



The Strategic Bombing of Germany in World War II: Costs and Accomplishments

Author(s): Kenneth P. Werrell

Reviewed work(s):

Source: *The Journal of American History*, Vol. 73, No. 3 (Dec., 1986), pp. 702-713

Published by: [Organization of American Historians](#)

Stable URL: <http://www.jstor.org/stable/1902984>

Accessed: 14/02/2013 06:39

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Organization of American Historians is collaborating with JSTOR to digitize, preserve and extend access to *The Journal of American History*.

<http://www.jstor.org>

The Strategic Bombing of Germany in World War II: Costs and Accomplishments

Kenneth P. Werrell

As interest in World War II increases, it releases what seems to be a never-ending flood of literature. While the volume of this material is staggering, gaps and controversial areas remain. One especially troublesome subject is strategic bombing.

Although much has been written about the bombing, few studies merit either the term “analytical” or the term “scholarly.” First-person and journalistic accounts of derring-do predominate. Perhaps in no other field of history do so many “feel” and believe so much, rely on so little analysis and proof, and yet write so much.¹

The following is a summary and assessment of the strategic bombing efforts in Europe during World War II. It focuses on the costs and accomplishments of the bombing, on what bombing did and did not do. Other aspects of the bombing, such as lessons, morality, and criticisms, are left to other studies.

The Development of Strategic Bombardment Theory

The long and costly deadlock on the western front during World War I called conventional warfare into question. Soldiers desperately sought a better way to wage war, a way that would restore decisiveness to warfare. New technology, especially aircraft, provided the principal hope. While most military men proposed traditional roles for aircraft, some espoused much grander doctrines. Bombing proponents, such as Giulio Douhet, Hugh Trenchard, and William “Billy” Mitchell, helped to develop a revolutionary doctrine of strategic bombing based on the belief that “the bomber will always get through.” The theorists held that the bombers would hit cities and civilians with devastating attacks of gas and high explosives, which would overpower the home front and thus decide the next war. Because the offense had such an advantage, the only “defense” against the bombing offensive

Kenneth P. Werrell is professor of history at Radford University.

¹ David Maclsaac, ed., *The United States Strategic Bombing Survey* (10 vols., New York, 1976), I, vii. For an overview of the literature on the strategic bombing offensive in Europe, see Kenneth P. Werrell, *Eighth Air Force Bibliography: An Extended Essay and Listing of Published and Unpublished Materials* (Manhattan, Kans., 1981).

was a deterrent or counteroffensive. In that way strategic bombing would be decisive, rendering armies and navies unnecessary.

This revolutionary bombing concept captured the imagination of soldier and civilian alike.² However, the reality of war proved different from the bomber proponents' predictions. The three major combatants in the west tried strategic bombing and encountered considerable difficulties. To each in turn . . .

Combat Operations: 1939–1944

During the early years of the war, the Germans achieved great success with tactical aviation. The Blitzkrieg, tactical aviation coupled with fast-moving tanks and motorized infantry, won quick and cheap victories in 1939 and 1940. When the Germans reached the English Channel, however, a new problem emerged: a cross-channel invasion.

In the ensuing Battle of Britain, the German Air Force (GAF, or Luftwaffe) met defeat. The Royal Air Force (RAF) demonstrated that the bomber would not always get through and would frequently suffer severe losses during the day. The heavy losses forced the Germans to switch to night operations, which proved less costly but also less effective than daylight operations. The Luftwaffe added London to its bombing list and pounded the city; nevertheless, London, the RAF, and Great Britain survived.

Later attacks on England were also unsuccessful. The Germans did not field a satisfactory strategic bombing force as they were unable to produce an effective heavy bomber and were overextended by the demands of the war.³ The V weapons' campaign was another German strategic bombardment effort and failure. The V-1 was cost, but not militarily, effective; the V-2 was a technological wonder, but neither

² On the development of strategic bombing theory, see Lee Kennett, *A History of Strategic Bombing* (New York, 1982), 39–104; R. J. Overy, *The Air War, 1939–1945* (New York, 1980), 5–25; Williamson Murray, *Strategy for Defeat: The Luftwaffe, 1933–1945* (Maxwell Air Force Base, 1983), 1–26, 321–36; and David MacIsaac, "Voices from the Central Blue: The Air Power Theorists," in *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton, 1985). For the American side, see Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington, Ind., 1975); Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II* (7 vols., Chicago, 1948–1958), I, 17–71; Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907–1964* (2 vols., Maxwell Air Force Base, 1971), I, 26–110; and Haywood S. Hansell, Jr., *The Air Plan That Defeated Hitler* (Atlanta, 1972), 1–97. For the best on the British, see Charles Webster and Noble Frankland, *The Strategic Air Offensive against Germany, 1939–1945* (4 vols., London, 1961), I, 6–64. On Giulio Douhet, see Bernard Brodie, *Strategy in the Missile Age* (Princeton, 1959), 22–23, 71–106; and Edward Warner, "Douhet, Mitchell, Seversky: Theories of Air Warfare," in *The Makers of Modern Strategy: Military Thought from Machiavelli to Hitler*, ed. Edward Mead Earle (Princeton, 1941). The standard on the Luftwaffe remains the old, yet solid [British Air Ministry], "The Rise and Fall of the German Air Force (1939–1945)," classified document, 1948 (London), repr. in *The Rise and Fall of the German Air Force (1939–1945)*, ed. W. H. Tatum IV and E. J. Hoffschmidt (Greenwich, Conn., 1969; repr., New York, 1983). Subsequent citations are to the 1969 volume. See *ibid.*, 1–49. See also Matthew Cooper, *The German Air Force, 1933–1945: An Anatomy of Failure* (London, 1981), 1–96; and Murray, *Strategy for Defeat*, 1–26.

