



# AMERICAN BOMBER CREWMAN 1941-45



**GREGORY FREMONT-BARNES**

ILLUSTRATED BY SEÁN Ó'BRÓGÁIN

## ABOUT THE AUTHOR AND ILLUSTRATOR

**GREGORY FREMONT-BARNES** holds a doctorate in Modern History from Oxford University. He is the author of *The French Revolutionary Wars*, *The Peninsular War*, *The Fall of the French Empire, 1813–1815*, *The Boer War, 1899–1902* and *The Indian Mutiny 1857–58*. He is currently editing a four-volume *Encyclopedia of the French Revolutionary and Napoleonic Wars* and co-editing a five-volume *Encyclopedia of the American Revolutionary War*.

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**SEÁN Ó'BRÓGÁIN** lives and works in Donegal, Ireland. He has a BA (Hons) in scientific and natural history illustration from Blackpool and Fylde College (Lancaster University).

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**GREGORY FREMONT-BARNES** ILLUSTRATED BY SEÁN Ó'BRÓGÁIN

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Astor, Gerald, *The Mighty Eighth: The Air War in Europe as Told by the Men Who Fought it*, Dell (1997):

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## GLOSSARY

<b>bail out</b>	To abandon an aircraft in flight
<b>bombs away</b>	Bombardier's notification to the pilot that the bomb load has been released
<b>ditch</b>	To crash land
<b>E/A</b>	Enemy aircraft
<b>flak</b>	German antiaircraft fire, usually fired from 88 or 105mm guns
<b>Fliegerabwehrkanone</b>	The German term for antiaircraft fire, which American airmen abbreviated to "flak"
<b>flight line</b>	Position on the runway where an aircraft is parked
<b>Fort</b>	Abbreviation for a B-17 Flying Fortress
<b>GI</b>	Abbreviation for "General Issue," slang for an American serviceman
<b>grounded</b>	Aircraft forced to remain on the ground, usually due to adverse weather conditions
<b>Lib</b>	Abbreviation for a B-24 Liberator
<b>milk run</b>	A short, low-risk mission, usually so designated because of the unlikely presence of enemy fighters or flak
<b>raid</b>	Bombing mission
<b>scrub</b>	To cancel a mission
<b>ship</b>	Colloquial term for a bomber
<b>sortie</b>	The mission of an individual aircraft



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# AMERICAN BOMBER CREWMAN IN WORLD WAR II 1941-45

## INTRODUCTION

When the United States entered World War II on December 7, 1941 as a result of the Japanese aerial attack on Pearl Harbor, it had virtually no air force to speak of, not least any bombers. The Eighth Air Force, which was to control bombing and fighter missions over Europe, did not exist. As a result of an agreement between President Franklin Roosevelt and Prime Minister Winston Churchill reached nine months before the United States even entered the war, priority was to be given to the defeat of Germany, and hence the majority of American assets were designated for service in Europe.

If aircraft themselves were not entirely new, the bomber itself was a very new form of aviation technology and the principles behind large-scale bombing of military and civilian targets were only formulated in the 1920s. Though not fully appreciated by 1941, much had already been learned



A bomber crew posing  
in front of their aircraft.  
(Library of Congress)

from the Blitz the year before. Men like Billy Mitchell and, more importantly, Giulio Douhet in the 1920s, had already advocated the importance of air power and the concept of what would later become strategic bombing rather than the tactical support of ground forces, that is, hitting the enemy's capacity for war: civilian population centers, transportation and communication, railway yards, factories, military installations, and dockyards, so crippling wartime production and so terrorizing the enemy population as to potentially break its will and cow it into surrender. It appeared to many that merely by bringing bombers to bear directly against the enemy's vital centers and means of production the war could be won.

The United States played a vital part in this effort, in the form of the strategic bombing campaign fought between 1942 and 1945, first against Germany and, by 1944, also against Japan. This book seeks to describe the lives and experiences of the men who served in these campaigns, particularly those who served in the most famous bomber aircraft of their day: the B-17 Flying Fortress, B-24 Liberator, and B-29 Superfortress.

A great deal is known about the lives and experiences of the men who flew in these machines, not least because they were generally more literate than their compatriots in the Army and Navy, but more importantly because they often had a respite between combat missions on the safety of an air base far from the enemy, where they could log their thoughts and experiences in a diary or journal, or write home. Foot soldiers had nothing more than a tent in which to sleep and could only carry with them what was absolutely essential. Only when withdrawn from the front line might they have the time to jot down some thoughts, but even then there was nowhere to leave such a journal, and they were in any event discouraged from doing so to avoid its capture by the enemy, who could obtain valuable intelligence from its contents. Airmen, on the other hand, could write down what they pleased and leave it safely in their quarters. Even if captured or killed, their journals and letters remained safely back at their base.

Sunset silhouette of a Flying  
Fortress. (Library of Congress)



## CHRONOLOGY

**1933–34** The Boeing Aviation Company designs and builds its first B-17, a four-engine bomber whose prototype makes its first flight in 1935.

**1939**

**September 1** World War II begins in Europe.

**1940–42** To supply the need for a bomber heavier than the B-17 and B-24, US aeronautical engineers design the B-29 Superfortress, which doubled the range and bomb load of other aircraft. In August 1943 the Joint Chiefs of Staff decide to confine the use of the B-29 to the Pacific Theater, where the bomber's impressive 1,600-mile combat radius could be put to best use.

**1941**

**December 7** The United States enters World War II as a result of the Japanese attack on Pearl Harbor. Germany declares war on America four days later.

**1942**

**January 28** The US Eighth Air Force is formed, responsible for the European Theater of Operations (ETO), with headquarters established in England on February 23.

**April 18** Doolittle Raid against Tokyo and other Japanese cities, involving 16 B-25s.

**May 11** First contingent of American bomber crew arrives in England – 39 officers and 384 enlisted men.

**July 4** First United States Army Air Forces (USAAF) operation over western Europe; six borrowed British bombers participate in an RAF raid against airfields in Holland.

**July 6** First B-17s of the Eighth Air Force arrive in Britain.

**August 17** The Eighth Air Force launches its first heavy bomber raid against occupied Europe, with 12 B-17s attacking the railway marshaling yards at Rouen, in northern France.

**October 9** First American bombing raid from Britain involving more than 100 bombers, now including B-24 Liberators.

**1943**

**January 3** During an attack on the submarine base at St. Nazaire, Eighth Air Force bombers employ formation precision bombing, instead of individual bombing, for the first time.

**January 27** Eighth Air Force launches its first attack against Germany, striking Wilhelmshaven with 55 B-17s.

**March 4** First Eighth Air Force attack on a factory complex in the Ruhr, Germany's industrial heartland.

**May 4** P-47 fighters begin escorting Eighth Air Force bombers as far as 175 miles.

**May 18** The Combined Chiefs of Staff of the United States and Great Britain approve a plan for the Combined Bomber Offensive (CBO), involving constant attacks on German targets by the Eighth Air Force and RAF Bomber Command.



- July 23–30 “Blitz Week”: First sustained air offensive mounted by the Eighth Air Force against important industrial targets in Germany.
- August 17 Eighth Air Force launches its deepest penetration of Germany thus far, raiding a fighter aircraft plant at Regensburg and ball bearing factories at Schweinfurt with 315 bombers, a staggering 60 of which are lost.
- August 30 First use of radar-equipped bombers designed to locate targets in Germany through overcast conditions.
- September 27 First American bomber raid escorted throughout its entire journey to a German target (Emden) by P-47 fighters.
- October 14 Staggering loss of another 60 B-17s in a second attack on Schweinfurt, leading to a temporary halt on daylight bombing of strategic targets deep inside Germany.

## 1944

- March 4 First American bombing raid on Berlin area.
- April Eight airfields for B-29s now available in India and China for operations against Japanese-occupied Asia and the home islands themselves; Operation *Matterhorn*, the bombing of Japan from China, begins.
- May 7 Largest number of B-17s and B-24s flying on a single day thus far, with more than 900 bombers operating against various targets.
- June 15 First raid against Japan since the Doolittle attack in April 1942 with 68 B-29s taking off from China, marking the beginning of the strategic bombing campaign against Japan.
- July The capture of the Marianas, above all Saipan in the western Pacific, enables American bombers to raid Japan without recourse to the more vulnerable and logistically problematic bases in China.
- July 20 More than 1,200 heavy bombers, the largest number of attacking aircraft by the Eighth Air Force thus far, strike various targets in central Germany; this figure will peak at 1,900 on Christmas Eve.
- November 12 First Superfortress attack on Japan from the Marianas, involving 111 B-29s.

## 1945

- February 25 Massive B-29 raid against Tokyo, the first of many to follow, involving incendiary bombs dropped on a densely populated city constructed mostly of wood.
- March–June Series of highly destructive fire raids launched against major Japanese cities, including Tokyo, Nagoya, Osaka, and Kobe, leading to the incineration of large urban areas.
- April 25 Last of the American heavy bomber raids in Europe, directed against an armaments factory and airfield in German-occupied Czechoslovakia.
- May 7 Germany surrenders unconditionally, with effect from the following day.
- May 25–26 Last fire raid against Tokyo.
- September 2 Japan formally surrenders, bringing World War II to a close.

## RECRUITMENT AND ENLISTMENT

A bomber crew of the United States Army Air Forces (often known as the Army Air Corps, the US Air Force did not exist as a separate branch of the armed forces until 1947) normally consisted of ten men: a pilot, co-pilot, radioman, ball turret gunner, tail gunner, bombardier, flight engineer (who also served as the top turret gunner), the right waist gunner, the left waist gunner, and the navigator. The flight engineer, radio operator, and gunners were all enlisted men; the others were officers. Crews necessarily contained a cross-section of American society – a microcosm in fact – since it required men of varying skills, abilities, and educational backgrounds. As bomber crews were partly composed of men with technical abilities, they generally needed to be quite intelligent. At the outset of the war the US Army Air Force (USAAF) therefore required men to have a minimum of two years of college education. When the number of qualified candidates began to dry up due to losses and the heavy demand by all branches of the service for good men, applicants were required to pass an entrance examination. Flight engineers and radio operators also required an ability to acquire certain technical knowledge and skills, and thus, in administering intelligence tests to such men, the Air Corps was looking for men with a reasonable command of reading comprehension and verbal skills.

Motives for enlistment varied greatly: attraction to the new phenomenon of flight at a time when commercial air travel was virtually unknown; the glamor of the uniform and the wings pinned to a man's chest; or perhaps dislike or fear of the experience of fighting on foot. Signing up was a simple affair – hopefuls could make an appearance at a recruiting station where they could then state their preference for the Army Air Corps, and more specifically to work with fighter or bomber aircraft, or as ground crew. Bomber crews were composed entirely of volunteers owing to the particularly hazardous nature of their task. Men could also enter the service via the Reserve Officers' Training Corps (ROTC) program at their college or university in which, while they continued to work toward their degree, they were simultaneously trained as a junior officer, entering the army (or navy) upon graduation.

Bill Odell, 27 years old and from Chicago, entered the Army in 1942 as a reserve officer in the ROTC program at Washington University in St. Louis, Missouri. After spending a year at Fort Sheridan, Illinois, in an antiaircraft artillery regiment, he applied for pilot training. His motives for joining up were several, including the romance of flying and an attraction to some of the comforts enjoyed by the Air Corps as opposed to those in the infantry:

Having endured four maneuvers during which Air Corps units were involved, I saw no torrential rain, shin-deep mud, well-digger's butt temperatures, impenetrable woods and thickets, inadequate maps, missed meals and sleep up where the Air Corps were. The hazardous duty pay was a windfall. There were few classmates who had increased their income by 50 percent in two years to \$187.50 a month since graduation.

Richard Fitzhugh, a B-17 pilot with the 457th Bomb Group, based in England, needed little in the way of incentives. As a boy he had admired Charles Lindbergh and had watched commercial C-47s and DC-3s take off from Hoover Field in Washington. In May 1942, after passing a recruiting poster for B-17s with a friend, they spontaneously signed up. B. C. Reed started training as a B-18 co-pilot in August 1940, unaware that war would soon put a stop to Wednesday and Friday afternoons off and completely free weekends.



B-17 Flying Fortress. Nose art usually came in one of two forms: either as a cartoon, as here, or a voluptuous, semi-clad woman. Note the numerous bomb motifs, which indicate the number of missions this aircraft has flown. The three swastikas indicate the number of enemy fighters shot down by the gunners of this bomber. (Corbis)

He simply wanted “wings,” which imparted a special form of prestige not only within the armed forces, but within American society as a whole.

Marshall Draper, 24, having run out of money for his education, had dropped out of UCLA the previous year and applied for pilot training in order to save enough money to finish college. In the event he was not trained as a pilot, however, but as a bombardier, learning to operate the Norden bombsight on both B-17s and B-24s while based in Florida.

Once recruited, men were shipped off to their training bases. Ben Smith, a B-17 radio operator, remembers the journey:

We came east on a troop train that seemed to make no progress at all. It toiled on for days, chugging and wheezing and clanking along, stopping for hours at a time, then backing up for miles, then stopping and starting again... Sometimes we would sit on a siding, sweating and dirty, as a streamliner flashed by us at lightning speed, compounding our discomfort... The troop trains were pulled by the old iron-horse locomotives. Because of the heat we rode with the windows up. There was no air conditioning. The cinders were flying about like sooty snowflakes. Rivulets of dirty sweat streamed down our faces, our clothes became filthy, and we stank abominably.

## TRAINING

Well before the United States entered the war in December 1941, the government was aware that war with Germany and Japan was virtually certain, as a result of which many military observers had come to Britain during 1940–41 to observe the RAF’s tactics in fighting the Luftwaffe. They also scouted the countryside for potential bases for American aircraft, and had sent bombers to Britain for the use of the RAF. Much, after all, could be learned from the combat experiences of these crews. Thus, once war began men and machines began to arrive in Britain in ever-increasing numbers and bases sprang up, particularly in the eastern counties of England. Lieutenant-General Henry (Hap) Arnold, chief of the Army Air Forces, appointed MajGen Carl Spaatz to head the Eighth, established in January 1942, with BrigGen Ira Eaker in charge of the bomber component, known as Eighth Bomber Command. At the end of May 1942, Operation *Millennium*, the beginning of saturation bombing by the RAF, began, and the following month the first B-17s, together with fighter groups of P-38s and P-39s, arrived in England.

Pilot training required a minimum of 400 flying hours and pilots were trained by the particular unit to which they were assigned. In addition to instruction in flying, they practiced gunnery, both in the air and on the ground, navigation, instrument handling, formation, night flying, and aerobatics, depending on the type of aircraft, of course. Bill Odell, on arrival in England in May 1942, was immediately assigned to fly in RAF Bostons in order to acquire immediate combat experience and such skills as aircraft identification, communications procedures, ditching techniques, combat flying, and many other aspects of aircraft operation. In one simulated attack he dropped four bombs on a range from 75ft and later bombed and machine-gunned a partly sunken ship off the coast. On rare occasions, training ended in disaster, as aircraft practicing at low levels could strike trees. In July 1942, two officers were killed in a crash at the USAAF base at Molesworth in East Anglia when, on returning from an altitude chamber test, their controls apparently locked during a descent from 4,000 feet.

Cadets were expected to make four three-point landings. "Evaluation," Bob DeGroat, recalled, "was based on approach, landing control, form, and proximity to a hypothetical spot directly in front of the parked control plane. As luck would have it, I was really 'on' this day. I strung together probably the best four BT landings that I ever made, and stuck them in with my wing tip dead in front of the 'judges.'"

Although the B-17 was not used as a night bomber, cross-country flight training often took place at night, with near mid-air collisions not uncommon in the days when there were no radar stations to manage air traffic. DeGroat recalled his final day of training:

The assignment was a low-level cross-country [flight] designed to sharpen identification of physical checkpoints and map reading, but was understood by student and instructor alike to be a legalized "buzz job." In my own case, during the early moments of the trip, every time I glanced at my instructor in the co-pilot seat, his hand seemed to subtly indicate that I was too high. It was great fun. We went down valleys, climbed over tree lines and high tension wires, scared some livestock, and even startled a few people driving on the highway.

