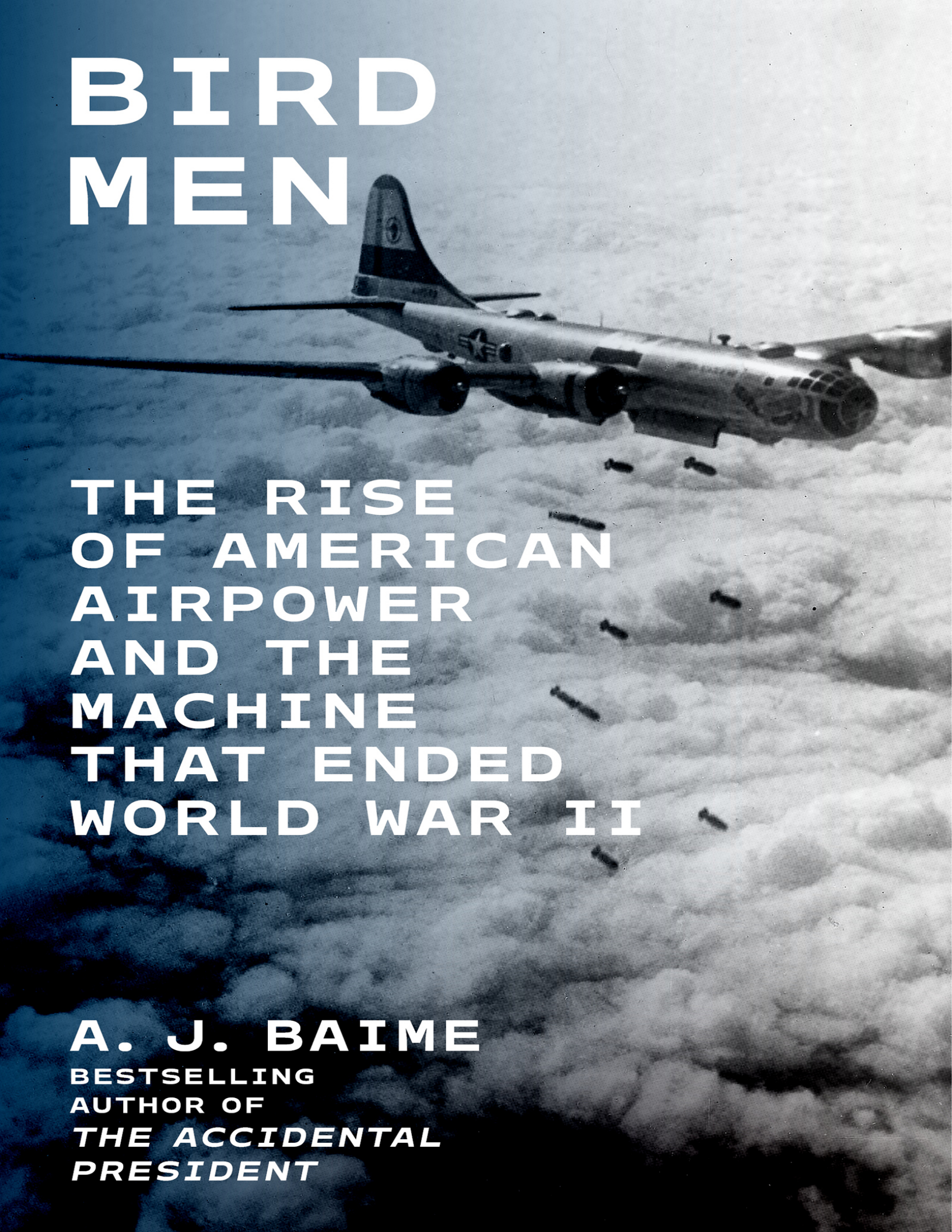


BIRD MEN

THE RISE OF AMERICAN AIRPOWER AND THE MACHINE THAT ENDED WORLD WAR II

A. J. BAIME
BESTSELLING AUTHOR OF *THE ACCIDENTAL PRESIDENT*

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Dedication

For the greatest women I have known:

MICHELLE BAIME, AUDREY BAIME, DENISE “ALICE” BAIME, ABBY MILLER

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The Flyers

HENRY H. "HAP" ARNOLD

The Father of the American Air Force, and commander of the Army Air Forces in World War II. As a young man, Arnold was sent by the Army to learn to fly from Wilbur and Orville Wright, at the new Wright Brothers Flying School. From his first takeoff in 1911, he lived his life attempting to see over the horizon. How will the art and science of aviation change the way humans relate to each other, and the way that armies will fight? Arnold remains today the only five-star general ever to serve in the United States Air Force.

BILLY MITCHELL

During World War I, Mitchell commanded the first mass airborne attack over enemy lines. Returning to Washington, he became the first American military officer to argue that, in the future, airpower would become critical for national survival. "Complete control of the air by any nation,"[1] Mitchell prophesized in the early 1920s, "means military control of the world."

CHARLES LINDBERGH

When "Lucky Lindy" flew his *Spirit of St. Louis* solo across the Atlantic in 1927, he became the world's most famous aviator. In 1938, he approached Arnold with a grave warning: Adolf Hitler, he said, was building the most technologically advanced air force ever seen. Airpower, Lindbergh warned, could make the Nazis invincible.

CARL "TOOEY" SPAATZ

A World War I combat aviator, Spaatz (pronounced "Spots") served as one of Arnold's closest confidants throughout both of their careers. During World War II, Spaatz commanded US Air Forces that largely destroyed both

Nazi Germany and Japan. After the United States Air Force was founded in 1947, Spaatz was appointed its first chief of staff.

IRA EAKER

Eaker rose to fame in 1926–27 during the Pan American Goodwill Flight, a twenty-two-thousand-mile South American aerial journey that garnered fifty-one pages of coverage in *National Geographic*. A graduate of the Army's Air Corps Tactical School in 1936, Eaker helped design the strategic bombing doctrine that guided almost all the United States' airborne operations during World War II.

JAMES "JIMMY" DOOLITTLE

Hero of the "Doolittle Raid" on Tokyo, Doolittle was the first to launch a bombing mission from the deck of an aircraft carrier. His mission in 1942 made him an international hero, but at a grave cost. As reprisal for this attack on Tokyo, Japanese soldiers rampaged in China, killing about a quarter of a million civilians and executing American flyers who had crash-landed during Doolittle's mission. Doolittle remained a key air commander throughout World War II.

CURTIS LEMAY

Few military figures remain as controversial as LeMay, the bomber pilot and navigator who commanded aerial firebombings of Japanese cities that killed over a hundred thousand civilians in 1945. LeMay has been quoted saying, "I'll tell you what war is about.[2] You've got to kill people, and when you've killed enough they stop fighting."

PAUL TIBBETS

A key test pilot in the development of Boeing's B-29 Superfortress, Tibbets went on to lead the 509th Composite Group, a crack squadron of airmen training to deliver a new kind of bomb. "My job, in brief, was to wage atomic war,"[3] he recalled. Tibbets flew the B-29 that dropped the "Little Boy" bomb on Hiroshima. He named the bomber after his mother—the *Enola Gay*. It remains today, arguably, the most famous airplane of all time.

Introduction

From the earliest scrawlings on caveman walls, human beings have expressed an envy of birds. The Greek god Hermes, son of Zeus, had wings on his shoes, so he could fly back and forth between the realms of the living and dead. The Bible speaks of flying "with wings as eagles"[1] and riding the sky in "chariots of fire."[2]

When the Wright brothers invented machine-powered flight in 1903, they realized a dream that was millenniums in the making. "Learning the secret of flight from a bird,"[3] Orville Wright said, "was a good deal like learning the secret of magic from a magician." Most who heard news of the first Wright brothers flight wondered if it was real. The first eyewitness to chronicle the Wrights in action was a man named Amos Root, who compared their feat to Columbus's discovery of America: "In a like manner these two brothers have probably not even a faint glimpse of what their discovery is going to bring to the children of men."[4]

Today, at any given moment, the skies are filled with pilots and passengers. The US Federal Aviation Administration oversees forty-five thousand takeoffs every day. Meanwhile drones and aerial armies are at the ready, as are nuclear missiles capable of flying over continents, robot bombs that keep the human race on the edge of oblivion.

How did humanity get to this point? And what can that tell us about the future?

Many books have been written about aviation. This one presents a new thesis: Few of the eight billion people on earth today have any sense of the degree to which airpower—in peace and war—has shaped our modern geopolitical world and our quotidian lives, and the narrative of how this came to be can best be told through the story of one man and one airplane.

Henry "Hap" Arnold was born in a Pennsylvania village in 1886 and enrolled at West Point the same year the Wright brothers first flew. As the aviation historian Dik Daso has written, Arnold's life "was synchronized with the evolution of the airplane."[5]

Arnold became the first infantryman the United States Army sent to the Wright brothers to learn how to fly, in 1911, following the first Congressional appropriation[6] for the study of machine-powered military flight on March 31 of that year. It was an era when death for pilots was routine. "Everybody expected to be killed,"[7] recalled Arnold's best friend and flyboy buddy in 1911, 2nd Lt. Tommy Milling. "That's absolutely true." From that time onward, Arnold spent his life on the forefront of aeronautics.

Today, he is known as the Father of the American Air Force. At his peak during World War II, he commanded nearly 2.4 million men and women, and the largest air armada ever built, in a new era of rocket power and airborne atomic weapons. Arnold also had vast influence on the creation of what we think of today as our global civilian airline industry.

When Arnold died, obituaries called him a "titan of the air,"[8] "a practical visionary,"[9] "a prophet of things to come."[10] "The great Army Air Forces which darkened the skies over Germany,"[11] stated *The Washington Post*, "and dropped on Japan the first two atomic bombs ever used on military targets was very much the creation of General Arnold, and bore the unmistakable imprint of his personality."

Throughout Arnold's life he recognized the role that *vision* played in civilian and military life. He once wrote, "[A leader] envisions possibilities yet undeveloped: new horizons of activity. This is the kind of vision that begets enthusiasm; and enthusiasm is the eager, driving force that converts dreams into realities."[12] Arnold believed that if the principles of flight worked for a machine no more complex than a motorized box kite in the Wright brothers era, then those same principles would work on a machine bigger, faster, and with ever more stamina.

The only limit to the power of aviation was humanity's ability to dream.

Arnold was not alone. The first national leader to harness true airpower was Adolf Hitler. During the 1930s, while the US economy was paralyzed by the Depression, the Nazis built the first modern operational Air Force, the Luftwaffe. Hitler understood, far before most in America did, that the

airplane was destined to change the way nations related to each other. It obviated previous concepts of war while serving as the strongest tool yet devised in power politics. Its mere existence distilled a psychology of fear in potential enemies with extraordinary economy.

Japanese military leaders, too, saw the game-changing value of attacking aircraft, proving the concept at Pearl Harbor in a first-strike sucker punch that changed the course of world history.

At the dawn of World War II, Arnold saw America on the verge of a losing war. He set out to imagine airpower as it had yet to be imagined. This power ultimately manifested in the aircraft he championed: Boeing's B-29 Superfortress, the first "global superbomber." Arnold's vision was to create a machine that would usher in a new meaning and new possibilities for airpower. Building it involved, arguably, the largest industrial program ever, up to that time. In 1944, the *Los Angeles Times* called the effort to build the B-29 "the greatest manufacturing program ever put behind a single instrument of war."[13]

Consider that the Manhattan Project cost American taxpayers $2 billion, while the B-29 Superfortress cost $3.1 billion. "Literally," the *Chicago Daily Tribune* stated in 1944, "almost our entire economy is involved."[14] The B-29 was the only aircraft capable of delivering atomic bombs over Japan in 1945. "This was to be the only case in history," according to the World War II aerial commander Curtis LeMay, "where air power had done what all its early pioneers said could be done."

Arnold and his coterie of "airpower fanatics" saw the only hope of winning World War II, and the only hope for peace and national security in the future, in a never-ending quest to evolve smarter, greater airpower. Our geopolitical world today—our wars, and our delicate peace—is the result.

This book is the origin story of the United States Air Force. It is not written for academia nor for strictly military audiences. It is aimed at anyone interested in how a new art, science, or technology can alter the course of human existence. The airplane in its early days was what AI is today; it was a new force that changed how people lived in profound ways. Like AI is almost certain to do, the discovery of machine-powered flight ignited vast engines of commerce. But it also sparked a rivalry between good and evil that ultimately engulfed the planet in flames.

I am hoping readers can wipe away preconceptions as they turn the page. To see life through Arnold's eyes, we must enter a world in which airplanes were only beginning to exist. A world when few people ventured more than a few miles from where they were born, let alone across oceans at supersonic speeds, or even to the moon.

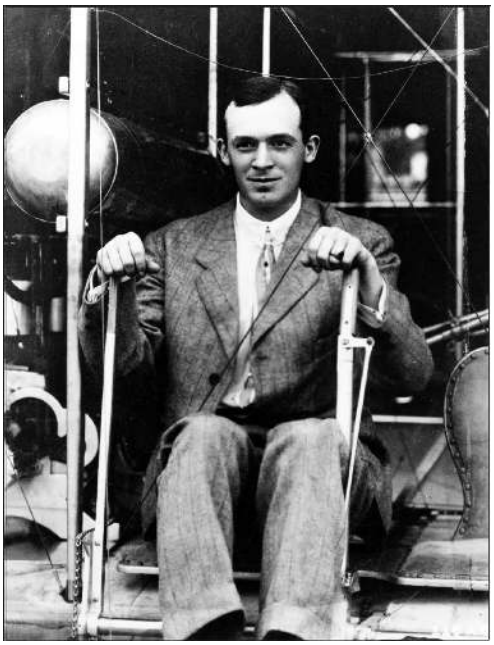
It begins with a young first lieutenant entering flight training with Wilbur and Orville Wright in 1911. "More than anyone I have ever known or read about,"[15] Arnold recalled, "the Wright brothers gave me the sense that nothing is impossible. I like to think—and during World War II, often did—that the Air Force has rooted its traditions in their spirit."

—A. J. BAIME

Sacramento, CA, February 28, 2026

Part 1

The Journey to Airpower



Henry Arnold at the Wright Brothers Flying School in 1911.

U.S. Air Force

We who fly today are[1] but puny harbingers of tomorrow. We are few in number. We rightly count ourselves pioneers in a new field . . . Our ranks have been thinned by death; our numbers have been decimated by disaster . . . Tomorrow there will be a million birdmen . . . We have sought to light the skyways of America.

—HENRY ARNOLD AND IRA EAKER, *THIS FLYING GAME*

1

No bird soars in a calm.[1]

—WILBUR WRIGHT

On a summer day in 1909, a twenty-three-year-old United States Army soldier walked down a bustling Paris street near the Place de l'Opera when he saw a strange machine suspended on display. A crowd had gathered beneath it. The machine had wings, 32.5 feet across and crafted out of wood and fabric, along with a two-spoke propeller on its nose, two bicycle wheels, and a wooden exoskeleton that made it look insectoid. It looked, to the young soldier, like "a frail, heroic freak."[2]

The soldier's name was Henry Harley Arnold, and he was a second lieutenant coming home from his first overseas assignment, in the Philippines. The machine was the Blériot XI, the aircraft that the French adventurer Louis Blériot had flown across the English Channel some weeks earlier. Blériot had motored twenty-five miles from Calais to Dover, not more than 350 feet over the water. His success had inspired banner headlines in newspapers around the globe, along with the famous quotation: "England is no longer[3] an island."

Arnold stood among the crowd of Parisians, in awe. Only six years earlier, the Wright brothers had first flown a machine-powered vehicle. Since that time, the flying machine had captured the imagination of countless people around the world, even though few had actually laid eyes on one. Now here was Arnold, staring at one for the first time. He was left to wonder what it meant. "Who had ever seen[4] such a sight before?" a *Washington Post* writer chronicled that same summer. "No one. It was an

absolutely new spectacle on the face of the earth . . . Has the wildest imagination even approximated what is to come?"

Thomas Edison, inventor of the light bulb, was asked that summer how he imagined airplanes changing society in the future. "The possibilities of the[5] flying machine are too great for me to be sure that I comprehend them," he said. "The effect of the flying machine upon civilization may largely depend upon what the flying machine can do in a war."

Everywhere the airplane traveled, it spread its own gospel. Future aerial heroes would mark the first time they saw one as a turning point in their lives. The World War II Air Forces commander Haywood S. Hansell Jr.: "In 1912 I got my first[6] glimpse of an airplane. I was standing on the fairgrounds of the annual carnival in Manilla, Philippine Islands, when a biplane beat its slow pace across the sky. An aged Filipino standing nearby said, in astonishment, 'Muy grande pollo!' or 'very large chicken!' As a boy of nine I was in full agreement."

Charles Lindbergh was a young child playing in his family home in Little Falls, Minnesota, when he heard a strange noise, around 1912. He rushed to a window, climbed out onto the roof, and looked up to see an aircraft ascending above. "Except in photographs,[7] I had never seen an airplane before," Lindbergh recalled. "The aviator, my mother told me, had come to Little Falls to give exhibitions and carry up into the air anyone who dared to ride with him."

Curtis LeMay, a future US Air Force chief of staff, was a toddler playing in a garden behind his house in Columbus, Ohio. "It must have been[8] during the winter of 1910–11 or the year or two following . . . ," he recalled. "Suddenly, in the air above me, appeared a flying-machine. It came from nowhere. There it was, and I wanted to catch it." He gave chase, sprinting across neighbors' lawns. He remembered the "wonderful sound and force and the freakish illusion of the Thing, a Thing made of wood and metal, piercing the air . . . Then it was gone."

From that moment forward, LeMay, like the others, felt a yearning that increased with every encounter. "I just knew," he later wrote, "that I felt[9] more determined than ever to fly."

Henry Arnold would later find it prophetic that he saw a flying machine for the first time in Paris, not in America, the home of the Wright brothers. He knew the airplane was, in his words, "a human instrument that,[10] for good or evil, in war and peace, was to change the face of the earth."

Arnold was born on June 25, 1886, the son of a physician who made house calls on horseback in Gladwyne, Pennsylvania. As a teenager, he entered West Point in 1903 with hopes of someday riding in the Army's cavalry. "The Horse Cavalry!"[11] he remembered. "It was the last romantic thing left on earth. The galloping charge! Indian fighting!" The United States Military Academy was America's first engineering school, but also, at the time, a small outpost that stood like a fortress on New York's Hudson River.

"The Corps was so small[12] then that you knew everybody in it," recalled one of Arnold's classmates, Tom Milling. "The Academy was still very much like it was in Civil War days. We had no running water; we had no baths or anything like that. There were three barracks, the academic building, and the big office. There was a bath-house, and when you wanted a bath, you had to go over there. Along the sidewalks in front of the barracks were spigots, and each room had a bucket . . . You had to go down, fill the bucket, and bring it upstairs. That was the way we lived at the time."

Arnold did not distinguish himself at West Point. "Hap was a good student,[13] but he didn't rank right up at the top," recalled Frank P. Lahm, his French teacher, who was also a famed adventurer and balloon aviator. "I don't remember anything outstanding about Arnold as a cadet. I can just see him standing up there and reciting French." Arnold graduated sixty-sixth out of 111 cadets in 1907. The Army sent him to the Philippines, where he spent months mapping the jungle, hacking through tropical overgrowth while shirtless and bearded in broiling air thick with mosquitoes.

As a young American soldier, Arnold saw Hong Kong, Singapore, and Cairo. He sailed across the Indian Ocean and saw the miracle of the pyramids at twilight. After his chance encounter with the Blériot airplane in Paris, he returned to the United States and was stationed at Governor's Island in New York Harbor. It was then that fate drew him to the pilot's seat as if by magnet. Governor's Island was home to New York City's first airfield. In 1909, Wilbur Wright came to demonstrate his Wright Flyer, motoring around the Statue of Liberty's towering spire.

On August 2 that same year, the US Army purchased its first airplane, a 30.6-horsepower Wright Flyer that Wilbur Wright demonstrated on October 8 over a prairie in College Park, Maryland, with Arnold's West Point French teacher Frank Lahm in the passenger seat. "For the first time in[14] American history," an eyewitness recounted, "an aeroplane owned by the United States government rose in the air here today."

That same month, Arnold went to Belmont Park to see the International Aviation Meet, billed as the most ambitious flying contest ever. The contest pitted American flyers against Europeans. “May the best men win,”[15] wrote a *Washington Post* reporter. “The best men, of course, are the American flyers, are they not? Well, we shall see.”

Arnold saw the famed Brazilian dirigible pilot Santos-Dumont sail across the sky and the Wright Brothers Exhibition Team in action. The Wright aviators featured nineteen-year-old daredevil Walter Brookins, who crashed his airplane at Belmont Park, but survived. Two of the most famous Wright flyers, Archibald Hoxsey and Ralph Johnstone, both flew that day. Both Hoxsey and Johnstone would be dead within the year, both in airplane wrecks, but in the moment, they were larger than life. The top prize went to a Frenchman, who also later died in an airplane crash.

On April 7, 1911, Arnold mailed a letter to the Army’s adjutant general in Washington, hoping that his experience mapping the Philippine jungle would entice Army leadership to give him a new assignment. He requested to be “detailed for aeronautical work[16] with the Signal Corps. It is believed that my experience in topographical work will prove to be of value in that work.” He received his response in the mail two weeks later—“Special Order 95”[17] from the War Department, dated April 21, 1911.

> The following named officers are detailed for aeronautical duty with the Signal Corps, and will proceed to Dayton, Ohio, for the purpose of undergoing a course of instruction in operating the Wright airplane.
>
> 2nd Lt. Henry H. Arnold, 29th Infantry
>
> 2nd Lt. Thomas DeW. Milling, 15th Cavalry

The Army ordered Arnold to the Wright Brothers Flying School, which the Wright brothers had recently opened in their hometown. He took the letter to his commanding officer, who told him, “Young man, I know[18] of no better way for a person to commit suicide!”

The Wright factory in 1911 stood all of one story, a brick building bordered by corn fields on Dayton’s West Third Street. Arnold and twenty-three-year-old Army cavalryman Tom Milling arrived at about the same time. The first figure Arnold recalled meeting was Frank Russell, factory manager,

and then the Wrights themselves appeared. The factory smelled of gasoline, oil, and sweat. Milling described what it was like to walk into the place.

"You entered it from[19] one end, and there was Orville Wright's office, which he didn't occupy very much because he was interested in all the rest of it. Then you went into the back, which was a big room, open, for assembling the planes. They were only building one then [at a time]. To the left, sliced off from this big room, was a smaller room about one-fourth the size of the big one, in which they were assembling and testing this small four-cylinder engine which powered the airplane."

Soon a crowd gathered around the two new students. Here was Harry Atwood, an aviator who would later make history as the first to fly nonstop from St. Louis to New York. And Calbraith P. Rodgers, who that fall made the first flight from New York to Los Angeles, a feat sponsored by a new grape soda brand called Vin Fiz (also the name of Rodgers' aircraft); this trip required forty-nine days and a traveling machine shop aboard railroads to make repairs each night. Rodgers did not live to see the end of 1911, the victim of a flight crash. Arnold also met the Wright flyer Howard Gill, who likewise would be dead in a matter of months.

Flight training began with a course in mechanics. "During this period, we[20] hadn't started flying," recalled Milling, "and had never even been in an airplane, but we learned something about the assembly of the plane, we learned about the motors, how to repair them, etc." The Wrights were flying their Model B, a biplane (two sets of wings stacked atop each other) which came to be regarded as their most successful aircraft. The Model B had made its first noteworthy flight a year before, in 1910, when Wright flyer Phil "Skyman" Parmalee—who died in 1912 in a flight crash—piloted one carrying two fifty-pound rolls of silk from Dayton to Columbus, Ohio, setting a new cross-country speed record while racing a locomotive traveling along the same route.

The Wright Model B was bigger than the Blériot XI. It measured 38.5 feet in wingspan and 30 feet in overall length. Its four-cylinder engine pushed out between 28 and 42 horsepower. The engine drove two propellers on either side of the pilot's seat, via bicycle chains. The plane's skeleton was made of cypress wood—strong and lightweight—while the wings were fashioned from canvas treated with a chemical paint that made them stiff.

Wright engineer Charlie Taylor designed the four-cylinder motor, which was not all that different from the four-cylinder in Henry Ford's Model T,

which first rolled out three years earlier. “A one-gallon fuel tank was[21] suspended from a wing strut,” Taylor described, “and the gasoline fed by gravity down a tube to the engine . . . There was no carburetor . . . the fuel was fed into a shallow chamber in the manifold. Raw gas blended with air in this chamber, which was next to the cylinders and heated up rather quickly, thus helping to vaporize the mixture. The engine was started by priming each cylinder with a few drops of raw gas.”

Wilbur and Orville were curious figures. “They were usually so courteous,[22] almost diffident, really,” Arnold recalled. “Wilbur was the genius,”[23] remembered Charles Wald, a Wright student who showed up at the same time as Arnold. “He was a regular Leonardo da Vinci . . . Orville always argued the point, and Wilbur always insisted that simplicity is perfection.” The brothers seemed always to be together. They lived together, ate together, worked together—even kept a single bank account. They shared the same blue-gray eyes, and the same fanatical dedication to their craft.

After a few days of mechanical training, the group headed to the airfield, further outside of Dayton. The field was called Simms Station. “It was a cow pasture,”[24] Arnold recalled, “not very different from hundreds of other fields in the vicinity.” On May 3, 1911, Arnold readied for his first flight. He and his instructor—Wright flyer Al Welsh—took their places in the Model B’s two seats, to the left of the center of gravity to balance the weight of the engine, mounted on the right. Welsh pulled a lever that fed gas into the motor. Assistants manually spun the two propellers, which were attached by crankshaft and bicycle chain to the engine. The machine belched and ignited, and the aircraft began to roll across the field.

When the wheels left the ground, Arnold felt that sensation that aviators do upon the first takeoff—all the senses alive to the sound and fury.

“The sensation is so keenly[25] delightful as to be almost beyond description,” Wilbur Wright described flight aboard the Model B. “It is a realization of a dream so many persons have had of floating in the air.” Another early Wright student put this sensation in these words: “I just wondered why[26] men hadn’t learned to fly years ago, it was so wonderful. I could never describe it. It was beautiful. It was a symphony.”

After seven minutes, Arnold’s instructor Welsh landed the plane. He wrote in his “Flying Report” of Arnold’s first lesson: “Rough, just rode as

passenger."[27]

Strong winds were the aviator's enemy, and flights at Simms Station only took off in calm weather. Which left a lot of time in the hangar. Conversation covered "everybody and everything that[28] the most encyclopedic aviation editor could have dreamed up," remembered Arnold. "Stories of men who had put the most zealous imagination—and often their last penny—into abortive aeronautical designs, freakish flying machines that wouldn't fly."

Inevitably, these conversations veered toward danger, which loomed in the hangar like the smell of gas and oil, intangible yet almost overpowering. Early aerial experiments had witnessed a stark death toll. There was Otto Lilienthal, the famed German "Glider King," who perished in 1896 when his engine-less glider plunged to the earth. And Percy Pilcher, the pioneering Brit who had flown in his hang gliders Bat and Hawk before meeting a similar fate. In 1908, a US Army lieutenant named Thomas Selfridge had become the first to die in a motorized airplane crash (Orville Wright was the pilot that day, and was mortally wounded in the wreck). Selfridge had been one of Arnold's teachers at West Point.