³ Tatum and Hoffschmidt, eds., *Rise and Fall of the German Air Force*, 75–96, 192–98; Cajus Bekker [Hans H. Berenbrok], *The Luftwaffe War Diaries*, trans. and ed. Frank Ziegler (Garden City, 1968), 144–83; Derek Wood and Derek Dempster, *The Narrow Margin: The Battle of Britain and the Rise of Air Power, 1930–40* (New York, 1961); Cooper, *German Air Force*, 121–74, 297, 327–28, 332–33.

cost nor militarily effective. Thus the Germans failed, and failed badly, in their strategic bombardment efforts.⁴

Initially, the British were even less prepared for strategic bombing than was the GAF, which at least had numbers of aircraft equipped with self-sealing fuel tanks and some effective navigational equipment, all of which the British lacked. Consequently, although the RAF's Bomber Command made elaborate plans for strategic bombing operations, it lacked essentially everything except doctrine and will.

Early British strategic operations mirrored German operations. The RAF met the same stiff resistance and the same lack of success, turned to night operations, and found that night bombing decreased both effectiveness and losses. For example, a 1941 British report indicated that only 22 percent of the bomber crews got within five miles of their targets; against heavily defended targets, such as those in the Ruhr Valley, the proportion fell to perhaps 7 percent.⁵ Therefore, the RAF took a number of measures that markedly increased its bombing effectiveness. These steps included the introduction of electronic navigational equipment (such as airborne radar), greater numbers of aircraft and aircrews, new aircraft (particularly the magnificent Lancaster), and especially new tactics, the most important of which was the formation of the Pathfinder Force, veteran crews who flew ahead of the main bombing force and marked aiming points with pyrotechnics. Bomber Command showed what it could do with the first one-thousand-plane raid, which battered Cologne in May 1942, and the much more destructive attack against Hamburg in the summer of 1943.

British attempts to destroy the morale of German civilians resulted in growing numbers of destroyed German acres but also growing numbers of lost RAF bombers and crews. For as the British increased the effectiveness of their bombing, the Germans also increased the effectiveness of their defenses. The climax came in the March 1944 attack on Nuremberg, during which ninety-six RAF bombers went down. As a result, Bomber Command curtailed strategic night operations against targets deep within Germany.⁶

Meanwhile, the Americans had begun to bomb Germany, but with a distinct difference. During the 1930s the United States airmen had developed a strategic bombing doctrine that deviated from the bombing theory already described. Airmen at the Air Corps Tactical School had drawn up a doctrine based on the use of unescorted, heavily armed bombers that flew in formation at high altitude. The crux of the American theory was bombing specific targets in daylight, most especially "bottleneck" targets, which, if destroyed, would cause the enemy's economy

⁴ See Kenneth P. Werrell, *The Evolution of the Cruise Missile* (Montgomery, 1985), 41–61; British Air Ministry, "The Economic Balance of the Flying Bomb Campaign, 4 November 1944," 142.0423-9 (Simpson Historical Research Center, Montgomery, Ala.).

⁵ "Report by Mr. Butt to Bomber Command on his Examination of Night Photographs, 18 August 1941," Appendix 13, in Webster and Frankland, *Strategic Air Offensive against Germany*, IV, 205–13.

⁶ See Webster and Frankland, *Strategic Air Offensive against Germany*; Overy, *Air War*, 26–40; Max Hastings, *Bomber Command* (New York, 1979); Cooper, *German Air Force*, 180–94, 297–309; Alfred Price, *Battle over the Reich* (New York, 1973), 9–81, 99–115; Martin Middlebrook, *The Nuremberg Raid: 30–31 March 1944* (New York, 1973); and Anthony Verrier, *The Bomber Offensive* (New York, 1968), 81–116, 163–80, 189–232, 239–48.

to collapse. In short, the Americans had proposed a surgical, rather than a sledgehammer, method.

The Americans entered the war with that precision-bombing theory and, compared with those of the British and the Germans, better bombers and bombsights. At the start, however, the Army Air Forces (AAF) lacked numbers of men and machines, as well as an appreciation of the differences between peacetime operations over cloudless, friendly Texas and wartime operations over cloudy, hostile Germany. In combat, American experience paralleled that of the British and the Germans; daylight operations proved both costly in casualties and limited in effectiveness. The test came during the summer and fall of 1943 when the AAF lost 54 bombers on the August 1 Ploesti mission, and then 60 bombers on the August 17 Regensburg-Schweinfurt raid. The worst was yet to come when, during one week in October, the AAF lost 148 bombers and crews on four missions, 60 on the October 14 Schweinfurt attack. The AAF's peacetime theory failed in wartime practice.⁷

Strategic Bombing Thwarted

Had the war ended in late 1943, the evidence would have squarely supported the view that strategic bombing had failed, and failed miserably. Results were minimal and losses were high. Why?

