE STRATEGIC BOMBING CAMPAIGN

“One may argue the exact degree of contribution made by strategic bombing to the final decision. The war against Germany was fundamentally an infantry war supported by air power.”¹ General Spaatz

Perhaps no aspect of WWII has remained more controversial than the contribution of strategic bombing to the ultimate victory. Some critics maintained that the eighteen months of bombing had apparently produced little effect on either the German war production or German morale. Sir Henry Tizard publicly denounced the whole enterprise as a misguided failure that had hurt Britain more than Germany.² Controversy centered on the ineffectiveness and apparent inhumanity of RAF Bomber Command’s policy of area bombing directed against German civilian morale and the employment of the immense material and human resources devoted to the bombing campaigns. Additionally, critics attacked the long-delayed effectiveness of the U.S. precision bombing efforts.³

Robert Pape has argued that strategic bombing was not decisive, and made virtually no difference in the outcome of the war. He claimed that the decline in the German war economy was due mainly to territorial losses, not strategic bombing. The loss of iron ore from Western Europe undermined steel production, and the loss of the Rumanian and Hungarian oil fields crippled oil production. Furthermore, he adds, even if there had been no strategic bombing campaign, the war would have ended in the same way and at about the same time.⁴ He credited airpower in general, and tactical airpower in particular, with its support of ground forces and the conduct of operational interdiction missions, with having been the decisive factors in the Allies’ victory.

Haywood Hansell and other airpower advocates claimed that the diversion of assets and the lack of priority in production prevented or delayed strategic airpower from decisively affecting the outcome of the war. He concluded that, if the strategic air forces had been equipped with the resources they requested and allowed to pursue without interruption their original strategy as laid out in AWPD-1, airpower alone could have won the war.⁵ For many aviators, the bombing offensive made sense only if it could ultimately achieve decisive results on its own. In both the RAF and the USAAF, some believed that strategic bombing could coerce Germany into capitulation. That view, however, was not controlling the overall Allied strategic plan.⁶ “The potential of the strategic air offensive was greater than its achievements,” stated Noble Frankland in his book The Strategic Air Offensive against Germany. “This was primarily due to the difficulty of obtaining a unified and concentrated policy through the channels of divided command. Even so, eventually strategic bombing both directly and indirectly contributed decisively to victory.”⁷

For the Allied forces as a whole, the bombing offensive made much more sense as an important instrument complementary to the ambitions and objectives of all the armed forces. The principles of employment sought to meet the needs of the other services, which refused to accept that only one service was capable of ending the war on its own. The invasion of Europe was the dominant element in the Allies plan. The role of strategic bombing was to establish air superiority before the invasion, and to substantially weaken the enemy’s will and capacity to resist. In this respect, bombing was successful in a complementary role by contributing to winning air supremacy, setting the conditions for an invasion, and assisting in winning land battles.⁸

The United States Strategic Bombing Survey (USSBS) concluded that Allied airpower in general had been decisive in the war against Germany. In the air, its victory was complete. At sea, its contribution combined with naval power eliminated the German U-boat threat. On land, it helped turn the tide in favor of the Allied ground forces. It made possible the successful invasion and brought the horror and suffering of modern war home to the German people. Additionally, although the full effects had not reached the German front lines, it brought about the collapse of the German economy.⁹

According to the USSBS, prewar assumptions had hindered effective employment of airpower. The belief that the bomber could always get through, for example, had caused unacceptable losses on unescorted bomber formations. The only way to affect civilian morale was through severe attacks whose extent and weight reached unacceptable humanitarian proportions. Prewar bombing experiments had failed to provide any useful data about bomb effects on various types of structures. Prewar intelligence about potential enemies proved inadequate for planners to select accurate target systems. The most significant of the survey's conclusions was that bombing attacks required a repeated, sustained, and heavy effort in order to achieve decisive results.¹⁰

The USSBS measured the damage, impact, and effectiveness of the air campaign against the stated plans and objectives. During the war, Allied military and civilian leaders conceived four strategies to defeat Germany, all of which depended heavily on strategic airpower. The first was the industrial web strategy, which would use precision attacks on key economic bottlenecks to cripple the German economy as a whole, fatally weakening the social and political cohesion needed for resistance. The second strategy,

strategic interdiction, would also use precision bombing but would focus on industries critical to war production rather than seek a general economic collapse. The third strategy followed a Douhet pattern of using area incendiary bombing of population centers. All three approaches aimed to break German resistance through airpower alone, so that a cross-Channel invasion would be either unnecessary or a reasonably easy undertaking against an already beaten foe. The fourth strategy aimed at destroying the German army through the combined weight of Soviet and Western ground offensives. Strategic airpower would support this strategy through operational interdiction attacks designed to have a direct and immediate impact on ground operations.¹¹