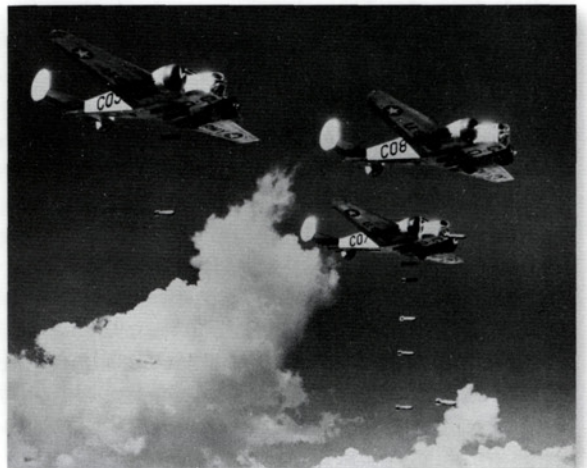
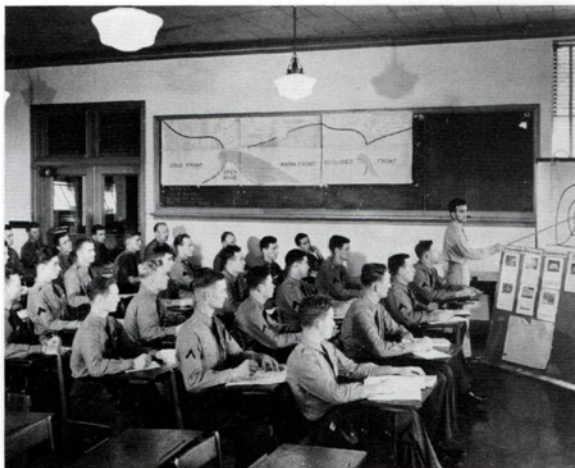
Those destined not to fly bombers – either because they did not possess the requisite skills or because they preferred to play a different role aboard

**BELOW**

Cadet ground school class at Randolph Field, Texas, 1942. (Air Force Historical Research Agency)

**BELOW RIGHT**

AT-11 training bombers at the USAAF advanced flying school dropping practice bombs near Carlsbad, New Mexico. (Library of Congress)



the aircraft, received specialist training suited to their task. Merlin Miller, for instance, raised on a small farm in Indiana, had a natural predilection for shooting, having had experience of firearms since boyhood. "I had a shotgun, rifle, pistol, or something like that in my hands ever since I was big enough to hold one," he recalled, "so shooting a gun was second nature to me, and I was a fairly good shot." For his training as a tail gunner, Miller was sent to gunnery school in Las Vegas, followed by armament school in Denver. George Hoyt, born into a wealthy family in Brunswick, Georgia, already possessed a private pilot's certificate, but became a radio operator, for which he received training at radio school in Sioux Falls, South Dakota. Similarly, prospective bombardiers, flight engineers, and others received specialized training at various posts and schools around the country before being brought together to form a crew.

Once a cadet successfully completed his flight training, he received his wings and a lieutenant's commission. After graduation, all crewmen – pilots, bombardiers, navigators, radiomen, flight engineers, and gunners – participated in the advanced phase of training known as "bomber transition." Each base trained men for a specific type of aircraft. Bob Gillman was sent for further training, this time with B-24s, at a base near Nashville

...with mostly brick buildings, an officers' club, and bachelor officer quarters. Other facilities included an officers' bowling alley, swimming pools, and several Hamburger Havens, even on the flight line. Now, this was a "real" military air base, where flying took place around the clock. Nevertheless, we were still basking in the glory of being saluted and addressed as "Sir!" We also realized that this was where the really serious business began.

A bomber crewman required specialized training and thus generally could not perform the function of the other members of the crew (apart, of course, from the gunners, who could operate each other's weapons if necessary). Gunners were sent to armament school, radio operators to radio school and pilots, not unnaturally, to flight school. The pilot did not necessarily know the finer details of his aircraft's construction, but he did understand the machine's capability. As Bob Morgan, a B-17 pilot, recalled, "I couldn't tell a nut from a bolt as far as a B-17 is concerned. All I knew was when she would fly, what she would do, what I could do with her, and what she would do for me."

First, of course, a new student pilot had to face the daunting task of understanding the controls in the cockpit. Bob Gillman was one of four student officers assigned to an instructor, who spent two hours explaining the aircraft, inside and out. The controls were a mass of confusing dials, meters, levers, buttons, and switches. "I will never forget climbing up on to the flight deck and seeing the cockpit for the first time," he recalled on his first day on the flight line in February 1944:

The instrument panel stretched from the extreme left to the extreme right of the cockpit and was covered entirely with instruments. There were controls and levers on the left side of the pilot's area from the front panel to behind the seat back, and from the window sill to the floor. Same on the right side. The center pedestal held not only the four throttles, but also four mixture controls, four turbocharger controls, four propeller controls, four cowl flap switches, and four of many other things. Landing gear and flap levers were by the pilot's and co-pilot's knees, respectively. Even the ceiling was covered with radio

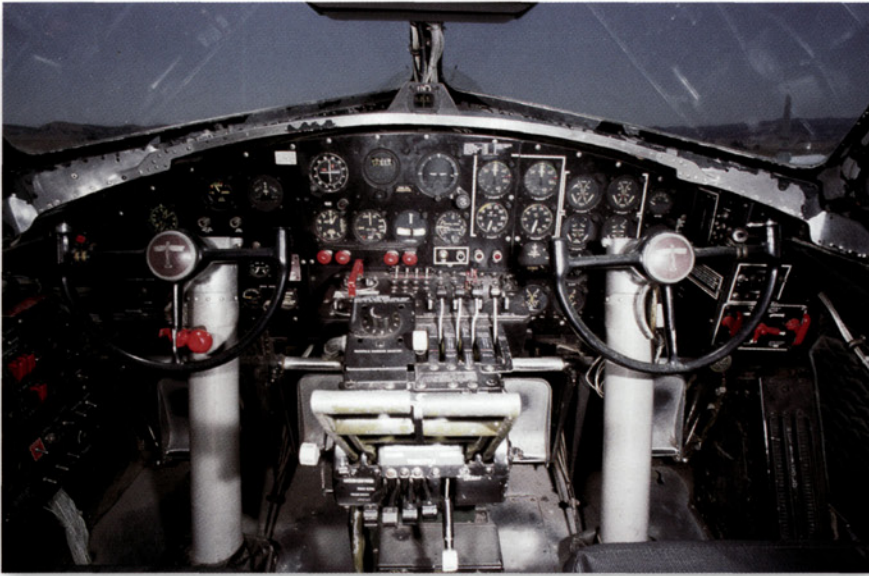


The waist gunner of an American bomber. This is almost certainly a posed shot taken on the ground, for he wears no oxygen mask, goggles, or flying helmet. (Library of Congress)

controls from front to rear and left to right. Immediately below the landing gear lever, by the pilot's right leg, was a red "T" handle, which was the bomb salvo lever. Pulled up to the first notch, it opened the bomb bay doors. Pulling further to the limit dropped the entire bomb load.

The transition from training aircraft to an actual bomber posed a host of difficulties for many new pilots and co-pilots. DeGroat, for instance, found visibility from the flight deck of a B-24 akin to "flying a hotel from the basement window... Visualize a flight line of fledgling pilots all trying to taxi their first tricycle-geared aircraft," he continued. "It not only has twice the engines and throttles, but also is twice the size of anything they have handled before. Note that this is under the impatient guidance of disgruntled instructors who are trying to get off the ground and on with their boring day of instructing extremely green pilots."

Pilots were trained to fly in formation and crews gradually became accustomed to working together as a team. Gillman noted that in order to maintain one's position in formation "you must learn to almost anticipate the need to add or reduce power *before* you actually begin to slide slowly back or forward, and I was just getting this down to a science." Learning to fly in formation was as much an art as a science, and a very dangerous proposition, as a bomber weighed approximately 32 tons, and once a machine of this size



The cockpit of a B-17 bomber, the preserve of the pilot. The co-pilot, on the other hand, may have had a tougher job, for while the pilot operated the controls on the bomb run and was consequently occupied, the co-pilot had comparatively little to do but watch the flak and enemy fighters. (Corbis)

began to move in a particular direction it was impossible to slow it down apart from easing up on the throttles. Mistakes could be fatal, and mid-air collisions occurred from time to time. Bombardiers could make their own mistakes, sometimes serious ones, such as one who dropped a 100lb smoke bomb through the roof of a house near Tuscon, Arizona.

Even the leaders of the USAAF were unsure how to make use of men who felt the strains of being new to flying. Never before had bombers been employed for the purposes to which they were now being put, and everything had to be learned by trial and error. Bob Morgan explained that “We had to learn the hard way. There were no books or training in the United States, except how to fly the airplane, that told us exactly what we had to do. Every mission we learned, and we started to write the manual for combat flying over Europe. It was tough. We lost eighty-two percent of our group in the first three months.”



Bombers in formation. Keeping one's proper position was essential owing to the ever-present danger of mid-air collisions, especially when aircraft operated in tight formations in poor weather conditions. In such cases contingencies were made if a bomber was unable to strike its primary target. In the event of heavy cloud cover obscuring the target, the bombardier would already have plotted a course for a secondary target. (Corbis)

## APPEARANCE AND DRESS

As so many versions and different types of clothing were issued before and during the war, no attempt was made to standardize the clothing of a given crew. As such, any description of a bomber crewman's appearance and dress must take into account such variations.

All bomber crewmen wore specially designed flying clothes to enable them to cope with the extraordinary conditions in which they fought. Flying at high altitude exposed men to climatic extremes not shared by any other fighting men, especially those operating over Europe. In particular, these flyers required a flotation and exposure suit to enable them to survive in the freezing waters of the Channel or North Sea should they need to bail out. Men flying over mountains or jungle, by contrast, required clothing and shoes particular to that environment should the need to ditch their aircraft arise. On the other hand, such clothing caused complications since neither was appropriate for high altitude flying – the flyer's principal requirement being protection from the cold. Bomber crews normally flew at about 25,000ft, where temperatures plunged to about -65 degrees Fahrenheit (-84 degrees Celsius) and thus required heavy clothing to ward off frostbite, in addition to parachutes and flak jackets, as well as oxygen masks to enable them to breathe at high altitude. The fully equipped flyer was therefore burdened by bulky clothes and had very little freedom of movement in the confined space of a bomber, especially in the cockpit and turrets.

Still, clothing had to meet the numerous requirements of its wearer. Not only did it have to protect him from the cold; it had to be easy to take on and off and be cut in such a way as to enable him to perform the functions of his job sitting down. Nor could it be allowed to over-encumber him once he also donned his goggles, oxygen mask, and survival and radio equipment. Originally, flying clothes were based on those worn by explorers, Eskimos, and trappers, employing fur and leather to retain body heat and provide protection from the wind. Over time these underwent numerous modifications, until



The crew of the Flying Fortress *Hell's Angels* watch a master sergeant paint a bomb motif on the aircraft's nose following its return from a raid. The bombs represent the number of raids carried out, while the swastikas indicate the number of enemy fighter aircraft destroyed. (Corbis)





The crew of *Lil' Audrey*, a B-24 Liberator which, as its bomb motifs attest, had many missions to its credit. (Corbis)

the USAAF settled on leather for a flyer's jacket and trousers. The jacket was hip-length with numerous pockets and lined in sheep shearling. Before the war various other materials had been tried, including the fur of the nutria (a large rodent from South America, much like a beaver), muskrat, and reindeer. None, however, provided adequate warmth. Furthermore, some were difficult to obtain, some emitted an unpleasant odor, or shed their hair over time.

Sheep shearling, on the other hand – pliable tanned leather lined with short-cut wool fleece – was easily obtainable, relatively inexpensive, and could be produced with a more uniform thickness. Still, it was needed in large quantities; in total, about 75 sq. ft of shearling was required for a single suit. To obtain a smooth appearance the wool was combed and ironed after oiling, then clipped to the required length and dyed beige. Thus, the outside of the jacket was leather hide in very dark brown, coated with a dark brown polyacrylate dye and then lacquered so as to make it resistant to gasoline, oil, and water. Over time the lacquer coating cracked into designs of thousands of tiny lines and shapes, giving it the appearance of the surface of a dried reservoir.

While such clothes did protect the flyer from the cold, they were nevertheless very cumbersome and trapped perspiration. Moreover, flyers who were shot down found they had to discard whatever they could in order to walk any distance, while if they ditched in water their excessive weight posed a risk of drowning. Sheep shearling was also prone to damage from moths, and attempts to moth-proof it resulted in greater damage to the material. Shearling also easily became filthy with dirt or grease and was difficult to clean. In 1944 shearling production therefore ceased and it was withdrawn from use overseas, though many men retained jackets so lined while serving in the United States. Thereafter, alpaca (a medium-gray, wool-like rayon material with a wool fabric backing, made in imitation of the hair of the alpaca, a Peruvian quadruped similar to a llama) replaced shearling. Inside, the clothes were filled with down to protect against the extreme cold.

The crew of the lead Fortress of their formation back at their base in Britain after a daylight attack on Berlin. Long and particularly dangerous missions such as this were exhausting ordeals, not least owing to the particularly strong resistance the Germans offered in the defense of their capital. (Corbis)



While the exterior of garments tended to remain leather, they could also be made from wool and cotton gabardine blends. Water-repellent, tightly woven cotton twill cloth was used for the outside of alpaca-lined flying clothes. Most lighter garments made from cloth were khaki, while heavier garments were usually manufactured in light olive drab. Later in the war they became darker – a sort of dark brownish green – with green the dominant color. After repeated washing, though, clothes tended to fade to gray-green. Metal fittings were generally enameled black, brown, or green, though buckles could be unpainted, polished metal.

Flyers operating in warmer conditions usually wore their service clothing together with specialized lighter-weight garments, such as light flying jackets for which there were no matching trousers. These were very popular even when not in the air, the most popular version being made of seal brown horsehide with dark brown knitted wool wristlets and waistband, generally lined with tan-colored cotton or rayon. The leather collar was of the stand-and-fall variety with snaps underneath the points to hold them in place, and pockets at the midriff, also secured with snaps. Some jackets bore shoulder straps, with cloth and hand-painted unit insignia and large hand-painted artwork on the back in the style of aircraft “nose art.”

Flyers sometimes wore summer flying suits made of light olive-drab cotton with front-opening pockets, on both the chest and shins, secured by buttons. Sleeve and ankle cuffs had zippers to enable the wearer to dress and undress as quickly as possible. Later versions had vertical ventilated openings above the knees, larger pockets and adjustable zippered leg cuff closures. Flying jackets came in myriad designs and weights throughout the war. Trousers, normally high-waisted, also varied in design, but often had zippers along the outer leg seams running from waist to cuff, with flapped pockets on the thighs and shins. The flying helmet was also leather, as were the gloves, which came in varying thicknesses depending on conditions. These types of clothing remained standard issue but were regularly modified according to conditions reported back by bomber crews. Thus, at the beginning of the bomber campaign in Europe in 1942, 70 percent of all combat casualties were the result of frostbite caused by inadequate clothing. Heating the aircraft was impossible, for in order to operate the machine guns on either side of the aircraft the fuselage had to remain open.

#### **OPPOSITE**

A B-17 bomber pilot. As well as the aircraft controls, the pilot operated four wing guns that could fire in unison, operated by depressing a single trigger on his control column. Aiming was a relatively simple affair: point the aircraft at the target, whether it were an enemy fighter, soldiers on the ground, vehicles, or buildings; look through a ring and crosshair sight; and depress the firing mechanism. (Library of Congress)



A bombardier in training at Fort Benning, Georgia. Among their many responsibilities bombardiers sought to overcome enemy counter-measures, such as the employment of smoke generators to obscure targets. Smoke screens could seriously affect visibility and prevent accurate bombing. (Library of Congress)



Preserving body heat was vital for the whole crew, especially for the top turret gunner who experienced a unique problem, with his head exposed to the sun while the remainder of his body was extremely cold. To combat these conditions, flyers were issued with electrically heated flight suits to aid crews flying long-range high-altitude missions. Bombers were fitted with electric outlets from which the suits could be powered, though some suits could operate on a 12-volt battery system. Electric suits, either in light gray or light blue, consisted of one-piece garments worn under a standard two-piece winter flying suit. To accompany this, crews had electrically heated gloves and shoes. Electric suits closed at the front with a zipper running from the neck to the crotch and crotch-to-ankle zippers on both legs – thus minimizing the difficulties inherent in dressing and undressing. Wiring was embedded into the suit's wool fabric, with an electrical cord junction box fitted to the right waist with a 2ft power cord, extended by a 6ft extension cord if necessary. Connectors carrying power to the gloves and shoes were fitted above the wrists and ankles. Effective though such suits were, repeated movement could damage the wiring in the accessories, which were wired in series. Thus, a break anywhere in the suit, gloves, or shoes would cause the entire system to cease functioning.