The bomber proponents' basic assumption that the bomber would get through with acceptable losses proved incorrect. First, by the time war came, the fighter had greatly improved in performance and had regained superiority over the bomber. Second, the introduction of radar shifted the advantage to the defender by stripping the cloak of limitless skies from the attacker.

Another factor in the disappointing performance of the bombers was that targets proved to be much more difficult to destroy than anyone had figured. Although factories could be hit and damaged, they could not be hit often or badly enough to be permanently knocked out of action. In addition, rapid and effective German repair, dispersion, and adaptation diminished the impact of the Allied bombing. Civilian morale also proved more difficult to affect than expected.

A third problem was intelligence. The airmen had difficulty not only in identifying the proper targets but also in determining how much damage they had inflicted. Therefore, targets written off as destroyed, more likely than not, quickly got back into action.⁸

⁷ Losses at Ploesti were 30.5 percent of the 177 B-24s dispatched, whereas losses at Regensburg-Schweinfurt were 19.1 percent of those attacking; on the October Schweinfurt mission, 26.2 percent of those attacking; and on the four missions between October 8 and October 14, 12.6 percent of those attacking. Craven and Cate, eds., *Army Air Forces in World War II*, I, 17-194, II, 479-83, 681-83, 696-706, 848, 850; Price, *Battle over the Reich*, 85-87, 90-94; Roger A. Freeman, *The Mighty Eighth: Units, Men and Machinery (A History of the U.S. 8th Army Air Force)* (London, 1970), 67-69, 75-79, 87-89; Roger A. Freeman, *Mighty Eighth War Diary* (London, 1981), 89-90, 123-29.

⁸ The reading of German codes, Ultra, apparently had little impact on the strategic bombing offensive except for the oil campaign. U.S. Army Air Forces, "Allied Strategic Air Force Target Planning," [1945], SRH-017, 170.601-2

Poor weather, inexperience, and stiff enemy resistance reduced bombing accuracy. The German defenders forced the British to bomb at night and the Americans to maintain their defensive formations and to use pattern bombing, which affected accuracy. The AAF calculated that under fire United States bombing accuracy declined 10 to 20 percent.⁹ Consequently, the British measured night-bombing accuracy in miles while the Americans measured their daylight, visual accuracy in thousands of feet.¹⁰

But the war did not end in late 1943; instead, it went on for another year and a half. During that period not only did the Allies win, but also the airmen reversed their fortunes. If the strategic air war had been a disaster in the early years of the war, it was a triumph in the last year of the war. What caused the change?

Allied Victory in the Air: 1944–1945

The key to allied aerial success proved to be modifications that extended the range of fighter aircraft. Prior to, and well into, the war, the experts believed that a fighter could never fly so far as a bomber. But pressed by the heavy losses in unescorted, daylight bomber operations, the AAF produced such an aircraft. In fact, by the end of the war, the fighters could fly farther than a B-17! Also important, although over-rated, was the introduction of a new fighter, the North American P-51 Mustang.¹¹ Finally, the American airmen changed their tactics by loosening their fighter escort.

The AAF recommenced deep penetration into Germany in early 1944 with increased numbers of bombers and fighter escorts. The fierce battle for air superiority proved costly to both sides, but by April 1, 1944, the Allies had clearly emerged as the winner. The GAF had lost daylight air superiority and the air war.

Nevertheless, the Allied airmen faced other difficulties. The Germans introduced

(Simpson Historical Research Center); U.S. Army Air Forces, "Ultra, History of U.S. Strategic Air Force Europe vs. German Air Force," 1945, SRH-013, 170.601-1, *ibid.*

⁹ U.S. Army Air Forces, "Minutes, Flak Conference, 1–11 June 1945," N10217 (Command and General Staff College, Ft. Leavenworth, Kans.); Hansell, *Air Plan That Defeated Hitler*, 252–53, 257; "Report by Mr. Butt to Bomber Command on His Examination of Night Photographs," 205–13.

¹⁰ By 1943, 60 percent of Bomber Command's sorties got within three miles of the aiming point, compared with over 20 percent within five miles in 1941. In 1944, the Eighth Air Force got one-half of its bombs dropped by nonvisual means within two miles of the aiming point. Price, *Battle over the Reich*, 97; "Report by Mr. Butt to Bomber Command on His Examination of Night Photographs," 205; Verrier, *Bomber Offensive*, 195, 285, 321; Hansell, *Air Plan That Defeated Hitler*, 252. During the last sixteen months of the war, the two United States strategic air forces (the Eighth and the Fifteenth) got 35 to 40 percent of the bombs they dropped using visual means within one thousand feet of the aiming point. During that period the Eighth dropped about 49 percent of its bombs by visual means and the Fifteenth, 82 percent by visual means. Overall, the two American air forces aimed 56 percent of their bombs by visual means. [Eighth Air Force], "Statistical Summary of Eighth Air Force Operations, European Theater, 17 August 1942–8 May 1945," pp. 20–21, 31, 520.308A (Simpson Historical Research Center); [Fifteenth Air Force], "The Statistical Story of the Fifteenth Air Force," pp. 11–12, 670.308D, *ibid.*