The industrial web theory embodied in AWPD-1 proposed destroying selected target sets on which all major German industrial sectors depended. The AWPD planners based this strategy on the assumption that the German economy had fully mobilized and that the war with Russia had stretched its capability so tautly that destruction of a few carefully selected nodes by air attack might cause its collapse. The Air Staff planners hoped that the resulting economic collapse would ruin Germany's ability to produce war material, produce widespread social disruption, destroy German morale, and possibly topple the state. The key was identifying a link between targets that supported the war effort and civilian welfare. The target priorities selected were the Luftwaffe (aircraft factories, aluminum plants, magnesium plants) followed by electrical power stations, the transportation network, and the petroleum industry.¹²

AWPD-1 plan emphasized the need for concentrating all bombers on the destruction of chosen objectives. The failure to achieve the needed concentration of forces imposed severe limits on what the bombing offensive could achieve at the time of

its probation. It was perhaps unfortunate for bombing forces that the decision to prepare for invasion coincided with the beginning of the Combined Bomber Offensive (CBO) itself.

The armies had arrived in 1943 at the point where it was possible to invade continental Europe, but the bombing offensive promised three years earlier had not even seriously begun. Bombing was to fill the gap between the end of the Blitzkrieg against Western Europe and the time when Britain and her allies should re-enter. It had achieved relatively little in terms of tactical preparations for an invasion or implementation of an independent war-winning strategy. The gap had not been filled precisely because the operational and material preparations for bombing were a long-term undertaking and could not be provide at short notice as a military stop-gap. In 1943, both the armies and the air forces had arrived independently at the stage where they could launch their own strategic operations, and although both were committed to the defeat of Germany, there was disagreement as to which strategy should receive the most emphasis.¹³ Therefore, the CBO followed, rather than preceded, the invasion.

By early 1943, the U.S. had finally deployed a significant bombing force to England to support the air offensive. American strategy shifted from the industrial web theory to a new strategy of strategic interdiction that focused on sectors of industry directly linked to the combat power of the German army. The main catalyst for this change was the Casablanca Directive and the resulting Combined Bomber Offensive Plan. Strategic interdiction was to reduce the enemy's capacity to field forces by destroying the production facilities that manufactured weapon systems.

Like the industrial web theory, strategic interdiction was a precision bombing strategy that sought to destroy an entire industrial system by striking only a small number of targets. The key assumption in this strategy was that the destruction of certain identifiable components early in the military production cycle would make impossible the large-scale manufacture of finished military equipment such as tanks, aircraft, and artillery impossible. Ideal targets for this strategy included primary and semi-finished products with special military use, such as ball bearings, machine tools, rubber, aluminum, magnesium, nickel, steel, and nitrates.¹⁴

The Casablanca Directive called for the progressive destruction and dislocation of the German military, industrial, and economic systems and the undermining of the morale of the German people to diminish their capacity for armed resistance in preparation for an invasion. The Combined Bomber Offensive air plan called for the destruction of the Luftwaffe as an intermediate objective and then the destruction or dislocation of support systems, including the German aircraft industry, ball bearing plants, petroleum production and supplies, grinding wheels and crude abrasives, non-ferrous metals, rubber, submarine yards, and various munitions factories.¹⁵

The Eaker Plan, which became part of Combined Bomber Offensive strategy, called for all-out attacks, by the combined day and night effort of U.S. and British bomber forces, on targets that were mutually complementary to undermining selected objective systems. Eaker further explained that this implied precision bombing of related targets by day and night where tactical conditions permitted, and nighttime area-bombing of the cities associated with those targets.

Sir Arthur Harris, head of Bomber Command, agreed with the Eaker Plan in principle, but disagreed with the limited attacks on what he referred to as panacea targets. Harris believed that the main intent of the Casablanca directive was to undermine German will to fight through the progressive destruction of the German military, industrial, and economic systems. This called for widespread, general destruction as opposed to the Americans plan for the thorough destruction of a few essential industries. This difference in interpretation resulted in a lack of synchronization that, in turn, led to non-mutually supportive attacks that diminished the effectiveness of both bomber units' campaigns.¹⁶

In June 1943, the CBO plan (Operation Pointblank) gave the German aircraft industry first priority for destruction and assigned the ball bearing industry as a complementary target. The German ball - bearing industry was at first heavily concentrated and centrally located; indeed, in the beginning approximately half the output came from plants near Schweinfurt. The initial heavy American bombing of the German ball - bearing industry began in August 1943, with subsequent follow-on attacks in September and October.¹⁷ The presence of the Luftwaffe, and the lack of air superiority, reduced the effectiveness of the raids and resulted in heavy American aircraft losses.