Owing to the limitations imposed by the amount of power supplied by an aircraft, only a portion of the crew could be so outfitted. In B-17s priority was given to tail and ball turret gunners owing to their confinement in cramped areas and their limited mobility. If sufficient power was available, waist gunners also wore electric suits, whereas in B-24s both the waist and tail gunners wore them. The suit could also be worn over several layers of long underwear, or a wool uniform and underwear. The former method of keeping warm nevertheless posed its own peculiar problem, for downed flyers wearing only underwear beneath their suits found it awkward trying to escape detection in enemy territory, and those

actually captured – which were all but a small minority of air crewmen – consequently had no suitable clothing during their captivity.

Flyers in all theaters, whether in northern Europe, the Mediterranean, or the Pacific, had flotation and exposure suits to provide protection in water temperatures of 65–35 degrees Fahrenheit (18–2 degrees Celsius). The suit used for most of the war consisted of a one-piece coverall with foam flotation pads in the chest and collar. While it did enable the wearer to float, it alone was incapable of providing adequate protection from cold water without its accompanying flying helmet, gloves, and shoes. In the last year of the war, the USAAF simplified matters by issuing a single, completely sealed, buoyant flying suit that also protected the flyer from exposure. This consisted of a one-piece coverall composed of two-layer neoprene-coated nylon, with integral boots and hood, garishly colored in orange-yellow to facilitate rescue. Special gloves were held in large flapped leg pockets which snapped shut. The suit was stored in a container of the same material as the suit and could be removed with a pull-tab. Every crewman was issued with one suit, with one or more normally comprising part of the equipment supplied in the life rafts carried aboard every bomber. The suit was large enough to fit all sizes and could be worn over all standard flying clothes and helmets. It was meant to be worn with a life vest over it, but there was sufficient buoyancy if there was no time – as was so often the case in a crippled bomber – for a flyer to don both. The suit offered protection in temperatures as low as 28 degrees Fahrenheit (2 degrees Celsius).

Bomber crewmen wore a large variety of headgear, the type depending on the year of issue and the required purpose. Flying helmets were made of leather, the inside being lined with chamois, a very soft and pliant leather made from sheepskin. Doeskin, made from South African or Brazilian sheep, eventually replaced chamois for this purpose. Helmet linings and gloves were sometimes also made from horsehide, goatskin, pony hide, worsted wool, or a blend of wool and rayon.

Headgear was intended to protect the wearer from the environment and to reduce noise, not to serve the function of a steel helmet. Thus, most varieties of headgear were close-fitting, covering the front of the head down to about the hairline, with ear flaps hanging to the jaw line or farther and secured under the



A B-17 bomber pilot. Pilots could abort or “scrub” their mission if they had sufficient reason – generally malfunctioning equipment or engines – but those who returned without due cause were accused of “featheritis.” (Library of Congress)



The crew of a B-17 assembled in front of their aircraft at Langley Field, Virginia. In this bomber a captain and lieutenant served as pilot and co-pilot, respectively, with two sergeants and four corporals manning the machine guns, radio and other equipment. The normal complement was ten men. (Library of Congress)

chin with a leather strap attached to the right ear flap. All headgear could accommodate goggles and radio or intercom headsets with the use of snaps. Some helmets had integral headphones with large earphone retaining cups and modifications were made when necessary to accommodate oxygen masks. Some models of flying helmet were made of both khaki and light olive drab cotton twill with a silk lining; others were manufactured using chamois-lined horsehide, wool-lined khaki gabardine, or doeskin-lined horsehide. Finally, those produced toward the end of the war were lined with sheepskin and contained a brow flap lined with shearling. Most varieties of headgear had a chin strap with a plastic or leather chin cup.

Alternative forms of headgear were sometimes issued with survival kits, such as a water-resistant helmet lined with knitted wool or other fabric, to

## A

### GROUND CREW LOADING BOMBS

After being informed of the required bomb load for the mission of the day, ordnance and armament men worked together to haul and load high explosive or incendiary bombs – a slow and laborious operation. Bombs were sometimes rolled across two wooden beams onto the trailer bed, which could hold a maximum of 6,000lb – the load for one bomber. The trailer for a B-17 could then be backed up directly under the bomb bay. Bomb fins were then fitted before the bombs were winched into the bays. Armorers in each ground crew would already have tested the release mechanisms for the racks to ensure they were functioning properly before the bombs were loaded. Bombs were loaded by hand winch, hoist, or an electric cable winch. Once they were all in place an ordnance man screwed in the nose or tail fuses and placed their safeties on with a pin and wire to prevent them becoming prematurely armed while the aircraft was still on the ground. The work for such men was difficult, for it required them to move about in a confined space, in poor light, and with heavy and dangerous objects to handle. Extra work was required if a mission was scrubbed, for the ground crew then had to reverse the task just performed, removing all the bombs and returning them to the ordnance dump.

A



protect flyers on missions over Alaska, northern Canada, and the Arctic. Similarly, a brimmed reversible sun hat was issued to those operating over jungles or other tropical regions, with one side in orange-yellow for easy recognition during rescue, and the other side in camouflage, either in dark olive drab for ground use, or in medium blue for use in water. A mosquito head net was provided for those in tropical climates. For flyers directly exposed to the air stream, such as waist gunners, the USAAF issued a face mask secured by an elastic headband, with three cut-outs for the eyes, nose, and mouth. Scarves made from white parachute silk were used to prevent exhaled breath from freezing on the inside of the mask, while other varieties of scarf served to protect the neck from extreme cold.

Gloves not only provided men with vital protection from extreme cold and from injury during the operation of machinery and the guns of the aircraft; they also ensured a firm grip on controls and weapons. Hands were in fact the most frequently frostbitten part of the body. Gloves came as one- or two-finger mitten style or with five fingers. As with headgear, gloves came in a variety of styles and types. Some consisted of a horsehide shell lined with medium-weight camel hair, others of seal-brown pigskin with a shearling interior, or with a goatskin, pony hide or deerskin exterior and shearling lining. Still others had a water-resistant gabardine shell with a fleece or wool pile lining and elastic in the wrists. A few varieties were electric for use with electric suits.

Flyers also had special shoes designed to protect them from the cold. Most were in fact boots and had to be adapted for use in long-distance walking in the event the flyer was downed over enemy territory and sought to escape, or was captured and therefore required sturdy shoes for prolonged use in captivity. Most varieties were 10in. high and made of seal brown, lacquered shearling with a zippered closure. The soles were flat, non-skid, of black rubber. Boots could be worn over, or instead, of standard service shoes, and could be fitted over electric shoes, held in place by simple tie tapes in some types or buckles or laces in others. Bomber crews also wore several pairs of wool socks, each of a progressively larger size. All flyers were issued with standard russet-colored, laced, high-top service shoes, which they wore inside flying shoes. These could be tied to their parachute harness for use if shot down, though it was considered something of a bad omen to do so.

## EQUIPMENT

While space precludes discussion of the flight controls, machine guns, navigational equipment, radio communications systems, and other equipment aboard a bomber, much can be said of the equipment designed specifically for the crew rather than the major components of the aircraft. Flyers were issued with an array of such equipment, all meant to keep them alive while operating in difficult climatic conditions and in all possible circumstances – whether in the air, on the ground, or in the sea. New arrivals to a theater of operations were given two weeks of instruction to familiarize themselves with their gear, including flying clothes, parachutes, flak suits, oxygen equipment, first aid kits, and the procedure for ditching from a downed aircraft.

All flyers were issued with parachutes, with each type depending on the flyer's position in the aircraft or on the type of aircraft. Bomber crews wore a model designed for the back, as opposed to that strapped to the chest. In theory they were to be worn throughout the flight, but they were



sometimes stowed near the wearer during non-combat missions to allow greater comfort and movement. Those crewmen who worked in confined positions or who needed greater mobility used a parachute worn on the chest, which could be attached quickly. This type allowed the man to wear the harness at all times, but attach the parachute pack only when necessary, a method particularly favored by ball turret, tail, and waist gunners. The harness attached the pack to the flyer and formed a cushion on which the flyer sat during descent.

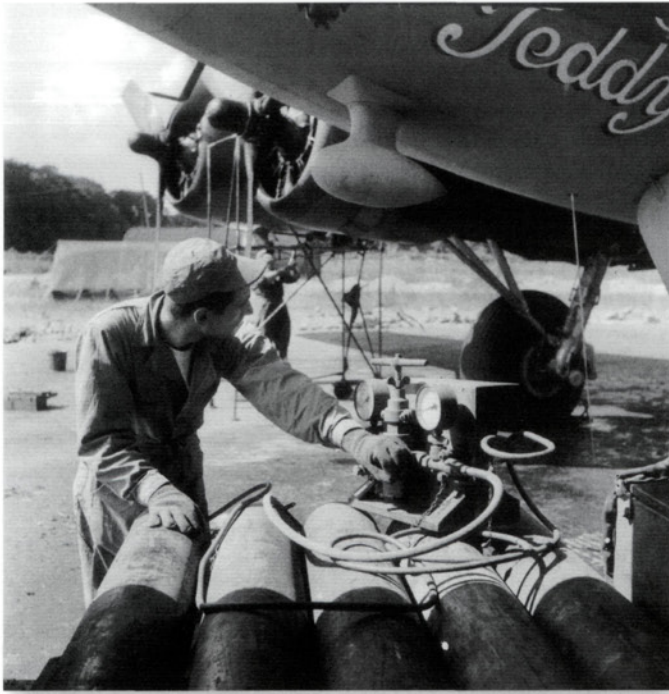
Parachute harnesses were made of an extremely strong white cotton webbing, later replaced by nylon. Up to 1944 parachute harnesses had three connection points: one chest strap and two leg straps. These could be released rapidly in the event a bomber crewman had to land in water. Hardware fittings were manufactured from forged alloy steel with rings, all with a high tensile strength. The canopy itself was made of silk, the service life of which was five years, but even before the war, on the presumption that conflict with Japan would end the supply of this commodity, the USAAF tested nylon as an alternative. Silk continued to be used until 1943, when it began to be replaced by nylon twill weighing a pound per square yard. This material had the advantages of not breaking down as quickly as silk, absorbing less water, and drying quickly. The great demand for nylon for the manufacture of parachutes, each of which required the equivalent of 500 pairs of women's stockings, led to a severe wartime shortage of that garment. The parachute canopy was constructed from numerous separate solid white panels of material, the whole having a diameter of 24–28ft and requiring between 450 and 600 sq. ft of nylon. For parachutes worn on the front the ripcord was generally located on the right end of the pack, while the ripcord of parachutes worn on the back was located on the left side of the harness.

Flyers all required flying goggles to protect their eyes from the wind, cold, and flying objects. Various types existed, but the most common consisted of a one-piece lens fastened in a gray, molded, synthetic rubber frame which was attached to the head with an elastic band. The lens consisted either of an amber, non-polarized version effective in hazy or foggy conditions, or of a red lens, which could help gunners recognize tracers during daylight. Goggles were improved over time to allow them to accompany oxygen masks more readily, and with individual interchangeable lenses of different colors depending on needs. Some versions were electrically heated for use with electric suits, while others were in fact modified sunglasses, often fitted with dark rose lenses, meant to protect the wearer from extreme glare in snow-covered and desert areas.

Every member of a bomber crew required a face mask specially designed to provide oxygen. Without it, above 10,000ft respiration is severely impaired and a flyer begins to suffer from anoxia (oxygen starvation), which renders a man insensible and inefficient. At the normal altitude

A top turret gunner on service in China. While the majority of American bombers in the Pacific Theater conducted raids on the Japanese home islands, some flew to support Chinese forces resisting enemy occupation. Note the extremely confined conditions under which turret gunners were obliged to work. (Library of Congress)





A member of a ground crew services a B-17 Flying Fortress, checking oxygen tanks and a regulator at an airfield in Britain. A properly functioning oxygen supply system was vital to every mission, enabling bombers to fly at high altitudes. Once a bomber descended to about 10,000ft it was safe for the crew to remove their oxygen masks and breathe normally. (Imperial War Museum D15110)

of bombing, that is, about 25,000ft, a man without a mask would soon die. It was axiomatic that oxygen masks had to be in perfect working order, for the wearer would not be aware that it was defective or improperly fitted and might consequently fall unconscious, his comrades sometimes oblivious to the fact until it was too late – especially in the case of men positioned in remote areas of the aircraft, such as the ball turrets. Masks were therefore donned once the aircraft reached a height of 10,000ft, though crews operating at night wore them from take-off, for the additional oxygen aided night vision. Oxygen masks worn by crews flying over Europe were prone to ice up or freeze altogether, whereas those worn in the Pacific suffered from no such drawbacks owing to milder conditions. Within the first year of the war crews received a spare mask in case the other froze.

Face masks and their hoses were made of synthetic rubber in either black, light gray, or medium green. The hose connected to a regulator fitted to the aircraft's oxygen supply system. As with other equipment, masks varied in style, but they generally contained a large nosepiece with a "y"-shaped oxygen tube from which hung a rubber re-breather bag, the whole apparatus secured by a single head strap. Early versions left the mouth uncovered, enabling the wearer to speak unencumbered, but this was eventually replaced with masks that covered both mouth and nose. Most provided continuous air flow, which could be adjusted according to the elevation of the aircraft as called out by the pilot. Nearly all versions contained integral microphones for communication with other members of the crew, which was conducted by interphone. Aircraft were fitted with cylinders of oxygen, both of high and low pressure, but only the latter type was used from 1942 since flak and bullets caused the former to explode in a shower of metal. Reinforced steel eventually protected cylinders from the impact of .50-cal. bullets.

To enable crewmen to move around the aircraft away from fixed sources of oxygen and beyond the reach of extension hoses, the USAAF developed portable or "walk around" cylinders. By disconnecting his mask hose from the regulator at his station, the flyer could attach it to the connector of the walk around cylinder and then move freely about the aircraft. They could also be used to administer emergency oxygen to wounded airmen and to revive those who collapsed from anoxia. These portable cylinders were also indispensable in the event of the failure of the main oxygen system or for escaping from a submerged aircraft forced to ditch over water. Usually slung over the back, a continuous flow cylinder provided approximately 30 minutes of oxygen at 25,000 feet. Flyers also had use of emergency, or bail-out, bottles, which allowed them a supply of oxygen if they bailed out between 25,000 and 40,000 feet. These high-pressure bottles provided eight to ten minutes of oxygen and were generally attached to the thigh or parachute harness leg strap.

The USAAF recognized the need to provide air crews with protection from low-velocity projectiles, specifically flak fragments and parts of the aircraft dislodged by antiaircraft fire. By spring 1943 a small number of crews were therefore issued with body armor, or “flak suits,” which by the beginning of 1944 were available to all bomber crews. Once properly protected with flak jackets and steel helmets, fragmentation wounds and bullet fatalities dropped by 50 percent and injuries by 70 percent. More than half those hit by fragments while wearing protective armor remained uninjured. Bomber crews were initially opposed to wearing flak jackets owing to their weight and the restriction of movement they imposed, to the extent that men often stood or sat on them while erroneously believing that the greatest danger came from below. In fact, most fragments tended to penetrate the aircraft from the sides. The experience of wearing them on their bodies and witnessing firsthand the degree to which they offered protection to the body, together with the dissemination of surgeons’ reports on their effectiveness, eventually convinced most flyers that the discomfort caused by the jackets was a small price to pay for the security they afforded.

Flak suits were made of overlapping thick manganese steel plates sewn into the pockets of a vest large enough to wear even over a parachute. A quick-release mechanism, consisting of a red strap at the midriff, enabled the bearer to remove the suit quickly if he needed to bail out. A flyer’s armor varied in weight depending on its type, but bombardiers, navigators, radio operators, waist, top and most top turret gunners’ vests weighed over 17 pounds.