Not until lesson numbers 27 and 28 did Arnold land the Model B without assistance. Welsh wrote in his official report: "Number of flights, 28.[29] Total time in the air 3 hours and 48 minutes. First lesson 3 May, finished 13 May—10 days of learning. Average 8 minutes."

Arnold put it more succinctly: "I could fly! I was an aviator!"[30]

On May 7, 1911, Arnold and Milling arrived at the Wright brothers' home on Hawthorn Street for dinner for the first time. A Navy pilot named John Rodgers accompanied them (a cousin of the aviator Calbraith Rodgers, and a pioneering open-water airplane pilot who died upon crashing into the Delaware River in 1926). The Wrights' sister Katharine was hostess. Bookshelves were crowded with works of poetry and treatises on philosophy and mathematics. Wilbur and Orville had never finished high school and were largely self-educated. Their father, whom everyone called "the Old Bishop," wrote in his diary on this Sunday, "Lieutenant Rogers, of the Navy,[31] and Lieuts. H.H. Arnold and T.D. Milling, of the Army, supped with us. They are here to learn to fly."

The Wrights loved to tell stories of their adventures. “They never took themselves[32] half so seriously as we took them,” Arnold recalled. “Still, to Milling and me, sitting at their Sunday dinner table and listening to their quiet stories, what they had done was a miracle.”

Wilbur and Orville Wright had begun their careers as bicycle manufacturers during the 1890s “bicycle craze.” They began flying experiments with kites at the end of the nineteenth century. Within the first two years, they had built kites big enough so they could lie prone under wings, riding the wind while tethered by rope to the ground. Countless inventors over the centuries had attempted to fly, and what set the Wrights apart was their focus on the flexibility of bird wings.

“While others balanced the gliders[33] by shifting the position of their bodies and thus getting a different distribution of weight,” Arnold later wrote, “the Wrights from the start utilized control surfaces. These control surfaces they operated by levers while lying flat along the lower wing. They emulated the birds in the use of warping wings to secure lateral balance.”

Introducing engine power presented endless obstacles. How should a propeller be shaped? There was no template. “It is hard to find even[34] a point from which to make a start,” Orville explained. “For nothing about a propellor, or the medium in which it acts, stands still for a moment. The thrust depends upon the speed and the angle at which the blade strikes the air; the angle at which the blade strikes the air depends on the speed at which the propellor is turning, the speed the machine is traveling forward, and the speed at which the air is slipping backwards . . . When any of these change, it changes all the rest, as they are all interdependent on one another.”

The journey into the skies took years of trial, error, and heartbreak. When the brothers arrived at a design they believed would work, they took it to Kitty Hawk, North Carolina, to test. They flipped a coin to see who would fly first. Wilbur won, and at 10:35 a.m. on December 17, 1903, he climbed aboard the Wright Flyer and rose successfully into the sky, dipping and whirling erratically for twelve seconds. Orville’s first words to his brother afterwards: “Were you scared?”[35]

“Scared?” Wilbur replied. “There wasn’t time.”

Both Wrights made several flights over the next days, and news spread. The *Chicago Daily Tribune* reported on December 19, 1903, on page 3: “Flying Machine Soars.”[36] The *Atlanta Constitution* ran a front-page

headline soon after: “Flying Machine Age Has Arrived at Last.”[37] Remembered Donald Douglas—the future builder of the Douglas DC-3—who was eleven years old at the time: “I didn’t read the paper[38] much at that age. But I saw the first notice of the first flight by the Wrights. I think this was what really struck in my mind: a man had actually flown.”

In 1908, the Wrights signed a contract to demonstrate for the military establishment that they could, in fact, fly in a machine. On September 2, in front of teeming crowds at the Fort Myer Army base outside Washington, DC, the brothers assembled one of their aircraft. Over the following days, both Wilbur and Orville made flights and, also, global news. While their experiments at Kitty Hawk made many scratch their heads dubiously, their triumphs at Fort Myer shocked the world.

“More than electric lights,[39] more than steam engines, more than telephones, more than automobiles, more even than the printing press,” historian Stephen Ambrose has written, “the airplane separated past from future. It had freed mankind from the earth and opened the skies.”

In 1910, Theodore Roosevelt became the first American president (a former president, at the time) to fly in an airplane, with a Wright pilot in St. Louis. In 1911, the US Congress made the first appropriation—$125,000—to fund research in machine-powered military aviation. “That was when we went to[40] the Wright brothers, and that was the first money that was ever appropriated by Congress for aviation: March 1911,” recalled Milling. “You see, you can pick out different places where Army aviation began—the use of balloons, back to Civil War times, or the Signal Corps activities in 1907 [experiments with dirigibles], or this date, 1911.”

In May, exciting news reached Dayton. The War Department in Washington announced plans to establish the first Army airplane base and flight school, at College Park, Maryland. After just two months of training, Arnold and Milling received orders to report to College Park, as the first ever Army airplane flight instructors.

The pair broke down a single Wright Model B, which Arnold named “Old War Horse,” and packed it in a railroad boxcar. He and Milling boarded a train for the journey east. As Arnold wrote, “A colossal first chapter[41] has been written in the sky saga. It remains for those who have but lately grown wings to write the next.”

2

> Without any blare of trumpets[1] or any advance press notices there has quietly come into existence in this little village, on the outskirts of the District of Columbia, the greatest and most completely equipped aviation field in this country.
>
> —*THE NEW YORK TIMES*, JULY 28, 1911

The United States Army Signal Corps opened its first airplane base on June 23, 1911, in College Park, Maryland.[*] The airfield was little more than a grass pasture. "On the opening day,"[2] reported an eyewitness, "there were three uncompleted hangars and one finished stretched along the tracks of the Baltimore and Ohio [railroad]. The finished hangar was merely four walls and a roof, having an earth floor and no appointments of any kind."

College Park was a quaint village chosen because of its low winds and its proximity to the nation's capital—a ten-mile drive by motorcar. Arnold and Milling took quarters in a rooming house in the city. During the first weeks of June, they spent their days listening not to buzzing aircraft engines but to the crackle of typewriters. Until the first aircraft arrived, they spent their time in War Department offices typing out drafts for flight manuals, as nothing of the sort existed.

At the end of June, Arnold's plane, the "Old Warhorse," arrived at College Park. "I'll never forget the first one[3] that we got in shape, and we took it up," Milling recalled. "The two of us went up in it together." As Arnold and Milling lifted off the grass on that maiden flight at College Park, a little boy standing on the edge of the airfield burst into a sprint, chasing the aircraft. At the moment of liftoff, he shouted, "My God, God has come[4] to earth at last!"

The flight instructors' first job was to teach their superiors to fly. Arnold's student was Charles de Forest Chandler, the newly appointed commandant of the College Park airfield and chief of the Army Signal Corps' Aeronautical Division. Milling's student was Roy C. Kirtland, the base's day-to-day commander.* Soon four hangars were complete, and the first group of students—just a handful of young men—reported for duty.

On July 17, a medical corps arrived, moving into a large white tent on the edge of the airfield. This was America's first flight hospital. The medical corps was headed by Lt. John P. Kelly—America's first flight surgeon.

More airplanes filled the hangars. The flyers set up a locker room where they kept their "aviators costumes": heavy leather jackets lined with corduroy for cold winds, leather football helmets and wool "gauntlets" (gloves). The country's most widely read newspapers sent top beat reporters to follow the action—J. Daly with the *Washington Post*, John Mitchell with the *Washington Star*, and Dick Richards of the *New York Times*. The *Post* on August 6: "Uncle Sam's aviation school[5] at College Park is now at the height of its efficiency. The hangars are filled with aeroplanes and the roster of camp officers bears the names of many experienced aviators."

"How different are the planes[6] of today," Arnold wrote years later. "There are tachometers to give the engine revolutions; oil and gas gauges; thermometers . . . turn and bank indicators . . . air-speed indicators . . . compasses, altimeters, ammeters, and volt meters . . ." The Wright Model B of 1911 had a single piece of string as its only instrument. Controlled by Newtonian physics, it simply dangled, and if it dangled straight down, that meant the aircraft was flying true and straight, giving the pilot perspective that was otherwise lost in the ether. "As long as the string[7] stood straight in the airflow," recalled Arnold, "the plane was flying all right. But as soon as it assumed an angle, the pilot knew that the plane was slipping or skidding and something had to be done about it."

In July, Arnold took Kirtland up for a historic flight over Washington, DC, becoming the first to circle the Capitol dome, above streets filled with awed spectators. Days later, Milling motored his aircraft into a wall of clouds, getting lost for minutes with his commandant Chandler aboard. Arnold became the first pilot to fly a US congressman in an Army aircraft —Ben Johnson of Kentucky. Milling flew experimental flights in the black of night, using bonfires set by villagers below to guide his way. Arnold

traveled to Long Island, where he became the first pilot to carry US airmail—a satchel of letters five miles from one village to another.

On August 20, the War Department sent orders for Arnold and Chandler to fly forty-two miles from College Park to Frederick, Maryland, for the annual encampment of the National Guard. Arnold took off at 6:34 a.m. with Chandler beside him.

"When the airplane was sighted[8] by lookouts at Frederick," Chandler recalled, "all factory whistles were blown as a signal for offices to be abandoned. Many of them remained closed the entire day in order to give the employees the novelty of seeing the first airplane that ever visited that locality."

Using a device called a thermobaragraph to measure altitude, Arnold set a record of more than a mile high. "The machine looked like[9] a small black speck in the sky," a witness recorded. Inventors brought imaginative new devices to be tested in the skies, such as a new "bomb-sight" developed by a former artillery officer named Riley E. Scott. Arnold and Milling spent hours flying figure eights above the College Park airfield trying to hit an *X* painted on the ground with sandbags—mock bombs—using this device.

The pilots made the first experiments with airborne cameras and the first efforts to fire guns at targets below. Arnold was temporarily blinded when an insect struck his eyeball during a landing; from then on, aviators wore goggles. Arnold took on work moonlighting as a stunt double in silent movies *The Military Air-Scout* and *The Elopement*, both filmed in 1911.

The faster the airplanes moved, and the higher the altitudes, the bigger the headlines grew in the press, and the faster they moved toward the front page. The newspapers were stirring "aviation madness" among the youth of America. "Hundreds of young men[10] in the service are clamoring for a chance to be sent to College Park and take up aeroplaning," reported *The Washington Post,* "realizing that the most important battles of the future will be lost or won by the air craft [*sic*]." Newspaper headlines referred to the College Park aviators by a nickname that stuck in the national lexicon: bird men.

"Army Bird Men Plan[11] to Make Cross Country Trips Soon."

"At Height of 3,000 Feet,[12] Birdmen Will Draw Maps of Land Beneath."

"Death Seizes Bird-Men[13] Soaring Skyward."

The flyers' crashes were reported nearly as often as their takeoffs. So dangerous was flying, the government permitted only unmarried soldiers to apply, as the Army did not want the responsibility of taking care of widows. The first two seasons at College Park saw the deaths of pilots Leighton Hazelhurst, Frank S. Scott,* Lewis C. Rockwell,* and Arnold's own Wright Brothers Flying School instructor, Al Welsh.

"Again, a close friend of mine,"[14] Arnold recorded after the accident that took the latter two. "Again, for all of us—Why? Like Al Welsh, Rockwell had been a good pilot. What had happened?" It seemed the only one who could say exactly what happened was dead.

As the ranks of pilots thinned, the bond among the surviving flyers grew stronger. "We flying men were[15] like a fraternity . . . ," Milling remembered. "Good Lord, I don't know of anybody who didn't figure he'd be killed before he got through . . . But the reason you don't is, to begin with, you know how to fly. That's what Orville Wright always said . . . The second thing is, you don't panic."

Arnold noticed something strange during these early College Park days. When he went to a restaurant in Washington with Milling, people began to point and whisper. The aviators were becoming figures of fascination, "like celebrities," Arnold recalled.

"There they are!"[16] strangers would say. "They're the ones!"

One person who noticed was a twenty-four-year-old woman who remembered meeting Arnold when the two were younger. "I cut out a clipping[17] saying that Lieutenant Arnold had broken the altitude record," recalled Eleanor Pool, the future Mrs. Henry Arnold. She showed the clip to a friend and said with excitement, "I used to know that young man."

The response was, "You never saw him in your life!"

"But I know him!"

In January 1912, a group called the Aero Club of America met for a banquet in Manhattan, where one of its members—the industrialist Clarence Mackay—unveiled a sparkling silver cup. Mackay was a towering figure: president of the Postal Telegraph & Cable Corporation, and the founder of the Mackay Radio and Telegraph Company.

For years, Mackay had awarded trophies to the most accomplished yachtsmen and tennis players. Now, in 1912, he announced a new trophy to

be awarded to the American military's top pilot. The silver trophy was crafted by Tiffany & Company and featured four depictions of Nike—the Greek goddess of victory—clutching a Wright airplane.

The Mackay Cup competition was held on Wednesday, October 9, 1912. All week leading up to it, the flyers struggled to focus as news reached the United States of war breaking out in Europe. Armies in the Balkans clashed on October 3 near the Bulgarian frontier as the kingdoms of Bulgaria, Serbia, Greece, and Montenegro united against the Ottomans. Four hundred soldiers were reported killed. On October 6—three days before the competition—a headline ran across the front page of the *New York Times*: "Only a Miracle Will Avert War."[18]

Three aviators qualified for the Mackay Cup contest: Arnold and Milling, and their commanding officer, Kirtland. The War Department issued rules: A mock platoon of enemy soldiers would be placed in northern Virginia, while the aviators' job was to take off from College Park in Maryland, fly over Washington, DC, locate the troops, and return to write a detailed report. Points would be awarded in five categories: accuracy of location, accuracy in estimating troop size, character of written report, time of reconnaissance, and landing accuracy.

Crowds gathered along the edges of the airfield as all three flyers boarded their aircraft. Milling took off first, at 9:34 a.m. Arnold departed at 9:36. Kirtland struggled to get his engine started and was left behind. Flying over the Potomac in blue skies, Arnold and Milling saw the White House and Capitol dome come into view. After ten minutes, Milling made a surprising maneuver. He turned his Wright flyer around and landed back at College Park at 9:56. According to the Army's official report, "He informed members of the board[19] that after proceeding as far as Washington he was overcome with a feeling of nausea and thought it advisable to immediately return to the airfield."

Flying over the city, Arnold felt the air suddenly feel "very much disturbed,"[20] according to the official report. It "required great effort on [Arnold's] part to maintain equilibrium." From thousands of feet up, his eyes zeroed in on the earth below. "Troops marching along roads[21] will be visible to the aviator for miles unless masked by trees," he recorded. He spotted the "enemy" troops and immediately turned around. When he landed, the crowds converged on his aircraft.

"His appearance was that[22] of physical exhaustion and nervousness," according to the official report. "Thirty-four minutes after landing, Lieut. Arnold stated to the board that he still felt very tired all over, especially the muscles in his arms."

Arnold was the military's "Champion of the Air,"[23] as the *Washington Post* headline put it the following morning.

Days later, Arnold and Milling boarded a train bound west for Fort Riley, Kansas. The Army set up experiments with a new lighting device made in Detroit called Prest-O-Lite that was being used in automobile headlamps. Flying high over a prairie in bitter cold, with an observer named Lieutenant Sands next to him, Arnold felt his aircraft suddenly jolt. And then, catastrophe struck.

"For some unaccountable reason[24] the machine plunged hard foremost in a vertical line down towards the earth," he remembered. He struggled to regain control. "I took in everything,"[25] he recalled, "as you do at such a time. Everything was all right, nothing broken, my hands doing all the right things on the controls."

Just before impact, he lifted the aircraft out of the dive and awkwardly punched it onto the ground. Climbing out of the pilot's seat, Arnold told his passenger, "Come on, Sandy,[26] let's walk over to the barracks." It was there in the barracks where Milling found Arnold with a bottle of Champagne, the wine "spread all over the table."[27] Arnold looked like he was "trying to get happy."

"That's it," Arnold told Milling. "A man doesn't face death twice."[28]

The next day, Arnold gave his commander, Chandler, a report. "At the present time my nervous system[29] is in such a condition that I will not get in any machine," he wrote.

Arnold had lost his nerve. He was not alone; the fear of death was so present at the airfield that the flyers had come up with a name for it: FOF, for "fear of flying." One World War II combat aviator once described a pilot's nerve, comparing it to a guitar string: "It's always pretty well tightened up[30] . . . Good strings have tolerance. They can be tightened and taughtened . . . And there are some superior strings which won't break, no matter how long you twist. Those are the rarities."

Milling was such a string. Arnold was not. "I cannot even look at a machine[31] in the air," Arnold admitted, "without feeling that some accident

is going to happen to it."

Arnold requested a dismissal from flight duty. One of his fellow officers wrote to Chandler: "Lieut. Arnold has become so nervous[32] as a result [of his near-death experience] that he has not flown since, and perhaps never will again."

The First Balkan War spread across eastern Europe in the fall of 1912, and for the first time, the airplane was used in battle. The Italian army used airplanes in the Battle of Tripoli, while French flyers soared over Morocco.

Armies in Europe invested huge amounts in pilotage and aircraft. The French founded the Établissement Militaire d'Aviation—its own stand-alone flying military service. The Germans founded Die Fliegertruppen des deutschen Kaiserreiches, which translated to "the flying troops of the German Kaiser's Reich." In the summer of 1913, as the war in Europe spread, Congress in America announced hearings on "Aeronautics in the Army," to get the facts and confront the question: What should be the future of American military flight?

On August 12, 1913, the 63rd Congress's Committee on Military Affairs convened in a hearing room in Washington—a board of twenty-two congressmen headed by James Hay of Virginia. Military officials filed in, among them Arnold, Milling, and a dozen other figures from Army aviation. Congressman Hay hammered a gavel and the room fell silent.

"Gentlemen of the Military Committee,"[33] Hay said, "the Signal Corps is composed of a number of men of undoubted scientific ability, recognized as men of great electrical knowledge, of strength of materials, and the working of gasoline engines . . . The aviator is the man behind the guns, the fighting man. He is the instrument by which the active work of the aviation corps is carried on."

Over the next four days, fifteen military officers spoke—many thousands of words in testimony. Hay called on Brig. Gen. James Scriven—chief of the Army Signal Corps—to speak first. Scriven cataloged the unnerving advances that were being made in Europe. Germany was investing about $37.5 million in aviation, he explained. France, $7.4 million. Even Japan would spend the equivalent of a million dollars in 1913. In the United States, the Army was given $100,000.

Part of the Army's problem, Scriven explained, was finding soldiers physically and mentally strong enough to take on flight duty. Congressman

J. C. McKenzie of Illinois responded, “Yes, it is a serious proposition; it is the most hazardous undertaking that a soldier, in my judgement, has to contend with.”

At 10 a.m. on August 16, the committee called Captain William “Billy” Mitchell to speak. This was the first major public appearance of a figure who was about to take the American military—and even the White House—by storm. With his side-parted, shortly cropped hair and square jaw, Mitchell looked central-casting Army officer. He explained that US Army aviation only had 19 officers on duty, and between 60 and 100 enlisted men. It was a tiny force, with only 17 airplanes. Mitchell urged the committee to back a huge new investment in military aviation.

“In order to develop our aeroplanes it is necessary to help out the industry by Government means,” he said. “In the case of the automobile such aid was not required because it was developed through commercial means and because they soon came into general use. The aeroplane industry has not been developed anywhere except where the Government has practically subsidized it.”

Only three airplane manufacturers existed in the United States, Mitchell explained: the Wrights, Glenn Curtiss in Buffalo, New York, and Glenn Martin in Los Angeles, California. “The industry in this country is starving,” Mitchell said. It was “groping in the dark.”

When Arnold was called to speak, Congressman Hay asked him, “Will you give the experience you have had as an aviator in the Army?”

“I was sent to the Wright company to learn aviation in April, 1911,” Arnold said. “Since that time I have been on aviation duty. However, I am to be relieved the 1st of September and will go back to join my regiment.”

“But you say you are to be relieved?” Hay asked.

“Yes, sir.”

“At your own request?”

“Yes, sir . . . Upon my own request . . . Some officers find that it gets on their nerves, and they become practically worthless as aviators.”

“I suppose that after an officer loses his nerve,” Hay said, “he is worthless as an aviator?”

“Yes, sir,” Arnold responded. “And he must quit. Or he will kill himself. He will probably kill himself and somebody else with him.”

The chairman asked, “Is there anything else you desire to say, Lieutenant?”

Arnold issued a grave warning, one that he would find himself repeating at times in desperate tones, over the next decades. The United States, he said, was not innovating fast enough. The country was failing to invest in its future. Aviation was born in America, he said.

“It had its origin here. And then the country went to sleep and left France, Germany, and England to develop it. We are trying to reach over there now and grab their ideas and bring our country back to where it belongs.”

3

The future of our nation is indissolubly bound up in the development of air power.[1]

—BILLY MITCHELL, AVIATION PIONEER

On April 2, 1917, the American president Woodrow Wilson spoke before Congress in the Capitol in Washington, asking for a Declaration of War against Germany.

"I have called the Congress[2] into extraordinary session because there are serious, very serious, choices of policy to be made," Wilson said, "and made immediately . . . The world must be made safe for democracy. Its peace must be planted upon the tested foundations of political liberty. We have no selfish ends to serve."

The events leading up to that speech are well-documented. On Sunday, June 28, 1914, a nineteen-year-old Bosnian assassin from an armed group called the Black Hand shot dead the Archduke Franz Ferdinand and his wife, in broad daylight in Sarajevo. Those bullets became the catalyst for war across Europe. The Allied nations (France, Great Britain, Russia, and Italy) faced the Central Powers (Germany, Austria-Hungary, the Ottomans, and Bulgaria) in war on a scale never seen. Events lured the United States into the fray—most notably, attacks on American shipping.

Wilson's speech moved Congress to declare war. It was the first time the country accepted its role as an international power with interests to shape and protect far beyond its own borders. In essence, America was accepting its role as a moral, political, and economic leader in the community of nations.

The groundswell was unprecedented. On June 5, ten million men between the ages of twenty-one and thirty registered for the military draft.

A tiny group of Army officials faced the task of integrating aviation into the planning. How would airplanes be used? What kind should be built, and by whom? "With the advent of the World War,"[3] Arnold recorded, "conditions changed. For a while the belligerents did not know exactly what use to make of the planes. First one thing was tried, then another." While reconnaissance remained aviation's primary role, the first purpose-built fighter planes engaged in dogfights using a new invention called the "interrupter gear," which enabled pilots to fire machine-gun shots synchronized to fly through propeller blades.

Germany birthed the Fokker D.VII, the finest German fighter plane of the first world war, while the British produced the Sopwith Camel, which downed more enemy aircraft than any other plane. The French made the legendary Spad XIII, which became one of the most mass-produced fighters, and also, the fighter plane most used by American pilots. At the same time, the Germans sent hydrogen-filled Zeppelin airships—modern fixed-frame dirigibles—over England at eleven thousand feet, causing havoc among civilians.

Still, the Great War remained largely traditional: it involved huge armies living in muddy trenches, fighting over a "line" akin to a football gridiron's line, pushing each other back and forth in an attempt to usurp land. The Industrial Revolution added the new element of machinery that could be mass-produced on assembly lines, most notably motorcars used for troop transport and ambulances. The tank made its first major appearance. But still, the horse and its rider remained paramount on battlefields. The American forces alone used an estimated 1.325 million horses and mules during this war.

Nearly every pilot the US Army could get its hands on went overseas, including Arnold's flyboy buddy Tom Milling. Arnold was stuck in Washington, having transferred out of flight duty. He was married now to Eleanor Pool, whom he called Bee for "Beadle" (her family nickname). Sensing that his military career was in jeopardy, he forced himself to conquer his fear of flying. The country was so desperate for aviators, the rule banishing married men from the flying service was forgotten. At Rockwell Field outside San Diego—an Army base named for Lewis Rockwell, who died in a flight crash at College Park in 1912—Arnold

began piloting flights in a trainer. He made every acrobatic move he could in an aircraft. He dove, he rolled, he stalled his engine in mid-flight and flew upside down. When he got home, his wife saw the wrinkle of goggles impressed around his eyes.

"It's perfectly all right,"[4] she said. "If you want to do it, go ahead and do it. It's your life."

He agreed. "When I'm going to die,"[5] he told himself, "I'm going to die."

But for Arnold, it was too late. He was assigned a desk job in Washington—number two in Army aviation administration. "That was one of his greatest disappointments,"[6] recalled Eleanor, "that he should be kept back, and the others all had a chance to go over and get into it. He was pretty bitter about that for a long time. They had to have one man on this side who knew aviation . . . There wasn't another soul in that office who'd ever had anything to do with it."

"That job—No. 2 man[7] in the Washington headquarters . . . may have looked very good for the moment," Arnold recalled, "but I was convinced that without combat experience my future in the air arm was limited."

As the armies clashed in Europe and populations saw airplanes roaring above for the first time, the war set the stage for a new kind of hero to emerge—the fighting aviator. Few would have a bigger stage than a young pilot from Wisconsin named Billy Mitchell.

Mitchell first appeared on the aviation scene at the College Park airfield around 1912. Arnold remembered the day he first showed up.

"One day a sharp-faced,[8] eager young captain for the General Staff came in to see me," Arnold recalled. "He was not a flyer himself, but was working on a paper concerning the military future of aviation which he intended to present to the Army War College." Mitchell had recently returned from Japan. "He said the Japanese Air Force was bigger than ours—it had ten planes [in 1912]."

Like so many others, Mitchell was seduced by the romance of flight and the camaraderie of the flyers. In January 1917, he went through fifteen hours of pilot training, at a cost of $1,470 (about $37,000 in 2025), of which only $500 was paid for by the Army. The son of a wealthy US senator, Mitchell could afford the bill. Less than a year later, he headed to

Europe to fight, as a major in the Army. The US troops had no airplanes, and so Mitchell was able to fly French aircraft. He was stunned.

"I had been able to flounder[9] around the animated kites that we called airplanes in the United States," he wrote in his *Memoirs of World War I*. "But when I laid my hand on the greyhounds of the air they had in Europe, which went twice as fast as ours, it was an entirely different matter."

During Mitchell's first flight over enemy lines in France, he gained not just an aerial view of the action, but a new perspective of military engagement overall. He saw not just the battlefields, but the future of warfare.

"One flight over the lines,"[10] he wrote, "gave me a much clearer impression of how the armies were laid out than any amount of traveling around on the ground. A very significant thing to me was that we could cross the lines of these contending armies in a few minutes in our airplane, where as the armies had been locked in the struggle, immovable, powerless to advance, for three years. It looked as though the war would keep up indefinitely until either the airplanes brought an end to the war or the contending nations dropped from sheer exhaustion."

Mitchell's wartime flying thrilled stateside audiences, who read about it in their newspapers. Army aviators were like a new kind of gladiator, risking their necks in the pursuit of victory and glory. "The Air Service in particular[11] is one of such peril that membership in it is of itself a high distinction," former president Theodore Roosevelt wrote in 1918. "Physical address, high training, entire fearlessness, iron nerve and fertile resourcefulness are needed in a combination and to a degree hitherto unparallelled in war."

Arnold's wartime experience proved less glamorous, but no less important. His job was to implement a plan to build 22,600 airplanes and 45,000 engines, while supervising the building of schools to train thousands of pilots and mechanics. At the time, the United States ranked fourteenth in the world in air strength, but "actually, it was worse than that,"[12] Arnold recalled.