The postwar inspection of German documents revealed that the destruction of the ball - bearing industry, at the cost of a small expenditure of effort, would have thoroughly crippled key industrial sectors in two to eight weeks and brought war production to a complete standstill. Although American bombers inflicted significant damage on the factories during these raids, the bomb loads were not heavy enough to destroy the machinery. Additionally, too much time elapsed between the attacks, which allowed the

Germans to disperse and restore the factories. The reluctance of the RAF to support attacks against the ball - bearing industry through complementary night area raids further complicated the problem. From examination of the records and testimony of war production officials and personalities, there was no evidence that the attacks on the ball-bearing industry had any measurable effect on essential war production.¹⁸ When asked how decisive effects could have been achieved against the ball - bearing industry Albert Speer, the Reich's Minister of Armaments, had a ready answer. "If all the plants had been attacked at the same time and if area attacks had been included and repeated three or four times at intervals of 14 days, in conjunction with follow-on attacks every eight weeks to deter reconstruction and sustained for a period of six months," he said, "then production would have been brought to a standstill and paralyzed thousands of armament plants."¹⁹

The attack on the German aircraft industry, primarily on airframe plants, began in the summer of 1943. The Germans had distributed the aircraft plants throughout the Reich. Isolated raids early, in 1941 and 1942, had caused further shifts in production to the east and dispersion of individual plant units to reduce their vulnerability. In the 1943 attacks, American bombers dropped 5,092 tons of bombs on fourteen airframe plants, which did cause a drop in fighter production between July and December. Because of these attacks, the Germans began a vigorous program of subdividing and dispersing plants and placed increased emphasis on fighter production.²⁰

The culminating attacks on the aircraft industry began in the last week of February 1944, "the Big Week." With the protection of long-range fighter escorts, Allied bombers dropped 3,636 tons of bombs on every known aircraft plant. The attacks

however did not knock out production for long. In fact, during the whole year of 1944, the Luftwaffe received 39,807 new aircraft of all types compared to 15,596 in 1942 before Allied bombing of the aircraft industry began. Production during the month following the attacks was actually higher than it had been in the months preceding them. One of the main reasons for the increase in German aircraft production was the transfer of production authority from the Luftwaffe to the Speer ministry.²¹ Speer mobilized unused capacity and undamaged machines, reorganized inefficient managements, reduced the number of models produced, and subdivided production into small units that were virtually immune to attack. “The raids on the aircraft industry in early 1944 caused serious anxiety and doubt, however, in this case it became evident that our industry was more elastic than had been assumed and our anxieties lessened,” Speer later commented.²² Nevertheless, like the attacks on the ball - bearing plants, bombing of the aircraft plants showed a continuous attack would be necessary to knock out a single industry with the weapons available.

The aircraft plant and ball bearing campaigns illustrated the difficulties of applying strategic interdiction to a continental power such as Germany, which controlled vast resources. Germany was not exceptionally vulnerable to economic shortages so long as it could extract resources from Europe as a whole. Temporary scarcity of particular materials might occur, but the State could intervene to overcome them. The huge size of the resource base provided many opportunities for substitution and conservation, and as a result, there was no Achilles heel or a small, vulnerable set of factories the loss of which would cripple all war production. Even if they had existed, it was nearly impossible to identify soft spots in the German war economy and monitor the daily performance of all

sectors to predict accurately how their destruction would ripple through the economy.

The Allies underestimated the effects that Speer's reorganization had on production and slighted the impact of substitution. Information was inadequate to produce reliable macroeconomic analysis, let alone the comprehensive microeconomic analysis required for strategic interdiction by precision bombing.²³

The Allies assigned overriding priority to the defeat of the Luftwaffe as an intermediate objective. Pursuit of the CBO air objective and a successful land invasion depended upon achieving air superiority. Although the attacks on the German aircraft plants and ball bearing factories failed to destroy production, they served a complementary purpose. The mere presence of Allied bombers over the target areas held the majority of the German fighter force in the West for defense. The development and presence of long-range American escort fighters achieved tactical victory in the air. The CBO contributed indirectly to this victory through the destruction and dispersal of manufacturing plants, assisted in the combat attrition of German fighters, and disrupted training. The loss of experienced pilots, along with the presence of long-range fighters, ensured that the Luftwaffe was never a serious threat again. The supplemental attacks by the strategic bombers on the German oil industry and the resulting loss of critical aviation gasoline completed the victory for the Allies in the battle for air superiority.

The pressure to minimize Allied ground casualties during the cross-Channel invasion and subsequent breakout from the Normandy area compelled a shift to an operational interdiction strategy designed to produce immediate reductions in German ground force mobility and fighting capability. General Eisenhower assumed control over all strategic bomber forces and tactical air support, from April 1944 to September 1944, to

ensure a combined effort in pursuit of that goal. The targets selected for the operational strategy included the destruction of the French and German transportation networks and Germany's oil production and petroleum infrastructure.²⁴ The core target was the German railway network because it carried the vast majority of military vehicles and other heavy equipment. Rather than cut individual railway lines, the idea was to create roadblocks by bombing the principal marshalling yards, which acted as transportation hubs. The goal was to make it impossible for the Germans to move significant reinforcements into France. The plan called for the destruction of seventy-six rail centers in France, Belgium, and West Germany.