Waist gunner J. C. Wilson of the 351st Bomb Group described the flak jacket thus:

The flak suit consisted of four aprons of two-inch platelets, overlapping like fish scales. Two of the aprons were for the front and two for the back. The flak jacket fastened at the shoulder with four snaps and had an emergency release where, if needed, you could pull a strap and they’d fall off. The top half of the apron would cover the chest and the bottom the thighs and crotch. They weighed between fifteen and twenty pounds. They were not bullet proof but would stop low-velocity projectiles such as flak shrapnel or pistol bullets. They’d been known to help men survive 20mm shell hits.

Pilots and co-pilots wore a lighter vest with a front panel only, since their seat was armored to protect their back. Attached to the vest by a series of hooks was a 7lb armor apron, triangular in shape, designed to protect the lower torso and groin of those who generally sat during a flight such as the pilot, co-pilot, radio operator, bombardier, and navigator. In 1944 the USAAF introduced specialized 15lb groin armor to provide further protection to the lower body than that already offered by the apron. This accessory, worn by pilots and

Heavily laden with body armor, two bomber crewmen chat next to their B-26 Marauder on an American air base in Britain. (Corbis)





A bomber crewman clad in full combat gear inspects the landing wheel of his aircraft. This flyer wears the standard soft flying helmet, but when under fire he would usually don a steel helmet. Airmen often smashed these against the pavement in order to flatten them so that they would sit on a table and serve as a wash basin. Other modifications included cutting out the ear protection and fastening it with a hinge as a large saucer-shaped earpiece, so enabling the helmet to fit comfortably over the leather flying helmet worn in conjunction with earphones. (Library of Congress)

waist gunners, came in three sections, the center of which hung between the legs, while the other two sections protected the outer thighs down to the knees. Other versions of jackets and aprons appeared during the course of the war, composed of different materials, but the concept remained the same.

Airmen wore steel helmets in conjunction with their body armor, though helmets tended to be less popular since they interfered with headsets, goggles, and masks; some turrets were so confined as to make the wearing of a helmet impossible. Helmets weighed between 2 and 3lb, depending on the type, and could be worn directly over sheepskin-lined flying helmets, though many men chose not to wear them at all, sometimes with fatal results. For the sake of comfort, bomber crews did not generally don them until the appearance of enemy fighters or flak.

Bombers carried first aid equipment of various types, both aboard the aircraft itself and as a component of the equipment accompanying a life raft. First aid kits contained items such as compresses, a tourniquet, field dressing, water purification tablets, antiseptics, and anti-malaria tablets, all of which flyers carried in a bag which they attached to their parachute harness. Some varieties contained dressings for eyes and burns, syringes of morphine, and other drugs. Bombers also carried emergency sustenance, or survival, kits for use after a forced landing or for dropping to crews who had already ditched but had not yet been rescued. The contents of these kits depended on the area of operations, whether in desert, jungle, ocean, or arctic conditions, and contained rations, signal equipment, canned water, medical supplies, specialized clothing, and other materials essential for survival. In some cases such kits also contained a rifle or carbine. Small versions of these survival kits could be carried by airmen, who, as with their first aid kit, often strapped them to their parachute harness in case the crew bailed out. This might contain a combination of rations, emergency drinking water, matches, a compass, a hacksaw blade, chewing gum, antiseptics, aspirin tablets, fishing line and hooks, and other items. Kits meant for use in the jungle were issued to crews operating in the Pacific, and contained various medications, mosquito netting, rations, a folding machete, and other items.

Bombers were also supplied with life preservers, a form of vest commonly known as the "Mae West." While it was not capable of keeping afloat a man in full flying clothes, once an airman discarded the heavier items, the vest, designed to fit like a horse-collar, could keep his head above water even if he passed out. The vest was inflated by two pull-cords which activated carbon dioxide (CO<sub>2</sub>) cylinders, or by mouth using tubes if the cylinders malfunctioned. Bombers also carried several four-man and six-man inflatable rubber rafts, together with survival equipment, some of which has already been described. Flyers also made use of one-man rafts made from rubberized fabric. Like their larger counterparts, these rafts were also inflated by a CO<sub>2</sub> cylinder, and were equipped with a can of drinking water and a tarpaulin for a multiplicity of uses: catching

rain water, signaling, providing protection from sun or rain, and serving as camouflage. The raft also came with paddles, a repair kit, an orange-yellow sail, marker dye, and other items to enable the downed airman to survive his ordeal at sea long enough to reach shore or be rescued by boat.

Space precludes any detailed study of the bombers themselves, but a brief word is certainly in order. The USAAF deployed a range of bombers, but the best known were the B-17 Flying Fortress, the B-24 Liberator, and the B-29 Superfortress, all four-engine aircraft. As the war progressed, so too did the technology. Bombers became faster, more heavily armored, could sustain longer flights at higher altitudes, and could carry heavier payloads. Boeing designed and built the first B-17 – the most famous bomber of the war – operating on 5,000hp, in 1933–34, with the first test flight in 1935. As this aircraft was exceedingly expensive, building a fleet of these was not deemed necessary until strategists appreciated that long-range raids against Germany might be needed if war broke out, particularly deep into Czechoslovakia and Austria. In 1941, the standard bomber, the B-17B, manufactured by Boeing in Seattle, Washington, was armed with only five flexible .30-cal. machine guns, had no belly turret or tail gunner, and had much less protective armor than later models. By the end of the war the planes sported an additional 12 .50-cal. machine guns as well as steel padding in areas particularly vulnerable to penetration, and power-driven turrets.

The other heavy bomber was the B-24 Liberator, made by the Consolidated Aircraft Company. Like the B-17, the Liberator also had four engines, but it flew faster and carried a heavier payload. When the war began there were fewer than 300 Liberators, all with very little firepower, no power-operated turrets, and little in the way of adequate protection for the crew. Indeed, by way of meager compensation for the absence of proper armor-plating in the fuselage, Marshall Draper recalled being handed a steel plate and helmet by an RAF officer and told to place the plate under his feet and the helmet on his head.

Bomber crews generally grew fond of their “ships” and resented having “their” aircraft, for whatever reason, transferred to another crew. Their attachment found expression in their right to provide a name for their aircraft, though officially aircraft were only known by their serial number. Thus, among the hundreds of bombers serving in Britain at any given time were some sporting such names as *Winnie the Pooh*, *Flak Wolf*, *Luscious Lady*, *Wallaroo*, *Black Diamond Express*, *Yankee Doodle Dandy*, *Winning Run*, *Vicious Virgin*, *Satan’s Workshop*, *Charlie Horse*, *Bad Check*, and *The Old Squaw*.

For escort protection, RAF Spitfires were initially assigned to accompany bomber raids, supplemented later by the American P-39 Aircobra, an aircraft which maneuvered poorly and climbed slowly – and only to inadequate elevation at that. The P-40 Warhawk proved something of an improvement on its predecessor, but it too climbed too slowly and could not maneuver like a Japanese Zero, which could make remarkably tight turns. By the time the United States entered the war, in fact, the P-39 and P-40 were obsolete, though this was somewhat rectified by the appearance of the P-38 Lightning, a twin-engine fighter built by Lockheed, complete with turbochargers which provided considerable extra speed. With time and experience, the P-38 would prove itself an effective escort fighter. By 1943 fighter protection for the Eighth Air Force improved markedly with the introduction of the P-47 Thunderbolt. At the same time, North American Aviation created the P-51 Mustang – a far superior fighter to other models – which saw service in the RAF as well as with the USAAF and would become the most popular American fighter in the ETO.

One of the four engines of an American bomber. One co-pilot named the engines of his aircraft after former girlfriends "according to how hard they were to get started." (Library of Congress)



Its impressive speed and high-altitude capability were complemented by its long range – a feature made possible by extra fuel tanks which enabled it to accompany B-17s and B-29s to any target in Europe.

The Americans carried out daylight precision bombing from high altitudes and relied heavily on the much-admired bombsight invented by C. L. Norden in 1932. The RAF, on the other hand, preferred to carry out low-level raids at night, and used their own device, the Sperry bombsight. The Norden was reasonably accurate, but notwithstanding the advantages offered by this relatively sophisticated piece of equipment, accuracy still depended to an extent on the human eye, the judgment of the bombardier, and the optical instruments available at the time, even those as crude as binoculars. Many army officials and not a few bomber crewmen placed great – indeed misplaced – faith in the effectiveness of this device to deliver bombs to a target with great accuracy. While the manufacturer claimed that a target could be pinpointed with such accuracy that a bomber could drop its load from between 20,000 and 30,000ft into a “pickle barrel,” in reality this claim revealed itself to be a massive overestimate of the bombsight’s true capability. When operating at such heights accuracy was affected by fluctuating wind speeds, not to mention the problems

## **B**

### **BOMBARDIER LOOKING THROUGH A NORDEN BOMBSIGHT**

American strategists placed considerable faith in the Norden bombsight, which was expected to drop bombs with great accuracy. Even in the best conditions bombs could fall well outside the target zone; in combat, amid exploding anti-aircraft shells and enemy fighters firing their guns through bomber formations, the task of the bombardier was even more taxing. To strike his target, a bombardier manipulated the controls of the bombsight, which in turn activated the Pilot’s Directional Indicator (PDI), an instrument in the cockpit, which then directed the course the pilot should follow. More advanced instruments by 1943 allowed the bombardier himself to direct the course of the aircraft through the automatic pilot. The point at which the bombs were dropped was set by a predetermined formula and calculations made before the briefing, this data having already been fed into the bombsight. Once over the target, the bombardier centered it in his telescope, allowing the bombsight to determine the precise instant at which to release the bomb load, which could be done automatically or by manual override by pressing a toggle switch. At the same time, the radio operator in those aircraft fitted with a strike camera ensured that it took several pictures of the target at six- to ten-second intervals, thus providing data on the accuracy of the strike.

B



posed for the crew themselves: machine guns tended to freeze up (specifically, the lubricating oil); airspeed was adversely affected; and oxygen systems could overload with potentially fatal consequences.

The Norden bombsight operated on a fairly simple principle, but the ability to strike a target from a vast height was far from a simple affair. The sight into which the bombardier looked to take aim contained a gyroscope at its base. First, the bombardier would position the vertical crosshair so that it remained steady on the target. Next, the bombsight tilted the telescope to position the airplane the correct distance upwind to compensate for the fact that since a bomb is dropped from a high altitude it is necessarily blown downwind, thus obliging the bombardier to release the ordnance upwind of the target. The bombsight was connected to the automatic pilot of the aircraft so that the bombardier could himself maneuver the bomber using the sight. Then, while the bombardier used a double control knob to hold the horizontal crosshair on the target, the bombsight would measure the speed of the aircraft, moving the crosshair to a new position according to its calculations. In theory, if the speed had been measured accurately and the crosshairs placed in the correct position, the bomb load would hit the target when the plane was directly overhead, a circumstance only possible if the bombs were released a specified distance before the plane reached its target.

The bombardier had more to do, however, than merely line up the crosshairs and allow the bombsight to compensate for human error after performing various calculations. Since every bomb fell differently according to its type (known as “trail”), the conditions of wind and air resistance, the bombsight featured a dial that could be set to account for these variations based upon prepared tables. The bombsight therefore had to be manipulated to account for trail and the movement of the plane in such a manner that when these two indices met, an electrical impulse triggered the release of the bombs. In this case, the bombardier had no button to push and he was free to use both hands to operate the four control knobs on the bombsight.

## DAILY LIFE AND CONDITIONS OF SERVICE

Americans found themselves known as “Yanks” in Britain, where a certain degree of jealousy prevailed between American airmen and those in the RAF, since the former received considerably more pay than the latter. Nevertheless, money was seldom of much concern to flyers, and often when on leave crews would combine their pay to create a sizable pot to be spent together. Sometimes men saved a considerable part of their pay, which they sent home every month if they managed not to gamble it away. Their tenuous existence simply rendered money an irrelevance.

The vast majority of American bomber crewmen in Britain maintained positive impressions of their time there: Sam Wilson, who served in a ground crew, wrote home in October 1942:

... England is really beautiful – everything is so neat and orderly. The trains are just like in the movies... The streets are cobblestone and run in every damned direction! The lower-class English rather resent us; however, the middle class and upper bend over backwards being nice to us... The Scotch people we have met are really swell, more like Yanks... We have to watch our slang. Have already had a few misunderstandings that way... The British version of toilet





tissue is equivalent to the rotogravure section of the Sears Roebuck catalogue. There are no oranges. We will soon be eating American food tho' I like English food. They have tried to cook our dishes and have flopped so far. But their hospitality extended that far!

Wilson found the blackouts so comprehensive that he bumped into lampposts, only to reply with "Beg your pardon."

Generally speaking, relations between Britons and Americans were amicable. Lalli Coppinger, a Red Cross Club volunteer, recalled her experiences thus:

Getting to know the Americans was a memorable highlight of the war. They provided excitement and brought fun back into our lives at the time we most needed it, when we were suffering greatly from the deprivations of the years of war. They livened up our dreary towns and introduced a new world to us. We learned to understand each other's cultural differences, but were also surprised to find out how much alike we were in many ways. When we opened up our homes and hospitality to them, they responded wholeheartedly and gradually became a very large part of our lives. Many were in England for as long as three years, plenty of time to form a special bonding and lasting friendships. The GIs had a great liking for children, who needed no encouragement to make their acquaintance. Their faces would light up when their American friends dug down into their pockets and brought out never-ending supplies of candy and chewing gum. No one will ever forget the catch phrase, "Any gum, chum?"

Once assigned to a base airmen sometimes found that they were among thousands of other men working in the same capacity and that their status was not as special as before. "We were 'fresh meat,'" Ben Smith recalled, "replacements, soon to be gobbled up by the voracious appetite of the air war like all those who had gone before." Indeed, the casualty rate was so high that crewmen often established strong bonds between them, with distinctions sometimes becoming blurred between officers and non-commissioned officers. Whole crews sometimes went on leave together, and even on the base saluting and military formality was often eschewed except when decorations were awarded or dignitaries visited.

**ABOVE**

The B-24 *Snow White* and members of her crew who have just completed 36 missions and a total of 300 hours of combat time in the Mediterranean Theater of Operations, stationed at a forward bomber base in the Libyan desert, April 1943. Owing to the particular danger of the flying missions over enemy territory, bomber crews, like those aboard submarines, were all volunteers and hence a self-selective group. As such, they were likely to be more daring and assertive than most service men. (Library of Congress)

Americans on leave were free to travel, though as John Ramsey, a B-17 navigator, discovered, train schedules were not always published, for security reasons, and making a journey such as from Norfolk to Leeds was not easy, requiring frequent transfers and requests for information at numerous stations along the way. He had trouble understanding Yorkshire accents and was surprised by advice given by someone in Leeds to “knock someone up” – a perfect example of what is meant by a people “separated by a common language.” Ramsey was quite naturally “momentarily taken aback by this statement, as in American slang it means making someone pregnant. This was the first time I had heard this expression from a Britisher but quickly realized that the woman was telling me to go bang on the door.”

John Regan also remembered the British people with fondness:

The British treated us wonderfully. When we had time off, we'd jump into our jeeps, tear off into the countryside firing flares, feeling no pain, having a big time, probably go to the town of Luton, fairly close to our base. We'd go to the same pub and people would see us, really greet us, cheer, sing songs. We got to know everybody there. We enjoyed it so much that one time I got all my men together and we called the fellow that owned the place up in front. I presented him with stripes and made him an honorary sergeant in our squadron.

Red Komarek, another airman, remembered how:

We were told by the brass that a formal introduction would be necessary in order to meet English girls and that the English were more strait-laced than us broad-minded Yanks. We found both to be untrue. Whoever researched this information must have seen a lot of old British movies. It was obvious from our first visit to town (Huntingdon [sic], in Cambridge) that boy-meets-girl routines were not very different from those back home.

Tommy Hayes would take himself off to London:

My trips, the so-called forty-eight-hour pass, was a break from the war and the opportunity to relax, to again be an officer and gentleman. For me that meant a comfortable hotel, a nice dining room, sleeping on sheets that might have been silk and a bath in a tub, the length of which exceeded my height. It happened often enough that you remained a member of the human race, although always eager to get back and fight.