Of all the most important ingredients of good leadership, Arnold identified "hard work" as the one most critical for success; "no outstanding success[13] is ever achieved without it." He spent weeks traveling the country to visit airplane factories and flight schools, stealing blinks of sleep on swaying train cars. At one point, he visited twenty-three cities in three

weeks. The aviation pioneer Donald Douglas—at the time the Army's chief civilian aeronautical engineer—recalled seeing Arnold for the first time, in Miami.

"The first time Hap impressed me[14] was standing in the old Miami Hotel—this must have been early in 1918," Douglas recalled. "In the evenings in the Miami [Hotel], it was a madhouse, with everybody drinking their heads off. Anyway, here comes this great big chap into the hotel, with a bunch of aides running around him, flinging out orders right and left, and I said, 'Who's that?'"

It was Arnold. "We'd seen a hell of a lot of fliers," Douglas recalled, "but they were all boys over here; but here was a man, a big shot."

The logistical challenge facing Arnold proved staggering. "Our harassed little Aviation Section[15] Headquarters in Washington," he recalled, "was the nerve center of something growing bigger all over the country every day."

On April 17, 1918, Colonel Arnold convened the first gathering of a group called the Signal Corps Science and Research Division. This was a think tank that set an archetype for the aeronautical think tanks of the future: a place to dream out loud, where nothing was to seem impossible.

The figures on this committee did not wear military uniforms. They wore crumpled suits and stained ties. The committee head, Robert A. Millikan, was a genius physicist with the University of Chicago who, in five years' time, would earn a Nobel Prize. Millikan had come to prominence by proving Albert Einstein's theoretical concepts regarding cosmic rays. The committee's work opened Arnold's eyes to the value of "long-haireds," as he called scientists whose academic training transcended anything the Army or Navy had to offer.

The group came up with "the Bug," or Flying Bomb. The "FB" was an unmanned biplane that carried eighty pounds of explosives. Essentially, the first drone. It was built out of an eclectic mix of ingredients—a 40 horsepower Ford gasoline engine, bellows pulled out of player pianos, a gyro, an aneroid barometer, airplane ailerons, and wings that spread nearly twelve feet wide. Its team included Millikan, Orville Wright, and the famed General Motors engineer Charles Kettering—"Ket," as Arnold called him, who was also the founder of the Delco automotive electronics company.[*]

"Dr. Millikan was in Washington[16] constantly, staying with us," recalled Eleanor Arnold, "and meeting there with Charles Kettering. They were often at the table together. Hap was in his element with those people."

When the time came to test the Bug, Arnold gathered military brass for an exhibition. The Bug did in fact take off, Arnold recalled. "At about six to eight hundred feet,[17] as if possessed by the devil, it turned over, made Immelmann turns, and seeming to spot the group of brass hats below, dived on them, scattering them in all directions."

It might have been a failure, but disciplined minds, Arnold knew, understood how failure could lead to discovery. Arnold began to believe in a doomsday-weapon philosophy—that inventions in wartime could make the difference between victory and defeat. Scientists and engineers could contribute just as a soldier or general, in the new industrial age. Competition was the impetus for innovation, and when competition involved the life and death of nations, innovation happened fast.

World War I saw new inventions of all kinds: oxygen masks with telephone connections, electrically heated clothing, mobile radio telephones for ground communications, instruments for aeromedical research, and various gun-firing mechanisms. America's most important industrial contribution was the Liberty engine—a mass-produced liquid-cooled engine that could be used in airplanes, boats, even tanks. More than twenty thousand came off assembly lines. "It was in trying to produce[18] the airplanes themselves that we met our real setback," Arnold later wrote. "No American-designed combat plane flew in France or Italy during the entire war. The foreign planes built in this country failed to arrive in Europe either on schedule or in the promised numbers."

The war did make a success out of Arnold, however. At thirty-one, he was the youngest colonel in the Army.

On September 1, 1918, a force of 1,481 European-designed airplanes, twenty balloons, and thirty thousand officers and men assembled over fourteen flying fields in France. The force included American, British, French, and Italian pilots, all under the command of Billy Mitchell. From September 12 to 15, Mitchell led the largest air attack in history up to that time, during the Saint-Mihiel offensive, against German installations in occupied France. This operation was also the first attempt to coordinate air and ground forces on a mass scale.

"Nothing like this had ever been tried before,"[19] Mitchell recounted.

The soldiers on the battlefields looked up, unable to believe their eyes. Soaring above came fleets of flying machines, dodging cannon fire from below while dropping crude bombs from cockpits. Mitchell's armada launched attacks on German supply routes, ammunition storages, and infantry reserves. Among the American aviators was ace pilot Eddie Rickenbacker, who recalled the night hours of this operation from the point of view of the cockpit:

"Through the darkness[20] the whole western front was illuminated with one mass of jagged flashes. The big guns were belching out their shells with such rapidity that there appeared to be millions of them shooting at the same time. Looking back I saw the same scene in my rear. From Luneville on the east to Rheims on the west there was not one spot of darkness along the whole front."

When Arnold heard about this mission, he called it "the greatest thing of its kind[21] seen in war." He was desperate to see action before the war was over.

In the fall of 1918, Arnold finally received permission from the War Department to travel to Europe, and his aim was to report directly to Mitchell's headquarters. By the time he arrived—after a delay spent in a hospital bed as a victim of the Great Influenza pandemic of 1918—the fighting had mostly ended.

"Mitchell returned from [the front][22] and said that firing had stopped all along the line," Arnold wrote in his diary. "I am sorry that I could not at least have had a ride over the lines when there was firing but no such luck."

Arnold felt as if he had missed the war. The best he could do was experience it through Mitchell's stories. "Billy Mitchell was on top[23] of the world at that time," Arnold recalled. "In his headquarters at Souilly, it was plain that the stories about Brigadier General William E. Mitchell had not been exaggerated." Mitchell wore a flamboyant uniform, and he had two personal airplanes. He drove a Mercedes-Benz said to be the fastest car in France. The French saluted him with cheers of "*Vive notre General Americain*."[24]

The armistice arrived on November 11. For the American troops, the sudden silence was the sound of victory. "The silence that followed[25] almost made one's head ache," recalled a thirty-one-year-old captain named

Harry Truman. At Mitchell's headquarters, the brigadier general told Arnold he was going to take a trip through Germany in his speedy Mercedes, then he was going to return home. Mitchell had big plans to launch Army aviation into a new era.

"Listen," he told Arnold, "as soon as you get back there,[26] have orders issued getting me home. I want to get home as fast as possible. Right away. Can you do that?"

"O.K., Bill," Arnold said.

The Allies had won the war, but despite the success of a small handful of American pilots, American aviation had proved a failure in comparison to the Germans, British, and French. Arnold's best hope now was to hitch his destiny to Billy Mitchell. "Watching him and listening[27] to him, I realized how much we needed him back in Washington," Arnold recalled. "There, a different kind of war was going to continue."

4

> The world stands on the threshold[1] of the "aeronautical era." During this epoch the destinies of all people will be controlled through the air. Airpower has come to stay.
>
> —BILLY MITCHELL, *WINGED DEFENSE* (1925)

When the Great War ended, a new America emerged—a country standing on the world stage with unparalleled prestige. When Woodrow Wilson arrived in Italy for negotiations in January 1919, "the reception in Rome exceeded[2] anything I have ever seen in all my years of witnessing public demonstrations," recorded a seasoned Secret Service agent named Edmund Starling. "The people literally hailed the President as a god—'The God of Peace.'" When Wilson reached Paris, one local politician compared the scene to "the second coming of Christ."[3]

One year after the Armistice, the American people chose Warren G. Harding of Ohio as their president, and the incoming postwar Republican administration began a sweeping national movement. The nation saw 116,516 war deaths, and 320,000 sick and wounded. In response, Harding promised "the resumption of our onward,[4] normal way," highlighting "normalcy" as a new national creed.

As if with a scalpel, the new administration removed the liberalism of Theodore Roosevelt and Woodrow Wilson from the White House. In place of internationalism was a new isolationism. In place of federal spending was small government that largely left taxation and spending to the states.

Most important for the disciples of airpower, military spending plunged.

On January 28, 1919, Arnold arrived by car in Los Angeles prepared to take command of the west. Now thirty-two, on the verge of a promotion to captain, his new job put him in charge of developing Army aviation across a huge section of the United States, including the Pacific Coast, the Rocky Mountains, and as far north as Montana. His stature was now big enough that packs of military figures and reporters met him on his arrival.

"The big problem now[5] is to try to keep the air service up to the efficient level it had reached at the close of the war," he told reporters. "I am on my way now to look over my whole territory and one of the first things planned is the careful mapping and photographing of the whole Pacific Coast for landing places."

His base of command was Rockwell Field, founded in San Diego in 1912 as the original Curtiss Aviation School. "We were living in Coronado,"[6] Eleanor recalled, "while Hap was stationed at Rockwell Field . . . There were no quarters. It was a more or less desolate place at that time. I don't think we had many planes, or many men."

Two new subordinates presented themselves with stiff salutes, both destined to become major figures in the rise of airpower. Carl "Tooey" Spaatz—who would end his career as chief of staff of the United States Air Force after World War II—was a twenty-eight-year-old major from Pennsylvania. Spaatz was a walking smokestack—a Lucky Strike man—who had proven himself a skilled and fearless pilot in the first world war. Ira Eaker hailed from Texas and was described by one colleague as "not only a top fighting flyer,"[7] but also Army aviation's "best poker player."

Eaker remembered meeting Arnold: "He was one of the handsomest military figures[8] I've ever seen. He impressed me as a tremendous personality. He always had a glint in his eye, sort of a half-smile."

While few Americans could afford aircraft, the nation was obsessed with them. "Every day there was some news[9] about airplanes," the historian Amity Shlaes wrote of this era. In 1919, famed hotel owner Raymond Orteig offered a prize of $25,000 to any pilot who could fly solo across the Atlantic Ocean. That same year, the first Transcontinental Air Race drew massive crowds.

But for military airmen, times were lean. Americans believed that their soldiers had fought "a war to end all wars," as Woodrow Wilson had put it. The United States emerged from the war with a $21 billion war debt, while

the overall federal debt was roughly $25 billion. The last thing anyone in the White House wanted was to spend money on the Army and Navy.

"A period of reorganization followed[10] the armistice," Arnold recalled. "War personnel was discharged and returned to civil life . . . Equipment and personnel were taken from aviation fields and the fields were abandoned." At Rockwell Field, "we were on very tight money rations,"[11] recalled Eaker. "It was pretty tough in the finance department."

The base employed about eight hundred civilians, some enlisted men, and just nine officers. Most of the airplanes were French-designed De Havillands. Arnold flexed what little muscle he could in hopes of keeping Army aviation relevant. He created a Forest Fire Patrol in 1919, the first Army unit of its kind. "The principal thing he was[12] interested in then was starting the Forest Fire Patrol," recalled Spaatz. "There wasn't much else for us to do."

"We made air patrols over[13] the forest in the West from the Cascade and Olympic Mountains, along the Sierra Nevada and Coast ranges down to the Sierra Madre," Arnold recorded. These patrols saw the first flights over numerous mountain peaks in the west never seen before from above, and airplanes have been used in firefighting ever since.

By this time, Captain Arnold had two small kids. "He had a growing young[14] family, of course, and he spent a lot of time with his children," recalled Eaker. "He always gave me the impression of being a father who really worked at the job." Arnold still loved to fly. "He would fly for miles[15] ten feet off the ground," recalled Spaatz, "just doing that for his own exhilaration. Innocent fun in the air."

These solo flights, with wings just above the treetops, left Arnold alone with his thoughts. It was surely here in the cockpit that he saw, in the horizon, his vision for the future. The airplane, he believed, was going to change the world in ways that few could yet understand. He believed the magic that the Wright brothers unlocked could be used for the common good, and to keep wars from happening again.

"Arnold had this quality of[16] profound optimism . . . ," remembered Robert Lovett, a World War I naval pilot who would later become one of Arnold's closest confidants. "If you choose to use an unfortunate word like 'vision,' he had enough vision to see that we could do with this field things that had up to that time been thought impossible."

On July 4, 1919, Arnold and Billy Mitchell renewed their friendship at a meeting in El Paso, Texas. Arnold always remembered the date, because it was the same day that Jack Dempsey knocked out Jess Willard to win the heavyweight title.

"I could see a change in Billy[17] Mitchell that summer," Arnold noted. "He was sharper, more alert than ever." Mitchell was working in the War Department in Washington as second-in-command of the Army Air Service. In Mitchell, Arnold found a kindred spirit who saw the future of aviation as he did—almost limitless. The ability to conceive aeronautical war-winning weapons and to imagine factories that could build them—this was the future not just of military power, but of world power.

"There can no longer be any doubt,"[18] Mitchell believed, "that complete control of the air by any nation means military control of the world."

For the most part, the officials running the War Department were the same figures who ran it before World War I, officers trained in the nineteenth century. They saw no war coming, nor could they imagine airplanes having any meaning in American military life. In Europe, nations rubbed elbows with one another; borders had proven to be conduits of attack for centuries. In Europe, military aviation made sense. But that history and those borders did not exist in America, where the country was surrounded by oceans like a giant moat. Postwar Gallup polls[19] found that some 70 percent of Americans believed, in retrospect, that involvement in the Great War was a mistake.

If the country was not responsible for fighting foreign wars, and it shared no borders with any hostile state, what did its military need airplanes for?

Mitchell dreamed up a bold plan to prove to the Washington brass that the country needed to invest in military aeronautics, not only to prepare for future wars but to keep them from happening. He wanted to prove that airplanes could sink a battleship. He approached Navy leadership with this idea and was given the cold shoulder. "Can you guess why?"[20] he asked Arnold. Because powerful Navy figures feared airplanes, Mitchell said. The War Department, Mitchell believed, was "unable to face the fact[21] that sea power was done for."

Nobody had ever tried to sink battleships with airplanes. "We're going to get them,"[22] Mitchell assured Arnold, "and we're going to sink them."

On January 4, 1921, Mitchell appeared before the House Appropriations Committee in Washington. The men running the War Department were not seeing the future clearly, Mitchell argued. “Their whole training is that[23] the armored ship is mistress of the sea,” Mitchell explained, “whereas, actually, it is just as helpless as the armored knight was when the firearm was brought against him.”

Congressman Louis Cramton of Michigan asked Mitchell, “Do you mean, General, that experiments as vital as those on a subject as vital as that of national defense are not being studied?”

“The air is less known today than any other branch of the national defense,” Mitchell answered, “and it is less known in this country than in any country in Europe. All we want is a chance to demonstrate these things and have you gentlemen see them.”

Mitchell requested an obsolete battleship, so that he could prove that airplanes could sink it. “The Army fights on land,[24] a navy on the water, but an air force over both,” Mitchell explained. If the Navy would provide the ship, he could sink it—“Tomorrow if you wish.”

This was a gauntlet. “You are throwing the Navy[25] into convulsions,” one reporter wrote Mitchell. “The entire fleet trembles with rage at the mention of your name.”

The Navy finally agreed, commandeering German ships left over from the war. The stage was set for an explosive fight. The age-old rivalry between the American Army and Navy was about to explode, literally, before the eyes of the nation. Thus began what Arnold described as “the closest thing to undeclared[26] civil war since the Whiskey Rebellion in my home state in 1791.”

Mitchell chose a team of pilots, took command of some cutting-edge twin-engine Martin bombers, and brought in Arnold’s old pal Tommy Milling to be the operation’s chief of staff.

“We immediately started,”[27] recalled Milling. “We brought in units from other places, to build up the required number we wanted.” The team practiced dropping bombs on targets at Langley Field in Norfolk, Virginia. “The proposition was that in order to sink a ship, you had to get away from the armored section of it and get below the waterline,” noted Milling, “so

we trained the men to drop the bombs off the side of the ship, a distance of 50 or 100 feet."

During the practice runs, two airplanes collided and crashed into the Chesapeake Bay. Both pilots were killed. But the mission continued.

On June 20, 1921, members of military high command, as well as senators and congressmen, left Washington bound for the Navy base at Hampton, Virginia. The next day, Mitchell's bombers took flight from Langley and roared over the sea, where the German submarine U-117 awaited six miles out, unmanned. Spectators watched from aboard the USS *Henderson* as three planes began attack runs, diving from two and three thousand feet up.

The explosions proved an awesome sight. Mitchell made sure to have the best Army photographers on hand, on the deck of the *Henderson*. Fourteen minutes after a direct hit, the German submarine disappeared, sinking to the floor of the Atlantic. Recalled Milling: "They tell me that the old[28] admirals, on the *Henderson*, just wept like babies as she went down."

One week after the sinking of U-117, the Army and Navy staged the next experiment. The Navy maneuvered a battleship called the USS *Iowa* into position, controlling the ship solely by radio. Then, five of Billy Mitchell's twin-engine Martin bombers attacked using dummy bombs, to test the bombing accuracy. Of 80 bombs dropped, only two hit the *Iowa*. "A distinct jolt was[29] given today to advocates of the theory that the day of modern battleships is over," noted one observer aboard the *Henderson*, "and these fighting bulldogs of the sea are to be rendered obsolete through intensive development of bombing aircraft."

On July 18, however, airplanes succeeded in sinking the German light cruiser *Frankfurt*. Then, for the main event, the Navy brought in the *Ostfriesland*. This dreadnaught had been the queen of the German fleet, reputed to be "unsinkable."

On July 21, angry clouds darkened the mid-Atlantic coast. Rather than boarding the *Henderson* to watch, the Army's chief of staff, Gen. John J. Pershing, and the new secretary of war, John Weeks, stayed ashore because they feared seasickness in the cresting waves. Navy leadership complained that the test might be unfair, because rough seas put the *Ostfriesland* at a disadvantage. "Rules or no rules,"[30] Arnold recalled, "Billy Mitchell had been out to sink that battleship."

The first wave of eight Martin bombers attacked with thousand-pound bombs. “When a death blow has[31] been dealt by a bomb to a vessel, there is no mistaking it,” Mitchell later wrote. “In a minute, the *Ostfriesland* was on her side; in two minutes she was sliding down by the stern and turning over at the same time; in three minutes she was bottomside up, looking like a gigantic whale.”

When the *Ostfriesland* sank into the depths, the bombers returned to Langley airfield. Huge crowds turned out to greet the pilots. Mitchell himself was ecstatic.

To drive home his point, two weeks later, Mitchell conducted a theoretical war game. A small number of attacking airplanes flew over Manhattan to demonstrate what would happen if these airplanes dropped gas bombs. The aircraft flew at eight thousand feet the length of Broadway to Manhattan’s southern tip. *The New York Herald* reported Mitchell’s “theoretical” findings in eerily prophetic language: “The sun rose today on[32] a city whose tallest towers lay scattered in crumbled bits of stone . . . The sun saw, when its light penetrated the ruins, hordes of people on foot, working their way very slowly and painfully up the island. Rich and poor alike . . . Always they looked fearfully up at the sky.”[*]

The war games might have been theoretical, but the threat was real, not just to cities like New York but to the American military establishment. “Nobody in Washington[33] . . . wanted to tangle with the popular Billy Mitchell,” remembered Arnold.

Mitchell’s report on the sinking of the *Ostfriesland* was a call to action that was decades ahead of its time. “It is now necessary to provide[34] an air organization and a method of defending not only our coast cities but our interior cities against the attack of hostile air forces,” he wrote. “An efficient solution of our defense needs will not exist until a department of national defense is organized with a staff common to all services. Subsecretaries for the Army, the Navy, and for the Air Service must be created.”

Herein, for the first time, lay a serious proposal for a self-sufficient air arm of the American military—a separate United States Air Force.

5

> Nothing in this world can take[1] the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination are omnipotent.
>
> —CALVIN COOLIDGE

The new Munitions Building in Washington, built during the Great War on Constitution Avenue, housed the Army Air Service headquarters. In the offices and hallways, a group of like-minded thinkers coalesced. It was almost like a secret society, and all were Billy Mitchell acolytes, fueled by an "us-against-them" contempt for the military establishment. "There was a flying fraternity,[2] you see," recalled K. B. Wolfe, an up-and-coming Army aviation officer. "You were either one of those, or you weren't."

"Arnold," recalled Eaker, "was the closest senior officer[3] . . . to Mitchell." Which gave Arnold a front-row seat to Mitchell's stunning demise.

By this time, Arnold had moved from Rockwell Field to Washington, with a promotion to Air Service chief public information officer. When Arnold visited Mitchell shortly after the *Ostfriesland* episode, he found Mitchell depressed and irritable. Mitchell liked to rub his fingers over a globe when he spoke, as if he was scratching an itch of wanderlust.

"Air power doesn't seem to[4] be getting anywhere at all," Mitchell told Arnold.

Even after Mitchell's airplanes had sunk the *Ostfriesland*, the military establishment refused to believe that aviation would outweigh naval power in future warfare. A budding politician by the name of Franklin D.

Roosevelt, who had served as Secretary of the Navy during World War I, told a group in a speech in 1922, "It is highly unlikely that[5] an airplane, or a fleet of them, could ever sink a fleet of Navy vessels under battle conditions."

"The public was interested,"[6] Arnold recalled, "but the individual leaders in Washington who could do something about it were not . . . [Mitchell] seemed to brush aside the possibility that a lot of people still might not understand his theories, and he could not be convinced that air power was not being blocked by deliberate and well-organized enemies."

In 1923 and 1924, Mitchell made a tour of the Far East, inspecting Japan's air fleet. His six-thousand-word report was yet another jab at his superiors. Japan's air force "was rapidly approaching[7] the second in size in the world, being exceeded in number only by France," Mitchell wrote, with "many more men, more machines and more factories working on an air force three times over what has the United States." He concluded that the US naval base at Pearl Harbor in Hawaii was vulnerable to sneak attack.

A Japanese air attack on Pearl Harbor? Military leaders in 1924 found this premise insulting and absurd.

In the eye of his own storm, Mitchell appeared on the edge. His newlywed wife reported "recent erratic conduct"[8] to Secretary of War John Weeks, who recommended a stay at Walter Reed General Hospital, where Mitchell underwent psychiatric evaluations. But Mitchell passed his medical examinations and remained in the public eye, making headlines with new aviation speed records of well over 200 mph.

Late in 1924, Mitchell penned a series of articles in *The Saturday Evening Post,* one of the most widely read publications in America. The articles again attacked the establishment. "They always fear to change,"[9] he argued, "to do away with or eliminate anything which has long been a part of their organization or system." Secretary of War John Weeks countered by firing Mitchell from his position as second-in-command of the Army Air Service and demoting him to a rank of colonel.

Then came the *Shenandoah* disaster. The *Shenandoah* was a US Navy leviathan airship—the first rigid body flying balloon inflated with helium, based on German Zeppelin designs of World War I. The ship was the *Titanic* of the skies—more than two football fields long, with five 6-cylinder Packard engines and a top speed of 60 mph. On September 3, 1925, violent winds tore the *Shenandoah* apart over Ohio, and the crash

killed fourteen crew members. Navy leaders were so humiliated, they brought in the FBI to guard the crash site in hopes of minimizing publicity.

Mitchell saw opportunity—or perhaps vengeance. Calling an audience to his office three days later, he described the tragedy as "direct results of incompetency,[10] criminal negligence and almost treasonable administration of the national defense by the War and Navy Departments . . . All aviation policies, schemes, and systems are dictated by the non-flying officers of the Army and Navy who know practically nothing about it. The lives of the airmen are being used merely as pawns in their hands."

Mitchell followed up by publishing his first book, *Winged Defense*, a paean to air power that, in stark language, called for the founding of a separate air force—"a department of aeronautics[11] to handle the whole air question, coequal with the Army and Navy." He argued in his preface that the advent of the air age meant America had to rethink its place in the community of nations, that America was going to have no choice in the future but to engage internationally from a position of leadership, for the sake of national security: "The former isolation of the[12] United States is a thing of the past." (The publisher, G. P. Putnam, called Mitchell's book "a bomb in the lap[13] of American complacency.")

Mitchell's opponents had seen enough. They brought him up on charges of insubordination. To which the airman responded: "I have not yet even begun[14] to fight."

On August 2, 1923, at 7:20 p.m., President Warren G. Harding was lounging in the Presidential Suite at the Palace Hotel in San Francisco, listening to his wife as she read to him an article in the *Saturday Evening Post.* Harding uttered the words, "That's good, go on."[15] Then he suddenly collapsed, and never regained consciousness.

For weeks, all anyone in America seemed to talk about was the unexpected death of President Harding. There was talk of foul play. Part of the story was the rise of Calvin Coolidge of Massachusetts to the presidency. "Silent Cal" confronted his new job with a six-word statement: "I believe I can swing it."[16]

Coolidge began his term while the Mitchell affair was reaching its climax. Mitchell's statements infuriated Coolidge, who saw no war on the

horizon and Mitchell's popularity as a threat. The new president was determined to silence him.

"Coolidge Revealed as Actual[17] Accuser of Col. Mitchell," read the front page of *The Washington Post* on October 30, 1925. "The entire system of national defense is under fire."

"President Coolidge will face[18] a real test of strength," one Washington insider explained, "perhaps his major one in the new Congress, on the issue of air policy. A highly technical problem concerning our national security has become a political issue with the public aligned on one side or the other." The public's fascination with airplanes made the Mitchell story all the more riveting. Airplanes had an "almost unbelievable place[19] in public imagination," wrote Army Lt. Cmdr. Clifford Tinker in a story about Mitchell in *McClure's* magazine.

The "Three Musketeers"—Arnold, Spaatz, and Eaker—anchored Mitchell's support. "We sort of made a team,"[20] Eaker recalled, "coming to Mitchell's aid."

Arnold found himself in a strange position. Almost to the day that President Harding died, the Arnold family lost a two-year-old son due to a ruptured appendix. Arnold also lost his mother, to whom he was intensely devoted. The grief hit him so hard his hair turned gray almost overnight, and he faced the kind of difficult decisions that military leaders can face—to put his health and his duties to his family first, or to prioritize what he saw as his duty to his country, which was to get behind Mitchell and fight for airpower, even if that meant a fight against the establishment. Arnold chose the latter, and threw himself into the fray.

"Billy, take it easy,"[21] Arnold said. "We need you. Don't throw everything away just to beat out some guy who doesn't understand! Air power is coming! . . . Stop saying all these things about the independent air arm that are driving these old Army and Navy people crazy!"

"When senior officers won't see facts," Mitchell said, "something unorthodox, perhaps an explosion, is necessary. I'm doing it for the good of the air force, for the future of air force, for the good of you fellows. I can afford to do it. You can't."

It was said that "Silent Cal" Coolidge could be silent in five languages. Coolidge got someone else to do the talking for him. He chose J. P. Morgan

banking chief Dwight Morrow[*] to lead an investigatory team, to gather testimony in advance of Mitchell's insubordination trial.

The Morrow Board interviewed ninety-nine witnesses over four weeks, dramatic hearings that took place in Washington. Most subjects were establishment powerhouses, relentless in their attacks on Mitchell and his supporters. Martin B. Madden, congressman of Illinois and head of the House Appropriations Committee, went so far as to accuse the Army and Navy of squandering millions of dollars on aviation, "in a purposeless, meaningless,[22] endless experimental orgy."

On the final day of testimony—on October 16, 1925—Cmdr. J. C. Hunsaker, a naval attache who had been serving in London, testified that Mitchell's warnings of foreign attack by air were exaggerations. "No country is ahead of us[23] in airplane design," he told the Morrow Board. An attack by a foreign country by airplanes "seems out of the question."