¹¹ Although the P-51 looked and performed better than the P-47, captured the public's imagination, and eventually equipped fourteen of the Eighth's fifteen fighter groups, if any American aircraft defeated the German fighter force, it was the P-47. Prior to April 1, 1944, by which time the battle for air superiority was decided, the P-47s claimed 767 victories to the P-51s' claims of 466. The Mustang did not fly its first escort mission until December 5, 1943, and did not exceed the claims of the Thunderbolt until March 1944. VIII Fighter Command, "Comparative Combat Performance," 670.308D (Simpson Historical Research Center). See also Bernard Boylan, "The Development of the American Long-Range Escort Fighter" (Ph.D. diss., University of Missouri, 1955).

into combat the best fighter aircraft of the war, the jet-powered Me 262, which could fly 100 mph faster than the best Allied fighter. But the old cliché “too little, too late” applied as poor command decisions, inadequate numbers of machines and trained fighter pilots, technical problems, and overwhelming numbers of Allied fighters nullified this tactically superior weapon. As the effectiveness of German fighters declined, however, the relative importance of German flak increased.¹² Allied airmen overcame both threats, although not without cost.

But the airmen were unable to take immediate advantage of air superiority because the cross-channel invasion took precedence. Therefore, it was not until late summer 1944 that the strategic air forces turned their attention from support of the invasion to the bombing offensive. By that time, German losses of night fighters as well as the existence of both radar sites and airfields in France had permitted the RAF to return to flying strategic bombing missions deep within enemy territory. It must be emphasized that 72 percent of the bombs dropped on Germany fell after July 1, 1944. In addition, not all the bombs were aimed at what could even broadly be called “strategic” targets; over 22 percent were directed at other targets.¹³

Therefore, when we discuss the accomplishments of strategic bombing, we are speaking of what occurred during the last months of the war. The arguments over those accomplishments have generated the great controversy that still clouds the matter today. The first aspect to be considered is that of the effort and cost of the bombing campaign.

Effort and Cost

The strategic bombing offensive required immense resources. As much as 40 to 50 percent of the British war effort went into the RAF, and perhaps as much as approximately 30 percent into the bombing offensive. The United States also made a tremendous air effort. Although some maintain that 35 to 40 percent of American production went into aviation, a more reliable figure is probably 25 percent. The AAF grew in size to a peak of almost 2.4 million personnel in June 1944, which

¹² In the European Theater of Operations, the Army Air Forces (AAF) lost 44 percent of their heavy bombers to flak and 44 percent to fighters, while they lost 46 percent of their fighters to flak and 32 percent to fighters. Bomber Command lost 63 percent of its bombers to fighters and 37 percent to flak. [U.S. Army Air Forces], *Army Air Forces Statistical Digest: World War II* (Washington, 1945), 255; “Monthly Annual and Grant Totals of Bomber Command Aircraft Despatched, Missing, and Damaged on Operations September 1939 to May 1945,” Appendix 40, in Webster and Frankland, *Strategic Air Offensive against Germany*, IV, 437. See also [Eighth Air Force], “Statistical Summary of Eighth Air Force Operations,” 61; and [Fifteenth Air Force], “Statistical Story of the Fifteenth Air Force,” 15.

¹³ The United States Strategic Bombing Survey, *Over-all Report: (European War)* (Washington, 1945), 10; The 24 percent figure is given in The United States Strategic Bombing Survey, “Statistical Appendix to Over-all Report (European War),” 1947, p. 5, 137.301-1A (Simpson Historical Research Center). For Bomber Command the figure is perhaps 25 percent. See Leonard Bridgman, ed., *Jane’s All the World’s Aircraft, 1945/46* (London, 1946), 30a; and Headquarters Bomber Command, *Bomber Command Review, 1945*, 49 (Air Historical Branch, London). The Eighth dropped 23 percent and the Fifteenth about 13 percent on other than strategic targets. [Eighth Air Force], “Statistical Summary of Eighth Air Force Operations,” 38–39; [Fifteenth Air Force], “Statistical Story of the Fifteenth Air Force,” 10. Hansell states that 37 percent of the American tonnage was aimed at targets other than those included in the strategic bombing directive, Combined Bomber Offensive. Hansell, *Air Plan That Defeated Hitler*, 204.

was 31 percent of the United States Army. Also significant is that the AAF got the best men. The AAF invested a great deal of resources into strategic bombing, putting over 40 percent of the dollar value of aircraft procured into heavy (B-17 and B-24) and very heavy (B-29) bombers.¹⁴

There were other costs as well. First, there were the opportunity costs. What might have been done differently with these resources? Could this effort have been better employed in the Battle of the Atlantic? Could this great effort have gone into the production of landing craft, a critical item that restricted Allied efforts? Or perhaps this effort could have been better used as tactical aviation, in support of Allied ground forces. As interesting as those questions may be, they are hypothetical and, therefore, cannot be satisfactorily resolved.