Oil was the foundation of German military operations. The Air Staff planners assumed that the Reich had stocks of finished petroleum products sufficient for only a few months of military operations. They estimated that the loss of more than 50 percent of Axis output would quickly reduce German tactical and strategic mobility as well as frontline delivery of supplies. The expected destruction of fifty-four oil installations would force Germany to cut military consumption by 25 percent, even if it retained possession of the Rumanian oil fields. Allied planners estimated that there would be a major impact within six months.²⁵

In May 1944, the Allies began their assault on the synthetic oil plants and the Rumanian oil refineries. The impact of the raids became apparent almost immediately. British intelligence intercepted German communication on the Ultra system indicating general petroleum shortages. "As a result of renewed interference with the production of aircraft fuel by allied action, most essential requirements for training and carrying out production plans can scarcely be covered by quantities available. . . . To assure defense of

the Reich and prevent gradual collapse of readiness of the German Air Force, it has been necessary to break into the OKW reserves.” The allies had uncovered a weak spot in the German economy and moved rapidly to exploit it to the fullest.²⁶ “The assaults on the oil industry in May 1944,” said Speer, “caused the first serious shortages of indispensable basic products and produced the greatest anxiety for the future conduct of the war.”²⁷

The chief sources of supply, and the only source for aviation gasoline, were thirteen synthetic plants. The major source of crude oil products was the Ploesti oil fields in Rumania and the Hungarian fields, which accounted for a quarter of the total supply of liquid fuels in 1943. The 1944 attacks, together with the mining of the Danube River, reduced Rumanian deliveries and in August of that year, Soviet occupation eliminated that source of supply and increased dependence on the synthetic plants.²⁸

The RAF and USAAF conducted 555 separate missions against 133 oil industry targets, plus numerous raids on reserve oil depots and petroleum oil and lubricant (POL) dumps. Production from the synthetic plants declined steadily, as bombers had hit every major plant by the summer of 1944. These targets received 13 percent of the total bombs dropped in 1944 and early 1945 and the result was a 93 percent reduction in production of aviation gasoline. The strategic attack against petroleum and the synthetic oil industry was extremely effective due to the volatility of the target. By July 1944, Germany’s oil production had dropped to about 30 percent of what it had been in the spring and it continued to decline in ensuing months. Bombing raids in January 1945 brought production to near zero and left Germany dependent on what little reserves remained. The oil campaign had succeeded in lowering output of fuel below the levels necessary for German forces to fight efficiently and significantly reduced the operational capabilities of

both the German air and ground forces. After January 1945, large-scale operations either by the Luftwaffe or by motorized units of the German army were impossible.²⁹

German authorities viewed those attacks as catastrophic. A by-product of the raids on the oil industry was a reduction in the production of ammunition; synthetic rubber production, moreover, suffered from the lack of gasoline products, nitrogen, and other ingredients. Stockpiles and production were so low that, had the war continued, Germany's rubber shortage would have become critical. Ammunition production also relied on the synthetic oil plants for nitrogen. Allied bombing of oil-chemical plants brought the explosives industry to an almost complete standstill. Stockpiles that were in ample supply in mid-1944 were completely exhausted.³⁰

The success of the attacks on transportation was a major contributor to the Allied victory in Normandy. Because the Germans depended on railroads to move reserves and supplies, destruction of that logistical support made it difficult to re-deploy and sustain reserves once the invasion began. Thus, the Germans lost the race to reinforce Normandy before the invasion began. Additionally, bombing forced German infantry units to fight without adequate artillery support, and created a shortage of ammunition supplies. German motorized and mechanized units' encountered difficulty in moving forward into Normandy because of the heavy damage to the road networks.

The transportation offensive opened in April 1944 with heavy attacks on French rail yards and bridges designed to prevent the Germans from moving reinforcements from Germany or redeploying reserves already in France to meet the Normandy invasion. There were eighty critical transportation targets in France: Bomber Command and the Eighth Air Force each attacked roughly half of them. In mid-April, French railroad

traffic began to decline. Fighter-bombers conducted attacks on bridges and trains the following month and accelerated the decline. By late May, French railroad traffic was half what it had been in January and by mid-June, it had ceased to operate.³¹