#### **CREW ON LEAVE IN A LOCAL ENGLISH VILLAGE**

Airmen enjoyed special privileges not accorded to ordinary soldiers; on the base they had a bed, hot food, showers, and clean clothes. They did not always have their own rooms, but they did have a bunk with a foot locker and a small space in which to put their personal effects. Still, men lived at best in barracks of wood or pre-fabricated metal, and although the base headquarters consisted of an actual building, often the officers and enlisted men slept in tents separated from the others. In short, bases were generally bleak, with perhaps woods on one side and open fields on the other. Those in the Norfolk countryside for instance provided no variation in elevation, and men eagerly awaited leave, which was generally granted between missions. With at least one night off – and sometimes several days between sorties – bomber crewmen often went into the local town or village in search of diversion in the pub or cinema.



The men need not travel far, however, for female company. Earl Pate recalled that:

About every six weeks the whole group would stand down and there would be a party/dance that started about dark and lasted until the next morning. The entire nursing staff from a general military hospital up the road would be invited. To supplement them, about four in the afternoon of the party, GI trucks would go to the several villages in the area and all the English girls would be invited. Crowds would gather at the base HQ as the trucks returned. If none of the ladies accepted your offer to be her escort for the evening, you simply waited a few minutes until the next truck arrived.

The eagerness of the men to escape from base as soon as an opportunity arose is scarcely surprising, for they were generally dismal, uncomfortable places. Bases were completely functional and unattractive, scattered across the English countryside, especially in Norfolk and Cambridgeshire, which were naturally useful areas from which to launch air attacks on Germany and occupied Europe. Apart from the runways, a base contained a control tower, one or more aircraft hangars and a series of buildings including mess halls, operations rooms, barracks, repair facilities and other structures, often of prefabricated construction. At Kimbolton, in East Anglia, for instance, the men lived in huts with potbelly stoves for warmth and outdoor toilets. George Hoyt recalled the appearance of his barracks, meant for enlisted men, thus:

Some squadrons had steel Nissan huts, but most of our barracks were long, low, drab-looking wooden buildings with crude doors that had antique hinges and hardware. Inside we were assigned beds which had RAF "biscuit" mattresses that came in three separate pieces. You needed a blanket under you as well as over you to keep the cold air from coming in between the "biscuits." For heat we had two pot-bellied stoves with a four-day ration of coal per week. Out the back door of our barracks stood the latrine in a separate building, and to the left was the "bomb shelter," a dugout with a mound of sod-covered dirt rising to about six feet.

There was no privacy in this form of accommodation, for it was simply one open space with a single room at the end for the barracks chief.

Some airbases provided separate accommodation for officers and enlisted men, but in many cases crews were so close-knit that such notions were discarded altogether. Archie Old, of the 96th Bomb Group remembered that: "We kept the crew integrated, the whole damn 10-man crew sleeps and lives in

the same quarters." Maintaining high morale also depended on proper supply. "If you feed them better, pay them better, clothe them better, house them better, transport them, this sort of stuff, the better this part is, the more relaxed they are... We lived as good or better over there than we did at home." In reality, accommodation could vary enormously, from country houses with proper beds and sheets, baths and indoor toilets, to tent cities where the men slept on cots under scores of blankets and trudged through the cold, rain and mud to the latrines and showers.

Air crews' accommodation could be as primitive as the makeshift huts shown here. (Air Force Historical Research Agency)



Wayne Gatlin, 18, from Duluth, Minnesota, could not believe his good fortune: "We live in a nice old castle – yup, there's a moat filled with water around it and all... We have our mess right in the castle and a lounge and all. I've a nice sack, a big bed and sheets." Earl Pate lived on simpler, yet perfectly comfortable terms: a permanent RAF installation without Quonset huts, coal stoves, mud or walks to the latrine. All the quarters were of brick, two stories, with tiled baths and paved roads, all in Georgian style with officers sharing two to a room. Wherever they happened to live the men often had pin-ups of Betty Grable, Rita Hayworth, or other women on the wall behind or beside their bunks. Movie stars such as Ginger Rogers sometimes sent autographed photographs of themselves in response to requests from the front.

Ben Smith recalled how, on his base:

We seldom wore uniforms. Our dress was flight overalls and leather A-2 jackets. We clomped around a lot in our flight boots, always when we went to the latrine or some short distance, because they were warm. We either went bareheaded or wore the leather fleece-lined gunner's caps. I can recall wearing my flight overalls for days at a time without taking them off. I would sleep in them too...

If we wanted to take a shower, we had to go a considerable distance to the showers. There was never any hot water. It was just too much trouble and a very punishing experience, so nobody bothered. Sponge baths had to do. After a time we couldn't smell ourselves; or we thought we smelled all right, because everybody else smelled that way.

To pass the time between missions the men were fond of listening to the radio, either the BBC or the Armed Forces Network (AFN), which played jazz and other contemporary music. Poker and other card games were popular. Some were fond of reading; others took afternoon tea at the local Red Cross club.

The reality of death around the corner meant that everything was shared. There was no sense in hoarding food when you might not survive to eat it, though men did tend to look after their whiskey. Flight crews generally shared items sent to them from home with local people, including chewing gum,

**BELOW LEFT**

An American bomber crewman sleeping below a pin-up in Darwin, Australia. Flyers rose early, sometimes well before dawn, had coffee in the mess hall, and then went to the operations room for a briefing. There they received a packet for combat flight in case they crash landed or bailed out, consisting of concentrated food, a water purifier, a compass and foreign money, depending on their destination. (Corbis)

**BELOW**

An American bomber pilot and navigator fish for trout on the banks of the River Test in Hampshire. Crews were often given leave from their bases during intervals between missions. (Imperial War Museum D14524)



chocolates, silk stockings, and cigarettes. Ben Smith recalled that “A few boorish fellows attempted to use these goodies to bargain for the favors of English girls, but only the most insensitive ones responded to such degrading behavior.”

To cope with the real prospect of death, some men turned to prayer and attended regular church services, like Philip Ardery:

Part of my reaction to my luck and general combat experience was a ... resurgence of religion. Fellows who hadn't attended services in years found themselves going to Sunday services. My religion didn't take me to these services with regularity, but I went occasionally, not only for myself but to let the men in my squadron know I didn't consider attendance a sign of weakness. I felt if they saw me there it might help some of them to go who wanted to but were kept from going out of embarrassment.

In my case, religion made me say short prayers before going to sleep at night and sometimes during a fleeting instant at the height of combat. I think this undoubtedly made me a better combat officer. It comforted me so that I could sleep before missions, even though I had been briefed for the next mission and knew the assignment of the morning might be my last. It helped me to say to myself with complete calm: “You can't live forever. You have had a great deal in your life span already, much more than many people ever have. You would not shirk the duty tomorrow if you could. Go into it calmly; don't try too hard to live. Don't ever give up hope; never let the fear of death strike panic in your mind and paralyze your reason. Death will find you sometime, if not tomorrow. Give yourself a chance.”

## EXPERIENCE OF BATTLE

Bombers played a very minor role in the Pacific Theater until 1944, when the capture of Saipan put American bombers within easy striking distance of Japan. Thereafter the strategic air offensive was rapidly stepped up. In Europe, on the other hand, the Eighth Air Force was established early in 1942, with its first bombers arriving in Britain on July 6, and the first heavy bomber raid against occupied Europe launched on August 17. The first raid on Germany proper



### **GROUND CREW INSPECTING A B-17 FLYING FORTRESS BEFORE TAKE-OFF**

Ground crew mechanics were roused at least three hours before take-off to provide them with enough time to ensure that aircraft were functioning properly and were ready for service in the day's mission. Each bomber had two mechanics assigned to it; both usually regarded the aircraft as something of their own, not unlike the attitude adopted by the airmen who flew it. The mechanics started work by “pulling through the props,” a difficult task of pulling on each propeller blade to turn the engine and remove any fuel that had collected in the cylinders during the night. The crew chief then entered the cockpit and followed the engine priming procedure to ensure that it was functioning normally. He started the particular engine (of four) which drove the electrical generators before running up each additional engine in turn. These he ran so as to achieve the maximum number of revolutions per minute, in so doing testing oil pressure, turbo-supercharger, and magneto performance. The ground crew also tested the propeller feathering mechanism and all electrical and hydraulic functions that could be monitored while the aircraft was still on the ground. Once everything was found to be in working order, the engines were shut down and the ground crew waited for the fuel trucks to arrive. Tanks were normally filled to capacity (i.e. 2,800 US gallons for a B-17 or B-24, which accounted for one-fourth the gross weight of the aircraft at take-off) regardless of the duration of the mission, thus enabling the bomber to make an extended flight in case of emergency.

D





Bomber crews of the US Army Ninth Air Force, based in the Mediterranean with responsibility for supporting the Allied campaign in North Africa, are given a "chalk talk" by their squadron commander before they take off on a mission. (Library of Congress)

was carried out in January 1943, with an attack on Wilhelmshaven. Airmen were alerted the day or evening before that a mission was to be flown the following morning. Once a target had been selected, the lead crew officers were awakened – these being the men specially trained to lead the group formation. They were up before the rest of the crews and four hours before take-off to attend pre-briefings in the operations room. Lead navigators and bombardiers were informed of the target and details of their route. Lead pilots received the same information and studied the course fixed for the mission to ensure that everyone understood their task and objective.

In the course of these briefings, the rest of the men taking part in the day's operations were roused from bed, many having slept fitfully in anticipation of the dangers that lay ahead. If enlisted men and officers shared different quarters from the rest of the crew, the men of each bomber crew would usually live within a short distance of one another so that the whole could be summoned at once by the duty sergeant. It was not uncommon for crews to be awakened at 2 or 3 o'clock in the morning, with half an hour allowed for washing, shaving, and dressing, and a stop at the latrine before proceeding to the mess hall. There the cooks and kitchen staff, awakened an hour before the crews, would have food already prepared – fruit juice, cereal, toast, and coffee with either pancakes or powdered (and, very occasionally, fresh) eggs. Two hundred to 400 men could be fed at once, so enabling an entire combat group to be readied for their mission.

From the mess hall the men were conveyed by covered truck, each carrying two or three bomber crews, to the briefing rooms, which could seat approximately 200 men. Officers and enlisted men were sometimes briefed



together, but in many cases they were informed of the details of their mission in separate rooms or buildings. A briefing room usually had a raised podium behind which, on the wall above, hung a large map of the area of operations: Western Europe, the Mediterranean, part of the western Pacific, or Japan and the nearby island groups.

A duty clerk would already have marked out the mission route, target, and fighter rendezvous points on the map with colored ribbons and pins. The briefing officer entered the room, walked down the aisle, mounted the dais, and drew back the curtain so all assembled were made aware of the objective simultaneously. If the raid required a deep penetration into enemy territory, the men's reaction of deep foreboding was usually palpable. Bud Klint, serving out of Molesworth, remembered the scene on August 17, 1943 when "every heart in the briefing room hit rock bottom when they pulled the cover off the mission map and revealed that black tape running direct from England to Schweinfurt," the site of a heavily defended ball bearing plant in the heart of Germany. In the event, 231 B-17 crews were to remain in the air over enemy territory for almost four hours. Dale Rice, in the same aircraft, recalled how the officer opened the curtain and announced, "'This is it. This is the big one,' and gave a few more details. By the time it was finished and we realized how far we were going, I think we were all in a state of shock." In the course of the day the bombers sent against Schweinfurt would face the largest assembly of enemy aircraft of the war: between 260 and 300 single-engine fighters and approximately 60 twin-engine night fighters.

Ed Leighty, a B-17 waist gunner, remembers the trepidation he felt on the morning he and the other members of the crew were sent on the first daylight attack against Berlin, not surprisingly the most heavily defended city in the Reich:

The intelligence officer was a big man; he looked as if he had lived a good life. He pulled back the curtain over the wall map, and there was the target marked out by a long wool string from England to Germany. "Men," he said pointing with his stick, "today you will bomb Berlin." I don't know about any men being there in the room, but I know there were a lot of frightened boys.



Last minute check-up. Just before taking off, a bomber crew reviews details of their mission, the target of which is a major German rail center in central Italy. (Library of Congress)

## Bomber crew being briefed for a mission

Bomber crewmen would be informed that a mission was to be carried out the next day, but they would not know their actual destination until the following morning. Alert time was invariably before dawn, sometimes as early as 2am. A jeep would normally arrive at the barracks to wake the men an hour before the briefing. This gave them sufficient time to dress, walk to breakfast and then attend the briefing, where a senior officer would call "Attention!" as he entered the room. The men would sit up straight as the officer strode down the aisle and mounted the platform to announce the target – perhaps St. Nazaire, Dusseldorf, Bremen, or some other city of significant industrial or military importance. During the briefing the men would intently follow the ribbon or tape that led from their base to the target. A graph of the squadron would indicate the position each crew would be flying, and the time to start engines, taxi and take-off, the point



and time of rendezvous with other formations, the target and the route back. If operating out of Britain, the men could see where the bomber stream would leave the English coast and would be briefed about the weather over the target by an officer familiar with meteorology. (Richards Collection)

The briefing officer had the unenviable job of explaining the purpose and details of the mission in a concise and articulate manner, carefully interjecting humor where possible to relieve some of the tension from which the men inevitably suffered. The length of the briefing usually depended on the importance and relative danger of the mission. Prominent or well-defended targets in the heart of Europe, for instance, particularly where the depth of penetration into enemy territory was great, naturally aroused the greatest concern and invariably took longest to explain. Sometimes the Group Commanding Officer (GCO) would address the crews if the mission was of particular importance. Words of encouragement and good wishes were usually conveyed toward the end of such a proceeding.

After the GCO or operations officer finished his briefing, an intelligence officer explained the details of the target and the enemy's defenses, both on the ground and in the air. Crews would be informed of the intensity of anti-aircraft fire they could expect to experience along the route to, and over, the target, as well as likely opposition to be offered by enemy fighters. Where available, photographs of the targets were projected on a screen. The staff weather officer then discussed predicted weather conditions that might affect the flight. Finally, the principal briefing officer opened the floor to questions before calling for all crewmen to synchronize their watches. The main briefing normally averaged about 40 minutes, after which the bombardiers and navigators moved to another room or rooms to make their own plans and preparations with the help of operations and intelligence staff. Specifically, navigators used maps to draw up their flight plans, notwithstanding the fact that a bomber group flew as a formation. Meanwhile, the bombardiers examined the available data concerning the target for the day, which they hoped would include photographs revealing prominent landmarks, natural or manmade, which could serve to guide the path of the aircraft and aid in bombing.

Gunners generally received their own briefing in a separate room, where details of the mission were discussed, with emphasis on the strength of fighter deployment and the locations of possible fighter interceptions. An operations officer also dealt with issues such as altitude, weather, the type of fighter escort available, and rendezvous points for the bombers. Afterwards the gunners collected their flight rations, electric flying suits and other clothing, harnesses and parachutes, oxygen masks, and inflatable life jackets. Burdened with this impedimenta, they dressed and mounted the waiting trucks, together with anyone else in their crew who happened to be ready at the same time. Radio operators received signals information in the form of the day's codes and radio call signs, as well as frequencies for communication during the flight.

Prior to take-off the gunners checked their weapons and ammunition, which had been removed after the previous mission for maintenance and cleaning, before being returned to the aircraft on the morning of the next mission. Flak suits, other body armor, and steel helmets had also already been loaded beforehand either onto the bomber itself or into a tent that was erected on the ground for the waiting crew and their equipment. Meanwhile, the pilot and crew chief walked around the aircraft inspecting the tires, fuel vents, propellers, and other moveable parts to ensure that all was well. The pilot and any other members of the crew not yet dressed in their flying suits could then do so while the rest of the crew relaxed as best they could, often with a cigarette in hand.

Before sunrise, a bomber crew receives final instructions prior to taking off in their B-17.  
(Library of Congress)



Ten minutes before the pilots started the engines, each airman checked the other's parachutes and life preservers to ensure they were in working order. They then climbed aboard the bomber to take up their positions or "stations." The easiest point of access for a B-17 was via the rear fuselage door which led forward through the bomb-bay. Those with the requisite fitness could haul themselves up through the nose hatch door – a difficult task in heavy flying clothes. If entering a B-24 through the rear, crewmen employed a ladder through the floor hatch, or through the open bomb-bay which sat low to the ground. Once inside, access forward to the flight deck was gained across the 10-in. wide catwalk across the bomb-bay and through the waist. The navigator and bombardier entered through the nose wheel hatch.