Then, it was Capt. Henry Arnold's turn to testify. "He had no hesitancy about[24] testifying . . . ," recalled his wife. "He was ready to go right down the line."

Just before Arnold fielded his first question, a thunderous roar interrupted the proceedings. It came from above, and it was so voluminous, it shook the building's bones. Arnold calmly said, "Gentlemen, you have just[25] heard the noise of the entire air force of the United States. Thirty-five planes. That's all."

Arnold had managed to signal his men to fly their aircraft in a group over the roof of the Wardman, right when he was set to testify. Stunned by the stunt, Morrow gathered himself and asked Arnold, "Do you mean to say those thirty-five planes are all we have in the United States?"

"It is the entire air force of the Army . . . ," Arnold said. "That is all we have for land defense . . . Those thirty-five planes are all that we could get together in the whole United States. It is everything we had in pursuit, observation, and combat. Just think of it, gentlemen. There are ten bombardment, twelve attack and thirteen pursuit planes, and that is all . . ."

Morrow asked, "Do you mean to say, that is all you could get together for this particular demonstration, or all you could get together if Washington were attacked by an enemy?"

"It is all we could get together in a short space of time . . . ," Arnold said. "We have been trying for five years [since the Armistice] to build up an air force, and you heard it all this afternoon—thirty-five planes."

On December 17, 1925, Mitchell stood with his wife in the courtroom in Washington's Emery Building. The team of judges included twelve high-level military officials, including a young officer named Douglas MacArthur. "There was a deathly stillness[26] in the shabby courtroom," recalled an eyewitness. "Colonel Mitchell listened to the[27] verdict with a smile on his face," recalled another.

Mitchell was found guilty of "conduct of a nature to bring discredit upon the military service." He was court-martialed—stripped of all rank and duty, and suspended for five years without pay.

"He was a fighter,"[28] Arnold recorded. "The public was on his side, he was righter than hell and he knew it."

Soon after, Congress voted down every proposal for the expansion of military aviation. The Morrow Board found that there was no threat of foreign attack by air, "no direct menace to the United States[29] in any future which scientific thought can now foresee." *The Washington Post* summed up the affair in a front-page story: "The administration is firmly in the saddle[30] so far as aircraft legislation is concerned. The battle fought by Col. William Mitchell and his adherents is lost."

The only major change the Morrow Board recommended was in name only. On July 2, 1926, President Coolidge signed the Air Corps Act, changing the Army Air Service's name to the United States Army Air Corps, "thereby strengthening the conception[31] of military aviation as an offensive, striking arm rather than an auxiliary service."

Days later, Arnold was called into the office of his boss, Gen. Mason Patrick. Capt. Arnold arrived and saluted. Patrick was furious. "In your opinion,"[32] General Patrick asked, "what's the worst facility we have in the entire Air Service?"

"Oh, there's no doubt about that," Arnold responded. "It has to be Fort Riley, Kansas."

"Good," said General Patrick. "You are now the commanding officer of an observation squadron there."

The Arnold family boarded a train headed for Kansas. Henry Jr. —"Hank," as his parents called him—recalled that it was the only time he ever saw his mother cry. Arnold and his wife spoke quietly so the kids could not hear as the steel wheels clattered on the railroad. "They tried to disguise their[33] conversation," their son Bruce later recalled. "But we

weren't idiots. Before we were halfway across Missouri, we all knew that Pop had been kicked out of Washington in disgrace."

The forces of anti-militarism and isolationism in America continued to gain strength: the president's fiscal policy, the sense of safety provided by geographic isolation, the sorrow that still stung so many Americans over the loss of loved ones in a world war that had ended just five years earlier. The power elite did not possess the *vision* to see a future when national security would require internationalism, when airpower would rule the skies, and war would engulf the globe.

"The time of airplane performance,[34] in fact, had not yet arrived," Arnold later wrote. "Air Power was still ahead of us."

6

> This hour I rode the sky[1] like a god, but after it was over, how glad I would be to go back to earth and live among men, to feel the soil under my feet and to be smaller than the mountains and trees.
>
> —CHARLES LINDBERGH

Looking back on the world's great public displays of celebration during the first half of the twentieth century, one thinks of the Harlem Hellfighters marching through New York in 1919—the first Black American Army regiment to fight overseas, returning home in triumph and kicking off the Harlem Renaissance in the process. Or the 1926 Army-Navy football game at the dedication day of Soldier Field in Chicago, where the teams played to a 21–21 tie in front of one hundred thousand.

But nothing compared to the hero worship that Charles "Lucky Lindy" Lindbergh experienced upon arriving in New York on June 13, 1927, after becoming the first to fly an airplane solo across the Atlantic.

Four million people laid eyes on Lindbergh on this one day, as the ticker tape parade crawled north up Fifth Avenue. Some 7.5 million feet of newsreel captured his movements. Toys and games were named after him or with the likeness of his *Spirit of St. Louis* airplane, as well as Lindbergh brands of bread, watches, pencils, cigars, cans of fruit . . .

Lindbergh's flight made the world "air crazy." "The news just saturated all[2] conversation, newspapers, the radios," remembered George McGovern, a future World War II bomber pilot and presidential candidate who was four years old at the time. "I just thought he was the most glamorous creature on God's earth. I grew up thinking that Lindbergh was our greatest American."

"Slim" Lindy's flight was the catalyst for a new Golden Age of Aviation. "That golden era of the air,"[3] recalled Arnold, "the period from 1927 to 1930, was as productive of air heroes as it was of new air exploits . . . There were the zealots who performed breath-taking deeds aloft which caught the world's fancy and ushered in the new air era—the ocean spanners, the substratosphere explorers, the world girdlers."

Not to mention transcontinental air races, Amelia Earhart's transoceanic flights, the around-the-world journey of Wiley Post and Harold Gatty, and commander Richard F. Byrd's flight over the South Pole. The Pan American Goodwill Flight sent five aircraft (named *New York, San Antonio, St. Louis, Detroit*, and *San Francisco*) soaring over South America, forging not just new air routes but future political and economic connections. Among the pilots were Ira Eaker and Muir Fairchild, a future Air Force vice chief of staff.

In an attempt to spark growth in civilian aviation, Calvin Coolidge signed the 1925 Contract Air Mail Act, placing the air mail service in the hands of nascent airlines. Donald Douglas's Douglas Aircraft Company was founded in 1921 and made airplanes that accomplished the first circumnavigation of the globe. Glenn Curtiss's Curtiss Aeroplane and Motor Company, based in Buffalo, bought out the Wright brothers to form Curtiss-Wright, and was building the famed Curtiss JN "Jenny," the signature aircraft for barnstorming circus shows around the country.

Ford Motor Company's Tri-Motor, the "Tin Goose," was the Model T of the air, claiming the title of America's bestselling aircraft. The Fords also built the country's most modern airport in Dearborn, Michigan, along with the 108-room Dearborn Inn, the first purpose-built airport hotel.[*] "There are sound economic[4] reasons for believing that a great epoch of air transportation is being born," said Edsel Ford, Henry's son and president of Ford Motor Company, in 1928.

Delta Air Lines was founded in 1925, followed by American Airways (1926), Eastern (1926), United Aircraft (1926), and Transcontinental and Western Air (1930). Civilian air travel was extraordinarily uncomfortable by modern standards; a passenger in a Ford Tri-Motor was assaulted by nearly 120 decibels of noise, loud enough to cause permanent hearing damage. But adventurous Americans wanted to go places and to experience the magic of flight.

Aviation companies used all manner of marketing policies to lure paying customers. For example, they employed female "stewardesses." As one 1920s airline magazine put it, "There is still a newness about[5] air travel, and, though statistics demonstrate its safety, the psychological effect of having a girl on board is enormous."

"Speed is a magic word in[6] air parlance," Arnold wrote in 1926. While the early Wright brothers flights averaged about 40 mph, the world aviation speed record hit 318 mph in 1928. In 1927, Army Air Corps pilot Jimmy Doolittle conducted the first instrument flying tests, piloting a De Havilland entirely by instrument rather than sight. "Flying by instruments soon[7] outgrew the early experimental phase," Doolittle wrote. "It became a practical reality and aviation entered a new era." The same year, the altitude record reached 38,418 feet—seven and a quarter miles high.

It was an exciting time to be in America. Daily life seemed to offer something new every day. In 1923, Coolidge lit the first electric-light National Christmas Tree on the White House grounds, inspiring more Americans to wire their homes with electricity. America's desire for new consumer products grew insatiable: Heinz Pickles, Ivory Soap, Gillette Safety Razors. In 1926, NBC was founded, and the world saw the first demonstration of a television machine a year later, when US Secretary of Commerce Herbert Hoover appeared on a screen in New York while his feet were firmly planted in Washington, DC. Newspapers boldly reported that "time and space were eliminated."[8]

In the corporate world, US Steel had become the world's first billion-dollar corporation. But it was the Boeing versus Douglas dogfight that captured the spirit of the era. Donald Douglas and William Boeing fought to bring out the best airplanes, and sell the most of them. "In the annals of titanic[9] competitions between corporations," noted the *Los Angeles Times,* "few during this century have been waged with the intensity or longevity as the one between Boeing Co. and Douglas Aircraft Co."[*]

One American who was not caught up in the roaring twenties excitement was Henry Arnold, who was living in exile at a small Army airfield in Kansas, now with the rank of major.

"There's no question he was[10] a pretty bitter and unhappy man at this time," remembered Arnold's close friend Donald Douglas. "Hap went through a low period. . . . It was after the court martial of Mitchell. I

remember one day—it must have been in ’26, ’27—he was telling me that he thought he was through in the [Air Corps].”

One day in 1926, Arnold sat in his office studying a map. Dreaming of a new airline of his own, he drew out air routes, creating a spiderweb of pencil markings through the Caribbean islands and as far south as Guatemala and Honduras. “I then called in Major Spaatz[11] and Major Jack Jouett,” he recalled. “We talked it over for hours, and finally we called in an ex-Navy man by the name of John Montgomery.”

Together, these military figures—none of whom had any money—created Pan American Airways, Inc. Montgomery was able to get financing. By July 1927, while the Lindbergh flight dominated the news, Montgomery was writing letters on freshly printed Pan American stationery, formally offering Arnold its leadership. “We are proceeding as rapidly[12] as possible with the organization and expect to have it completed within a week,” Montgomery wrote on July 27. “We would suggest, therefore, that if possible you arrange your leave so as to be in New York by Tuesday, September 6th, 1927.”

“The salary at Pan Am would[13] have been tremendous,” Eleanor Arnold recalled. At the last minute, however, Arnold changed his mind about Pan Am. He decided to stick with the Army. “In his heart,”[14] recalled Eleanor, “Hap loved the service, always. He loved it. He was loyal.”

Pan Am would go on to become the first international air carrier, the first jumbo jet airline, and a symbol of Stars and Stripes primacy. Arnold would end up profiting not a dime. A little more than a year after Pan Am was founded, on October 24, 1929, the stock market crashed. Five billion dollars evaporated from the stock market in one day. The crash came at the same time as new orders for Arnold, and soon the family moved again, this time to March Field outside Riverside, California.

“The Arnolds landed on March Field,[15] in debt,” according to Eleanor, “and with no savings and no education fund, nothing but our paycheck.” The family arrived in their old Nash automobile just after sunset during a torrential rainstorm, in November 1929. Arnold took his two top deputies with him—Eaker and Spaatz. It was around this time that Arnold began to go by his famous nickname, Hap.[*]

Due to the Depression, military expenditures all but disappeared. “The Army had to be partially[16] disbanded,” recalled Eaker. “A lot of people had to get out. There was a great battle, as to how much the [Air Corps] could strip down . . . It had a very threatening morale effect—we couldn’t get the engines, couldn’t get the spare parts to fix up the airplanes, and sometimes they’d only let us fly four hours a month (because of gasoline). Then they even reduced our pay.”

The economic emergency heightened the country’s anti-military ethos. Who could think of taxpayer spending on the Army when people were starving and there was no war? Military officers wore street clothes rather than uniforms, when they left their bases. “To be a military officer[17] was somewhat in the nature of being almost un-American,” Eaker recalled. “In uniform, you were ‘someone who advocated for war.’”

Due to March Field’s proximity to Los Angeles and its budding film colony, Arnold welcomed studios to shoot air scenes for movies, and enjoyed showing off the aircraft to stars like Errol Flynn and Clark Gable. Still, money was so tight that Arnold had to make a special request when the offices ran short of typewriters. “The machine the Air Corps[18] could least afford to be without is the typewriter,” he said at the time, “for communications are the backbone of our operations.” In 1932, the Air Corps allotted three typewriters per squadron of aircraft. Arnold wrote the Army Table of Basic Allowances, requesting that this number be raised to four, and was denied.

In the early 1930s, in part due to the crushing economic depression, movements in power began to alter course. Like ocean tides, these power shifts were invisible in real time, yet overwhelmingly forceful as they began to shape the future. Early in 1933, two new leaders came to power: Adolf Hitler in Germany and Franklin Roosevelt in the United States. At roughly this same time, Japanese forces invaded the Manchuria province of China. Japan’s movement into Manchuria was the first explosion of violence in what would become World War II.

On February 9, 1934, Arnold and his wife went on a morning horseback trip into the desert mountains outside of March Field. “Twelve or fourteen of us[19] rode up into the mountains,” Eleanor remembered, “and the chuck

wagon used to meet us there, and we'd have flapjacks and coffee, a real old Army breakfast out in the mountains."

Suddenly, a man on horseback appeared. This messenger pulled Arnold aside and told him that Carl Spaatz, in Washington, needed to speak to him immediately. The group turned back for March Field, where Arnold spoke with Spaatz on the phone. Spaatz told an electrifying story.

For weeks, a growing scandal in Washington had made headlines, regarding fraud, airmail contracts, and the private airline carriers. These stories were inscrutable. All that seemed certain was that powerful people were pointing fingers at each other. During FDR's first midterm election year, it all smelled of smoky backroom political machinations. Nevertheless, the Roosevelt administration now formally accused leaders at private airlines of manipulating fees that the government paid for carrying airmail. As Spaatz explained to Arnold, FDR had met with the secretary of war and had made a shocking decision, that morning:

The president was canceling all the contracts with the private airlines, and was now handing over the US Postal Service's airmail duties to the Army Air Corps. Arnold realized that American military airpower was on the verge of its most important test since the Great War. Could the Army handle this job? It was starved for resources. What few pilots were on hand had little flying experience. But success could be the spark that finally proved airpower's importance in the eyes of the War Department and the White House.

The day that Arnold learned of the news, the administration released the infamous Executive Order 6591: "It is . . . ordered and directed that the Secretary[20] of War place at the disposal of the Postmaster General such airplanes, landing fields, pilots, and other employees and equipment of the Army of the United States needed or required for the transportation of mail, during the present emergency."

The Army Air Corps Mail Operation split the country into three zones—East, Central, and West. Brig. Gen. Oscar Westover was placed in overall command; Maj. B.Q. Jones took command of the eastern zone with headquarters in New York City; Lt. Col. Horace Hickam the central zone with offices in Chicago; and Arnold was placed in charge of the west, from Wyoming to the Pacific. This zone included airmail routes connecting San

Diego, Los Angeles, San Francisco, Portland, Seattle, and Salt Lake City, with much of this territory iced over in the middle of winter.

"We were given ten days[21] in which to orient ourselves," according to Arnold. "That is, my boys had ten days in which to 'familiarize' themselves with the topography and weather idiosyncrasies of the air-mail routes."

Arnold traveled to Salt Lake City and set up headquarters in the Newhouse Hotel downtown, a new twelve-story brick "skyscraper." An Air Corps pilot whom he had his eye on—young and highly talented Barney Giles—was at March Field when he got a call from his boss. "We took a big load of[22] supplies up in a great big old Martin bomber," Giles remembered. "We took about 4,000 pounds of batteries, special equipment . . . So we flew on in, and went right on into Arnold's headquarters."

Arnold told Eaker, "Your squadron will run the[23] route from Los Angeles to Salt Lake City. That's route 4. You're in command of it, and your squadron is to run it."

"Where are we going to get the money for this?" Eaker asked. "We've got to rent these offices that Western Airlines has."

"Go ahead, take it over," said Arnold. "I'll support you."

The Sunday before the flying began, a group of pilots reported for duty at Arnold's headquarters in Salt Lake City. Snow blanketed the region, and these fresh-faced Army pilots played with the Arnolds' children in the snow. "I never shall forget it,"[24] recalled Eleanor. "They sat around the fire and had sandwiches and coffee, and the next morning, they departed. Three-quarters of them were killed within two weeks . . . You know, the airmail was a very tragic affair."

7

When I go, I'd like best[1] to go in my plane. Quickly.

—AMELIA EARHART

Long before the days of email, the US Postal Service's mail routes were the circulatory system for the economy of the strongest nation on earth. If money was the lifeblood, the mail routes were the veins and arteries. If anything could benefit from the new science of aviation in the twentieth century, mail was a prime candidate. In 1934, however, the Roosevelt administration broke up the system of private airline mail contracts after a Senate investigation claimed corruption among the airline executives to keep their fees high and keep only the largest airlines getting the contracts.

Immediately after Roosevelt's Executive Order, the administration realized it had created a political maelstrom. The order was an attack on this growing industry—both in publicity and financially—with no concrete proof of wrongdoing. The world's most famous aviator, Lindbergh, went on the attack, telegramming the president and releasing his missive to the press. It ran on front pages of newspapers across the nation. "THE CONDEMNATION OF COMMERCIAL AVIATION BY CANCELLATION OF ALL MAIL CONTRACTS AND THE USE OF THE ARMY ON COMMERCIAL AIRLINES WILL UNNECESSARILY AND GREATLY DAMAGE ALL AMERICAN AVIATION," Lindbergh charged.

The Air Corps' top official in Washington, Maj. Gen. Benjamin Foulois, promised that the Army could do the job. "The President has ordered[2] the Army Air Corps to carry the air mail," he told the press. "And we'll carry it. Organizing the carrying service has been a rapidly but well done job. We're

all set to begin service covering nearly 41,000 miles a day in 68 daily trips. Everything is working smoothly and efficiently."

Around the country, leaders of the three Air Corps zones prepared to launch their operations, having to plan, build, and man what were essentially entire airlines from scratch in a matter of days. "My pilots were mostly[3] Reserve officers," Arnold later wrote, "none of whom . . . had had two years' service. Very few of the 'regular' civilian air-mail routes had been flown over by these officers. They had none of the special instruments; they must fly in whatever planes we had, including trainers."

On February 16, three days before the Army was set to fly the mail routes, two pilots named Lt. Jean D. Grenier, age twenty-four of Manchester, New Hampshire, and Lt. Edwin D. White, twenty-three, of Berkeley, California, took off for a test flight from Salt Lake City, at 9:15 a.m., bound for Rock Springs, Wyoming. Their airplane never arrived. Arnold sent out search aircraft. The wreck was discovered eighteen miles southeast of Oakley, Utah, with no survivors. The next day, another of Arnold's flyers, Lt. James Y. Eastham, twenty-two, of Huntsville, Texas, died when his airplane exploded in a fireball after crash-landing near Jerome, Idaho.

"It hit us very hard,"[4] recalled Eleanor. "Those boys were [Arnold's] children, you know . . . Hap slept right in his office. The men lived in their offices, and their radios and offices were all together on that floor [of the hotel]."

Because the airmail story was already a politicized scandal, the press was all over it. Nothing could sell newspapers like photos of airplane crashes, or the public embarrassment of an American president. This scandal had both. World War I ace flyer Eddie Rickenbacker called the deaths "legalized murder."[5] And still, the real Air Corps mail flying had yet to begin.

At the same time the airmail scandal started, on the other side of the Atlantic, a frenzy of air activity was also taking place—inside Nazi Germany. The same week that Roosevelt released his airmail executive order, in February 1934, American newspapers published some of the first reports of German rearmament in the air.

"Never has any government[6] more bestirred itself to make its citizens air-minded than has the Hitler regime," reported the American journalist Hugh Jedell. "There is ceaseless propaganda in the newspapers, over the radio and at public meetings for inculcating popular interest in flying."

"Our aviation enters a new phase,"[7] announced one Nazi captain. "Its essential note is the consciousness that its nurture serves primarily our fatherland's renaissance."

The Third Reich announced a "German Air Sports Week," and Berlin saw groups of pilots swarming street corners collecting funds to help turn the country into "a nation of flyers."[8] "There can be no doubt of her[9] [Germany's] intention," the *New York Times* reported the same week that Roosevelt released his airmail executive order. "The remarkable intensification and improvement in the methods of training, disciplining, controlling, uniforming and organizing manpower since National Socialism came to power have surprised even close advisors."

"Mad Race for Air Power Is On,"[10] claimed a *Washington Post* headline.

Few in the United States noted the stark contrast of these unfolding stories about aviation—in the US and in Nazi Germany—in their newspapers, at the same time. One who did was Franklin Roosevelt, a voracious reader of newspapers. Roosevelt routinely read four, five, even a dozen on any given day, almost always including *The New York Times*, *The Washington Post,* and the *New York Herald-Tribune.*

"It may be said that the world at large is due[11] for some surprises in respect to German air rearmament," reported the *Times*. "It is generally understood that the next war, when it comes, will be fought in the air."

At dawn on February 19, all over the United States, the first Army airmail flights took off. Over the following days, a series of accidents shocked the nation. "Within a week,"[12] Arnold recorded, "the crack-ups were pushing Hitler, the New Deal, and the Stavisky case in France, out of the headlines." On February 23: "One Killed in Ohio,[13] Another in Texas." The next day: "Another Army Pilot Is Killed[14]; 6 Die in Week."

Between February 19 and June 12, Army airmen suffered 66 major accidents and 13 deaths. The Army flew over 777,000 pounds of mail over

1.5 million miles in any kind of airplane pilots could get their hands on, in all kinds of weather.

What started as a political football turned into the biggest scandal FDR's administration had seen yet. "Politics was costing the lives[15] of a lot of boys," as Arnold put it. Arnold's western zone saw the most hazardous flying, over twelve-thousand-foot peaks and impenetrable ocean fogs. With the exception of the three deaths prior to the date when the Army officially took over airmail duty, his zone was the only of the three that did not see a fatality.

When Roosevelt ended the "Army Air Mail Fiasco" on June 12, 1934, General Westover, in charge of the overall operation, gave a statement: "When you consider how[16] the job was dumped on our laps, how little warning we had, how little time for preparation, the men have done exceptionally well, particularly with our present equipment." The administration gave the airmail contracts back to the major private airlines, if they promised to reorganize. Which they did, mostly in name only. American Airways became American Airlines. United Aircraft became United Air Lines. Eastern Air Transport became Eastern Air Lines.

In Washington, a humiliated president let loose his fury on War Department officials. Roosevelt had agreed to the plan, he said, because top Army officials had promised him the Army flyers could do the job. He appointed former secretary of war Newton Baker to lead a committee to investigate the Air Corps. Baker formed the "Baker Board" and began hearings in Washington.

Billy Mitchell, who at that time was living in obscurity and would be dead of heart failure in two years, gave a statement that cut to the core of the matter. "If an army aviator can't fly[17] a mail route in any sort of weather," he said, "what would we do in a war?"

At Army headquarters in Washington, officials were desperate to shift the narrative. They came up with a plan for an ambitious mission. Alaska had been an official American territory since 1912, but it was still mostly an untouched wilderness. What if the Army Air Corps sent a group of top aviators to map it for the first time and fly over Mount McKinley, the tallest mountain in North America?

"America needed, by June[18] of 1934, a re-birth of faith in its military aviation," according to this mission's official documentation. "To regain the nation's confidence—and the government encouragement dependent thereon—the [Army Air Corps] must now accomplish some unusually laudable feat. The Alaskan flight was to be the answer."

Arnold was back in his office at March Field in southern California when he received a telegram from Army headquarters. Would he be interested in leading the mission? He placed a long-distance phone call to the chief of the Air Corps, Benjamin Foulois.

"General," Arnold said, "I hear the fishing is great[19] in Alaska now. When do I leave?"

Arnold assumed command of the Alaska mission on June 25, 1934. The official documentation noted on this day: "Health of Command: Excellent.[20] Morale of Command: Excellent." For the next month, Arnold commanded a fleet of new Martin B-10 twin-engine aircraft—the first all-metal modern monoplane bomber produced in any quantity—over Canada and into Alaska. The crews photo-mapped nearly twenty-one thousand miles of coastline and circled the twenty-thousand-foot peak of McKinley. "That was one of the finest[21] exhibitions of expert pilotage that has ever been done," noted Army pilot Hugh Knerr, who was on the trip, "because we went through rough country. And they literally cut strips out of the forest brush [for] our landings."

At the same time, Roosevelt's Baker Board conducted hearings in Washington behind closed doors, to investigate the airmail disaster and make recommendations for the future of Army aviation. When the Baker Board released its 4,283-page report, it once again recommended no major new investment in airpower. "Our national defense policy[22] contemplates aggression against no nation," the report concluded. "The idea that aviation can replace any of the other elements of our armed forces is found, on analysis, to be erroneous."

On August 20, Arnold's flyers completed their mission. The press photographers captured the moment Arnold stepped from his aircraft onto the tarmac at Washington Airport. Tanned from the long Alaska summer days, Arnold flashed his trademark smile at the welcoming crowds and gave them a surprise. The governor of the Alaskan territory had given him,

as tokens of goodwill, six Malamute Eskimo husky pups, which came rushing out of the airplanes. All objectives, Arnold announced, “were met with success.”

Arnold became the first pilot to receive the Mackay Cup trophy a second time. He paid his first visit to the White House. Recalled Donald Douglas: “That’s when he really burst out.”[23]

On March 2, 1935, Arnold was promoted to brigadier general and ordered back to Washington to serve as second-in-command of the Air Corps. Once again, the family packed its belongings and moved. He earned his first Army star. His new job was partly political and thus a little dangerous. “In Washington,” Arnold believed,[24] “you never know just who is trying to find out just what, or just how, or just why.”

8

The Americans cannot build[1] aeroplanes. They are very good at refrigerators and razor blades.

—HERMANN GOERING, CHIEF OF THE NAZI LUFTWAFFE

In the hallways of the Munitions Building, the martyrdom of Billy Mitchell was still palpable, and the tight-knit group of Army Air Corps officers remained steadfast in their dreams to build American airpower and launch a separate Air Force, coequal with the Army and Navy.

"I never met anyone[2] who did not from the very beginning accept the desirability of a separate air force," recalled the Army pilot and engineer K. B. Wolfe. "Everybody in the [Air Corps][3] talked about that, year after year after year," recalled American Airlines executive and Army Maj. Gen. Cyrus Rowlett Smith.

"We suffered,"[4] said Benjamin Kelsey, an Army airman who made brigadier general during the 1940s. "We suffered in procurement. We suffered in funding. We suffered in doctrine. In everything. By being an upstart brand of the Army."

In the 1930s, however, Arnold noticed a shift in the narrative. His rise to number two in the Air Corps came at an opportune time. "Almost at the same moment[5] I arrived in Washington, the first real American Air Power appeared," he later wrote. "Not just brilliant prophecies, good coastal defense airplanes, or promising techniques. But, for the first time in history, Air Power that you could put your hand on."