In September 1944, strategic bombers reverted to control of the air commanders. Chief Air Marshall Tedder forwarded a plan based on the campaign model against the French transportation system, to destroy the Reich's transportation system and bring the Nazi industry to a halt. The final plan divided Germany into nine districts for attack. American bombers, to be augmented by tactical fighter raids, would conduct precision attacks against transportation centers, while Bomber Command used marshalling yards and railroad stations in city centers as the primary aim points for their area attacks. The goal was to smash the rail network, thus preventing the movement of raw materials, finished goods, and parts. Critical to success was the disruption of not only the German railway system, but also the canal and waterway systems.³²

The attack on the German transportation system, beginning in September 1944, was the single most important cause of Germany's ultimate economic collapse. The effects of the bombing on the German rail and water transportation systems were almost exactly as envisioned in AWPD-1 and AWPD-42. Transportation targets received almost one-third of the total bombs dropped throughout the campaign from 1944-1945 with decisive results.³³ Bombing raids decimated rail yards, depots, bridges, and canals. After October 1944, it became impossible for the rail and waterway systems to meet transportation requirements. From December on, all sectors of the German economy were in rapid decline.

The loss of transportation facilities completely disorganized the flow of basic raw materials, components, and production of semi-finished materials. The movement of coal to the steel plants, power stations, railheads and other industrial factories became impossible. Dwindled coal stockpiles caused assembly plants to shut down and had a rippling effect on civilian and military operations. As The Strategic Bombing Survey put it,

The attack on transportation was the decisive blow that completely disorganized the German economy. It reduced war production in all categories and made it difficult to move what was produced to the front. The attack also limited the tactical mobility of the German Army. . . . Germany was reaching a state of helplessness. . . . Her armament production was failing and total disruption and disintegration were well under way. . . . Even if the final allied land victories had not occurred the German Armies without ammunition and the impending collapse of the supporting economy would have had to cease fighting within a few months.³⁴

The bombing forced reduced production, but more importantly, the main effect was the Germans inability to put weapons and supplies in the hands of the divisions actually fighting.

The impact of Britain's night area bombing raids during the Combined Bomber Offensive was undoubtedly the more spectacular. However, it was also the most controversial from both a moral standpoint and debate over its effectiveness. The idea of attacking civilian population centers and inflicting casualties on non-combatants continues to be a subject of debate. In this respect, the British implemented Douhet's idea that, in a total war, all inhabitants were legitimate targets and the civilian population was the easiest to affect through attacks on their support structure and morale.

British area bombing strategy came about as an operational necessity and in response to events. German defenses and the inaccuracy and ineffectiveness of British bombers undermined early daylight attempts against selected targets. The subsequent transition to night operations required large target areas due to the lack of visibility, navigational aides, and accurate bombsites. Additionally, the British government felt pressured to retaliate against German cities for damage suffered during the Battle of Britain.

The British Bombing Survey Unit gauged the overall result of city bombing by its effects on fifty-eight main population centers. By June 1943, British bombers had burned an average of fourteen square mile per city; by March 1944, the level of destruction reached thirty-six square miles and continued to rise. British bombers attacked sixty-one major cities and thirty-one towns and razed 128 square miles, amounting to 50 percent of the urban area. Area bombing rendered 7.5 million people, or 11 percent of the German population homeless, killed 305,00 civilians, and wounded 780,000. The catastrophic losses inflicted on such cities as Cologne, Hamburg, and Dresden shocked the entire German people.³⁵ The key to the destructive impact of the raids on those cities lay in the development of improved bombs, such as the 12,000-lb Tallboy and the 22,000-lb Grand slam special earthquake bombs.

“The first attack on Hamburg in August 1943 made an extra-ordinary impression,” Albert Speer recalled. “We were of the opinion that a rapid repetition of this type of attack on another six German towns would inevitably cripple the will to sustain armaments manufacture and war production and might bring about a rapid end to the war. However, the raids were not repeated soon enough or with the same weight, and

in the meantime it became possible for the civilian population to adapt themselves.”³⁶

The damage caused to industry by concentrated high explosive attacks varied, but was mostly temporary in nature. The most effective attacks involved the use of a mixture of high explosive and incendiary bombs. Fire was most effective in destroying workers dwellings and had the greatest impression on the general morale.

A prerequisite for attaining such results was the reduction of towns by a succession of raids separated by small intervals. Day attacks made in addition to night raids, using incendiary bombs, would have contributed to the overall effect. The Allies employed this system of attack against Dresden in February 1945, but the war was practically over by then. This showed a lack of coordinated effort between the two bomber commands. Additionally, the considerable length of time between attacks allowed the restoration of water mains and the creation of natural firebreaks, which lessened the impact of subsequent attacks.³⁷

Although Bomber Command never employed the use of gas bombs, the campaign satisfied the requirements of an ideal Douhet strategy. But British planners underestimated the powers of resistance of the German people and did not take into account the fatalistic frame of mind that a civilian population acquires after numerous air raids. There is no evidence that area bombing produced any political pressure on German leaders or contributed much to the collapse of the German economy. There were no mass demonstrations against the government or any other form of popular activity. Civil disobedience was insignificant. Far from discouraging loyalty to the Nazi state, bombing tightened political ties and led to political apathy while individuals were obsessed with finding solutions to their own personal problems. The civilian population became

dependent on the functioning Nazi relief organizations. Raids had only a minor effect on the overall economy and practically no effect on war production. Absenteeism from work did not substantially increase because of bombing. Many workers simply continued to work in routine fashion. The German armament industry sustained a steady increase in munition production until June 1944. Allied bombing widely and seriously depressed German civilians. However, depressed and discouraged workers were not necessarily unproductive.³⁸ The British attempts to destroy the German workers morale had failed.