A green flare signaled the time for engines to be started, which came 25 minutes before scheduled take-off. This gave sufficient time for the pilots to repeat the same checks that had been conducted by the ground crew several hours before. At the same time, the flight engineer, who doubled as the top turret gunner, stood behind the pilot and co-pilot to monitor the instrument panel and gauges. When the time for taxiing arrived, the pilot gave a signal to the ground crew to remove the wheel chocks. Sergeant George Hoyt, a B-17 radio operator, recalled this phase of a mission thus:

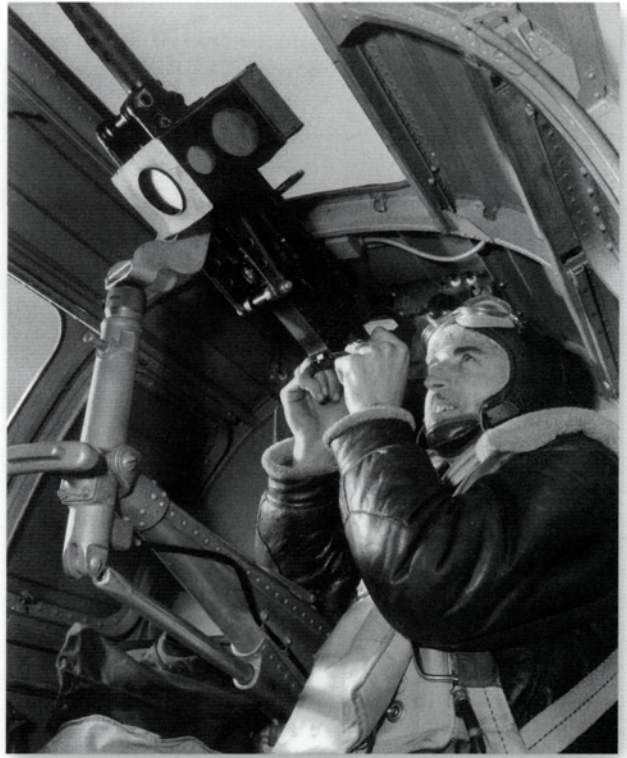
As we taxied out to become part of a long procession of B-17s waddling along the taxi strip, I stood up on an ammo box to let my head get above the radio room roof. I saw a long, ambling line of Forts proceeding like huge, drab prehistoric birds that made screeching cries as the brakes were constantly applied to keep them on the taxi strip. It was an otherworldly scene in the dim light just at sunrise.

The pilot had been briefed on the order of taxiing and he carefully watched to ensure that the order of take-off was maintained according to the flight plan, which in turn dictated the formation of the bomber group into its usual three positions – lead, high, and low. To ensure his correct position in the line a pilot usually kept an eye on the call-letter painted on the tail of the aircraft in front.

Mitchell B-26 bombers over North Africa. After take-off the aircraft assumed formation, as shown here. Maintaining one's correct position was critical, for there was no way of slowing down a wayward bomber short of reducing power, and a mid-air collision could be fatal to both aircraft concerned. Bomber pilots generally brought their aircraft to an elevation of about 25,000–30,000ft, though over northern Europe in winter radical sub-zero temperatures caused ice to form on the wings. (Library of Congress)



When a green light was flashed from the flying control van parked off the head of the runway, the pilot of the lead plane released his brakes and the long process of bringing the formation into the air began, each co-pilot advancing all throttles for maximum power. A B-17 or B-24, weighing 65,000lb, generally lifted off after traveling approximately 3,000ft, by which time it would be moving at about 110–120mph, with aircraft ascending at 30- to 45-second intervals. During the ascent, turret gunners – those who were positioned in the bomber’s undercarriage – sat in the radio room in case of a crash which would, of course, place them in greater jeopardy than anyone else aboard. To avoid spending more time than absolutely necessary in his cramped station, the ball gunner would not establish himself in his post until after the aircraft had reached an elevation of several thousand feet. Eventually, all the bombers – apart from those obliged to abort owing to a malfunction during take-off – would reach the agreed assembly point, establish their formation, and proceed together to the target.



Once an aircraft reached a height of 10,000ft, the navigator or co-pilot spoke over the interphone system to the remainder of the crew, advising them to switch on their oxygen supply. Each man then adjusted his mask and checked his oxygen-flow regulator. To check that every member of the crew was receiving oxygen, the bombardier, or sometimes the pilot, periodically spoke to each man to ensure that all was well. This procedure could save a man’s life, for an insufficient supply of oxygen would lead to unconsciousness and death after about 20 minutes. Anoxia occurred only gradually, with a man starved of oxygen unaware of the fact as he grew successively more drowsy.

By the time the bomber group entered hostile airspace its aircraft had normally reached an altitude of over 20,000ft, roughly between 24,000 and 27,000ft for B-17s and 20,000 and 24,000ft for B-24s, the latter bombers being more difficult to control at the higher altitudes. By this time, any aircraft that had experienced technical difficulties would have aborted the mission and returned to base. In addition, the bombardier instructed the gunners to test-fire their weapons – into the sea if over the Channel for those aircraft operating out of England, or over the Mediterranean or Pacific, if operating in those theaters. The alternative, of course, was simply to fire into the open sky, taking care not to hit other aircraft in the formation.

Necessary though their heavy clothing was, it created problems for men wishing to relieve themselves during such stages of the mission. Sometimes they could make use of a little rubber funnel attached to a hose that led outside the aircraft. Notwithstanding this innovation, with a fleece-lined suit, parachute harness and flak suit, long underwear, wool trousers, and a heated suit, answering the call of nature remained extremely difficult. Initially, no system was available at all for ball gunners, many of whom tried to use tin cans. Disposing of the can after use naturally posed a problem, for to do so the

Gunners sometimes tested their machine guns in the course of their mission. If an aircraft happened to be flying near the surface of the water gunners soon discovered that it was dangerous to fire their weapons, as the bullets could ricochet at unpredictable angles off the waves, and even bounce back at them. (Library of Congress)



#### ABOVE

Unleashing death and destruction on a vast scale: B-29s dropping hundreds of incendiary bombs on Yokohama, Japan, during a raid in May 1945. (Corbis)

#### ABOVE RIGHT

Bombs make their descent toward a German-controlled bridge in Italy far below. Targets such as this were very difficult to strike, and while advocates of the Norden bombsight claimed that the device was highly accurate, once it was tested under combat conditions the results achieved were not always satisfactory. (Library of Congress)

gunner had to leave his position; anything which spilled instantly turned to ice – which then defrosted again at a lower altitude or could remain stuck to the plexiglass until it melted after the bomber returned to base. The same risks applied if someone used the relief tube in the bomb bay area, in which case the exterior of the ball turret might become covered with yellow ice and impair the visibility of the gunner inside. Eventually, bombers were manufactured with relief tubes so positioned as to prevent such problems.

Prior to reaching an altitude at which it was necessary for men to don their oxygen masks, the bombardier went to the bomb-bay and removed the safety pins from the ordnance. This task was performed at a relatively low altitude, for at a greater elevation the pins could freeze, thus preventing anyone from arming the bombs. At about the same time the crew plugged in and switched on their heated flying suits, if the mission required them. The desired temperature was controlled by a rheostat.

Wireless telegraphy could transmit Morse signals up to 600 miles at combat altitude and radio telephones could be used up to 150 miles for bomber-to-bomber communication. Other methods were used to maintain contact with base when flying over friendly territory. Except in rare circumstances, radio silence was strictly maintained over enemy territory to prevent detection. Meanwhile, navigators used a variety of methods to reach the target – dead reckoning being the most popular – all worked out before the mission began. In order to deceive the enemy as to the objective, bombers rarely followed a straight course to the target, adopting instead a series of changes of course.

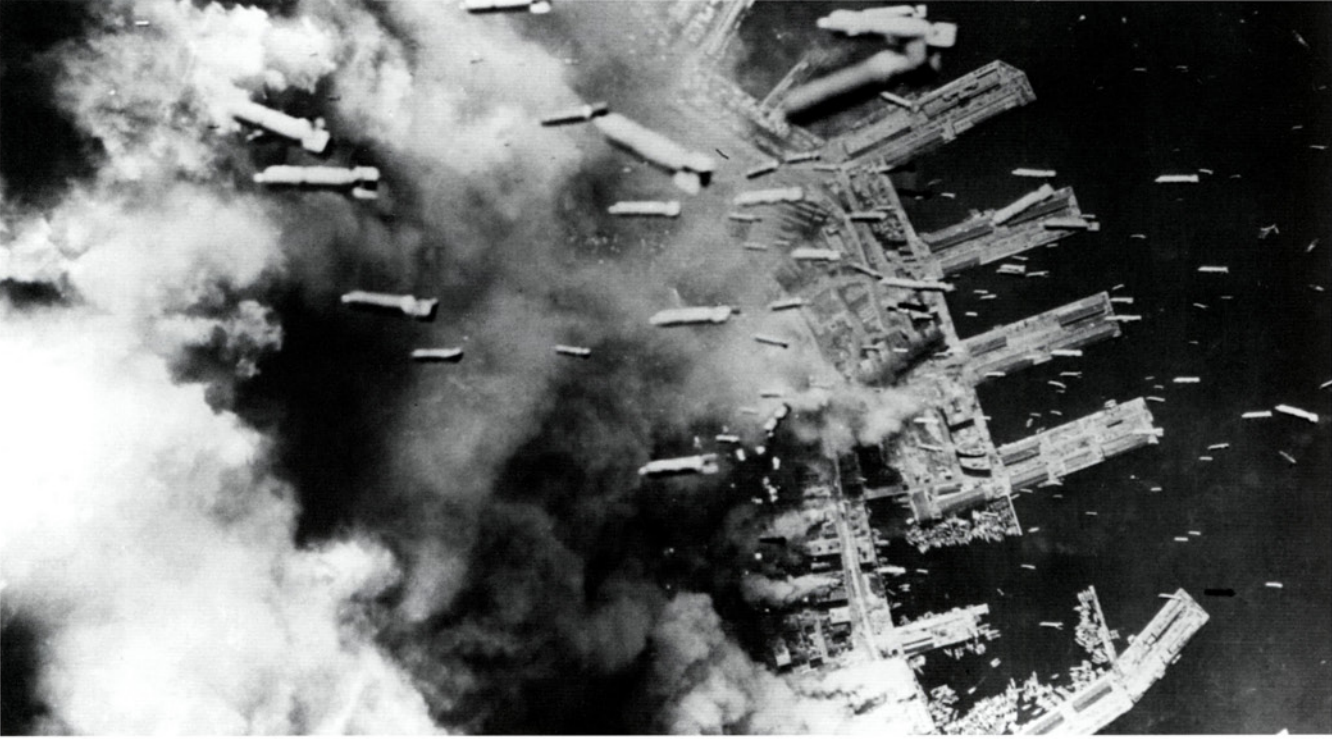
As a bomber entered enemy territory tension aboard the aircraft naturally rose. “The element of fear began to grow within me as we continued onward,” Bob Gillman recalled, “and I could see the whole crew beginning

## E

### PILOT AND CO-PILOT IN THE COCKPIT OF A B-17 DURING A MISSION

Prior to take-off the pilot and co-pilot checked all the dials and controls. Then, as one airman described it, “you hear the engines starting here and there, some close, a roar, and then rrrrrmmmm, ready on one, ready on two, contact, ready on three, ready on four. And the four engines of the B-17 slowly throbbing, vibrations increasing, a spitting and grumbling, a lust for the morning air, a waking from the dead ... four engines beating, four propellers whirling, engines revving, echoing each other across the field. The olive drab B-17s would slowly move, brakes screeching, the ground crew watching, one of them helping to guide the plane around the circle onto the tarmac path to the perimeter track. One after another, lumbering out onto the track and then all of them, single file on each side of the field, two files moving, lumbering slowly toward the takeoff point at the end of the runway... The nose of the B-17 in the air, the body sloping down to the rear tail wheel, already in an attitude of urgency, of wanting to rise into the gray morning sky.”





A view from the air of a raid on the docks of Kobe, a major Japanese port city attacked on this occasion in March 1945 by 500 B-29s carrying high-explosive bombs. When attacking residential areas, bombers dropped incendiary bombs, for, unlike the brick and stone of German houses, the traditional paper and wood of Japanese buildings was considerably more vulnerable to fire. (Corbis)

to tense up... I quickly reasoned, as I would do many times again, that nothing could be changed. There were no choices here but to go on.” Calm as the men may have seemed, in reality many were extremely anxious. Ben Smith admitted later:

I used to lie awake in bed dreading the time when I would have to lay it on the line or forever be lost in the infamy of disgrace (I learned later that I was not the only one). This was so real to me. Outwardly, I was lighthearted and jovial, well liked by my friends. They thought I was a pretty cool customer, but inside I was sick, sick, sick! My bravado was sort of a rallying point, though phony as a three-dollar bill. I wore a “hot pilot’s” cap, smoked big black cigars, and drank boilermakers. The only one who wasn’t fooled was me.

Such tension was natural, for at some point during the mission a bomber group was certain to encounter opposition from enemy fighters. In the Pacific, bombers were confronted by the Mitsubishi Zero, a highly maneuverable aircraft that flew faster, higher, and farther than anything like its American equivalent. Still, Japan’s severe fighter losses in the early years of the war meant that by the time American bombers could be deployed in large numbers against the home islands in 1944, but above all in 1945, the Japanese no longer possessed Zeros in sufficient numbers to prevent bombers from executing massive raids with virtual impunity. Circumstances in the ETO were, however, quite different, for there a bomber formation had to cope with an impressive array of enemy fighters – the Messerschmitt 109 and 110 (Me 109 and Me 110) and the Focke Wulf 190 (Fw 190), among others, to which bombers, though themselves heavily-armed, were highly vulnerable. Fighters were armed with machine guns as well as with cannon and could cause havoc while flying at high speed through bomber formations. While bombers naturally made use of their machine guns to ward off their much more maneuverable opponents, the best form of defense was to have a fighter escort. Initially, as no fighter could escort bombers the entire length of their mission, fighter cover was only



provided for as long as the escort could remain in the air with sufficient fuel to enable them to fight and to return safely to base. Eventually the Americans designed fighters that could escort bombers well above 20,000ft and for missions sent deep into German territory. No single innovation contributed more to the preservation of bomber crews than the development of long-range fighter aircraft.

Frank Morrison, a B-17 navigator, explained the effectiveness of what bomber crews called “little friends” in his description of the harrowing moments when his stricken aircraft nearly failed to make it home:

We took a series of flak hits over the target at 26,000 feet, and with two engines out and a broken oxygen line, we could not take evasive action to escape the extremely heavy ground fire. We began to gradually lose altitude, and we called for a fighter escort. Almost at once those beautiful P-51s appeared and stayed right on our wing tips as we limped for the coast. The Me 109s just loved to get a wounded B-17 alone, but they surely didn't want to tangle with a couple of P-51s. As we reached the Channel, we were down to near 1,000 feet, and the pilot gave the order to jettison all expendable cargo. That seemed to be just enough to let us land at the first fighter base on the English shore.

In keeping German fighters at bay, Allied fighters tried to play on the disadvantages of the enemy's limited range by using RAF Spitfires and Hurricanes to decoy German aircraft into expending their fuel, obliging them to leave the area and return to base. At no altitude were American bombers immune from German fighters, which could fly as high as any B-17 or B-24. Before the advent of the long-range fighter, the problem remained: how to load enough fuel on a lightweight, highly maneuverable fighter without compromising its performance and speed. Until this could be solved, bombers needed rear-facing firepower to confront enemies attacking from behind, as well as armor plating to protect personnel and the essential instruments that kept a bomber in the air.