Operational costs are much clearer. Bomber Command lost 8,325 bombers destroyed and almost 64,000 aircrew casualties on operations. As the RAF also put its finest men into the air arm, it is not farfetched to note that more aircrew members were lost during the bombing offensive than British officers were lost during World War I. In both that respect and as a war of attrition, the bombing offensive resembled the struggle on the western front during World War I. The AAF's strategic air forces, the Eighth and the Fifteenth, lost 8,237 bombers and 3,924 fighters, as well as 73,000 crew members, of whom about 29,000 died. These American casualties compare with the United States Army losses in the Normandy campaign (63,000 total, 16,000 dead), the Ardennes (105,000 total, 19,000 dead), and the entire Pacific War (170,000 total, 57,000 dead), or with all United States Navy (69,000 total, 16,000 dead) and United States Marine (75,000 total, 20,000 dead) casualties.¹⁵

Another cost of the bombing campaign was the destruction of European cities, most of them German. In all, the Allied bombing devastated over 600 acres in each of 27 German cities, the approximate area the Germans destroyed in London. Berlin

¹⁴ Hastings, *Bomber Command*, 349; J. F. C. Fuller, *The Conduct of War, 1789–1961: A Study of the Impact of the French, Industrial, and Russian Revolutions on War and Its Conduct* (London, 1962), 286; J. F. C. Fuller, *The Second World War, 1939–1945: A Strategic and Tactical History* (New York, 1948), 230; Irving Brinton Holley, Jr., *Buying Aircraft: Matériel Procurement for the Army Air Forces* (Washington, 1964), 556. The Germans devoted 40 percent of their total production to aircraft. United States Strategic Bombing Survey, *Over-all Report*, 11. As late as 1943, 41 percent of the men who scored highest on Army's intelligence tests went into the AAF. Craven and Cate, eds., *Army Air Forces in World War II*, VI, xxv, xxvi; [U.S. Army Air Forces], *Army Air Forces Statistical Digest*, 18, 118, 134.

¹⁵ Michael Howard, *Studies in War and Peace* (New York, 1972), 144–45; Bridgman, ed., *Jane's All the World's Aircraft*, 28a; [British Air Ministry], document superseding AMB 19042, n.d. (Air Historical Branch); Noble Frankland, *The Bombing Offensive against Germany: Outlines & Perspectives* (London, 1965), 92. Of these casualties, 74 percent of Bomber Command's personnel and 40 percent of the AAF personnel in the European Theater died. "Monthly Annual and Grand Totals of Bomber Command Aircraft Despatched," 437; "Bomber Command Casualties, 3rd September 1939–8th May 1945," Appendix 41, in Webster and Frankland, *Strategic Air Offensive against Germany*, IV, 440; Department of the Army, "Army Battle Casualties and Nonbattle Deaths in World War II: Final Report, 7 December 1941–31 December 1945," pp. 54, 56, 92–93, 170.47–4 (Simpson Historical Research Center); [Eighth Air Force], "Statistical Summary of Eighth Air Force Operations," 16, 29; [Fifteenth Air Force], "Statistical Story of the Fifteenth Air Force," 15, 22; [U.S. Army Air Forces], *Army Air Forces Statistical Digest*, 254. Marine and Navy casualties do not include captured, which were few compared with those of Army and AAF. The Division of Medical Statistics, Bureau of Medicine and Surgery, Navy Department, *The History of the Medical Department of the United States Navy in World War II: The Statistics of Disease and Injuries* (Washington, 1950), 79.

and Hamburg lost more than 6,000 acres each, Cologne and Dusseldorf about 2,000 acres each, with 10 other cities losing more than 1,000 acres each.¹⁶

Understandably, the loss of civilian life was also great. Allied bombs probably killed 600,000 German civilians, about ten times the number of British civilians killed by German bombs and missiles. Almost as many civilians died in individual German cities—Berlin, Dresden, and Hamburg—as died in all of Britain during the entire war. In addition, American and British bombs killed a sizable number of civilians in the occupied countries; almost as many Frenchmen died (58,000) from Allied bombs as Britons died (60,000) from German bombs and missiles.¹⁷

Without a doubt, the bombing campaign was expensive in Allied resources and casualties as well as in European cities and civilians. The question is, was it worth it? What did strategic bombing accomplish?

Achievements

The death and destruction of the bombing offensive are easy to see while the accomplishments are less clear, and that lack of clarity fuels the controversy concerning the bombing. Nevertheless, there were at least three major achievements of the bombing: the defeat of the German Air Force, the diversion of the German war machine, and the destruction of key elements of the German economy.

The most important accomplishment of the air war was the defeat of the GAF. In the climactic air battles of early 1944, the AAF defeated the German fighter force and won daylight air superiority. Air superiority was vital both for the Allies' success and for relatively low casualties during the D-Day invasion and the remainder of the war.¹⁸

The strategic bombing diverted considerable German forces. Between June 1940 and June 1944, the bombing campaign was the only Anglo-American offensive action in western Europe. After the Soviet Union's entry into the war, strategic bombing served as a "second front," draining off one to two million of German per-

¹⁶ Headquarters Bomber Command, *Bomber Command Review, 1945*, 8, 9; Arthur Harris, *Bomber Offensive* (London, 1947), 261. Compare this destruction with the two legendary American fires: Chicago (1871), 2,124 acres destroyed; San Francisco (1905), 2,560 acres destroyed. Craven and Cate, eds., *Army Air Forces in World War II*, V, 617.