In the spring of 1936, the world's first four-engine bomber landed at Langley Field, south of Washington. The Boeing B-17 "Flying Fortress"

was the world's first "heavy bomber." It was, in Arnold's words, "a turning point in the course[6] of air power—of world power."

In the future, it would be called a legend. But in its time, the B-17 Flying Fortress landed in the public eye in a whirlwind of controversy.

Its story began with a contest. On August 6, 1934, the Army Air Corps sent out requests for a new multi-engine bombardment airplane. The request set a deadline of August 1935 for the first prototype, and pitted potential manufacturers against each other. The Army wanted a range of 1,020 miles, speeds of 200 to 250 mph, a 1-ton bombload, and a crew of four to six.

Boeing's chief executive, Claire Egtvedt, convinced the company's board of directors to authorize the building of a prototype, knowing that the cost of the construction would exceed the total financial resources of the company. It was a massive gamble. Failure could mean the end of Boeing—a company founded in Seattle in 1916.

A year of around-the-clock work followed before the prototype rolled out of Boeing's Seattle factory on July 17, 1935, with codename Model 299. It was built of some sixty-five thousand parts, a quarter million rivets, and tens of thousands of spot welds. It measured 103 feet, nine inches from wingtip to wingtip. A photo of the plane in the *Seattle Times* appeared with the headline "15-Ton Flying Fortress."[7] From that day forward, the airplane had its name.

On August 20, Boeing pilot Leslie Tower flew the new B-17 Flying Fortress with a crew to Wright Field in Dayton, where Orville Wright himself got a tour. The nonstop trip lasted nine hours and three minutes, averaging 233 mph. Then, on October 30, 1935, a group of Air Corps and Boeing officials gathered to take the prototype up for a shakedown flight. The Army's Donald L. Putt was sitting in the copilot seat on that morning.

"When we taxied out,[8] for some reason, we were in a hurry," Putt later said. "[Boeing test pilot] Pete Hill was the pilot that day. I'd been doing most of the test work. When we got to the end of the field, ready to take off, the controls were all right. . . . So that takeoff was perfectly normal. Even in the few seconds we were in the air, we gradually picked up speed."

At two hundred feet, the Flying Fortress suddenly banked and dove toward the earth with its engines screaming. When the behemoth impacted, the jolt could be felt thousands of feet away. Boeing's youthful engineering star Ed Wells was on the ground at Wright Field, watching when the cockpit

burst into flames. “It was just as if, when[9] the plane crashed, I had seen a child of mine slain in front of my eyes,” he remembered. “And I could do nothing to save it.” Two of Boeing’s best pilots, Towers and Ployer “Pete” Hill, did not survive.

Boeing officials had spent $600,000 on this prototype [over $14 million in 2025], in hopes of winning an Army contract, and were not sure the company would survive. A team formed to investigate. “General Arnold was on the[10] original Board that went up [to] the Boeing factory to look at the B-17,” recalled Army airman Eugene Eubank. “I was on that Board, and General Tooey Spaatz, and a boy named Jake Harman, who was the engineer on it.” News of the flight crash was a terrible blow to the Air Corps establishment. Arnold and others poked and prodded at the wreck. The accident, they learned, was tragically avoidable. The pilot had forgotten to unlock controls for the rudder and ailerons.

“We must not permit another[11] accident to happen,” Arnold told the others. “Now go over the list of officers coming out of the Tactical School, returning from foreign service, and pick out the very best pilots that you can, and bring them here in the B-17 program.”

One of those top aviators was young Curtis LeMay, a cigar-chewing pilot and navigator who was at the time earning himself the nickname Old Iron Pants. LeMay recalled meeting Arnold, who told him that this new Boeing aircraft “had only one predecessor[12] of equal importance in air history. That was the first ‘military aircraft’ of the Wright brothers.”

As fallout from the B-17 flight crash played out in Washington, the news of Nazi rearmament drew more attention—especially in France and Britain, where leaders expressed grave fear of a growing fleet of Nazi aircraft close enough to launch a sneak attack.

From the beginning of Hitler’s regime, the Fuhrer had embraced American principles of mass production. Inspired by the genius of Henry Ford, Hitler had launched *Volksmotorisierung*—his rough translation of Fordism and the centerpiece of his economic plan to pull Germany out of its own depression. “The Government of the Reich will[13] give all support to the development of the motor car industry,” Hitler declared at the 1933 German Auto Show. Germany unveiled its equivalent to the Ford Model T: the Volkswagen, or “people’s car.”

It was only a matter of time before the Third Reich applied those principles of mass production to military preparation, war factories, and, ultimately, warplanes. Pioneering German manufacturers like Hugo Junkers, Henrich Focke, and Willy Messerschmitt designed new aircraft capable of surprising speeds and big bombloads. Meanwhile, as the United States remained mired in financial paralysis, Hitler's "Four Year Plan" to rearm became a driving force of its economy.

The Treaty of Versailles, signed after the Great War, had ruled in Article 198 that "the armed forces of Germany must[14] not include any military or naval air forces." The German airplane industry, its leaders claimed, was nothing more than a sporting club. Training of military pilots commenced under the guise of the "League of Air Sports."[15] Meanwhile the Nazi government contracted German chemical manufacturer I.G. Farben to begin making synthetic oil and rubber—materials fundamental for building a kind of modern air force that had never existed before.

On March 10, 1935, Hermann Goering—the second most powerful man in Germany—invited the air attaches of Britain and France to Berlin, where he told them that the Nazi regime was rearming in the air. At that moment, the attaches heard a roar from outside. They rushed to the window to see the sky filled with military aircraft, four hundred of them circling above. Goering told his audience that a new German air force, the Luftwaffe, was in service "for the defense of the country,"[16] and he named himself its leader as "General of flyers." Goering was a World War I ace pilot who had spent time in a psychiatric hospital constrained in a straitjacket.

One week later, while addressing the Reichstag, Hitler publicly announced "the withdrawal of the German[17] signature" from the Versailles Treaty.

On April 20, 1936—Hitler's forty-seventh birthday—tens of thousands of soldiers and hundreds of tanks rolled through Berlin streets festooned with Nazi flags. For many around the world, photos of this Nazi parade on Hitler's birthday were their first sight of a swastika. Still, few if anyone in America could foresee a war that would entangle the western hemisphere.

In September 1936, Goering spoke in a secret talk to industrialists and powerful officials in Berlin. "We live in a time when the final battle is in sight," he told them. "We are already on the threshold of mobilization and we are already at war." Pausing for effect, Goering then said, "All that is lacking is the actual shooting."

On June 17, 1936, the US Army committed to thirteen B-17 Flying Fortresses, and the first production aircraft landed at Wright Field on January 11, 1937. In order to prove the worth of this bomber, the Air Corps planned an experiment. The Corps would send three B-17s (called Y1B-17s, at that time) over the open ocean, where pilots would attempt to locate a ship some 700 miles out at sea—an Italian liner named the *Rex*—in order to prove that open ocean navigation by air in a hulking bomber as big as the B-17 was possible. The aircraft took off on May 12, 1938.

"I was on the [lead] ship,"[18] recalled Air Corps Gen. George Kenney. "LeMay was the navigator." "We flew a rather loose[19] V formation," recalled another airman, C. B. Allen. Over the wide-open sea, the B-17s ran into weather. "Some of these were real rough fronts," Allen recorded. "We flew and flew,"[20] recalled airman Harris Hull. "After we had flown about something like 3½ hours, we broke out into the most amazingly clear day you've ever seen. We were barging along there, and pretty soon, we saw the *Rex*."

A pilot made a low-level run and a photographer aboard captured an image from the sky of the Italian ship on the open sea. The next day, that photograph of the *Rex* appeared in newspapers. *The New York Times*: "Three of the army's sky[21] bombers, the four-motored $250,000 'flying fortresses,' roared through line squalls, hail, rain, and sunshine today in a 1,300-mile over-water flight, unprecedented in the history of the Army Air Corps."

"From then on," Arnold recalled,[22] "the B-17 was the focus of our air planning." Arnold and his boss, Air Corps chief Gen. Oscar Westover, went to bat for the B-17, as they had to fight for appropriations. "I am for the development[23] of long-range bombers," Arnold wrote on August 15, 1938, "and realize that there is a need for a definite number of these in our military machine and am doing everything in my power to secure such for the Army Air Corps."

When the Air Corps made its formal request for more B-17s, the War Department refused, suggesting instead that the Army Air Corps build "the two or three smaller planes[24] that could be procured with the same funds." A proposed long-range bomber, as one War Department official put it, was "distinctly an airplane of aggression"[25] that had "no place in the armament of a nation which has a National Policy of good will."

The officials holding the purse strings could not understand why the Army wanted an attack aircraft, when there was no war.

On September 12, 1938, Roosevelt was on a train with his most trusted aide, Harry Hopkins, chugging through Minnesota. They were listening to a Hitler speech from Nuremberg, Germany, live over CBS radio. For countless Americans, it was the first time they heard the Fuehrer's voice, and the invective was shocking. One journalist listening, William Shirer (later the author of *The Rise and Fall of the Third Reich*), wrote in his diary, "I have never heard Adolf[26] so full of hate, his audience quite so on the borders of bedlam."

"We are fighting the Jews[27] so fanatically," Hitler shouted, "because National Socialism wants to create a true unity of the nation." Threatening the leadership of Czechoslovakia, he said, "My patience is exhausted." Already, Hitler had taken control of Austria in the Anschluss, the "annexation." Now he was threatening not just Jews but the sovereignty of another nation on Germany's eastern frontier.

Throughout his first term, Roosevelt had remained steadfast in his focus on the American domestic economy, working to meet the basic needs of the Depression's hungry masses. During that time, Congress had passed Neutrality Acts, a series of laws in 1935, 1936, and 1937 designed to prevent the United States from getting embroiled in any foreign wars. The US had signed the 1928 Kellogg-Briand Pact along with sixty-two other nations, renouncing war as an instrument of national policy.

As a result, America's fighting forces had little weaponry. There was almost no legitimate munitions industry. The neutrality laws were "born of the belief that[28] we could legislate ourselves out of war," explained Roosevelt's chief speechwriter, Robert Sherwood, "as we had once legislated ourselves out of the saloons (and into the speakeasies). Like Prohibition, it was an experiment 'noble in motive' but disastrous in result." The US Army was now smaller than that of Belgium, a country that could fit inside the state of Maryland.

In 1938, however, a historic shift in international policy took place—away from two decades of isolationist Oval Office policy. Roosevelt had read of Hitler's dazzling display of military might, paraded before one hundred thousand spectators at Berlin's Olympic Stadium in 1936. Most of all, Roosevelt had heard the boasts of Nazi airpower. As the British

statesman Sir Nevile Henderson put it to the president, "If one makes a toy,[29] the wish to play with it becomes irresistible. And the German Army and Air Force were super toys."

Roosevelt was unnerved. Aboard his train in Minnesota, following Hitler's Nuremberg speech, he turned suddenly to his aide Hopkins. Roosevelt's greatest fear was now, he intimated, becoming a surety. "The President was sure then[30] that we were going to get into war," Hopkins recalled, "and he believed that air power would win it."

Fifteen days after Hitler's Nuremberg speech, Arnold was in his backyard at home when his phone rang. "I heard the phone ringing,"[31] he remembered. "It was a long-distance call from Major K.B. Wolfe, our factory representative at the Lockheed plant in Burbank." Kenneth "K.B." Wolfe was a brilliant engineer out of the University of California and a career Army airman, whom Arnold was grooming for big things. He was normally soft-spoken. But not on this day.

With the phone speaker to his ear, Arnold received the shock of his life. Wolfe was at Lockheed headquarters awaiting the arrival of the Air Corps' chief, General Westover. Arnold was Westover's second-in-command. Wolfe heard an alarm coming from outside on the runway. "We rushed out there,"[32] recalled Wolfe, "and there the airplane was, on fire. [Westover] and the mechanic were both killed." Wolfe told Arnold over the phone that he was looking at the crash site while talking. Wolfe said, "I can see the plane burning,[33] and there's no hope."

Arnold sat down at his kitchen table. His wife found him there, as pale as a sheet of paper, his head in his hands.

The next morning, news reports showed the charred remains of Westover's aircraft. Assistant Secretary of War Louis Johnson gave a statement saying that "the loss of Major General[34] Oscar Westover is the greatest in the history of the Air Corps."

One week after this flight crash, Arnold was made chief of the Army Air Corps. The next day, Great Britain, France, Germany, and Italy signed the Munich Pact. Fearing war—fearing German airpower specifically—Europe's most powerful leaders bowed to Hitler, allowing him to annex part of Czechoslovakia.

"Without firing a shot,"[35] Arnold recalled, "dropping a bomb, or even starting an engine, Hitler's Luftwaffe and his armored forces won for him his first major victory of World War II."

On November 14, 1938, Arnold walked into the White House for the first time as commander of the US Army Air Corps. He had been summoned to a meeting of Roosevelt's most high-level advisors, unaware that this meeting was to become one of the most consequential of his life.

Officials gathered around the president's desk, including Assistant Secretary of War Louis Johnson, Secretary of the Treasury Henry Morgenthau, Solicitor General Robert Jackson (later chief justice of the Nuremberg trials), Army Chief of Staff Gen. Malin Craig, and Harry L. Hopkins, whom Arnold had recently befriended. Roosevelt had always been a Navy man. He had served as assistant secretary of the Navy during World War I, and his Oval Office featured model ships standing on cluttered surfaces. "You would think you were[36] in the summer residence of the general manager of a steamship company," as the writer Emil Ludwig described the room.

There was a feeling of expectancy, but of what? The world was on the brink, but no one could say what would happen next. Five days earlier, Germany had exploded in a frenzy of violence against Jews. Kristallnacht, or the "Night of Broken Glass," saw some twenty-six thousand rounded up and arrested. Looters ravaged synagogues and Jewish businesses. The bloodlust fueling this violence seemed insatiable.

When Roosevelt opened the meeting, he immediately spoke of airplanes. "To the surprise, I think, of[37] practically everyone in the room . . . ," Arnold recalled, "the President came straight out for air power. Airplanes—now—and lots of them!" FDR spoke of mass production, of American factories. "What he wanted was airplanes!" Arnold recorded. "Airplanes were the war implements that would have an influence on Hitler's activities!" The president desired "a striking force to back[38] United States foreign policies," he said. A ground army could not accomplish this goal, nor could a navy. But "a heavy striking force of aircraft would," the president said. Hitler had effectively proved this to be true.

"When I write to foreign countries,"[39] Roosevelt said, "I must have something to back up my words. Had we had this summer 5,000 planes and

the capacity immediately to produce 10,000 per year, Hitler would not have dared to take the stand he did." Roosevelt's idea was to use bomber aircraft as a negotiating tool, or if it came to it, as a way to bludgeon a war opponent into submission. "Pounding away at Germany from the air," he believed, would ensure that "the morale of the German people would crack."

Then, "everybody began to talk,"[40] according to Arnold. "Counterproposals were put forward; if the Air Arm was to be suddenly expanded, the Navy and War Department said they would like to have similar consideration." No one was arguing a simple, undeniable fact: the force that the United States would be up against, if war broke out, was astonishing.

"It seemed to many,"[41] recorded FDR's speechwriter, Robert Sherwood, "that the boasts of Nazi propaganda were not mere bombast, after all; the Germans were supermen, and nothing would ever be able to stop them." Britain's spymaster William Stephenson (codename: Intrepid) had confided in Roosevelt: "The Fuehrer is not just a lunatic.[42] He's an evil genius. The weapons in his armory are not like anything in history. His propaganda is sophisticated. His control of the people is technologically clever. He has torn up the military textbooks, and written his own."

Roosevelt asked Arnold what it would take to create a plan for a production schedule of ten thousand airplanes per year, with the ability to expand to twice that number. Arnold explained that airpower required many ingredients. This lesson he had learned the hard way during World War I, as he wrote in his memoirs: "The strength of an Air Force[43] cannot be measured in terms of airplanes only. Other things are essential—productive capacity of airplanes, of pilots, of mechanics, and bases from which to operate. A sound training program is essential to provide replacements." Top-rank mechanics and pilots, navigators, gunners, schools to train all of them, a pipeline of spare parts, and most important, the most technologically advanced aircraft on earth—the building of airpower required all of this.

Arnold requested an immediate increase in production to 7,500 combat planes—3,750 ready for action, 3,750 in reserve—with an additional 2,500 training aircraft. He asked the president for a commitment to build four-engine bombers. Roosevelt agreed to the plan, and to an ultimate appropriation of $300,000,000 [almost $7 billion in 2025].

When Arnold left the Oval Office, he believed he had just seen airpower's "Magna Carta."[44] He rode in a car back to his office in the Munitions Building on Constitution Avenue with the Army's chief of staff, Malin Craig, ready to give "a get-rich-quick course in the elements necessary to make an Air Force."

After decades of fighting internally in Washington for the cause of airpower, Arnold felt the floodgates opening. "It was the first time in history[45] we had ever had a program," Arnold recalled, "the first time we could shoot toward a definite goal of planes from the factories and men from the training fields. A battle was won in the White House that day."

9

To build up our Air Force[1] was an obligation that I had to Congress, to the President, to the people of the United States. It was a job that was still ahead of me, for at that time we had no Air Force.

—HENRY ARNOLD

Somebody had to set the pace,"[2] recalled K. B. Wolfe. "What were we going to build? How much money, how many airplanes, how fast are you going to get them? Arnold called a series of conferences of his commanders, his senior people, both operational people, engineering people, procurement people. What shall we do, how shall we do it? . . . You see, we had practically nothing, before 1939."

One of Arnold's first moves was to reach out to the private aircraft manufacturers and ask them to report on what they could build at their maximum capacities. The response put into perspective what the United States was up against. Boeing president C. L. Egtvedt responded that Boeing had thirteen B-17 bombers on contract with the Army. "Our maximum delivery,"[3] Egtvedt wrote, "in one month was 3." He estimated that with a "large production order," Boeing could get that number up to 8 per month.

Dwayne Wallace, of Cessna Aircraft in Wichita, Kansas, reported: "Working at top speed with[4] four hundred men employed, we estimate that it would be possible for us to produce fifteen of our present single-engine ships per month and five of our twin-engined model per month."

North American Aviation out of Inglewood, California; Bell Aircraft out of Buffalo, New York; Glenn L. Martin out of Baltimore, Maryland; Vultee

out of Downey, California—each reported numbers that were a tiny fraction of what Arnold and the president envisioned.

One week after Arnold's "Magna Carta" airpower meeting in the White House, he held a conference with the leaders of these companies. When he told them what America had to produce, "Boy, why some of them didn't[5] have heart attacks, I'll never know," according to Wolfe. "We just said, 'Look, you are going to have by such and such a time, an output of so many bombers or fighters or trainers. You get busy and tell us what kind of money you need, how big a factory, and so on.'"

Arnold reached out to civilian contractors asking them to build schools to train mechanics and pilots. "You can borrow the money,"[6] Arnold said, "can't you? Until I can get congressional appropriation?" Soon new aviation schools were going up across the country, from Parks Air College in St. Louis to the Chicago School of Aeronautics to the Lincoln Airplane and Flying School in Nebraska.

On November 28, 1938, Arnold produced a document called "Air Corps 10,000 Airplanes,[7] Two Year Program." It had detailed figures down to the dollar for the granular ingredients required to build airpower—everything from ammunition and bombs to real estate purchases for factory land to lists of production numbers for different categories of airplanes. He listed manpower requirements for every kind of officer needed, even chemical warfare officers (he wanted eighteen). The Air Corps was going to need an endless flow of gasoline. According to recent estimates, America had produced 23,475,000 gallons of gasoline in 1937, but less than a quarter of that was 100-octane aviation fuel. Where was it going to come from?

Time and again, Arnold faced the same question from confused officials who could not yet see the United States getting tangled in a war: "But I want to ask you,"[8] they said to Arnold, "who are we going to fight?"

"We were still back in the preair age,"[9] wrote *Washington Post* columnist Marquis Childs, from the point of view of 1945. Few could understand the role the airplane was about to play. "We couldn't believe what this big man with the bellicose look was telling us . . . He was constantly battling the skepticism and doubt of the ordinary individual, who simply could not take in the meaning of this new weapon."

Early in 1939, Arnold was asleep with his wife in a room at the Fountain House Inn, in Doylestown, Pennsylvania, when he was awoken by an urgent knock on the door in the middle of the night. The hotel's proprietor stood outside. Charles Lindbergh, he said, was on the hotel's only telephone, in the office. Arnold dressed, hurried down the stairs, and heard Lindbergh's voice crackling through the long-distance line. Lindbergh explained that he had just returned to the States from Germany and was in New York, dodging reporters. Lindbergh told Arnold it was imperative that they meet.

"How about meeting my wife[10] and me at West Point for lunch at the Thayer Hotel?" Arnold said.

The next day, Lindbergh and the Arnolds met in the Thayer Hotel's dining room near the campus of Arnold's alma mater. The Thayer's manager closed off the room so that the three of them could be alone. Lindbergh had recently become a political lightning rod, during a visit to Germany. Hermann Goering, head of the Luftwaffe, had personally decorated the American aviator with a Nazi medal, molded out of a cross with flying eagles and swastikas. Lindbergh shrugged off the criticism he received in America for accepting the honor. Now he was at lunch with the Arnolds; they talked for three hours, then took a walk to West Point's baseball stadium, where Army was playing Syracuse. "General Arnold impresses me[11] more as I get to know him better," Lindbergh confided to his diary.

Lindbergh had toured the Luftwaffe's facilities as a guest of Goering, he explained. The American pilot had seen the German factories. He had flown some of the aircraft. His intelligence on the German air force was breathtaking and terrifying. "Germany is undoubtedly[12] the most powerful nation in the world in military aviation and her margin of leadership is increasing with each month that passes," Lindbergh explained to Arnold.

According to Arnold, Lindbergh said that "Hitler held the destruction of[13] any major city on the continent, or in Britain, in his hands."

Arnold asked if Lindbergh would be willing to serve on a new board, to help guide the future of airpower's development. Lindbergh agreed, and Arnold assigned this new think tank to Brigadier Gen. Walter Glenn Kilner, who was at that time about to retire from the Air Corps to join the National Advisory Committee for Aeronautics (NACA, which in 1958 changed its name to NASA).

On May 12, the Kilner-Lindbergh board met for the first time, in the Munitions Building in Washington. Lindbergh described the meeting in his diary: "The discussion centered around[14] the appropriations available for research and development, the branches which were in most need of improvement, the necessity for a larger yearly appropriation for research and development, etc."

The Kilner-Lindbergh Board's initial report landed in Arnold's hands in the spring of 1939. In this report was the kernel of a new idea. "Arnold was thinking ahead[15] toward a *super* strategic bomber," recalled Curtis LeMay, "something that would be officially designated as a very heavy bomber. He assigned Brigadier General W. G. Kilner the task of determining and detailing the specifics of such an airplane. By June 1939, the report of the Kilner Board was on Hap Arnold's desk."

If there was one thing Arnold had learned from Billy Mitchell, it was the importance of vision. One of the hardest lessons Arnold had learned in World War I was the profundity of foresight. Vision and foresight required a thinker to find answers to the questions no one had thought yet to ask. What would be the doomsday weapon of the future? Surely it would ride on wings. Arnold imagined, in 1939, an aerial machine like the kinds of things he had seen in the popular *Buck Rogers* comic strip, something generations ahead of what had yet been imagined and engineered.

"Hap was foremost in believing,"[16] recalled Spaatz, "there were no limitations to the speed, altitude, weight carrying capacity abilities of the airplane to do a military job." What if an airplane could be built that could fly so high, it would be out of range of enemy aircraft and anti-aircraft fire? So fast and so armored it could dispose of enemy fighter planes? So massive it could carry apocalyptic-size bombloads? An airplane with so much range, it could reach any target on earth?

It could render any enemy instantly defenseless.

Arnold arranged a meeting at Wright Field with Boeing officials, where he first mentioned the idea for the world's first superbomber. The Air Corps wanted a flying battleship that could travel four hundred miles per hour and span distances that no aircraft ever had before, while carrying a bomb payload more destructive than anything yet imaginable.

When Arnold and his deputies put this idea to Boeing, the company's chief aerodynamicist said, "We can put in a lot of armament and cut down on performance, or we can keep performance up and stay out of range of fighter planes." Which would the Air Corps prefer: more speed or more bomb-carrying capability?

An Air Corps official responded, "We've got to have both."

Arnold had a habit of making major decisions impulsively. This was one of those times. He ordered Boeing to push forward with every resource possible. The superbomber was born with the codename Model 345, a name that would change to XB29, and ultimately, B-29.

"The fault I can see about Arnold," recalled K. B. Wolfe, "was that he was impetuous." As the air historian Thomas Coffey once wrote, "If Arnold had known in 1939 what headaches the B-29 would eventually give him, if he had known that it would one day put his entire career and reputation in jeopardy, he might have been more cautious in endorsing it." Nevertheless, at Boeing in Seattle, engineers began to sketch out the first drawings of the first global superbomber.

On September 1, 1939, Hitler unleashed his Luftwaffe over Poland. He declared, "I am putting on the uniform, and I shall take it off only in death or victory." He had told his commanding generals that the point of war was to destroy the enemy, that men, women, and children were to be killed "without mercy."

"The citizens of Western Europe must tremble with horror," Hitler said.

On this first day of World War II in Europe, the airplane revolutionized battlefield engagement. Fleets of dive-bombers roared through the skies while Panzer tanks rolled onto Polish soil beneath, in a highly coordinated brand of warfare Hitler called Blitzkrieg, or "lightning war." "Our enemies should take note," Goering told the press, warning of "aerial attacks, stupendous in their mass effect, surprise, terror, sabotage, assassination from within, the murder of leading men, overwhelming attacks on all weak points in the enemy's defense, sudden attacks, all in the same second, without regard for reserves or losses."

The Nazis put over 3,000 airplanes in the sky during the conquest of Poland, far more than America would produce on all its assembly lines in the entire year of 1939. Hitler mounted cameras on his Stuka dive-bombers.

When he later watched the film, he marveled at the velocity of the planes and the impact of the bombs. "*That is what will happen to them!*[23]" he cried out. "*That is how we will annihilate them.*"

When Roosevelt heard of the Nazi attack on Poland, over the phone from his ambassador to France, William Bullitt, the president said, "It's come at last.[24] God help us all."

Roosevelt released a statement that day, aimed at the role the airplane was already playing in this new war. The president condemned the killing of helpless civilians from above. "The ruthless bombing[25] from the air of civilians in unfortified centers of population . . . ," Roosevelt wrote, "which has resulted in the maiming and death of thousands of defenseless men, women, and children, has sickened the hearts of every civilized man and woman, and has profoundly shocked the conscience of humanity."

Lindbergh summed up what many Americans were feeling on this day, in his diary: "The war has begun![26] . . . The future of the human world hangs in the balance today. This war will change all of our lives."

Part II

The Creation of Airpower



A B-17 crew returning from a bombing mission in 1943.

Getty/Fox Photos/Stringer

Every single man, woman,[1] and child is a partner in the most tremendous undertaking of our American history.

—FRANKLIN ROOSEVELT, DECEMBER 9, 1941

10

Our Air Force, as a powerful[1] weapon, may keep America out of war; it will keep war out of America.

—HAP ARNOLD IN A SPEECH TO THE AMERICAN SOCIETY OF NEWSPAPER EDITORS, 1939

The task ahead seemed insurmountable. “Germany required ten years[2] to create her Luftwaffe,” Arnold recorded. “We were required to build our air force in one.” This, at a time when the antiwar movement in America surged into the mainstream, when peace rallies filled every seat in New York’s Madison Square Garden.