The British Bombing Survey Unit concluded in its special report that area attacks against German cities were not responsible for more than a very small part of the reduction in German production.³⁹ The demands on power supplies following attacks provided the best gauge of the effects of night area attacks upon production. These frequently dropped to between 30-40 percent, but usually recovered rapidly after a week to their original level. The destruction of the gas grid in the Ruhr caused heavy damage, which resulted in a serious and continuous reduction in the processing of products. Because of the breaching of the Mohne Dam flooded the Ruhr valley and put the fresh water pumping station out of action. Despite this, however, German workers restored adequate supplies of water within a couple of weeks.⁴⁰

In summary, the city attacks by the RAF did not substantially affect the course of German war production. German war production as a whole continued to increase. While production received a moderate setback after a raid, it recovered substantially within a relatively few weeks. As a rule, the industrial plants were located around the perimeter of German cities and characteristically these were relatively undamaged. Additionally, dispersal of important industries began in 1942 and 1943. From 1944 on,

German authorities transferred vital industries to caves and other underground installations and virtually invulnerable to attack.⁴¹

However, one cannot dismiss the direct and indirect effects of the British area-bombing offensive quite so easily. The raids on oil facilities helped clear the skies of German aircraft and its contribution to the transportation offensive paved the way for the successful allied invasion and continued push toward Germany. The indirect effects caused changes in the conduct of the German lives and brought the horror of modern war to their doorsteps. It brought about a change in German production requirements that required a shift to an increased emphasis on fighters and the attempt to develop new technologies in the form of the V-2 bombs and jet aircraft to combat the assault. It forced the diversion of a large segment of Germany's work force to the unending task of reconstruction of bombed factories and public utilities, engaging a million and a half workers.

The CBO served to open a second front in the West. Together with the American bomber effort, the British Bomber Command forced the Luftwaffe to keep the bulk of its strength in Germany for defense, thus limiting German airpower on the Russian front and weakening the German army effectiveness. British area bombing then undoubtedly hampered the German effort in much more than a marginal way.⁴²

Allied airpower dropped over 2.7 million tons of bombs on the German countryside in an attempt to pursue a war winning strategy through strategic bombing. However, despite the tremendous punishment inflicted, from a standpoint of coercion, strategic bombing failed to force Germany to surrender.⁴³ To understand why strategic bombing failed to force Germany to surrender, it is helpful to divide the problem into

parts. First, the Allies underestimated the resilience of the German people, their ability to adapt to the harsh conditions, and the control that a police state has over the hearts and minds of its people. Additionally, the Allies' assumptions about the condition of the German economy were in error. Germany had not fully mobilized her economy and was not suffering from overexertion or from a lack of resources. On average, the German workweek was shorter in duration than those in Britain and the United States. Germany did not mobilize women to work in the factories, like the U.S. and Britain. Germany continued to produce civilian goods, and especially women products such as cosmetics, until the last years of the war.

Until Allied ground forces began their advance, Germany was essentially a continental power. Strategic Bombing directed against the German economy had little impact until Germany could be denied access to the assets and manpower from all of Europe. The targets attacked produced no significant shortages for the civilian population and had little impact on the execution of their daily lives. Although German leaders tried to mitigate the damage, aerial punishment played no important role in the decision to surrender.⁴⁴

The final form of the Allied goals for war against Germany was set at the Casablanca conference in January 1943. The Allies determined they would accept nothing less than the unconditional surrender of Germany, Japan, and Italy. The Casablanca Directive laid out a strategic air campaign against Germany in terms of eventual physical capture of that nation by surface forces. Unconditional surrender meant not only complete military victory but also the destruction of German sovereignty, the democratization and de-Nazification of political institutions and the reduction of the

population. Additionally, the Allies had agreed to the division of Germany into zones of occupation, resettlement of ethnic Germans in Eastern Europe and transfers of forced labor to the Soviet Union.⁴⁵ The biggest fear of the German leaders was that of Soviet occupation and retaliation for the atrocities committed by German forces, something that unconditional surrender would make inevitable.