In opposing attacking fighters, gunners generally called out the approaches of such aircraft over the interphone, using the positions of the clock to identify the enemy's position, with “high,” “low,” or “level” to indicate his relative

**BELOW LEFT**

Aerial view of a ball-bearing plant under attack by bombers near Paris, 1943. In their letters and memoirs, bomber crews gave scant thought to the perspective of those on whom their bombs fell – in this case French factory workers as well as German technicians and administrators. Most, however, viewed strategic bombing as a necessary evil. (NARA)

**BELOW**

View through the nose of a B-29 Superfortress during a bomb run over Japanese-occupied Manchuria, August 1944. Once over enemy territory radio silence was observed, which meant that the radio operator had nothing to do but relieve the position of any man who was hit. Men within the aircraft could of course communicate with one another by interphone. (Library of Congress)





#### **ABOVE**

A rear-belly turret gunner. In combat the floor around him would be covered in hundreds of spent shell casings. (Library of Congress)

#### **ABOVE RIGHT**

A burning B-24 Liberator tumbles toward earth after being hit by enemy fire. The best defense against fighters was not the array of machine guns carried by bombers, but what crews affectionately called “little friends” – fighter aircraft assigned to escort a bomber formation, either outbound or returning to base. Nothing gave bomber crews more confidence in their own survival than the presence of a fighter escort, particularly of P-51s. (Corbis)



altitude. Thus, “Bandit at one o’clock!” might be blurted out over the interphone, or “Six fighters at three o’clock!” By this method, other gunners, unable to see the enemy from their particular stations, could anticipate his approach from a particular direction and thus be prepared to fire when the fighter appeared. Bombers depended almost entirely on the massed defensive fire of their machine guns to ward off the enemy, for the only evasive maneuver was to move up and down; any other radical movement might lead to collision with other bombers. In any event, many airmen believed maintaining a steady course was the best option, for it provided the gunners with the best chance of hitting their targets.

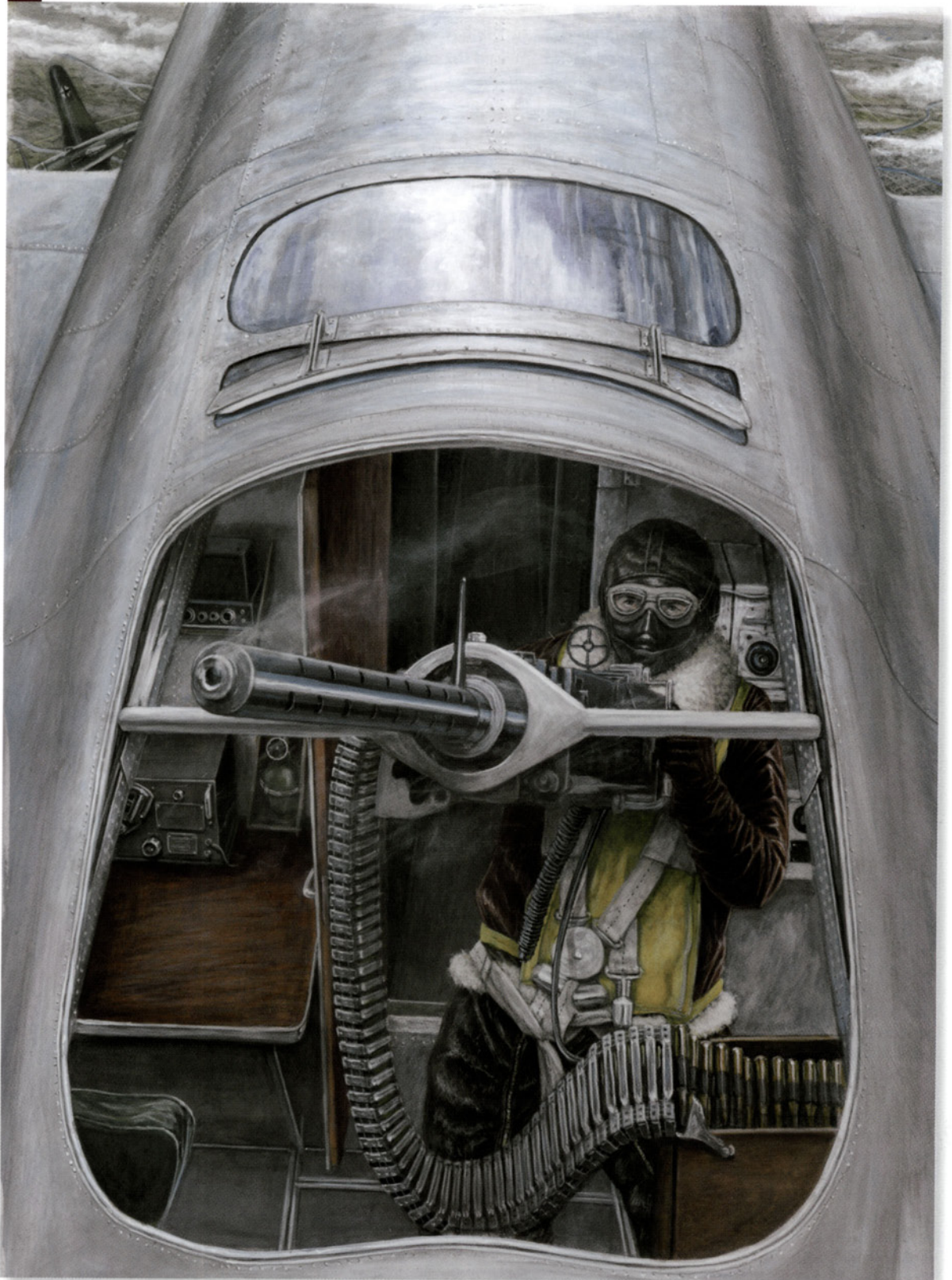
Sergeant Richard Grimm, a 19-year-old radioman from Pittsburgh, described the attack of an Fw 190:

He was coming in at 5 o’clock high, and he saw that there was no firing from the tail. I know because he dropped his flaps and took a long slow pursuit curve at us. He was taking his time and was going to come right in and get us. I gave him two short bursts at practically zero deflection and hit him with both of them. I could see things fly off, but he kept coming. I kept the trigger down, and he blew all to hell, like dust in the air. I wondered, did I hit his fuel and 20mm shells?

## **F**

### **B-17 DORSAL GUNNER IN COMBAT**

As bombers were open in the waist positions of the fuselage in order for the gunners to fire their machine guns, the temperatures at 30,000–32,000ft ranged between 40 and 70 degrees below zero. The men consequently dressed very heavily, with several pairs of long underwear, uniform shirt and trousers, an electric suit over these, and the whole topped by a lined flying suit. On his feet he usually wore wool stockings, sometimes supplemented with silk stockings, electrically heated shoes, and fur-lined flying boots. On his hands he might wear as many as three pairs of gloves – silk, followed by wool, followed by electric gloves, and then fur-lined flying mitts on top of the rest. As such, it was almost impossible for him to move his fingers, although a gunner always left one finger free to work the trigger. Gunners rarely unplugged their electric suits, which were connected to the battery system of the aircraft, for without the heat they provided a man could die of exposure in a matter of minutes. Indeed, frost regularly formed on a man’s eyebrows and cases of severe frostbite due to inadequate layers of clothing were not uncommon. It was impossible to fly with a cold, for one’s oxygen mask would freeze up with ice and cut off the supply of oxygen. Gunners, especially those directly exposed to enemy fire while stationed in the waist of the aircraft, often wore armor plating to protect their chest, stomach, groin, shoulders, and legs.



John Doherty described a similar scene on the same mission:

They came right through the middle of the formation, trying to peel us out, one or two of them, and the others would be circling to pick out someone who didn't get right back into formation real quick; I was in the waist and they came in so close I could actually see the faces of the German pilots, right outside the wingtip, going through. You could see them with their goggles on. They had their tops back and their scarves were flying, right in their face. It was lots of shooting, lots of shooting.

Lieutenant Carl Fyler remembered one particular German fighter thus:

On my right I could see a row of German fighters lining up. Then they flew out ahead of us, and turned around to attack us head on... One of them came right at me. He rolled right side up and came over my right wing, still firing. S/Sgt. [staff sergeant] Bill Addison, my top turret gunner, swung his two guns to the right and fired practically "point blank." He got him! I could see the pilot's face as he went past us and went down.

On the other hand, bombers were large and ponderous, and often fell victim to fighter attack. A 19-year-old radioman of the B-17 *Iza Vailable* recalled how:

Fortresses were falling everywhere. As they dropped out of the protective formations, enemy fighters roared in for the kills. Parachutes began peppering the sky as American airmen jumped from burning B-17s. At least they stood a chance of surviving in German POW camps. What sickened me to the point of tears were the Fortresses that were exploding in midair with no hope of their crews' escape. (O'Neill: 1999)

On approaching the target area, a bomber group could expect to receive anti-aircraft fire directed from the ground and known to American crews as "flak." Sometimes the Germans calculated the elevation of an incoming raid

B-17s harassed by anti-aircraft fire. Notwithstanding this danger, the German Me 109 and FW 190 posed the single greatest threat to the relatively ponderous, albeit heavily armed, bomber. Machine gun fire constituted the only defense for bombers. If enough fighter aircraft were encountered in the course of a mission, a bomber could exhaust its complement of over 10,000 rounds of .50-cal. ammunition, with the interior becoming so covered in shell casings as to impair movement for the crew. (Corbis)



accurately enough to send up such an intense barrage in the path of the bombers that the exploding shells gave the impression of storm clouds. Bob Gillman remembered how 20 miles from his target:

... we could clearly see some weather ahead over the target [Ploesti, in Romania], as we could see dark clouds forming. This was surely strange, since the weather had been so clear... As we got closer, we could begin to see that something was very strange about the cloud formations. They seemed to be constantly moving!... Then it hit me! *My God, it wasn't clouds at all – but barrage flak!*

The approaching formation was easy prey for the Germans, who had used radar to determine the bombers' altitude. Flak was particularly dreaded because unlike fire issued by enemy aircraft, it was impossible to tell if a hit was about to occur, nor could one reply to antiaircraft fire by firing back.

It was critical that the pilot, above all, remained calm, for if he panicked he was likely to cause the death of the entire crew. Philip Ardery, a B-24 squadron commander, recalled how:

... when the flak started breaking right against my airplane, or when I saw the enemy fighters practically flying through our waist windows, I could feel my pulse rise. Particularly, if I saw one of our ships filled with friends of mine sprout flames for a few seconds and then blow up – which wasn't uncommon – the icy fingers I hated would reach right around my heart. I would shut my eyes for a brief instant, pray for a little nerve, and then say to myself, "R-e-l-a-x, you jerk!" My temples would pound, but I would keep my hands flexible and easy of motion and feel.

Once it was clear that a bomber was fatally hit, the crew had no option but to bail out (attempts to crash land rarely succeeded), the pilot being the last to go. Roy Kennett, a B-24 radio operator, recalled his formation being attacked by a large formation of Fw 190s and the necessity of ditching:

All of a sudden, all hell broke loose. When we got hit, a fire broke out in the airplane, and it spread into the bomb bay... The fire was just tremendous ... and there was no chance of getting out... Gasoline was pouring down into the bomb bay and was feeding the fire, so I looked upwards toward the flight deck ... the co-pilot was standing there motioning for me to get out ... [I] grabbed my parachute and snapped it on... Then I turned around on the catwalk and rolled out of the bomb bay.

Even if a flyer managed to escape from a crippled bomber, it was hardly the end of the story. Dean Whitaker, a B-17 navigator, had to bail out over enemy territory, with the expected consequences:

As soon as I hit the slipstream going by at 160 knots, the flak suit ripped off. I was free now to put the rest of my chute on but the only problem was that due to the lack of oxygen and the force of the wind I could not get the other side of the chute fastened... As soon as I entered a layer of low stratus clouds, I knew it was now or never time to pull the rip cord. Being half-dazed by the lack of oxygen, it seemed as if I was floating through the air without a worry in the world. This abruptly was broken by the sound of rifle fire and bullets zinging by me. Looking down, I could see a couple of Germans shooting at me... Before I hit the

ground, a soldier came running... He stopped the civilians from shooting me. Hitting the ground hard dazed me for a few minutes, but when I looked up the German soldier was standing over me with his rifle pointing at me...

A stricken bomber will eventually begin its descent in a spin, and the centrifugal force sometimes trapped the crew inside unless the slipstream forced them out, as occurred to Roy Kennett:

Now, the sound of being pulled out into the slipstream – you'd almost have to hear it, and a person telling you probably can't describe it either. The best way I can think of to describe what happens when you first jump out of an airplane is this: If you're traveling down the road in an automobile and you throw a piece of paper out the window, you notice how it flutters and turns and does all kinds of whirligigs, and then all of a sudden it just calms down and very gently floats down to the ground. Well, the initial reaction to a jump is very much the same. When I rolled off that catwalk and into the slipstream, it just turned me every which way but loose for a few minutes. Then it sort of comes down to your normal falling speed – around 120 miles per hour. But you have no sensation of falling, because you have no reference point. If you fall off a ladder, you can see the house go by. When you're five miles up in the air, you're not passing anything (although there were pieces of airplanes falling down all around you). It isn't noisy; you don't hear anything but the wind whistling next to your ears. I know when I first came back, I told my father I had glided for over four miles before I pulled the ripcord.

Kennett was fortunate, for sometimes bailing out was impossible, as when the aircraft went into a tailspin. Gunner Bill Fleming recalled how, when flying over Hamburg at 28,000ft, his plane was hit by unidentified enemy fire:

We went into a diving spin and the pilot rang the bail-out alarm but nobody could jump out because the centrifugal force was holding us. The experience is impossible to describe. Once I couldn't move, I knew there was no way we could come out of that dive and I was going to die. The fear I felt was unbelievable. As we came down, somehow, even the pilot couldn't say later how he did it, he pulled that plane out of the dive. We started at 28,000 feet and leveled off only at 6,000.

Downed fliers particularly dreaded landing in the Channel in the winter, when the water was especially cold. Still, they had inflatable boats with "Gibson Girl" emergency radios, which were operated by a crank. Moreover, the Royal Navy operated high-speed motor launches out of Harwich and Great Yarmouth to rescue downed airmen, both RAF and USAAF personnel. One such launch rescued the crew of *The Old Squaw*, which ditched after losing fuel when hit by enemy fighters during a raid on Stuttgart in September 1943. After debating whether or not to try to land in Switzerland, where international law would have required them to be interned for the remainder of the war, the crew took a vote and decided to make for the English coast, only to run out of fuel just short of land. Elmer Brown later described the incident:

About halfway across France I recommended jettisoning excess equipment to reduce the weight and aid us on gas consumption. Soon afterwards we started throwing things out. We kept just enough ammunition to ward off fighter attacks, which, thank goodness, we didn't get... We were still throwing clothing,



**ABOVE LEFT**

A B-17 fatally damaged by flak which has blown off one of its wings. Any surviving crew would have only moments to bail out before the aircraft descended into a tailspin in which centrifugal force would render escape all but impossible. (NARA)

**ABOVE**

Men wait on and beside their British-made crash tender and ambulance, in case of emergency, as a B-17 Flying Fortress lands at an American airfield in Britain after a mission over the Ruhr. The engines of the trucks are kept running and the men are alert at their posts, ready to move into action. Visible on the back of the crash tender is an asbestos suit, which enables the wearer to work in fire for several minutes, giving him enough time to rescue any trapped crew members, should an aircraft catch fire on landing. (Imperial War Museum D15116)

extra ammunition, and spare radio equipment overboard when No.3 engine exhausted its supply of fuel. For our own protection, we had to stay with the rest of the formation as long as we could. That became no longer possible when we lost our second engine, still over France. Luckily, there were no enemy fighters in the vicinity, but even so, an awfully empty feeling crept over me as we began to drop behind and below the other ships.

Once a fighter escort appeared, the bomber no longer had any need for its ammunition, and jettisoned that, too. By the time it left the French coast, *The Old Squaw* was down to 14,000ft, with the crew discarding its machine guns and about 7,500 rounds of ammunition. Just before the fuel supply was exhausted the crew spotted a surface vessel, nationality unknown. "The last engine quit," Brown continued, "and we put the ship into a glide, trying to get as near to the boat as we could... Just before hitting, the pilot feathered the No.4 engine, and we all sat tight, and I for one said a little prayer... Out of my window I saw the choppy and rough sea coming up towards us, closer and closer, and I prayed fervently as I continued to beat out those SOS signals."