¹⁷ Dudley Seward, *Bomber Harris: The Story of the Royal Air Force Sir Arthur Harris, Bt, GCB, OBE, AFC, LLD. Air Officer Commanding-in-Chief, Bomber Command, 1942-1945* (Garden City, 1985), 298; Cooper, *German Air Force*, 377; United States Strategic Bombing Survey, *Over-all Report*, 72; Hans Rumpf, *The Bombing of Germany*, trans. Edward Fitzgerald (New York, 1962), 164. In contrast, Henri Michel asserts that the bombing killed two million civilians. Henri Michel, *The Second World War*, trans. Douglas Parmee (New York, 1975), 815.

¹⁸ United States Strategic Bombing Survey, *Over-all Report*, 10; Hastings, *Bomber Command*, 350; Frankland, *Bombing Offensive against Germany*, 101; Verrier, *Bomber Offensive*, 322; Robert Saundby, *Air Bombardment: The Story of Its Development* (London, 1961), 211, 229-30; Headquarters United States Strategic Air Forces in Europe, "Impact of American Air Power on the German War Machine," 1945, pp. 1-2, 519.04-3 (Simpson Historical Research Center); George C. McDonald, "The Contribution of Air Power to the Defeat of Germany" (3 vols., 1945), I, [pp. 5-6], 519.601C I, *ibid.*; United States Forces, European Theater, The General Board, "Air Power in the European Theater of Operations," n.d., pp. 7-11, 512.101-56, *ibid.* Omar N. Bradley, "Effects of Air Power on Military Operations: Western Europe," pp. 2-4, 168.6005-127, *ibid.*; Gordon Wright, *The Ordeal of Total War: 1939-1945* (New York, 1968), 181.



The men who ran the air war against Germany: from right to left, Maj. Gen. Ira Eaker, Lt. Gen. Frank Andrews, Air Chief Marshal Arthur "Bomber" Harris, and an unidentified colonel. They pose before a poster of American B-17s, which led the American bomber offensive against Germany.

VIII Bomber Command Headquarters, March 25, 1943.

Courtesy United States Air Force Photographic Collection, National Air & Space Museum, Smithsonian Institution.

sonnel in direct air defense and in rescue and repair activities. The strategic bombing also forced the GAF to change its priorities. In 1941 the Luftwaffe employed 65 percent of its aircraft on the eastern front; in 1944 it used only 32 percent there. Certainly that shift helps to explain, to some degree, German successes in 1941 and German failures in 1944. The impact of the bombing can also be seen in German aircraft production. Early in the war, in 1940, the offensive-oriented German war machine devoted only 17 percent of aircraft production to single-engine fighters, compared with 76 percent in late 1944. The bombing also absorbed a significant amount of German material resources, resources that thus could not be used in offensive operations.¹⁹

¹⁹ Overy, *Air War*, 122; Michel, *Second World War*, 575; Saundby, *Air Bombardment*, 229; Hilary St. George Saunders, *The Royal Air Force: 1939–1945* (3 vols., London, 1954), III, 386; [Arthur] Tedder, *Air Power in War: The Lees Knowles Lectures* (London, 1948), 103; H. H. Arnold, "Third Report of the Commanding General of the Army Air Forces, November 12, 1945 to the Secretary of War," in *The War Reports of General of the Army George C. Marshall, Chief of Staff, General of the Army H. H. Arnold, Commanding General, Army Air Forces, Fleet Admiral Ernest J. King, Commander-in-Chief, United States Fleet and Chief of Naval Operations* (Philadelphia, 1947), 427; Cyril Falls, *A Hundred Years of War, 1850–1950* (New York, 1962), 339; Erhard Milch and Adolf

While the impact of the bombing on German industry is less clear, certainly the attacks on the German oil industry were very successful. Short of oil as early as 1942, the Germans were forced to make cutbacks in training. The attacks on the oil industry did not begin in earnest until May 1944 and quickly forced the Germans to curtail their combat operations. The attacks on German transportation systems were also successful. These blows absorbed considerable German efforts, as well as largely nullified extensive German efforts to disperse, to hide, and to harden German factories. Finally, it is estimated that the bombing destroyed 20 percent of German war production during the last sixteen months of the war.²⁰

Critics of the bombing ignore or downplay those aspects and point instead to other aspects of the bombing, beginning with the issue of civilian losses. Some condemn the entire bombing campaign as immoral: end of discussion.²¹ Others hold that the considerable aircrew and civilian costs were not worth the gains. More specifically, some critics cite the impact, or lack of impact, of the bombing on German production and morale.