The failure of Germany to surrender underscores the importance of the relationship between the cost of surrender and the cost of resistance. Leaders abandon territorial objectives only when the cost of continued resistance exceeds the expected benefits of further fighting. The German leaders did not believe that the conquest of Germany itself had become inevitable. The Nazis believed that a severe blow could still shock the West into breaking the coalition with the Soviet Union and making a separate peace.⁴⁶ Therefore, no matter how much damage strategic bombing inflicted, it could not force capitulation as long as the German leaders believed their defensive positions were still tenable.

The results from interviews with German leaders and findings made by the USSBS revealed that the initial priority of targets selected by the AWPD would have crippled the German economy and hampered the war effort had the Allies carried out effective attacks against them. However, as the bombing offensive began, target priorities often changed out of necessity. The Allies never attacked many of the original targets, except as a possible complementary target. One of the primary targets not attacked was the German power system.

Allied planners believed that the German power grid was highly developed and that another sub-system could easily compensate for the loss of one area. However, the

USSBS showed that the German electric power situation was extremely precarious. The destruction of five large generating stations would have reduced capacity by 8 percent, and the destruction of forty-five plants would have reduced capacity by over 40 percent. Additionally, generating and distribution facilities were relatively vulnerable and recuperation would have been extremely difficult. The Chief German electrical engineer stated that the war would have been finished two years sooner if attacks had been concentrated on German power plants. All areas of production, as well as the civilian sector, would have felt the results of these attacks.⁴⁷

The Air War Plans Division adhered to the traditional principles of war in developing strategies and forecasting requirements; however, the Chain of Command violated the basic principles of objective, mass, economy of force, unity of command, and security during the execution of operations.

Objective means directing every military operation toward a clear, decisive, and attainable goal. The ultimate military purpose of war is the destruction of the enemy's armed forces and will to fight.⁴⁸ The objective of the air strategist did not necessarily correlate to the overall objective in the Allies' grand strategy. Target priorities were continually changed based on operational necessity. This often detracted from the overall effectiveness of the bomber units.

The principle of mass requires the concentration of overwhelming combat power at the decisive place and time to achieve decisive results.⁴⁹ Until late in 1943, the USAAF and British Bomber Command did not possess the assets to allow them to conduct mass operations. The diversion of resources away from Europe to support other operations further complicated this problem.

Economy of force deals with employing all combat power available in the most effective way. That means that military leaders should allocate minimum essential combat power to secondary efforts and concentrate mass on the principal effort.⁵⁰ The Allies' grand plan detailed a Europe-first strategy in which they would strive first to achieve the defeat of Nazi Germany. However, the Allies continually diverted forces to support secondary efforts in the Pacific and Africa draining resources that were required to achieve the primary objective.

Security means never permitting the enemy to acquire an unexpected advantage. Unless one can secure and defend his base of power, it will be very difficult to sustain the strategic offensive and to continue to prosecute the war.⁵¹ Security relates to the inability to protect the bomber force in the conduct of operations. This primarily pertained to the absence of long-range fighters.⁵²

Unity of command means that all forces are responsible to one commander. It requires a single commander with the requisite authority to direct all forces in pursuit of a unified purpose and effort.⁵³ The Combined Chiefs of Staff oversaw operations and developed strategy, but exercised no control over the prioritization of targets or the execution of operations. The individual bomber commands (RAF Bomber Command and the U.S. Eighth Air Force) retained that authority. Only when General Eisenhower, as Supreme Allied Commander, assumed control over all air assets in the theater did the Allies achieve unity of command and unity of effort.

The lack of unity of effort opened windows of opportunity for the Germans to conduct repairs or disperse industrial factories. Without the heavy destructive power of Bomber Command, the American bombers were not able to bring about the destruction of

selected targets. Likewise, the American bomber forces did not follow up the success of the British area raids to prevent the restoration of emergency services and to provide continued pressure on the target area during the day.

The achievements of the daylight-bombing offensive went far toward substantiating the prewar prophecies of the airpower enthusiast. However, the hopes that strategic bombing would render the need for a ground offensive unnecessary did not come to fruition - armies still had to win the war. The debate, therefore, will continue as to whether or not strategic bombing alone could have won the war if given the appropriate resources, time, and adherence to the original air war plans. Nevertheless, the ground and air campaigns were so closely interdependent that it is impossible to judge what either of them might have accomplished if it had gone unassisted by the other. For reasons of policy the Allies could not have afforded to rely on air power alone, no matter how effective it may have proven, in defeating Germany. The effect would have been to leave too much of the European continent open to Soviet occupation. The Allies from SLEDGEHAMMER onward had plans for rapid deployment of troops onto the continent and into Germany in the event airpower or other means brought about the rapid collapse of Nazi Germany. The inescapable conclusion is that air and ground together achieved the goals of the American strategy of annihilation, in which strategic bombing played a significant factor. The strategic bombing offensive helped win the battle for air supremacy, paved the way for the invasion of the continent, assisted in winning land and sea battles, and crippled the German war machine.⁵⁴