The pilot hit the ditching alarm buzzer, the tail hit the top of a wave at 80mph, while the ball turret hit another. The aircraft then settled into the water, in the course of which the plexiglass nose was shattered, the leading edge of the wing was torn off, and the propellers were bent. Within a few seconds, the men were already in water up to their knees, though miraculously they were all unhurt. Within 45 seconds the crew were out of the bomber and onto the wings and fuselage, by which time the water was waist deep. Following procedure, the crew inflated their "Mae Wests" and deployed the rubber dinghy amid 4–5ft swells. Another member of the crew described the aircraft's final moments: "The *Old Squaw* stayed afloat about five minutes, then reluctantly gave up the ghost. Our last sight of her was with the tail straight up in the air and then, suddenly, she was gone."

Most of the time a stricken bomber simply plummeted to earth, taking its ten-man crew with it. Lieutenant Carl Fyler, the pilot of a B-17 called *Thumper Again*, witnessed the destruction of another bomber in his formation:

Lt. Crockett's ship directly in front of us took a direct hit in the cockpit. Chunks of flesh came back at us, across our windshield. My co-pilot became ill.



A ground crew extinguishes the fire aboard a Flying Fortress which has crash landed alone on its return from a massive raid on a German aircraft factory. Even if bombers returned to Britain undamaged, poor weather conditions obliged ground crews to guide aircraft to the field by runway flare pots. (Imperial War Museum EA12171)

Crockett's ship seemed to come to a complete stop. Since I was directly behind him, with wingmen on both sides, I could not turn away to avoid a collision. I cut the throttles, and "fish-tailed" the bird, praying I'd miss the stricken ship. Somehow, it seemed to float over my right wing and was gone.

Once over the target area, the bomber formation released its bombs in the manner described earlier. Their task completed, the aircraft turned around and proceeded to a pre-determined rallying point, selected so as to be out of range of antiaircraft batteries. There the whole formation could re-form and return to base with its aircraft – their numbers thinned by enemy action – flying in their original positions or filling the gaps left behind by those shot down. Without its bomb load and having expended much of its fuel, a bomber now increased speed to up to 180mph. After leaving the enemy coast, radio communication could be resumed, and within 100 miles of the English coast any damaged aircraft which urgently needed to land could communicate its state of distress and seek to touch down at the nearest airfield.

Once bombers descended to beneath 10,000ft the crew ceased to rely on their oxygen masks and could smoke if they wished. By the time a bomber reached the coast of England it was likely to have descended to only a few thousand feet. The home station was contacted and the estimated time of arrival reported. The base operations officer then proceeded to the tower to oversee the landing, while other officers alerted ground crews, ambulances, and fire tenders of the bombers' imminent arrival. Any aircraft bearing casualties on board or itself stricken with severe damage was given priority to land. Others landed according to their position in the group, with 10- to 20- second intervals separating touchdown for each bomber, which then cleared the runway for the aircraft immediately behind.

Those bombers with wounded turned off the runway as soon as they could, stopping near a hardstand where an ambulance would be waiting. Other aircraft taxied to their usual ground positions and the crews disembarked with their personal equipment. Flying suits were usually removed and carried away in trucks, together with the guns which would be taken away, inspected, and



cleaned. Flight engineers and pilots reported any damage and mechanical problems, and both the air and ground crews inspected the aircraft for damage before the former were taken back by truck for debriefing. A typical damage report, issued by an officer of the B-17 *Lady Luck*, ran thus: “20mm [shell] exploded in bomb bay damaging several bombs. Vacuum system and four oxygen bottles smashed by another 20mm shell. Flak holes in right wing.” (Ethell: 2003) Some bombers returned to base literally perforated from antiaircraft fire. In August 1943, on returning from a raid on Watten, in northern France, Sgt Eddie Deerfield counted more than 200 flak holes in *Iza Vailable*.

With the bombers safely on the ground and their engines off, the vast array of equipment which they carried was handed in – escape kits, life preservers, parachutes, flying suits, oxygen masks, and so on – and the men made short shrift of the food, usually donuts or sandwiches, provided by Red Cross workers. After taking refreshments the crews were interrogated by an officer who questioned them on the targets, flak, and fighter opposition, the number of fighters claimed to have been shot down, the number of friendly aircraft downed, the state of the weather, and other information. Navigators and bombardiers issued separate reports, with the former submitting their logs and the latter completing forms relevant to their role in the mission. Debriefing could take over an hour before crews were allowed to return to their quarters either for a shower and much-deserved sleep or to the messhall for a more substantial meal. Most flyers preferred to go straight to bed, well aware that, if the need was urgent, they could be called upon to fly another mission as early as the following day.

While the air crews slept, the work of the men on the ground continued. The bombers had to be repaired where necessary, with holes caused by shrapnel, bullets, and flak mended by repair teams who riveted patches to the aircraft skin. Meanwhile, an assessment was quickly made as to which bombers were serviceable for the next mission and which required substantial repair. Some aircraft enjoyed remarkable service records, proving the resiliency of bomber aircraft. The 427th Squadron’s *Sweet Rose O’Grady* was a veteran of 143



The crew of the B-17 *Knock-out Dropper* returning from a mission over occupied Europe. The pilot (center) is wearing a flak jacket, as are two other airmen. Once on the ground, a crew was picked up by a truck or jeep and brought to an interrogation shack or building. The injured were brought to the base hospital or sick bay. After debriefing, the crew – sometimes mentally and usually physically exhausted – was served dinner and went to bed. Raids might last eight hours or more, and most men simply wanted to lie down and sleep. (Corbis)



missions, having been flown by numerous different crews. Some aircraft survived only a few missions before being shot down, or were so heavily damaged that their parts were cannibalized to keep other aircraft operational. Finally, fuel tanks and oxygen were replenished for those aircraft deemed fit for immediate service; the machine guns were prepared for the next mission; the photographs from the strike cameras developed and the data analyzed. Detailed reports were drawn up on the effectiveness of the mission; friendly losses and claims of enemy fighter kills were assessed; Missing in Action forms were completed; and the location and strength of antiaircraft fire logged for the benefit of future missions sent against the same target. All the foregoing data would remain of interest to intelligence officers and others long after the crews themselves consigned the mission to the past and prepared for their next.

## AFTERMATH

Losses among bomber crews were the heaviest of those in any arm of service during World War II. A flyer returning from a mission knew almost immediately – unless he nursed the usually vain hope that more aircraft would return late – who had been lost and who had made it safely back. As Ben Smith put it, “The



### **INJURED CREW RECOVERED FROM A DAMAGED B-17**

Airmen suffered the highest mortality rate in the entire armed forces of the United States. Looking at the ETO, the Eighth Air Force lost 26,000 air crewmen out of the 210,000 who served (140,000 men served in other capacities), giving a rate of mortality of 12.38 percent compared to 3.29 percent for the Marines, 2.25 percent for the Army, and .41 percent for the Navy. On top of this, hundreds of thousands were injured and 21,000 ended up as prisoners of war. Of those who flew in the original 25-mission bomber tour of 1942–43, only 35 percent survived, though as the war progressed and crews received better fighter protection and German fighters grew fewer in number, the casualty rate for the US Army Air Force declined. During the 25–30 mission requirements of 1944, 66 percent of bomber crews survived the war, and by 1945, when men were required to fly 35 missions, this figure had improved to 81 percent. Those air crewmen who died of their wounds in England or who were killed in flight aboard aircraft which managed to return to base were buried in the American Cemetery outside Cambridge. (Astor: 1997)



empty beds in the huts were silent witnesses to that fact.” Some men managed to survive all 25 required missions, after which they could re-enlist or receive an honorable discharge and return home. Others were unfortunate enough to be killed on the first one, like radioman Charley Gunn, for whom a cablegram was waiting back at his base informing him of the birth of his son.

Some men eventually became inured to news of the death of their comrades, but others were deeply affected. Philip Ardery noted:

When a group lost heavily on one or two raids, there was a natural strain on the morale of the remaining combat crews. It was hard for the boys coming back to go to quarters that were practically vacant – quarters that had been full a few hours before. It wore on their nerves to go to the club and find the place more filled with the ghosts of those who had gone than the presence of the few who remained.

Sometimes the survivors coped by making light of circumstances, as tail gunner John Gabay recalled:

Some nights when we were drinking beer, one of the comedians would drink a toast to the guys who were shot down... It would start out very solemn, and then turn into a roast – especially if the guys didn’t leave any cigarettes or candy in their foot lockers. What really cracked me up was when the clown giving the toast couldn’t remember the names of the guys being toasted. Not very good copy for a movie or the folks back home, but that’s the way it was – no dramatics, no sadness, no hearts and flowers.

Often, though, men were profoundly affected. Johnny Miller, a B-17 waist gunner, described the aftermath of a raid on Berlin in March 1944:

Most of our planes didn’t make it back. It was so quiet. The men spoke in low, almost inaudible tones, if they spoke at all. There were many that wandered off by themselves wanting to be alone in their grief. Others, their eyes moist, stood silently. And many drank more than usual that evening...

I was living in the spare gunner’s hut at the time, and for fifteen days following that raid on Berlin, I was alone in that hut! Everyone I knew was either killed or taken prisoner. Less than two months after joining my group, I became the oldest gunner in my outfit. I was seventeen years old.)

Those who survived 25 missions usually seized the opportunity to return home rather than take their chances against flak and fighters, though they sometimes felt a sense of guilt that friends with fewer missions behind them would be obliged to carry on without them. Bob Gillman remembered the excitement he felt when the moment finally arrived:

I am in a state of euphoria, since this is my last mission, and each of the crew have been joking about how nice it would be if I would volunteer to fly additional missions until they are finished too. Fat chance! I feel as though an enormous weight has just been lifted from my back, and it’s really hard to believe that I will not be flying any more combat missions. What a thrill to bring the formation over the field for the last time, peeling off in turn and landing.

Parents and wives were informed by telegram of the loss of their sons and husbands. Corrine Wall, widow of B-24 co-pilot Jack Wall, described the impact:

Words can never express the feelings families have when their young men are sent out to kill or be killed – no matter how noble the cause may seem to be – for there is no winner as the cream of that generation dies. Only by living through their period can anyone really feel the pains of war.

A son missing for a year, constant hope that he'll be found. Asking for help from the Red Cross to find information and then having their reply blocked just prior to reaching you. Needing your other son to hold as you grieve for the lost one, but not being able to do so. Knowing your son would never have been flying and would possibly still be alive had you never signed parental permission papers. Replacing the little flag in the window that had two blue stars (two sons in the service) with two flags – one with a blue star and one with a gold star (one killed). A baby who would never know her father. A body returned six years after death with only officials stating he was your son.

Willeta Shoens recalled how she combed the newspaper for news about bomber missions. “As a young wife, waiting at home, you just naturally assumed that your husband went on every raid. On March the 4th, we learned that our best man had died in the first raid on Berlin. You just pray that *your* man is going to come home. You can't help but be selfish about it.”

If an airman died aboard a damaged aircraft which had managed to return to base or subsequently succumbed in the hospital, he was buried locally in a military cemetery. His personal effects were gathered together by a superior officer and conveyed home by the army, though small items sometimes accompanied a letter of condolence from the base commander. Ralph Watson, in informing his sister of her husband's death in a crash landing in Italy, enclosed the man's ring, bracelet, Bible, letters, and pictures. His letter to her was particularly moving:

... my heart goes out to you, and I cannot begin to express my feelings and sympathy by this letter. I only hope that you will take it like a good flier's wife, which you are, and be proud, knowing that Gordon died as a hero fighting for his country, and that the little boys and girls now growing up may enjoy the freedom and privileges which America is fighting for. I know that you loved him dearly, Midge, and I know that he lived and breathed for you. It is God's will, Margaret, and I pray to Him that you will be strong. God bless you always, my dear little sweet sister.

Words seem so futile, but I will always be where you may lean on my shoulders, God willing.

**BELOW LEFT**

A B-17 in the South Pacific undergoing service. The contribution of ground crews to the success of bomber missions has largely gone unrecognized, notwithstanding the fact that for every man aboard an aircraft, at least ten men on the ground worked long hours to keep these machines serviceable. (Library of Congress)

**BELOW**

A Red Cross clubmobile near Constantine, Algeria, serving donuts and coffee to the crew of a bomber just returned from a mission. (Library of Congress)





Air crews had implicit confidence that their counterparts on the ground had made their aircraft serviceable for the mission. That confidence was often returned with admiration. One ground crewman said of his comrades: "We knew that when the crew got in that machine in the morning, the chances of us never seeing them again were very real and likely. I just don't know how those guys did it." (Library of Congress)

Such poignant expressions serve to remind us of the human dimension of war – a feature so often missing in military historiography. Death on a large scale was a prominent feature of the life of a bomber crewman, both for himself and for those on whom, far below, he wreaked destruction on a vast scale. Whether the high price paid by bomber crews can be justified remains a point of controversy to this day, as does the extent to which the bomber offensives against Germany and Japan materially weakened those countries' ability to wage war. Above all, complex moral issues inevitably arose when, in the pursuit of higher aims, strategists made the grim decision to send men and machines to lay waste to civilian – and not merely industrial – areas from 25,000 feet.

Yet these issues, however eventually resolved, were not the province of the crewmen themselves; what remains is the incontrovertible fact that they were exceptional men, prepared to face much more fearful odds than those of their compatriots on the ground or at sea – and did so with the determination of men who never doubted the justness of their cause.

## COLLECTIONS AND MUSEUMS

Readers may wish to know that over 40 official websites are maintained by the Eighth Air Force Bombardment Group and the Eighth Air Force Historical Society, relating to the wartime activities of American bombers operating out of Britain during World War II. In addition, numerous museums in the United States and Britain maintain original bomber aircraft, as well as collections of, and exhibits relating to, the equipment, uniforms, and lives of bomber crewmen. Among these are:

### *United Kingdom*

Bassingbourn Tower Museum, Bassingbourn  
Imperial War Museum, Duxford

## *United States*

Air Museum Planes of Fame (Chino, CA and Valle, AZ)  
EAA Air Adventure Museum (Oshkosh, WI)  
Mighty Eighth Air Force Museum (Savannah, GA)  
Museum of Aviation (Warner-Robins, GA)  
National Museum of the United States Air Force (Wright-Patterson AFB, OH)  
Strategic Air and Space Museum (Ashland, Nebraska)  
Smithsonian National Air and Space Museum (Washington, D.C.)

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The crew of *Hell Hen* clearly delighted to be "stateside" following their arrival at Bradley Field, Windsor Locks, Connecticut, only two weeks after Germany's surrender in May 1945. (NARA)



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Cologne lies devastated by bombing. Although bombing caused widespread havoc in built-up residential areas, it was difficult for crews flying 25,000ft above to appreciate in practical terms the horrendous damage they could inflict. Prevailing opinion held that the destruction of German cities would accelerate Allied victory, though the efficacy of this policy has remained controversial ever since. (NARA)



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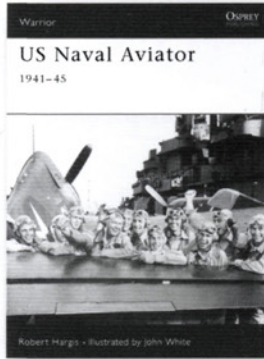
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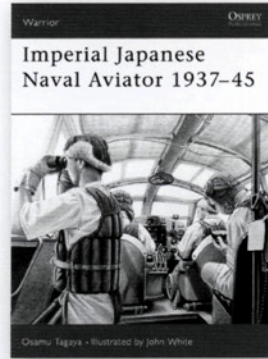
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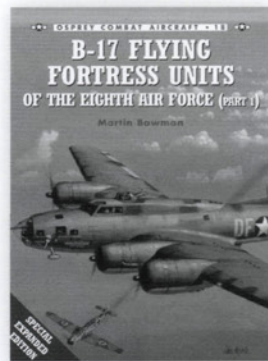
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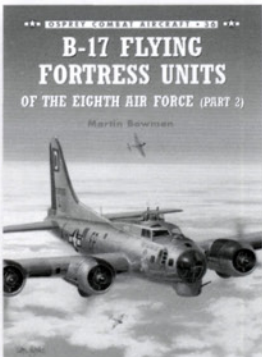
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