Despite the bombing, German production rose to a peak in July 1944, 3.2 times greater than that of January-February 1942. A number of factors account for that apparent contradiction. The Allied airmen maintain that they were not permitted to hit the targets they wanted until the summer of 1944. It should also be recalled that the Allied airmen dropped 72 percent of the bombs that fell on Germany after July 1, 1944, and only 14 percent of all bombs were aimed at specific factories. Another factor that restricted the impact of the bombing was that, contrary to wartime

Galland, "The Allied Combined Bomber Offensive: Two German Views," in *Command and Commanders In Modern Warfare: Proceedings of the Second Military History Symposium, U.S. Air Force Academy 2-3 May 1968*, ed. William Geffen (Washington, 1971), 304; Wright, *Ordeal of Total War*, 181. The United States Strategic Bombing Survey reached a figure of 4.5 million by including manpower required to replace the damage. United States Strategic Bombing Survey, *Over-all Report*, 37; Seward, *Bomber Harris*, 311-12; Vertier, *Bomber Offensive*, 18; Peter Calvocoressi and Guy Wint, *Total War: The Story of World War II* (New York, 1972), 482; B. H. Liddell Hart, *History of the Second World War* (New York, 1970), 606. In 1944, 20 percent of heavy artillery ammunition, 30 percent of artillery tubes, 33 percent of optics, and over 50 percent of electronics went into German air defense. Tedder, *Air Power in War*, 103; Harris, *Bomber Offensive*, 266; "Interrogation of Albert Speer, former Reich Minister of Armament and War Production (18th July 1945)," Appendix 37, in Webster and Frankland, *Strategic Air Offensive against Germany*, IV, 383; Albert Speer, *Inside the Third Reich*, trans. Richard and Clara Winston (New York, 1970), 332, 644; Headquarters United States Strategic Air Forces in Europe, "Impact of American Air Power on the German War Machine," 3; Bradley, "Effects of Air Power on Military Operations," 16.

²⁰ Frankland, *Bombing Offensive against Germany*, 92; Speer, *Inside the Third Reich*, 412-13; Kennett, *History of Strategic Bombing*, 183; Hastings, *Bomber Command*, 350; Berenbrok, *Luftwaffe War Diaries*, 340, 362; United States Strategic Bombing Survey, *Over-all Report*, 36-37, 39-45, 59-64; "The British and United States Surveys of the Strategic Bombing Offensive," Appendix 5, in Webster and Frankland, *Strategic Air Offensive against Germany*, IV, 54; P. M. S. Blackett, *Fear, War, and the Bomb: Military and Political Consequences of Atomic Energy* (New York, 1948), 22; Noble Frankland, "Bombing: The RAF Case," in *Warplanes & Air Battles of World War II*, ed. Bernard Fitzsimmons (New York, 1973), 153; Roger Freeman, *The U.S. Strategic Bomber* (London, 1975), 81; Gerd von Rundstedt cited in Bridgman, ed., *Jane's All the World's Aircraft*, iii; Arnold, "Third Report of the Commanding General of the Army Air Forces," 427-29; Milch and Galland, "Allied Combined Bomber Offensive," 297. See also "Testimony: The Reich's Ex-Leaders Explain Why They Were Beaten," *Impact*, 3 (July 1945), 62-65; Cooper, *German Air Force*, 377; Headquarters United States Strategic Air Forces, "Impact of American Air Power on the German War Machine," 2; McDonald, "Contribution of Air Power to the Defeat of Germany," [2-3, 6]; United States Forces, European Theater, The General Board, "Air Power in the European Theater of Operations," 8, 21-25; Bradley, "Effects of Air Power on Military Operations," 4-16; and Wright, *Ordeal of Total War*, 180.

²¹ See Ronald Schaffer, *Wings of Judgment: American Bombing in World War II* (New York, 1985); and the considerable literature on morality noted in Werrell, *Eighth Air Force Bibliography*, 85-86.

intelligence, the Germans did not fully mobilize their economy until 1942. Until the summer of 1944, the bombing destroyed the slack and prevented the industrial increase from rising even higher. Regardless, the Germans were never short of weapons, and in a number of categories—tanks, submarines, and jet aircraft, for example—employed superior equipment. The bottom line is that the Germans had enough equipment; they lacked fuel and numbers.²²

The bombing's impact on morale is perhaps the least understood aspect of the bombing campaign. Clearly, German morale did not crack under the massive bombing assault; German workers continued to produce weapons of war and German soldiers continued to wage war. A number of writers go so far as to hold that the bombing stimulated German morale.²³ The best available evidence indicates, however, that the bombing adversely affected morale.²⁴

Strategic bombing did not achieve the goals that some sought. It neither broke German morale nor deprived the German military of needed weapons. Despite tremendous efforts and costs, the war proved the prewar air prophets wrong. The bomber's potential and the airmen's promises exceeded bombing results: World War II strategic bombing of Germany was not a clean, quick, cheap, surgical, or revolutionary force.

Did strategic bombing win the war? While most hold that air power, as contrasted with strategic bombing, was decisive or vital, none asserts that air power alone won the war.²⁵ Although some write that air power was a failure and that its strategic

²² Overy, *Air War*, 123; United States Strategic Bombing Survey, *Over-all Report*, 10, 31–38, 71; Kent Roberts Greenfield, *American Strategy in World War II: A Reconsideration* (Baltimore, 1963), 113.