In a Gallup poll taken right after Germany’s attack on Poland, 84 percent of Americans answered *no* to the question, “Should we send our Army[3] and Navy abroad to fight against Germany?”

A movement called America First took the country by storm in 1940, grasping at the tapestry of isolationism that was fraying in Washington. The face of America First was none other than Charles Lindbergh, who was adamant that the United States stay out of any conflict in Europe. He was a pacifist, and he believed that aviation should be an agent of peace, not of violence. But his antiwar activism also sent a chilling message to the American people.

“Our own air forces are in[4] deplorable condition,” Lindbergh said in testimony before Congress, in front of a packed hearing room. “Regardless of how much assistance we send [to Britain], it will not be possible for American and British aviation, concentrated in the small area of the British isles, to equal the strength of German aviation.”

Lindbergh warned that if America joined the war, it "would be the greatest disaster the country has ever had."

Soon after the Nazis conquered Poland, Arnold went on a trip around the country to visit airplane factories. Over handshakes in smoky offices, and conversations on airfields with voices loud enough to be heard over the roar of 1,000-horsepower engines, he attempted to convince America's most accomplished aviation engineers and executives that the reality they knew was going to change, and the boundaries of what they thought was possible were going to be obliterated.

The first stop was Bolling Field in Washington with the president himself. Army and Navy officials lined up a display of military airplanes for FDR to inspect, with Arnold by his side to give the president the highlights of each. Rows of soldiers stood guard under a blue sky while American flags waved. An eyewitness recounted, "The President and his advisors rode[5] in automobiles past planes which ran the scale from primary trainers to the gigantic B-17, the Army's largest bomber."

Arnold visited Douglas aviation in Los Angeles. "If you traveled with him through[6] a plant or a training base, he had to know everything," recalled Donald Douglas. "A great man for pulling information out of people." Arnold grew furious anytime he heard anyone say that something could not be done. "If he got his dander up," Douglas remembered, "and you presented fact after fact to uphold your argument, that wouldn't bother Hap. He'd still say, 'This is what you've got to do. That's all very nice, but it ain't enough. You've got to do more and better.'"

"You never thought the things[7] he asked you to do were possible," recounted one Douglas engineer. "But then you went out and did them." Arnold visited Lockheed in Burbank. Chief executive Robert E. Gross said, "He made you do better than[8] you could, because he demanded more than you had in you, and wasn't satisfied with anything less."

All of these civilian aviation firms were going to have to build new factories. The only way this could happen was for the government to put up the money. "I was called in by Arnold,"[9] remembered K. B. Wolfe, "and told that I was to set up and draw up the plans and make the estimates for a series of factories that were to be built by the government for the production of aircraft for war. It was a kind of secret project . . . We drew up a plan as

to who was to operate the factories, naming the various companies . . . We'd discussed with them many times, if we get the money and if we start to build an air force, how do we do it?"

In order to get approval from Congress for funds to build war factories in a time of peace, even with the president's backing, Arnold and his staff had to present accounting reports so persuasive, in such detail, their preparation took around-the-clock days. To build one small airplane factory for 8,000 workers, for example, Arnold's team prepared a document listing dollar figures[10] for everything from a sewage disposal plant ($40,000) to dual water wells for 2,500 gallons of water per minute ($20,000) to a heating plant of 4,500 horsepower ($475,000) to a natural gas main, railroad siding, electrical equipment, storm sewer systems, 6,000 feet of linear "non-climbable" fencing, fire and security equipment, 11,200 lineal feet of telephone cable, office space, warehouse storage, foundry, pattern shop, and raw stock storage, among dozens of other items that needed accounting down to the dollar.

"Arnold had 99 percent[11] of the people behind him," according to K. B. Wolfe. "What the companies did,[12] for Arnold, was an unusual thing," recalled Robert Lovett, who was joining the effort at this time as the federal government's assistant secretary of war for air—Arnold's partner in the Executive Branch. "They got started spending their own money on setting up production—that is, jigs, tools, dies—for certain types of aircraft, before the Air Corps got the appropriations from Congress. In that field, Douglas, Lockheed, Curtiss, North American, and Boeing risked their own money on the ability of the Air Corps to get the money to pay them back when they built the completed article."

"We had to finance it on[13] our own money," North American's CEO, J. H. "Dutch" Kindelberger, said. "They [the Air Corps] didn't have any money for this. I was scared to death for a long while there because I didn't even have a piece of paper. I was building six hundred trainers for Hap, and building a factory [near] Dallas, and the net worth of North American was obligated several times over. And I hadn't any contracts yet."

Aircraft had always been built in small numbers, so no manufacturer had ever set up functioning assembly lines of the kind that had made Henry Ford the richest man in the world. It had simply never been done. The airplane builders made airplanes one at a time, no two completely alike. And an airplane was a far more complex mechanism than a Model T. To

figure out how to mass-produce a product required engineering brilliance that neither the Army nor the private companies themselves had. “We had no people[14] who were familiar with the actual techniques of producing equipment,” Wolfe later said.

Meanwhile the clock was ticking. The Roosevelt administration wanted everything *now*. To people like Arnold, the anti–Air Corps sentiments so flagrant in Washington for so many years, and the corrosive hubris with which the military establishment had looked down its nose at Billy Mitchell and his ilk all through the 1920s and ’30s, now felt like a grave injustice. Not just to the Air Corps but to all of America.

Arnold was fifty-four years old, his hair white and receded, his belt size a bit bigger—and he was working more hours than ever. When he was not traveling, he sat behind a big desk in his office, and the lines formed outside to see him. His subordinates could see the veins bulging in his neck when he got angry.

“Things are moving along as fast[15] as ever, maybe a little faster,” Arnold wrote his brother Cliff. “Sometimes I wonder how much high speed effort a guy can stand.”

Before airplanes could be built, the architects of airpower had to confront a critical question: How would airpower be used? The foundation of airpower was theoretical. Nothing like full-scale air war in the machine age had ever occurred. Everything that Arnold and the Air Corps planned for the future was dictated by theories never before put to the test.

By 1940, the top Air Corps officers had inherited volumes of thinking. An emerging doctrine of modern airpower made its first appearance in books by two writers, Giulio Douhet of Italy and Basil Liddell Hart in Britain, soon after World War I. The airplane in modern warfare, they postulated, destroyed the idea of *a line* that drew the boundary between two opposing armies. With the advent of the airplane, a “front” on a battlefield no longer mattered. Entire nations now comprised the battlefield.

“Aircraft enables us to jump[16] over the army which shields the enemy government, industry, and people,” wrote Hart, “and so strike direct and immediately at the seat of the opposing will and policy.” Or, as Douhet wrote, “Now it is actually populations[17] and nations which come to blows and seize each other’s throats.”

This emerging doctrine's most ruthless visions came in the 1920s writing of Briton J. F. C. Fuller. If bombing aircraft could attack with impunity, he wrote, "picture, if you can,[18] what the result will be: London for several days will be one vast raving Bedlam, the hospitals will be stormed, traffic will cease, the homeless will shriek for help, the city will be in pandemonium. What of the government at Westminster? It will be swept away by an avalanche of terror. Then the enemy will dictate his terms, which will be grasped like a straw by a drowning man. Thus may a war be won in forty-eight hours and the losses of the winning side may be actually nil."

This was the vision of modern air war imagined in the science fiction of H. G. Wells, who had penned the novel *The War in the Air* in 1908, the year before Arnold had first witnessed the Blériot airplane in Paris as a young soldier. Wells had prophesized aerial armies in pulsating ornithopters and "Drachenfliegers" attacking the United States from above, turning New York City into "a furnace of crimson flames."

"No place is safe—no place is at peace," Wells wrote. "The war comes through the air, bombs drop in the night. Quiet people go out in the morning, and see the air fleets passing overhead—dripping death, dripping death!"

The Italian writer Douhet postulated a more strategic form of warmaking in his groundbreaking 1921 book, *The Command of the Air*. It centered on the destruction not of armies, peoples, and cities, but of "the vital centers." The writer defined the "vital center" as anything that could destroy an opponent's will to fight, specifically infrastructure such as water supplies, electrical grids, and factories where weapons were made. Bridges and dams, air bases and oil refineries—anything that could damage a country's ability to wage war.

"The more rapid and terrifying[19] the arms are," Douhet wrote, "the faster they will reach vital centers and the more deeply they will affect moral resistance."

Hart envisioned a similar strategy, using the term "nerve centers." "A nation's nerve-system,"[20] he wrote, "no longer covered by the flesh of its troops, is now laid bare to attack."

The "vital centers" or "nerve centers" thinking became influential within the US Air Corps Tactical School, which emerged in the United States in the 1930s, based at Maxwell Field[*] in Alabama.

"I use the date 1934 to[21] indicate the beginning of what got to be the overall basic strategic principle for the employment of strategic air forces," recalled Brig. Gen. Donald Wilson. "I happen to know about that because I was charged with the instruction of the Air Corps Tactical School class in the year 1933–34 . . . The idea struck me that in industrial nations, that this war-making potential was a web of interwoven things, interdependent, and that by picking out the critical, essential items in various systems [i.e., Douhet's "vital centers"], that we could actually produce a worthwhile effort with the relatively small number of airplanes of such bombing accuracy as we had at that time."

As Tactical School officers concluded in the 1930s, "The airplane gives us a weapon[22] which can immediately reach the internal organization of an enemy nation, within range, and therefore bring about the defeat of that nation. The fundamental innovation lies in the fact that whole nations *now lie within the combat zone*."

Part of what appealed to the American airmen so much about this "vital centers" ideology was its ability to isolate military and infrastructure targets, rather than populations of people. It drew a clear line between moral warmaking and terrorism.

Airplanes could be built in many shapes and sizes, to serve many purposes. But one kind of airplane, the Tactical School concluded, trumped all others: the bomber. Haywood S. Hansell Jr.—a key leader of the school and a future World War II bomber commander—described this thinking: "The early visionaries and proponents[23] had made great claims for air power. Their strategic concepts all depended upon one basic tactical concept accepted by the Tactical School as fundamental doctrine: bombers could reach their targets and destroy them."

Armed with all this doctrine, Arnold came to conclusions in the early years of planning for war. Distilled down from his many writings, they can be summed up in five bullet points.

- Winning a war began far from the fight, on the homefront. "Military Air Power,"[24] Arnold wrote, "or Air Force—is dependent upon the air potential provided by industry." In other words, before a force could fight in the skies, it had to fight to get into the skies, which

meant engineering brilliance to design the best warplanes and factories to build them in great numbers.

- Employment of air power relied on the *training of airmen* to do highly specific jobs with skill, and *strategically located bases* where aircraft could be effectively employed. This meant construction of schools of all kinds, and air bases from which bombers could hit targets.
- Airpower was an offensive weapon. "Practically speaking," Arnold said, "there is no such thing as[25] defensive operations in the air. Our whole concept in the air force is offensive: to seek out the enemy; to locate him as early and as far distant from our vital areas as we can; then to carry the fight to him and keep it there."
- The most critical tool of air power was the heavy bomber. "The United States must build,[26] as quickly as possible, an air force capable of waging a decisive air offensive against the Axis powers in Europe," Arnold wrote to the secretary of war in 1941, "and this air force must consist predominantly of heavy bombers." These bombers must be "second to none in range and striking power," he also said. "The No. 1 job of an air force[27] is bombardment. We must have long-range bombers which can hit the enemy before he hits us; in short, the best defense is attack."
- Arnold believed that long-haired scientists were key to the development of airpower. When theoretical scientists joined with practical engineers and military planners, magical things could happen.

American air leaders needed a plan on paper, something that could usher theoretical ideas into physical reality. "We realized the first requirement[28] for our plan was a statement of purpose," recalled Maj. Gen. Haywood S. Hansell Jr., one of four officers[*] whom Arnold charged with drafting what became Air War Plans Division 1 (AWPD-1). Over nine days of around-the-clock work, in 1940, these airmen constructed the first plan for all-out war against Nazi Germany. It called for a force of 61,800 aircraft and 2,164,916 airmen.

"The scope of the air proposal[29] was simply staggering . . . ," Hansell remembered. "The frantic efforts to meet deadlines, the disagreements, the uphill fight against entrenched and hostile opinion, the dedicated crusade

for the new role of air power, the slumbering dread that we might be wrong."

Four-engine bombers were to play the critical role; AWPD-1 called for eleven thousand of them, plus 770 per month continuous production to fight Germany alone. The "vital centers" ideology isolated specific bombing targets: 30 German air force factories, assembly plants, aluminum and magnesium plants; 50 electrical power plants; 47 transportation hubs; and 27 fuel sources.

AWPD-1 suggested for the first time that a major war could be won through airpower alone, but also left room for airpower to serve as a prelude to a ground invasion of Nazi-occupied Europe, if the United States were in fact to fight this war. As the writers put it, the overall strategy "leaned heavily toward victory[30] through air power, but which provided for air support of an invasion and subsequent combined operations on the continent if the air offensive should not prove conclusive." The plan also left one last option if all else failed, one that in retrospect would prove prescient, if not terribly controversial.

"If these air operations against[31] industrial targets were not conclusive," wrote Hansell in his memoirs, "the plan suggested direct attack on cities as a last resort."

One day soon after the Nazis attacked Poland, Arnold placed a long-distance phone call to a Cal Tech scientist named Theodore von Kármán, requesting a meeting in Washington. Von Kármán was a Hungarian-born Jew who had come to the United States during the 1920s. He recalled, "General Arnold indicated to me[32] his strong belief that the U.S. Army Air Corps could not reach the top in aviation and remain there without doing experimental work to advance the art."

Airpower was always evolving, and employing it effectively—even as a deterrent to keep wars from happening—meant building the airplanes of today while always innovating the weapons of the future. "An Air Force," Arnold once wrote, "is always verging on obsolescence."[33]

In subsequent meetings, Arnold and von Kármán discussed radar, first used in military experiments in the 1930s, and also rocketry. The idea of rocketry was so cutting-edge in 1940, few believed it would ever exist. "At that time," von Kármán recalled, "rocketry was a bad word."[34] Arnold

authorized funds for von Kármán to work on development, and the Cal Tech professor assigned the job to a group of graduate students. “The project,” he noted, “was transformed into the so-called[35] Jet Propulsion Laboratory,” a lab that later helped NASA send astronauts to the moon.

Arnold had to imagine the Nazis were working on weaponizing rocketry. Could the Americans solve this technical challenge first?

Starting in 1940, Arnold forced through budgets with a massive boost in research and development—upward of $20 million a year, while the country was still mired in the Depression and was not at war. Von Kármán, Arnold believed, was the ultimate incarnation of the long-haired scientist. In turn, von Kármán saw in Arnold “a fanatic belief that air power[36] would be determining in war and in the life of nations.”

“In this war,” Arnold promised von Kármán, “air power will determine the outcome.”[37]

11

> Our ideal, yours and mine,[1] the ideal of every man, woman and child in the country—our objective is still peace—peace at home and peace abroad. Nevertheless, we stand ready not only to spend millions for defense but to give our service and even our lives for the maintenance of our American liberties.
>
> —FRANKLIN ROOSEVELT, MAY 16, 1940

On March 5, 1940, at 4:30 p.m., Arnold arrived at a meeting in the office of the secretary of the treasury, Henry Morgenthau. The treasury secretary had become highly interested in airplane production and was one of FDR's closest aides. He had arranged an impromptu meeting with Arnold and some of Arnold's subordinates.

Morgenthau had already, in 1940, negotiated a deal to sell twenty-five Curtiss P-40 Warhawk single-engine fighter planes to France, and thousands of aircraft to Britain. These countries were desperate for warplanes. Now, in Morgenthau's office, the secretary kicked off a meeting that made Arnold squirm.

"I appreciate you people[2] dropping everything to come over," Morgenthau said, according to a transcript of this meeting. "But I have a tough assignment from the President." Roosevelt had promised Finland airplanes, dealing with a Finnish politician named Victor Procopé. "I just called him up," Morgenthau said, "and he said he wished we would all get together and see what we could do to sell the Finns, for cash, 150 modern pursuit planes and 36 two-engine bombers. There's the problem. And, of course, they want it tomorrow."

Arnold said, "They want immediate delivery?"

"Immediate delivery," answered Morgenthau.

“Don’t look at me, Jack,” Arnold responded. His tone did not sit well with the treasury secretary.

Already, these two figures were on poor terms. Morgenthau had inserted himself into aviation policy and was the point person for selling airplanes to foreign governments. A controversial new law informally called Lend-Lease was in the works that would allow the Roosevelt administration to widen the wiggle room in the munitions embargo that existed under the neutrality laws that the president had signed in the 1930s. The airplane industry was buckling under the pressure to build airplanes for national security, and the small number actually getting produced were going to foreign powers.

In his memoirs Arnold described the problem: “The responsibility for building[3] up an Army Air Force was not that of the Secretary of the Treasury. He might give away, sell, or what-have-you, every plane produced, the latest planes which our engineers could develop, the most modern gadgets and devices out of our factories, and would lose nothing by it. It was someone else’s responsibility. It was mine.”

The secretary of the treasury saw things differently. As Donald Douglas recalled, “Morgenthau hated Hap’s guts,[4] for some ungodly reason, and was always trying to dig the sand out from under Hap’s feet with the president.”

On March 13, eight days after Arnold’s meeting in Morgenthau’s office, he was summoned to the White House. Roosevelt informed Arnold that he was going to cooperate with Morgenthau, or he was going to be shipped out to the South Pacific. Arnold took this drubbing in front of the secretary of war, the assistant secretary of war, the secretary of the Navy, and Morgenthau himself, who described the meeting in these words: “Oh, boy, did General Arnold[5] get it.” In his own account, Arnold journaled, “He [FDR] intimated that there[6] were places where officers who did not play ball might be sent, such as Guam.”

Arnold went home that night and told his wife that his job might be in jeopardy. Meanwhile, his responsibility now was to build airpower not just for the United States but for Britain, France, Finland . . . Already, the backlog of orders for American planes purchased by European countries topped $400 million.

Thus far, the violence in Europe had yet to spread, following Hitler’s invasion of Poland. The term “phony war” had entered the lexicon, because

since the invasion, there had been little violence. All that changed on the night of May 9.

At 11 p.m. on May 9, 1940, Roosevelt sat in his second-floor study in the White House when the long-dreaded phone call arrived. The president's ambassador to Belgium, John Cudahy, called with devastating news.

The Nazis, Cudahy breathlessly reported, were in that moment attacking the Netherlands, Belgium, Luxembourg, and parts of France. Europe's old citadels crumbled. Hitler issued an order to his troops, saying, "The decisive hour has come,[7] for the fight today decides the fate of the German nation for the next 1000 years."

Without assistance from the United States, Western Europe would be impotent to resist the Nazi incursion. Increasingly, the American military establishment had come to the conclusion that only airpower could do the job. The sentiment was captured in a memo that the assistant secretary of war, Louis Johnson, wrote Roosevelt on May 15, six days after the Nazi attack on Western Europe.

"Events in Europe of the last[8] few months and especially of the last few days convince me that this government and this country must accept the fact that air power is not simply an auxiliary to land and sea forces. It has become a paramount factor in national defense. It is my conviction that this question of air power must be faced boldly, fearlessly and comprehensively on the basis of having to use it in war in a big way on short notice. The question must be solved in accordance with a simple formula which Congress and the public can understand. Dollars must not control."

Roosevelt knew he had to address the nation and thus the world. He had to posture strength. A historic speech was set for May 16. Roosevelt met almost daily with Army Chief of Staff George Marshall, and he wanted Marshall's opinion: If the American president were to announce the number of military aircraft the country was determined to build, what should the number be? Strength in numbers was a simple concept that America and the world would understand. Marshall consulted Arnold, who gathered his advisors.

In a meeting in his office that became legendary, Arnold said, "Here is the Air Forces' great[9] opportunity because we have a President who sees these things. He is very imaginative, and we have been crying all our lifetime as a Service for someone to listen to us. Now is our moment of

greatness and I brought you people in here—the most experienced men in the [Air Corps] . . . You're the ones who dreamed the dreams, made it what it is, set its foundation. Here the sky is the limit . . .

"Now," Arnold continued, "I'm going to give you till tomorrow morning, because tomorrow I have to give word to the President and I want each of you to think about this the rest of the day and tonight. Tomorrow we will meet here at 8:00 a.m. and I want you to tell me how many airplanes you need."

The next day, the advisors gathered, and Arnold went around the room. Each offered a number. The numbers did not approach what Arnold was thinking. So he came up with his own.

On May 16, the president left the White House at 12:40 p.m., his limousine following the usual motorcade to the Capitol. Inside the House chamber—that dramatic setting where presidents delivered State of the Union addresses—he stood at the rostrum with steel buckles locking his lifeless legs in place. Always, there existed an elaborate production around the president to conceal his disability and any hint of weakness from the world. When he stood, the room erupted in applause and remained that way for two full minutes. Then came silence and, as one in the room described, "every Cabinet member present[10] appeared sunk in serious thought."

"Mr. Vice President, Mr. Speaker,[11] Members of the Senate and the House of Representatives," Roosevelt began. "These are ominous days . . . The brutal force of modern offensive war has been loosed in all its horror. New powers of destruction, incredibly swift and deadly, have been developed; and those who wield them are ruthless and daring . . . The clear fact is that the American people must recast their thinking about national protection."

Arnold listened to this speech over the radio. When he heard certain parts, he almost surely thought of Billy Mitchell, as Roosevelt's words mirrored what Mitchell had said fifteen years earlier. When Mitchell spoke them, Washington's power brokers scoffed at his audacity. No one was scoffing anymore.

"Lightning attacks," Roosevelt said, "capable of destroying airplane factories and munition works hundreds of miles behind the lines, are a part of the new technique of modern war. The element of surprise which has ever been an important tactic in warfare has become the more dangerous

because of the amazing speed with which modern equipment can reach and attack the enemy's country."

In the past, the oceans protected American soil, like giant motes. "But the new element—air navigation—steps up the speed of possible attack to 200, to 300 miles an hour," Roosevelt said. "From a base in the outer West Indies, the coast of Florida could be reached in 200 minutes. The Azores are only 2,000 miles from parts of our eastern seaboard and if Bermuda fell into hostile hands it is a matter of less than three hours for modern bombers to reach our shores."

Standing before his political friends and foes, Roosevelt asked Congress for $896 million for the military. He also dropped a number that confounded all experts. "I believe that this nation should plan at this time a program that would provide us with 50,000 military and naval planes."

After the speech, Arnold gathered his top advisors in his office. Fifty thousand airplanes! When one asked how Arnold could allow the president to make such a preposterous statement, Arnold answered, "If I had asked for twenty-five[12] thousand, I would have gotten fifteen thousand. Now I've asked for fifty-thousand, and if I don't get twenty-five thousand, you boys won't be here a year from now."

The next day, Roosevelt's critics attacked. Senator Bennett Clark of Missouri—a Democrat like Roosevelt—released a statement, pointing to the $7 billion Congress had recently approved for military expenditures. "We hear now that the Army[13] has only 58 airplanes that are not obsolete," Clark said. He wanted to know how all that money had been "squandered."

In Germany, Hitler's aviation chief, Goering, burst out laughing when he heard the number fifty thousand. Hitler mused: "What is America but beauty queens,[14] millionaires, stupid records, and Hollywood?"

Crowds of stunned Parisians lined the Champs-Élysées the day the Nazi tanks rolled through their city—June 14, 1940. Many wept openly. France was no match for the power of the Third Reich. According to French premier Paul Reynaud, his military forces were like "walls of sand that a child[15] puts up against waves on the seashore."

The conqueror of Western Europe arrived on June 23 in a motorcade of five large Mercedeses. Hitler visited the Paris opera house and Napoleon's Tomb. He told one of his chief aides, Albert Speer, "It was the dream of my

life[16] to be permitted to see Paris. I cannot say how happy I am to have that dream fulfilled."

It was the season of horrifying news. In April and May, the Nazis overwhelmed Denmark and Norway. On the same day Norway surrendered (June 10), Italy, under Mussolini, joined the war on Hitler's side. Twelve days later, Philippe Pétain signed the Armistice with the Nazis, and what was left of the French resistance went underground. Secretly, the chief of Hitler's Concentration Camp Inspectorate informed his boss, Heinrich Himmler, that he had found a "suitable site"[17] for a new "quarantine camp" at Auschwitz, which joined the site at Dachau as the foundation of the Nazi "Final Solution."

Hitler was now zeroing in on Britain, confidentially informing his underlings in the Reichstag "that conflict would have to be[18] fought to a finish . . . there was no other solution than a life-and-death struggle."

Before the House of Commons, Britain's new leader, Winston Churchill, gave his famous "We Shall Fight" speech: "We shall fight on the beaches,[19] we shall fight on the landing grounds, we shall fight in the fields and in the streets, we shall fight in the hills; we shall never surrender."

The Battle of Britain—the first fully waged battle fought entirely by air forces—began on July 10. Churchill's Royal Air Force brawled with Hitler's "birds of hell" in slug matches at astounding speeds. German warplanes dropped incendiary bombs on British cities that set towering blazes. "The London that we knew[20] was burning," a resident wrote in his diary. "The London which had taken thirty generations of men a thousand years to build . . . and the Nazis had done that in thirty seconds."

On August 13, 1940, the Luftwaffe's chief Hermann Goering ordered *Adlertag*—"Eagle Day." Attacking aircraft came in waves, filling the skies over London. Churchill and his chief military assistant, Lord Ismay, stood in the operations room of Britain's Fighter Command over a map showing the positions of Nazi flyers. "There had been fighting[21] throughout the afternoon," Lord Ismay remembered, "and at one moment every single squadron in the Group was engaged. There was nothing in reserve, and the map table showed new waves of attackers crossing the coast." Churchill resolved to fight on. Said Lord Ismay: "I felt sick with fear."

"There are no words to describe[22] the thing that is happening," Edward R. Murrow reported over CBS radio, from London. Due to the airplane, it

took so little effort, it seemed, to destroy so much. “I thought what a puny effort is this to burn a great city,” Murrow told his audience.

On September 27, Germany, Italy, and Japan signed the Tripartite Pact. That same week, Japan invaded French Indochina. Like the Nazis, the rolling Japanese forces seemed unstoppable.

Meanwhile more orders for airplanes came to the United States from desperate leaders abroad. On June 5, Sweden asked the US for P-36s. In August, the British negotiated a deal for forty-two thousand aircraft engines to be built in the US.

On August 9, the new secretary of war, Henry Stimson—who was confirmed and sworn in the day the Battle of Britain began—spoke to a joint Congressional committee. “Air power today has decided the fate[23] of nations,” Stimson said. “Germany with her powerful air armada has vanquished one people after another . . . All the help of the British and French planes were insufficient to frustrate the German attack from the air.”

Hitler doubled down on his air strategy to bomb civilian populaces in a speech on September 4, 1940. “And should the Royal Air Force[24] drop two thousand, or three thousand, or four thousand kilograms of bombs, then we will now drop 150,000; 180,000; 230,000; 300,000; 400,000; yes, one million kilograms in a single night. And should they declare they will greatly increase their attacks on our cities, then we will erase their cities!”

Churchill also doubled down on airpower: “There is one thing that will[25] bring him [Hitler] back and bring him down, and that is an absolutely devastating, exterminating attack by very heavy bombers from this country upon the Nazi homeland.”