Albert Speer later explained the full impact of the bomber offensive. "The real importance of the air war consisted in the fact that it opened a second front long before

the invasion of Europe,” he said. “That front was the skies over Germany.” The unpredictability of the air attacks turned every inch of German controlled territory into a kind of front. The defense against the Allied bomber offensive forced Germany to divert fighter aircraft and personnel from other theaters, increase production anti-aircraft guns, and stockpile ammunition all over the country. In addition, hundreds of thousands of soldiers had to stay put in position by their guns-often inactive for months at a time. “As far as I can tell,” he concluded, “this was the greatest lost battle on the German side.”⁵⁵

End Notes

¹ Robert F. Futrell, Ideas, Concepts, and Doctrine: Basic Thinking in the USAF 1907-1960, I, 147.

² Gordon Wright, The Ordeal of Total War: 1939-1945, p. 177.

³ David Mac Isaac, “Voices from the Central Blue,” Peter Paret, ed., Makers of Modern Strategy: from Machiavelli to the Nuclear Age, pp. 636-637.

⁴ Robert A. Pape, Bombing to Win: Airpower and Coercion in War, p. 281.

⁵ Charles Griffith, The Quest: Haywood Hansell and American Strategic Bombing in WWII, p. 89.

⁶ Ibid. , p. 9.

⁷ Sir Charles Webster and Noble Frankland, The Strategic Air Offensive Against Germany, III, 310.

⁸ Richard Overy, The Air War: 1939-1945, p. 102.

⁹ The United States Strategic Bombing Surveys, Summary Report (European War), p. 37. (hereafter cited as USSBS)

¹⁰ David MacIssac, Strategic Bombing in WWII: The Story of the USSBS, p. 164.

¹¹ Ibid. , p. 258.

¹² Ibid. , pp. 259-260.

¹³ Overy, The Air War, pp. 115-118.

¹⁴ Pape, Bombing to Win, p. 263.

¹⁵ Griffith, The Quest, p. 117.

¹⁶ Charles Webster and Noble Frankland, Strategic Air Offensive Against Germany, II, 13-16.

¹⁷ USSBS, p. 15.

- ¹⁸ Ibid.
- ¹⁹ Charles Webster and Noble Frankland, Strategic Air Offensive Against Germany, IV, 391.
- ²⁰ USSBS, p. 17.
- ²¹ Ibid. , p. 18.
- ²² Webster and Frankland, Strategic Air Offensive Against Germany, IV, 379.
- ²³ Pape, Bombing to Win, p. 275.
- ²⁴ Williamson Murray and Allan Millet, A War to be Won, p. 326.
- ²⁵ Pape, Bombing to Win, p. 277.
- ²⁶ Murray and Millet, A War to be Won, p. 329.
- ²⁷ Webster and Frankland, Strategic Air Offensive Against Germany, IV, 379.
- ²⁸ Murray and Millett, A War to be Won, p. 330.
- ²⁹ USSBS, p. 21.
- ³⁰ Haywood Hansell, The Strategic Air War against Germany and Japan, pp. 121-125.
- ³¹ Murray and Millett, A War to be Won, p. 327.
- ³² Ibid. , p. 331.
- ³³ Hansell, The Strategic Air War, p. 122.
- ³⁴ Ibid. , p. 126.
- ³⁵ Ibid.
- ³⁶ Webster and Frankland, Strategic Air Offensive Against Germany, IV, 378.
- ³⁷ Ibid. , p. 393.
- ³⁸ Pape, Bombing to Win, p. 273.
- ³⁹ The British Bombing Surveys, Overall Report, p. 97.
- ⁴⁰ Webster and Frankland, Strategic Air Offensive Against Germany, IV, 392.
- ⁴¹ Ibid. , p. 393.
- ⁴² Wright, The Ordeal of Total War, p. 181.
- ⁴³ Pape, Bombing to Win, p. 254.
- ⁴⁴ Ibid. , p. 255.

⁴⁵ Ibid. , p. 257.

⁴⁶ Ibid. , p. 256.

⁴⁷ USSBS, p.33.

⁴⁸ United States. Department of the Army. Field Manual 100-5 Operations, (hereafter cited as FM100-5), p. 2-4.

⁴⁹ Ibid.

⁵⁰ Ibid. , p. 2-5.

⁵¹ Ibid.

⁵² Hansell, The Strategic Air War, p. 15.

⁵³ FM 100-5, Operations, p. 2-5.

⁵⁴ Russell F. Weigley, The American Way of War: A History of U.S. Military Strategy and Policy, pp. 358-359.

⁵⁵ Albert Speer, Inside the Third Reich, p. 256.

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