²³ Rumpf, *Bombing of Germany*, 233; Milch and Galland, "Allied Combined Bomber Offensive," 295; Speer, *Inside the Third Reich*, 331; Kennett, *History of Strategic Bombing*, 185; David Halberstam, *The Best and the Brightest* (Greenwich, 1969), 200; Michael Howard, "Total War in the Twentieth Century: Participation and Consensus in the Second World War," in *War and Society: A Yearbook of Military History*, eds. Brian Bond and Ian Roy (London, [1975]), 221; Marshall Andrews, *Disaster through Air Power* (New York, 1950), 8; Robin Higham, *Air Power: A Concise History* (New York, 1972), 130; James L. Stokesbury, *A Short History of World War II* (New York, 1980), 279; Barbara W. Tuchman, *The March of Folly: From Troy to Vietnam* (New York, 1984), 336; Janusz Piekalkiewicz, *The Air War: 1939–1945*, trans. Jan van Heurck (London, 1985), 419. See also Verrier, *Bomber Offensive*, 18; Greenfield, *American Strategy in World War II*, 113; MacIsaac, ed., *United States Strategic Bombing Survey*, I, xxiv, xxv; Wright, *Ordeal of Total War*, 181–82; and "Interrogation of Albert Speer," 385.

²⁴ United States Strategic Bombing Survey, *Over-all Report*, 95–99; Murray, *Strategy for Defeat*, 300; Liddell Hart, *History of the Second World War*, 610; Calvocoressi and Wint, *Total War*, 477–81; Frankland, "Bombing," 152; Noble Frankland, *Bomber Offensive: The Devastation of Europe* (New York, 1970), 157; Louis L. Snyder, *The War: A Concise History, 1939–1945* (New York, 1960), 400; Overy, *Air War*, 208; Bradley, "Effects of Air Power on Military Operations," 16.

²⁵ Generals Ira Eaker and Haywood Hansell believe that air power could have won the war. Robert F. Futrell, "Commentary," in *Command and Commanders*, ed. Geffen, 285; Hansell, *Air Plan*, 252, 273. A postwar study concluded that air power could have ended the war six months earlier, whereas Arthur Harris, wartime commander of Bomber Command, wrote that the war could have been won without an invasion. Robert F. Futrell, "Air Power Lessons of World War II," *Air Force/Space Digest*, 48 (Sept. 1965), 47; Harris, *Bomber Offensive*, 265. Second parties assert that Carl Spaatz, commander of the United States Strategic Air Forces in Europe, and Harris believed that bombing could have won the war. Hansell, *Air Plan That Defeated Hitler*, 142; Ira C. Eaker, "Some Observations on Air Power," in *Air Power and Warfare: The Proceedings of the 8th Military History Symposium, United States Air Force Academy 18–20 Oct. 1978*, ed. Alfred F. Hurley and Robert C. Ehrhart (Washington, 1979), 356. But Hermann Goering, the Luftwaffe chief, stated that air power alone could not have beaten Germany. Hermann Goering interview by United States Army Air Force officers, May 10, 1945, p. 3, 519.1612-2 (Simpson Historical Research Center); Goering quoted in "The Final Sob—From an Unhappy Reichsmarschall," *Impact*, 3 (July 1945), 66.

use prolonged the war, the record indicates that air power was important to Allied victory.²⁶ How important depends on the definition of “vital,” “decisive,” and the like.²⁷

²⁶ Rumpf, *Bombing of Germany*, 210–14, 233; Blackett, *Fear, War, and the Bomb*, 3–4; Henry Tizard cited in Wright, *Ordeal of Total War*, 180–81; Tizard cited in Hastings, *Bomber Command*, 349; Walter Millis, *Arms and Men: A Study in American Military History* (New York, 1956), 285–87; Tuchman, *March of Folly*, 295, 336; Stanley Karnow, *Vietnam: A History* (New York, 1983), 457; J. F. C. Fuller, *Armament and History: A Study of the Influence of Armament on History from the Dawn of Classical Warfare to the Second World War* (New York, 1945), 154–55. Fuller tempered these views three years later, however, stating that until the spring of 1944, the bombing was an extravagant failure. Fuller, *Second World War*, 231.

²⁷ Wright, *Ordeal of Total War*, 182; Webster and Frankland, *Strategic Air Offensive against Germany*, III, 310; Murray, *Strategy for Defeat*, 299; Freeman, *U.S. Strategic Bomber*, 80; Berenbrok, *Luftwaffe War Diaries*, 340, 362; Snyder, *War*, 400–401; Liddell Hart, *History of the Second World War*, 612; United States Strategic Bombing Survey, *Over-all Report*, 1, 107–108; Overy, *Air War*, 205–206; Kennett, *History of Strategic Bombing*, 182–83; Verrier, *Bomber Offensive*, 18; Albert Kesselring and Gerd von Rundstedt cited in Bridgman, ed., *Jane's All the World's Aircraft*, iii. See also “Testimony,” 62–65; Russell F. Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (New York, 1973), 358; Hansell, *Air Plan That Defeated Hitler*, 273; and Greenfield, *American Strategy in World War II*, 86, 120.