On December 29, 1940, at 9 p.m. on the East Coast, Roosevelt began a fireside chat to address the war crisis, via radio hookup from the White House’s Diplomatic Reception Room. The largest radio audience in history hung on Roosevelt’s every word. At that moment, German bombers thundered over London. At this time, in 1940, the American Army ranked sixteenth in the world in size, with 200,000 men compared to 7 million Nazi soldiers. The Air Corps still had fewer than 1,300 combat planes, most of them technologically obsolete.

“My friends,” Roosevelt said, “this is not a fireside chat on war.[26] It is a talk on national security . . . Never before since Jamestown and Plymouth

Rock has our American civilization been in such danger as now . . . The Nazi masters of Germany have made it clear that they intend not only to dominate all of life and thought in their own country, but also to enslave the whole of Europe, and then to use the resources of Europe to dominate the rest of the world."

The president called for a new national effort. "Guns, ships, and many other things have to be built in the factories and arsenals of America. They have to be produced by workers and managers and engineers with the aid of machines which in turn have to be built by hundreds of thousands of workers throughout the land."

Roosevelt's climactic line captured the essence of a new philosophy, one to join government, free enterprise, and military into one fighting force. "We must be," he said, "the great Arsenal of Democracy."

The new war was a mechanized war, a war of machines and vehicles, of speed and horsepower. It was the industrial revolution applied fully to warfare for the first time. Of all the machines, one had become the most critical. Arnold's insistence that heavy bombers anchor aviation policy had now become accepted strategy.

At the start of the Battle of Britain, Churchill wrote Roosevelt, "WE SHALL NEED THE GREATEST[27] PRODUCTION OF AIRCRAFT WHICH THE UNITED STATES . . . ARE CAPABLE OF SENDING US. THE HIGHEST POSSIBLE PROPORTION SHOULD BE HEAVY BOMBERS." America's secretary of war Henry Stimson said in an address to Congress, "Reports from overseas multiplied,[28] emphasizing again and again the vital role of the bombing airplanes and what it portended for our own security." In 1940, the first B-17 bombers were arriving at a US air base in the Philippines. The secretary of war informed Roosevelt that these planes represented nothing less than a "reversal of the strategy of the world."

"From being impotent[29] to influence events in that area," Stimson wrote, "we suddenly find ourselves vested with the possibility of great effective power."

In May 1941, Roosevelt wrote the secretary of war, in a memorandum widely published in the press. It began, "The effective defense of this[30] country and the vital defense of other democratic nations requires that there be a substantial increase in heavy bomber production. Command of the air by the democracies must and can be achieved." The British chiefs of staff issued a paper that said, "It is in bombing, on a scale undreamt[31] of in the

last war, that we find the new weapon on which we must principally depend for the destruction of German economic life and morale." Robert Lovett, the American assistant secretary of war for air, followed with his own paper called "Need for Heavy Bombers,"[32] dated September 22, 1941.

"Only the heavy bomber can reach Germany's vital targets," Lovett concluded.

To this end, Roosevelt brought in a new "production czar"—William Knudsen of General Motors. The chief executive of the largest corporation in the world quit his job in Detroit and came to work for the government for a salary of $1. On May 4, 1941, still new on the job, Knudsen received a memorandum from the president which called for "increasing both our capacity for big bombers and the monthly production rate."

"I know of no single item[33] of our defense today," the president wrote Knudsen, "that is more important than a larger four engine bomber capacity."

The bomber aircraft was no longer just a weapon. The science of aviation had become political. This ideology was best expressed in a book by writer and aviation pioneer Alexander de Seversky, whose tome *Victory Through Air Power* became a bestseller during the early months of World War II.

"The most significant single fact[34] about the war now in progress," this book's first page read, "is the emergence of aviation as the paramount and decisive factor in warmaking . . . All experts agree that air power will play an ever more decisive part in determining the power balance among the nations of the earth . . . A realistic understanding of the new weapon, of its implication in terms of national security, of its challenge to America, is not a matter of choice. It is the very condition of national survival."

12

I think it well for the man in the street to realize that there is no power on earth that can protect him from being bombed, whatever people may tell him. The bomber will always get through.

—BRITISH POLITICIAN STANLEY BALDWIN

In Washington, office lights remained on all night long as government lawyers and accountants worked over hundreds of millions of dollars in war contracts, to build everything from trucks and tanks to a new four-wheel motor vehicle that would come to be known as the jeep.

Airplane lifeboats. Photographic materials. Fuses. Generators. Uniforms. Floodlight assemblies . . . *The Wall Street Journal* began a column listing the dozens of new war contracts announced by the Roosevelt administration, every week. Leading the charge on the American homefront was the auto industry, which had a bigger economy than every foreign nation on earth except Britain, France, Germany, Japan, and possibly the Soviet Union.

Chrysler broke ground on the Detroit Tank Arsenal. General Motors undertook tens of millions in defense orders, the first going to Chevrolet to build seventy-five-millimeter high-explosive shells. Ford Motor Company began construction of the Willow Run bomber plant in Ypsilanti, Michigan, in the effort to build the largest airplane factory in the world.

Experts estimated that aircraft factory construction was proceeding at a rate of 75,000 square feet, every day. "Aircraft manufacturers currently[1] are engaged in the most spectacular program of expansion ever undertaken in the industrial history of this nation," the *Wall Street Journal* stated on December 1. However, the manufacturers were only beginning to

understand the obstacles ahead, particularly with regard to heavy bombers. No tool of war was harder to build than a four-engine bomber.

"A heavy bomber," Arnold wrote[2] in a report to the War Department, "has over 400,000 component parts and perhaps 60,000 different parts. The manufacturer of one single radial type, air-cooled engine, involves more than 30,000 major and minor inspection operations. The finished surfaces of working parts on engines are checked to a millionth of an inch."

"The process of commissioning[3] a plane is not unlike the process of commissioning a battleship," the secretary of war explained to the president. "And you know how long that takes."

At one point, Arnold drove up to the new Glenn Martin airplane factory outside Baltimore with Army Chief of Staff George Marshall. When they arrived, Glenn Martin himself greeted them. Martin was an extraordinary figure, roughly the same age as Arnold and also a pioneering aviator. He had built his first airplane in 1912 in an abandoned church with the help of his mother, back when Arnold was flying a Wright Model B at College Park. In the early 1930s, Martin had developed the twin-engine B-10 medium bomber, the aircraft that Arnold flew with his team on his historic Alaska mission of 1934.[*] Now Martin was one of the most important aircraft manufacturers in the world.

In Martin's factory, Arnold and Marshall walked past rows of airplane building equipment. "In row after row,"[4] Arnold recorded, "new machines stood idle; not a workman anywhere around; nothing moving." Arnold asked Martin why more airplanes were not getting built.

"How can I?" Martin replied.

"What do you mean?" Arnold asked.

"No aluminum."

Marshall's face contorted. "Now wait a minute," he said. "What do you mean, 'no aluminum'?"

An aluminum shortage was hampering production, Martin explained. How could he build bombers without aluminum? The more Arnold investigated, the more he realized, in his words, "The conditions here were quite[5] similar to those in all our aircraft factories."

Arnold could see massive delays brewing. He received an alarming letter from the president of North American Aviation, Dutch Kindelberger, alerting him to another major problem. North American built the B-25 Mitchell twin-engine medium bomber and the T-6 Texan, widely used for

training. Kindelberger complained of the near-impossibility of finding experienced aircraft engineers and metal workers. “This factor [in] man power[6] shortage together with the existing critical material situation make us very fearful that airplane production may reach a crisis point.”

“Frankly I am worried about[7] aircraft production,” Arnold wrote to Maj. Gen. Frank Andrews in 1941. “As you know we are leaning over backwards to give everything to the British. Very little is coming to us . . . Engines are the neck of the bottle more than anything else and England has a priority on engines.” For all the chatter about airplane production and the desperate need for bombers, the truth about production proved unnerving.

“Taking everything into consideration,” Arnold wrote, “aircraft production insofar as getting airplanes for U.S. units is concerned is more or less a mess.”

The United States in 1941 had two heavy bombers in its pipeline: the Boeing B-17 Flying Fortress and the Consolidated B-24 Liberator.

The B-17 had a fully loaded weight of 55,000 pounds.[8] It was powered by four Wright Cyclone 1,200-horsepower engines. It flew with a range of 1,850 miles, a maximum speed of 300 mph, a bombload of 6,000 pounds, and a flight ceiling of 35,000 feet. Its main factory was Boeing Plant 2, in Seattle. Consolidated Aircraft in San Diego designed the other four-engine bomber, the Liberator. The B-24’s numbers were roughly similar, with a slightly larger bomb-carrying capacity of 8,000 pounds. Up to this time, the B-24 had the longest wingspan of any American aircraft yet built—110 feet. Like the B-17, the B-24’s four engines put out the equivalent horsepower of fifty-six Ford V-8 automobiles.

To build the B-24, the government contracted Ford Motor Company. Emboldened car engineers believed they could mass-produce a bomber aircraft using automobile assembly line techniques. But when they went to Consolidated Aviation in San Diego for their first studies of the bomber, they were stunned by its intricacy.

“We were all very much awed[9] by the size and complexity of the whole thing,” said Ford engineer Roscoe Smith. “I know for two weeks after I got there, I was in a daze.” Over a four-month period, blueprint makers drew out 5.9 million square feet of plans, to build this one airplane. Eighty-five percent of it was made of aluminum alloy; 13 percent steel; 0.33 percent

magnesium; 0.66 percent brass, copper, and bronze; and 1.01 percent rubber, glass, and plastic. Every one of those ingredients was desperately in short supply.

At the same time, Arnold's dream of a global superbomber continued to take shape at Boeing in Seattle.

On June 14, 1940, the same day that Paris fell, Arnold accepted the mock-ups for Boeing's B-29. Early in September, Boeing received $3,615,095 to complete two prototypes of the aircraft. "It was so large and complicated[10] that it required about ten thousand drawings before it was possible to put it into production," Arnold recalled. "A thousand engineers worked on that airplane. The drawings themselves cost us three million dollars."

If the B-24 Liberator could carry 8,000 pounds of bombs—the most of any American aircraft—the Superfortress would aim to carry more than twice that—20,000 pounds of bombs. If the B-17 could fly with a range of 1,850 miles, the Superfortress would fly 3,700 miles. The B-24's top speed was 303 mph; the Superfortress would hit 357 mph. The B-17, fully loaded, could take off with a top weight of 55,000 pounds. The B-29's max weight would be well more than twice that number—133,500 pounds.

For the first time, an aircraft would have machine guns that could be remote-controlled. For the first time, a military aircraft would have a pressurized cabin.[*] For the first time, an airplane would employ analog computers. But would all these ideas coalesce into a functioning flying machine? Would the thing take off and fly?

One year after Boeing created its first renderings, the company agreed to build a new government-owned factory in Wichita, Kansas, with orders to construct the first 250 B-29s. This meant that the Army and Boeing were now investing in two giant factories—Wichita and Seattle—for B-29 production, before the first prototype was even complete. Boeing aimed to make the Wichita factory ground zero for B-29 production.

A hulking complex began to rise out of the quiet, dust bowl plains in Kansas. Boeing already owned a small plant in Wichita. But the choice of this outpost in the Great Plains had other benefits. It was far from the coasts, as miliary officials believed that an attack on either the Atlantic or Pacific coastline could be imminent. Meanwhile, the B-29 project remained top secret.

"People watched this industrial[11] colossus rising from a former Kansas wheat field and wondered what was going on," recalled a Boeing spokesman. "Those who were on the inside of another of the Army's great secrets were keeping their mouths shut."

This new factory would require housing and training for tens of thousands of workers who had never worked on anything like an airplane, and infrastructure such as schools, roads, sewers, markets for food—everything needed to support a small city-size population.

Never before had a corporation or a government invested so much money, time, and manpower to build a product that did not yet exist. The B-29 program came to be known as "the $3 billion gamble." In a book about this aircraft, General Curtis LeMay later put it in context: "Hap took the chances,[12] cut the corners, and ordered this unique airplane into production before the prototype was even completed. He built the factories and the command structure before the airplane itself came into being."

The government asked for the first superbombers to be ready to fly on February 1, 1943. As one Boeing employee put it, "So began the largest single[13] industrial program ever."

On May 27, 1941, the Roosevelt administration declared an "unlimited national emergency." One month later, the Third Reich launched "Operation Barbarossa": the invasion of the Soviet Union, the largest and most expensive military operation ever up to that time. Hitler's forces were now fully engaged on both Germany's eastern and western frontiers. The same week that Hitler invaded the Soviet Union, the American War Department announced the birth of the USAAF, or the United States Army Air Forces.

The emergence of airpower led a senator from Nevada named Pat McCarran[*] to introduce a new bill to separate the air arm from the Army and make it an independent military service. "Military aviation has reached[14] the point of importance now where it can no longer be treated as merely a part of the other services," said McCarran. He was hoping to "convince Congress and the country of the necessity of a separate air force." Arnold had been influential in the movement, but remained in the shadows for fear of what had happened to Billy Mitchell.

The global emergency was so critical, McCarran's bill could not get support. Now was not the time for a radical reimagining of the American

military establishment. But it pushed the department ever closer to establishing a separate air force. The War Department changed the name of the Air Corps to the United States Army Air Forces, in an attempt to bolster the force and give it more autonomy.

Arnold was thrilled. “The Chief of Staff [George Marshall][15] has been with me 100 percent in the creation of this organization,” he wrote on July 28. “It is not a separate Air Corps but we are no longer the fifth wheel of a wagon. We have stepped up in importance and in responsibilities in accordance with our value in national defense. Some day—who knows—we may have a separate Air Corps. I have always said that it is bound to come.”

13

> My feelings against Americanism[1] are feelings of hatred and deep repugnance . . . Everything about the behavior of American society reveals that it's half Judaized and the other half Negrified. How can one expect a State like that to hold together—a country where everything is built on the dollar?
>
> —ADOLF HITLER

As the Battle of Britain raged, the United Kingdom's collapse felt imminent. "So many different problems[2] were cropping up with the British that it became apparent I must make a trip to England," Arnold recalled.

On April 10, 1941, he arrived at LaGuardia Airfield[*] in New York for departure to London. "Plenty of press men and photographers[3] but gave out no interviews," he wrote in his diary. Aboard a Boeing Yankee Clipper flying boat with eighteen passengers and eleven crew, he felt the aircraft lift off. Arnold was bound for a war zone for the first time in his life.

Although he commanded the Army Air Forces, Arnold had never seen warfare with his own eyes. He had never piloted an aircraft over hostile territory. He knew that if the United States entered the war, the British air leaders would become his partners, and he had to earn their respect and trust.

"On that trip to England,"[4] he remembered, "I hardly knew what to expect."

After stops in the Azores and Portugal, Arnold landed in Britain on April 12, 1941, along with an assistant named Lt. Gen. Elwood "Pete" Quesada, who was also an accomplished Army pilot.[*] "I did all the spade work,"[5]

noted Quesada, “had all the papers, had all the facts.” The duo checked into London’s Dorchester Hotel, and meetings with top British officials began.

The first major figure to meet Arnold at his hotel was Sir Charles Portal, air chief marshal of the Royal Air Force (“a very savvy man,”[6] Arnold described him in his diary). Then Lord Beaverbrook, who was in charge of airplane production, and Sir John Dill, chief of the Imperial Staff. Arnold met the dapper, Bentley-driving head of Britain’s Bomber Command, Arthur Harris, and the American statesmen John Winant and Averell Harriman.

The British leaders carried themselves with a comportment that struck Arnold as odd. They appeared imperturbable, even in the heat of war, as if showing the slightest emotion outside of humor was somehow gauche. Still, they were brilliant and determined. All of these figures were men, and all the product of moneyed families and the finest schools. Class structure was woven into the fabric of America, as exemplified by Roosevelt and the figures he chose for his cabinet and ambassadorships, but it was even more prevalent in Britain. Arnold—with his rough edges and homegrown sense of humor—did not quite fit in.

“My impression of him[7] was of a man who obviously hadn’t had these contacts before,” remembered Harriman, a Yale man and a railroad tycoon who was in meetings with Arnold in London. “But he was not unduly awed by it and he wasn’t unduly affected by it. He was tremendously interested by it.”

Everywhere the eye turned in London, the bombing airplane had left its mark. Crushed buildings lay in rain-soaked streets. Civilians and soldiers carried gas masks and walked exceedingly quickly. Arnold’s eye fell upon a flower box barely hanging from a window pane, about to fall at any moment—quite like England itself. At night, blackouts left the city as dark as ink, with the occasional automobile headlights stabbing through deserted avenues. Britons were suffering through shortages of food—barely any meat, bread made out of potato flour because there was no wheat flour. All the street signs had been removed, as the Germans had promised to invade and Londoners feared that street signs would help guide them upon their arrival.

Driving through the concrete maze, Arnold made mental notes. “Tour through London.[8] Saw where 24 or more blocks were leveled by bombs. House after house destroyed and burned. Docks destroyed with their stores

and supplies." On another drive: "Signs of bombing everywhere[9] as we drove to the Dorchester. People salvaging what they could from wrecked stores. Glass all over the streets. Buildings flattened."

Both the British and Germans employed high-grade incendiary bombs—firebombs—to a degree never seen before. "Fire departments working everywhere,"[10] Arnold journaled. He made a note to investigate the development of these bombs for the American arsenal, when he returned to Washington. The Americans had nothing like them—yet.

Arnold inspected the British aircraft and found some excellent, such as the Spitfire fighter plane with its Rolls-Royce Merlin engine. The British bombers—the Wellingtons, Hallifaxes, and Lancasters—impressed him as well. What impressed him most was the *lack* of airplanes. Britain needed far more, and these machines would need to come from America. The most surprising thing Arnold saw was a propeller-less airplane the British had developed. It was called a "jet-propelled" airplane and he saw the machine taxiing on a runway and making short flights.

"I knew then," he recorded, "I must get the plans and specifications."[11]

Arnold toured the Royal Air Force's Air Defense Headquarters, where he saw large maps affixed to horizontal tables showing locations of attacking and intercepting aircraft, which were tracked by ground observers and radar. He spent one evening in Churchill's war rooms while the British launched an air raid against German-occupied territory in France. "Only 140 bombers available for[12] [the] mission," he journaled. "Went through the War Room where Army, Navy and Air operations are coordinated. All given special treatment on their own maps. All maps kept up to date."

On April 15, Arnold was sitting at a dinner with British officials and Australian Prime Minister Robert Menzies when the Germans attacked the city. "The sirens started,"[13] Arnold recorded. "Search lights flashing everywhere. AA [anti-aircraft] guns cracking . . . Bursting bombs on all sides with their br-ump. The AA guns across the street start firing. The planes are overhead. The noise is deafening."

From the roof of the Dorchester Hotel, in darkness, Arnold and Quesada gazed out at what looked like an inferno. "We were right in the midst[14] of these heavy raids . . . ," recalled Quesada. "It was a horrible thing to watch, to see a hundred raging fires taking place throughout the city at one time. I can say rather frankly that we were both rather—*frightened* isn't the word,

but the horrible effect of these night attacks had a profound impact on both of us."

"Hospitals filled[15] . . . ," Arnold wrote. "Back of it all a determination not to be wiped off the map."

At one point, after a dinner with British officials, Lord Beaverbrook turned to Arnold and said, "What would you do if[16] Churchill were hung and the rest of us in hiding in Scotland or being run over by the Germans, what would the people in America do? We are against the mightiest power the world has ever seen."

On April 18, Arnold took a chauffeur-driven car to Ditchley Park, where he met with Prime Minister Winston Churchill. The Ditchley manor was built in 1722, meaning the building was older than the United States as a nation. Eight guests sat at dinner, and after, the men adjourned to a sitting room where Arnold talked with Churchill until 2 a.m. Over the following days, Arnold spent many more hours with Churchill. The prime minister spoke of American bombers constantly.

"Long range bombers must[17] be furnished to the British as fast as we can get them over," Arnold wrote of these conversations. The Americans had already given the British a small number of B-17s, with more promised. Both Arnold and Churchill agreed: they needed bigger and more sophisticated bombers. "We must plan new equipment[18] for 1943," Arnold noted. In a not-so-thinly veiled allusion to the B-29, he wrote in his diary of the need for "pressure cabins, long-range bombers, larger bombers."

Before leaving Britain, Arnold spent an afternoon with the king of England, George VI, at Buckingham Palace, which had already seen damage by bombs. Some windows were blown out and were yet to be repaired. Before leaving Britain, Arnold visited Churchill one last time, and the prime minister said, "You tell the President[19] for me that with you—the United States—in the war, we cannot help but win."

Arnold distilled some takeaways from the trip, none of them encouraging.

- Britain's survival was in doubt. As Arnold's compatriot Quesada put it, "I just didn't see how[20] they could possibly do it. I thought the odds were overwhelmingly against them."

- The American and British air officials agreed on the necessity for more bombing aircraft, but disagreed on bombardment methodologies. The British conducted raids on cities at night. The Americans were building their equipment to bomb by day, in precision strikes. The Americans believed in the "vital centers" philosophy, which they believed would be more effective and less destructive to civilian populations. This split would, soon enough, cause terrible controversy.
- The United Kingdom had built its power and prestige over centuries on the back of its Navy ships. Now, almost all the British officials agreed with Arnold that only airpower could save Britain and the world. "War is an Air war today,"[21] he wrote in his diary. "The Air alone can bring Germany to its knees if anything can."
- Without aid from America, the United Kingdom was almost certainly doomed. "They needed equipment badly,"[22] Arnold concluded. "They were fighting and we were not; and they did not know whether we could really build an Air Force or whether it would be any good if we did build one."

Back in Washington, Arnold met with Roosevelt to brief the president. He then set in motion plans to build the two most striking weapons he had seen in Britain. He summoned leaders from Bell Aircraft and General Electric and told them exciting news of this jet-propelled machine the British had developed. Was the jet-powered aircraft the airplane of the future? Bell and GE began work immediately.

Arnold then called a conference of the Army's Chemical Warfare Service, to discuss the firebombs that Britain was using. When the Chemical Warfare Service leaders gathered, Arnold came face-to-face with Dr. Vannevar Bush, a former dean of MIT and a director of NASA's predecessor, the National Advisory Committee for Aeronautics (NACA), who was attending this meeting as head of the government's Office of Scientific Research and Development. Bush told Arnold that the Chemical Warfare Service was already developing a new incendiary bomb—using a new flammable jelly developed in a laboratory. When this substance detonated, as Arnold put it, "the jelly was thrown in gobs[23] in all directions. The gobs stuck to the wall and ignited, causing fires that were very difficult to put out."

A team of scientists at Harvard University had developed this jelly substance, led by a chemist named Louis Feiser. The first tests had yet to be conducted. The jelly compound took its name from its major ingredients: *nap*hthenic and *palm*itic acids.

It was called napalm.

"That," Arnold later said, "was the start of a new era[24] of incendiary bomb construction for the AAF [American Air Forces]." This new era would reach its apocalyptic climax in Tokyo in a few short years.

On July 31, Arnold was flying from Baton Rouge to Ellington airfield in Texas when he got a radio message from General Marshall, reading, "Return to Washington—arriving not[25] later than 10:00 P.M., Saturday, August 2. Marshall."

The Air Forces chief responded: "Message received and will comply. Arnold."

When Arnold met with Marshall on the second, the Army chief of staff told him that they were going on a secret trip, and that Arnold should prepare to be gone for ten days. The destination was top secret.

On the day of travel, large numbers of American officials boarded the Navy destroyer USS *Tuscaloosa* in New York City. The boat cruised up the Atlantic coast, zigzagging to avoid Nazi submarines—what Roosevelt called "the rattlesnakes of the sea."[26] The ship's cabins filled with a who's who of military power. Arnold slept in his cabin and awoke at 7 a.m. to the sound of the *Tuscaloosa*'s engines throbbing.

"Where are we going?"[27] he wrote in his diary. "And why?"

The *Tuscaloosa* traveled with a fleet of American ships. The convoy arrived in a desolate cove of Placentia Bay off of Newfoundland on August 7, where soon another fleet of boats appeared on the horizon with Union Jack flags waving. The United States and Britain had secretly launched a historic meeting on the high seas.

No one present at the Atlantic Conference would forget the spectacle: two allied nations aligned in full ceremony, in icy Canadian waters. The American president was aboard the USS *Augusta.* The British fleet was led by the HMS *Prince of Wales*, with Churchill aboard. Military bands boomed out "Stars and Stripes Forever" and "God Save the King." When

Roosevelt and Churchill shook hands aboard the deck of the *Augusta*, the American president said, "At last, we've gotten together."[28]

"Yes," Churchill answered, "we have."

Aboard the ships, the American and British officials held long meetings, poured through bottles of sherry, and cemented a special friendship they hoped would carry them through the war. "The British as usual asked[29] for everything they wanted regardless of whether we have or ever will have an Air Force," Arnold recorded. The British leaders produced a position paper that said, among many other things, "bombing offensive must be[30] on the heaviest possible scale" and "we [must] give to the heavy bomber first priority in production."

Churchill and Roosevelt communed for the first time. "Being with them,"[31] said Churchill's daughter Mary, "was like sitting between two lions roaring at the same time." The Americans and British attempted to outdo each other with banquet dinners. The president's menu[32] included filet of beef, mushroom gravy, rosette potatoes, olives, chicken noodle soup, peaches and cream, cupcakes, and cigars. Churchill's menu a few days later featured caviar, vodka, mock turtle shop, grouse, champagne, port, and coffee. Over brandy and cigars, the prime minister spoke and Arnold made notes of Churchill's talk. These notes begin:

"This is a mechanized war,[33] it is not a war of 1917–18 where doughboys in the mud and the trenches fought it out to a conclusion. This is a mobile war, in the air, on the land, and at sea. It is a mechanized war where mechanized equipment is used to an extent never dreamed of before. Bombers are the things that we need to bring home to the Germans the horrors of war, bombers to an extent not heretofore dreamed of."

On August 14, 1941, Roosevelt and Churchill finalized a pivotal policy statement called the Atlantic Charter. This historic document expressed both countries' belief in democratic self-determination, the ability of a nation's peoples to choose their own government without undue force from outside its borders. The Atlantic Charter read: "After the final destruction[34] of the Nazi tyranny, [we] hope to see established a peace which will afford to all nations the means of dwelling in safety within their own boundaries, and which will afford assurance that all men in all lands may live out their lives in freedom from fear and want."

The affair ended with ceremonial flare—hundreds of troops aboard the decks of the numerous warships. The prime minister later said of this conference on the high seas, “Every word seemed to[35] stir the heart, and none who took part in it will forget the spectacle presented . . . It was a great hour to live.” To Arnold, it seemed, “We [the US] were planning for the war,[36] even though we were not in it.”

14

To conquer the command[1] of the air means victory; to be beaten in the air means defeat and acceptance of whatever terms the enemy may be pleased to impose.

—GIULIO DOUHET, *THE COMMAND OF THE AIR*

On December 7, 1941, in Washington, the first report of a surprise attack on the Navy and air base at Pearl Harbor in Hawaii reached the White House secret communications Map Room, in a cable marked "Urgent." It read, "AIR RAID ON PEARL HARBOR[2] X THIS IS NOT DRILL." Around this same time, Roosevelt received a phone call. He was sitting with his aide Harry Hopkins in his White House study.

"Mr. President," said Frank Knox, the secretary of the Navy, "it looks as if the Japanese[3] have attacked Pearl Harbor."

Information began to trickle in to the White House. "The first evidence of hostilities[4] was the presence of a submarine in Pearl Harbor defense area at about 0715 local time," according to a cable from the Navy's commander in the Pacific. "There were only a few minutes warning of the approach of aircraft which arrived at 0747."

Within minutes, the news leaked and spread all over the globe: the Japanese had launched a surprise attack on Pearl Harbor, and their airplanes had hit the US Navy's Battleship Row and the Army Air Force's airfields with crushing blows.

Arnold was in the woods outside of Bakersfield, California, taking a break from his exhausting job, quail hunting with his pal Donald Douglas. When they returned to the cabin where they were set to sleep that night, they found Douglas's father jumping up and down, yelling, "Pearl Harbor's been bombed!"[5]

"We all just stood there[6] for a moment," recalled Douglas. Arnold looked off into the distance. He said, "I've been trying to tell this guy[7] Roosevelt that something like this was going to happen for some time."

Arnold's deputy Ira Eaker had lain down for a Sunday nap, and his wife was listening to the radio. Eaker: "She came in after a few[8] minutes and said, 'The Japs have attacked Pearl Harbor!'" Eaker sprung from the bed and launched into action. Arnold's other deputy, Tooey Spaatz, was in Washington, in charge of the Air Forces in Arnold's absence. He immediately ordered the Air Force Combat Command to implement its war plan, termed Rainbow 5.

Lieut. Gen. K. B. Wolfe was aboard a B-18 in the copilot seat, the radio switched off. Gen. George Kenney was piloting. "It was a beautiful day,"[9] Wolfe said. "We came in at Boeing Field, and one of our colonels, Colonel Burnside, came rushing up to the airplane. He said, 'I was supposed to go back last night, but after this damn thing happened today, I thought I'd better wait and see what you and George wanted done.'"

Wolfe said, "What the hell happened?"

"The Japs hit Pearl Harbor."

Assistant Secretary of War for Air Robert Lovett was at a theater with his wife, seeing *Ninotchka* with Greta Garbo. "We came out at the end[10] of the film, and went to get the car in the parking lot, and we heard people talking." Lovett turned to his wife and said, "Why, I can't believe it! I can't believe the Japs would be such damned fools as to do a thing like that!"

Gen. Curtis LeMay heard the news as it "came a-crashing on a memorable Sunday afternoon." "Sure," he later wrote, "there wasn't anything very pretty[11] in the spectacle of our sailors and soldiers lying burned or drowned out there in Hawaii; but at least we did have some sense of relief." The pressure had been so intense, for so long. "Now we knew where we were going. We were going to war."

Even in Tokyo, the news came as a shock. A French journalist saw a newsvendor dash into a main intersection, yelling "*Senso! Senso!*[12]" He waved his hands wildly, but no one seemed to comprehend him. The shock was too great. "*Senso! Senso!*" he screamed. "War! War!"

In Bakersfield, Arnold rushed by car to the nearest airport. "Upon arriving at the[13] airdrome," he recalled, "I found everybody greatly excited —commotion, disorder, confusion everywhere. Washington wanted me to

get in communication with them at once! Radio, telegraph, telephone, any way I could!" Army Headquarters in San Francisco, the Army chief of staff in Washington, Spaatz and Eaker—everyone wanted to talk to the chief of the Army Air Forces.

"Got to Washington at 3:50[14] Monday afternoon where hell was a poppin'," Arnold recorded. "And where it's been poppin' ever since."

The attack on Pearl Harbor proved the worst naval disaster in American history. Nearly 2,500 Americans were killed and many more wounded. The Naval base's Battleship Row saw indescribable wreckage. The USS *Arizona*, *Oklahoma*, *Nevada*, *California*, *West Virginia*, *Cassin*, *Oglala*, and *Downes*—all were heavily damaged or sunk.

The Japanese flyers had taken off from aircraft carriers in the Pacific. The images of what airplanes could do to Navy ships, and the stealth of their approach, again signified a revolutionary new power in warfare. Hours after the initial attack, the Japanese Empire struck the Philippines, destroying nearly all the American B-17s and P-40 fighter aircraft stationed at Clark Field in Luzon—effectively, all the American airpower in the Far East.

Across the country, Americans felt a newfound fear of the skies, and a new kind of fear of instant attack they had never sensed before—all because of the bomber aircraft. "This is war,"[15] one army lieutenant general announced. "Death and destruction may come from the skies at any moment." New York was in a state of panic. "The war will come right to our[16] cities and residential districts," Mayor Fiorello La Guardia said in a speech. "At the present time, under the present relative position of the enemy, we may not expect long-continued sustained attacks such as the cities of Great Britain have suffered, but we will be attacked—never underestimate the strength, the cruelty of the enemy."

Teachers were taught to place gas masks on the faces of small children. The Red Cross first aid manual became one of the nation's bestselling books. Military officials scrambled to study the anti-aircraft defense resources around every major metropolis along both coasts.

Outside of Pearl Harbor itself, Washington was ground zero for chaos. Helmeted sentries swarmed the White House grounds. The president's Secret Service protection tripled. Anti-aircraft cannons could be seen atop

buildings. “If you think that this place[17] was hectic back in the early days of 1917 [World War I],” Arnold told a friend, “let me tell you now you were greatly mistaken because that was mere child’s play.”

Most Americans could not understand why Japan had attacked. The events leading up to Pearl Harbor stretched back to when the United States first extended aid to China in 1940. Japan’s military leaders—at that time gaining power over the country’s political officials—saw US aid to China as a rebuke and even a threat. Japanese leaders were determined to expand power, penetrating deeper into resource-rich China and Indochina. The US reacted by freezing Japan’s assets in the United States and cutting off shipments of aviation fuel and steel, which put Japanese military leaders in a position of fight or flight.

They chose to fight.

From Arnold’s point of view, Pearl Harbor could have been avoided. If the US military had a unified defense department, and perhaps a separate Air Force, rather than War and Navy departments that did not communicate well and were always in conflict for appropriations, Pearl Harbor would never have happened. Arnold wondered: “Who was responsible for[18] reconnaissance in the waters surrounding the Hawaiian Islands? The Army? Yes and no. The Navy? Yes. Both Army and Navy? Yes and no.”

An “I told you so” anger permeated the chaos, the feeling that airmen from the days of Billy Mitchell forward had warned of an event like Pearl Harbor. Meanwhile, the blow was devastating. “All the money that was spent for national defense between World War I and World War II was spent on the Navy, which was sunk at Pearl Harbor,” Spaatz told one interviewer. General Douglas MacArthur—stationed in the Philippines and the highest-ranking Army officer in the Pacific—cabled Arnold directly on December 10.

“EVERY POSSIBLE PRECAUTION WITHIN[19] THE LIMITED MEANS AND TIME AVAILABLE WAS TAKEN HERE BY THE FAR EAST AIR FORCE [STOP],” MacArthur communicated. “THEIR LOSSES WERE DUE ENTIRELY TO THE OVERWHELMED SUPERIORITY OF ENEMY FORCE [STOP]. THEY HAVE BEEN HOPELESSLY OUTNUMBERED FROM THE START.”

The United States declared war on Japan on December 8 and on Germany and Italy three days later. Victory or defeat would depend on America’s ability to manifest Roosevelt’s “Arsenal of Democracy” theory: to join

government, free enterprise, and military into one fighting force that would begin on the assembly lines of American factories. “We build things in America,”[20] FDR’s production chief, William Knudsen, said in a post–Pearl Harbor speech. “That is why most of the world is looking toward us, hoping and praying that we will come through.”

What needed building the most was airpower. Secretary of War Henry Stimson wrote Roosevelt after Pearl Harbor and put the stakes in context. “We must use our coming increase[21] of production primarily for the purpose of establishing as quickly as possible a powerful American Air Force. We are no longer a mere arsenal for other nations. We are ourselves in desperate danger . . . Never before have we faced the necessity of quick action in so many widely separated localities . . . Thus in all our primary activities today, air is a more prominent factor than either the Navy or the ground forces.”

According to Arnold’s records, his forces had a total of 159 combat-ready four-engine bombers. At bases outside of the US, there were only 61 heavy bombers, 157 medium bombers, 59 light bombers, plus 636 fighter planes. A far cry from 50,000 airplanes.

Meanwhile, the Japanese advance remained brutal and unchecked. Soon Japan completed conquest of Malaya, Burma, the Dutch East Indies, and the Philippines. News came from the Far East that Japanese torpedo bombers hit the British ship HMS *Prince of Wales* just three days after Pearl Harbor. This was the ship that Churchill used in his first meeting with Roosevelt at the Atlantic Conference just months earlier, off the coast of Canada. The *Prince of Wales* became the first ship sunk on the open waters by airplanes, in the Pacific War. Many of the sailors who sang and prayed with Roosevelt, Churchill, and Arnold at the Atlantic Conference were aboard.

“Nearly half those who sang,”[22] Churchill later wrote, “were soon to die.”

15

> The task of the military airman[1] now departs from the crusading role. It becomes a task of organization on a tremendous scale. No longer do we require flaming leaders with fanatic zeal to sell a cause; we need sound, even-tempered minds of great resource and depth to perfect the plans and build the structure of an air force larger than armies and navies of old.
>
> —HENRY ARNOLD AND IRA EAKER, *ARMY FLYER* (1942)

Now nearing his fifty-sixth birthday, his girth up to two hundred pounds, Arnold arrived at the Munitions Building each morning at 7 a.m. His appearance came like a thunderbolt through the hallways. His power over the Air Forces was complete. In the Army Air Forces, "there was no second in command,"[2] said Lt. Gen. Fred Dean. "There was only a Chief of Staff. There was never any Vice Commander or Deputy Commander of the Army Air Forces."

Arnold's drive was relentless. "He never stopped,"[3] recalled Lt. Gen. Donald Yates. "How that man ever kept on, and lived as long as he did, I don't know. He just wore himself out." Strangely, the smile never left Arnold's face, even in those frenzied mornings after Pearl Harbor. Arnold had a habit of smiling when he was livid, which some believed to be the source of his nickname Hap—that it was ironic. "He always had a smile,[4] which was quite deceiving," said Brig. Gen. F. Trubee Davison.

Work hours no longer existed. Life became work and work alone. "The only limit to our working hours was our own physical and mental capacity," said Brig. Gen. Donald Wilson. "We were there very early in the morning, and we worked until late in the evening, after ordinary dinnertime. This went on for six days a week, and oftentimes, Sunday morning." Arnold's chief assistant, Susie Adkins, a "spinster," devoted herself entirely to his

job. It was "her whole life,"[5] according to one of Arnold's staffers. Every member of Arnold's inner circle kept a red telephone at home to be reached at any hour of night. Each had a "squawk box" on his or her desk; the sound of Arnold's voice over the intercom could send a person into paroxysms.

Arnold kept a "Black Book"[6] on his desk full of facts, and keeping it up-to-date became a daily marathon. It was organized in seven categories: Operations; Production; Strength; Losses; Training; Transport Operations; Miscellaneous. The pressure was so great, anyone entering Arnold's office had to be on his or her toes. "If a man came into his office[7] and didn't know all the facts," recalled Army pilot Pete Peterson, "it wasn't long before the old man's face started getting red, and he was hammering the table and throwing the guy out."

"I guess I don't have to explain[8] to you," Arnold was known to say, "that I'm personally never satisfied." He knew what he wanted, as he had envisioned in his mind what a modern air force could be, all his life.

On a Sunday soon after Pearl Harbor, a colonel named Steve Ferson arrived at Arnold's office for a meeting. A studious officer whose job was to compile data, Ferson was a walking encyclopedia with up-to-date numbers on airplanes rolling out of factories, engines produced, airframes completed, trainers delivered to flying schools, spare parts production . . . During this Sunday meeting, Ferson suddenly plunged to the floor. "Steve was sitting on a table,"[9] said Brig. Gen. Eugene Beebe, who was for a time Arnold's personal pilot and one of his closest aides. "There were some big tables in the office, and I think the meeting was just getting underway, and he just keeled over."

A staffer began yelling, "Get a doctor! Get a doctor!"[10]

Within minutes, the senior Army doctor in the building declared Ferson dead of a massive heart attack.

"I came into Arnold's outer[11] office on a Sunday morning, just as they were carrying out the body of Colonel Ferson, who had been standing in front of Arnold's desk, and Arnold was shaking his finger," recalled Gen. Charles Cabell. Arnold "literally scared Ferson to death."

The primary ingredients of airpower were "man and machine," to use the parlance of the day. In terms of men, the Army Air Forces had grown from barely more than 20,000 when Arnold took charge to about 150,000 before

Pearl Harbor to over a quarter of a million in 1942. “There was a great deal of[12] German propaganda at this time about Hitler’s ‘secret weapons,’” Arnold later wrote. “We had some ourselves, but the most valuable secret weapon that we had was the self-reliant, resourceful American soldier.”

As a career military officer, Arnold had an almost religious faith in “chain of command.” As of early 1942, his organization was headed up by a chief of staff (at that time, Maj. Gen. Millard Harmon), a deputy chief of staff (Laurence Kuter), then six assistant chiefs of staff heading up different sections such as planning, inspection, and intelligence. The flow chart included key individuals like the director of military requirements, Brig. Gen. Muir Fairchild (later a US Air Force vice chief of staff), and the head of materiel command, Maj. Gen. Oliver Echols.

The boss felt that he knew his top officers as well as they knew themselves. “Even as Chief of the Air Corps[13] [Air Forces] in Washington, he had been a highly personal leader in face-to-face contact with his subordinates,” said Gen. Laurence Kuter. Among these most trusted figures were K. B. Wolfe, George Stratemeyer, Barney Giles, George Kenney, Fred Dean, LaVerne “Blondie” Saunders, Harold George, and Emmett “Rosie” O’Donnell, plus his two most trusted officers, Eaker and Spaatz. Most of these officers were in their fifties and had grown up in the service as “Mitchell-ites.” He called these officers by their first names, while the younger up-and-comers he addressed by last name.

Arnold’s closest confidants understood his primary operating principle: “‘It can’t be done’ were fighting[14] words to Arnold,” as Kuter put it.

Keeping the command structure optimized required the right individuals within it, and also outside of it. Arnold had Theodore von Kármán and his Scientific Advisory Group working on projects like rocketry and wind tunnel design. One day soon after Pearl Harbor, Arnold called in two of his most intelligent young officers, Charles Cabell and Larry Norstad. When they arrived, he showed them an organization chart of the Army Air Forces. At the top was a box that said, “Commanding General.” That was Arnold. Under him sprawled a vast chart with boxes and names, cascading down the page in the shape of an open umbrella. Arnold pointed to a little box on the side, attached to his own but not otherwise integrated into the chain of command. Arnold told Cabell and Norstad, “That’s you.”[15]

The two officers looked confused. Arnold explained that it was now their job to do nothing but “blue-sky thinking.” Arnold had no time to think.

He said, “I’ll do the operating,[16] and if I ever catch you two boys operating, I’ll skin you alive. No operating, just be thinkers.” Arnold paused. “Whatever you are doing,” he said, “drop it. You are working for me. The job begins right now.”

So began the rise of these two figures: Cabell, who would later become deputy director of the Central Intelligence Agency, and Lauris “Larry” Norstad, who would play a key role in the climactic air battles of World War II. Norstad was described by one pilot as “tall, handsome, and intelligent.[17] He had what it takes to go places in the military. He also had political connections, which did him no harm.”

Arnold searched for talent anywhere he could find it. Charles Lindbergh came to see him; the world’s most famous aviator, also the most famous antiwar activist, now believed he had to play a role in fighting for his country. Arnold had a lot of questions. “In view of your past stand[18] . . . ,” Arnold asked Lindbergh, “what are your convictions now? Would you have confidence in the President as your Commander-in-chief?” Ultimately, Lindbergh was permitted to join the Air Forces.

With a homebase in Tuskegee, Alabama, a new group called the Ninety-Ninth Pursuit (later Fighter) Squadron had begun training in Curtiss P-40 Warhawks. This was the first Black Air Forces squadron, known as the Tuskegee Airmen. In the heavily segregated American military, the Tuskegee Airmen had passed the same tests and were now training in the same equipment as white airmen—smashing the color barrier in Arnold’s command.

Arnold had no intelligence system to rely on, so he called in Gen. William “Wild Bill” Donovan, the head of the Office of Strategic Services (the precursor to the CIA). Donovan was a dynamo of energy who responded to Arnold’s calls with the words, “What do you want?[19] When do you want it? I’ll get it for you.” Arnold even found talent in Hollywood, commissioning actor Clark Gable, who signed on as a private and reported for pilot training. Arnold’s wife, Eleanor, began working endless days as the acting head of a new organization called the Army Air Forces Aid Society—a group founded by the Arnolds to support wounded Air Forces veterans and the families of airmen killed while serving their country.[*]

Equally critical was the bottom end of this command structure. After Pearl Harbor, the American Army Air Forces became the largest educational institution in history. “The majority of AAF personnel[20] are

specialists," Arnold wrote. "We trained men to repair gun turrets and airplane propellors, to operate radio control towers, to take aerial photos, repair teletypewriter systems, and to perform a thousand other important tasks."

Pilots and bombardiers, gunners and navigators, specialized mechanics, meteorology experts—all needed to be schooled. To build institutions from scratch would take too much time and use too many resources, so the government turned existing buildings into schools. Parking lots and warehouses became classrooms. Five hundred hotels were leased and turned into educational institutions.

For each one of the tens of thousands who put on that uniform, passed those tests, and made that leap of faith, it meant joining a purpose larger than oneself. One navigator in training at an airfield in Michigan said that at this time, "The separation of wheels from[21] the ground was the most thrilling moment of my then young life."

The other main ingredient of airpower—machines—presented an equally daunting challenge.

At the beginning of America's involvement in World War II, the Army Air Forces had in the pipeline roughly 50 different aircraft,[*] anchored by the "big heavies"—the Boeing B-17 Flying Fortress, the Consolidated B-24 Liberator, and, although not yet in production, Boeing's B-29 Superfortress. The lineup included six medium bomber models, six light bombers, eight fighters, six observation aircraft, seven cargo planes, and a dozen training aircraft. Every one of these aircraft required expansion in mass production —each presenting unprecedented challenges, including raw material shortages, labor shortages, engineering know-how . . .

Aircraft models took months and years to design, and months and years to produce, while the needs for new and different aircraft changed constantly. What to build? The answer was a moving target. "There has never been a time[22] since the war began in Europe," Arnold wrote in a memo to the War Department, "that our air needs were not in a state of change from day to day."

The Air Forces remained desperate to find manufacturing facilities. "I'll give you an example,"[23] recalled K. B. Wolfe. "General Mills." This Minnesota-based breakfast cereal company was famous for its brands Kix

and Cheerioats (later Cheerios). “We were scratching the bottom of the barrel for mechanical ability. One of my boys came up and said, ‘General Mills has got a small mechanical department.’”

Soon Army Air Forces officials were there, training employees to build automatic pilot units. “Things were just happening all the time,” Wolfe said, “just one crisis after another . . . You just had to step out and do it.”

Six days after Pearl Harbor, Roosevelt issued Executive Order 8974. “The Secretary of War,” it read, “is authorized and directed[24] to take possession and assume control of any civil aviation system, or systems, or any part thereof, to the extent necessary for the successful prosecution of the war.” In short, the civilian airline industry was now at the service of the military—all its airplanes, all its factories, all its resources. In a small room in Washington, with two clerks and a trusted general named Maj. Gen. Robert Olds in charge, Arnold launched the Air Transport Command (ATC). The ATC’s job was to move people and resources around the globe—everything from storages of gasoline to spare engines to hospital equipment.

The ATC would have to become the largest airline transportation system in the world, almost overnight. A large part of the Army Air Forces’ success would rely on its ability to move men and resources, in huge quantities, all over the world, with unprecedented speed.

In Wichita, the second B-29 facility outside of Boeing’s home Seattle plant rose up out of the Kansas plains, higher every day. “As fast as the contractors[25] trussed, roofed over, and paved a few square feet,” recalled one Boeing employee, “jigs and tools for the B-29s were moved in . . . People were swarming into Wichita from all over Kansas—from Oklahoma, Missouri, Arkansas, from virtually everywhere . . . hardy Midwesterners from the farms, the crossroads, the towns, the cities . . . They poured in from the farm fields, the oil fields, offices, stores, shops, schools, pulpits, and from home kitchens . . . They were people who knew nothing about building what was to be the world’s most powerful and mightiest warplane.”

In one of the riskiest decisions of the war, the government doubled down on the B-29 yet again, assigning a *third* company to build a *third* factory, even though a prototype of this aircraft had yet to fly. Bell Aircraft of Buffalo signed on to build the B-29, and hastily began erection of a

factory in Marietta, Georgia. The government chose Marietta because it had so much open space, was far from any coast, and was home to a new airport, one that could be greatly expanded.

"The plant is to produce a new[26] bomber plane larger and faster than any in the air now," Atlanta's biggest newspaper, the *Constitution*, reported, in a front-page story with the headline, "$15,000,000 Army Bomber Plant in Cobb County to Employ 40,000." When complete, the factory would house an assembly line longer than eight football fields, comprising two million square feet. Water lines, high-tension electric, and gas lines were already laid.

"The bomber is called the B-29,"[27] commented Bell Aircraft's spokesman William J. O'Connor, in the first mention of the airplane's name in the mainstream press. "Tests of this new plane, which has the longest range of any bombers now flying, will be completed in August. It will have four motors."

The Marietta factory was set to be the third largest factory in the world. Only nine thousand lived in Marietta, according to the 1940 census. "New schools will be needed[28] in the area which will be thickly populated," noted the *Constitution*. "New stores, new businesses and new everything that goes to make up a city of nearly 100,000 will be needed."

When the first workers were hired at Marietta, Georgia, an Army troubleshooter from Washington by the name of Brig. Gen. B. E. Meyers came in to supervise. What he saw mortified him. "The Marietta plant is probably[29] the best illustration available of the difficulties we have had in production," he said. "The people there were untrained, plant facilities were practically nonexistent, and there were none of the conditions that would normally seem necessary for a successful industrial venture. Believe it or not, people who were employed to make aluminum airplanes had to be shown what a sheet of aluminum looked like."

The B-29 prototype had yet to fly, and engineers were still pulling and tugging on its design. "There just wasn't time to complete[30] the necessary engineering and experimental work before production got under way," a Boeing spokesman later said. "It was a choice of having a combat plane now or of not having one for several years."

Every hour was critical to national survival. "Not an hour can be spared,"[31] the secretary of war urged the president. "Not a plane can be

unnecessarily given away. We are so far behind that it will require Herculean efforts to catch up."

16

The difficult we do immediately; the impossible takes a little longer.

—ARMY PROVERB

In the White House—at 4:45 p.m. on Tuesday, December 23, 1941—Roosevelt called to order the first wartime conference between the American and British high commands. Sitting at the table on the British side were Winston Churchill, Lord Beaverbrook, and Sir John Dill. On the American side sat Secretary of War Stimson, Secretary of the Navy Frank Knox, Admirals Ernest King and Harold Stark of the Navy, Army Chief of Staff George Marshall, and General Arnold of the Air Forces.

It was Christmastime in the White House, and the bond between the president and prime minister shattered formalities. But once the conference got underway, it was all business. In Europe at that moment, the siege of Leningrad left even seasoned military figures appalled. Hundreds of thousands of soldiers and civilians, both Germans and Soviets, were dying of violence, starvation, and frostbite. That morning, the *Boston Globe* reported that 117,000 Nazi soldiers had died in a single month on the war's eastern front.

During the president's opening remarks, the subject of bombers came up almost immediately. "The President said that he[1] had agreed that we would start operating Heavy Bombers as soon as possible from England," according to the meeting minutes, and "that Churchill was in agreement on this—that the total number need not necessarily be large but the morale value of this action would be extremely high." Churchill urged that US bombers be sent to England "at the earliest possible moment to bomb

German forces, German industries, and French ports used by German raiders—land, sea, and air."

Over the next hours, the leaders discussed basing troops and airplanes in Ireland, Iceland, Norway, and Greenland. They talked about naval support in the Central Atlantic, the hunting grounds of Nazi U-boats. Roosevelt presciently targeted the year 1944 for the climactic battles to be won. "We should project everything into[2] 1944," when the "planes, tanks, and ammunition in quantity" would be fully ready from American factories.

So began the planning for the joint forces to begin fighting back.

The following day, in the Federal Reserve Building, the American and British military chiefs of staff met for the first time. This conference was significantly larger; while six British military officials were at the table, the United States had seven naval officers and nine from the Army—most notably, Marshall and Arnold. Again, the subject of American bombers arose almost immediately.

Arnold spoke little, allowing his boss, General Marshall, to do most of the talking from the American side. The first wartime American-British conference took on the codename Arcadia. The most important agreement was the "Europe First" plan, to focus on the destruction of Nazi Germany before Japan. According to the official "Memorandum by the United States[3] and British Chiefs of Staff" (a paper that had the words "to be kept under lock and key" at the top), "Germany was the predominant member of the Axis Powers, and accordingly, the Atlantic and European area was considered to be the decisive theatre." At the Arcadia Conference, "Project —Gymnast" crystalized, a plan for joint operations in North Africa—what would become the first major Allied offensive of the war.

The agreement of wording in strategy papers required endless debate, but when they were complete, and the strategy for "undermining and wearing down[4] of the German resistance" was set, it was listed as the number one program: "Ever-increasing air bombardment by British and American Forces." The American bomber was to play a starring role—if the American factories could succeed in building bombers on a historic scale.

On February 6, 1942, both governments announced the establishment of the "Combined Chiefs of Staff." The British named four officers to its elite rank, most notably for Arnold, the air marshal in charge of the Royal Air

Force's Bomber Command, Arthur T. "Bomber" Harris. The American top four were: Admiral Stark, chief of naval operations; Gen. George Marshall, chief of staff of the Army; Adm. Ernest King, commander in chief of the US Naval Fleet; and Lt. Gen. Henry Arnold.

As the American and British commands hammered out agreements, Arnold sent a telegram requesting a meeting with his deputy Ira Eaker, who was on the West Coast. In early January 1942, Eaker presented himself in Arnold's office with these three words: "What's up, Boss?"[5]

"You're going over to England to start to understudy the British bomber effort, and to start our bombing operations," Arnold said.

"Bombers? I've been in fighters all my life."

"Yes, I know," said Arnold. "That's why. We want the fighter spirit in our bomber units."

Eaker later recalled, "He told me I was to go over[6] and begin negotiations with the British for headquarters, airdromes, communications, and all the stuff we required before we went over with bombers."

"Then," Arnold said, "I'll get you some bombers[7] and some crews." Arnold told Eaker to build his own team, but to remember there were not enough qualified Army Air Forces officers to go around. "You assemble some bright[8] young civilians who have prospects for executive ability, and you train them," Arnold told him. "You can take a smart executive and make a fair Army officer out of him in a few months. You can never take a dumb Army officer and make a good combat leader out of him."

Arnold and Eaker had known each other for twenty years, and an unspoken complication bubbled up in certain moments. Arnold had never seen combat. Eaker once wrote, "No man should plan air battles[9] who has not fought in a flying machine. No leader should ever send airmen to battle unless he knows by personal experience their problems and the limitations of their equipment and the opposition they will meet. Great leaders in the air and on the ground do not send men. They lead them." Arnold was in the unavoidable position of sending subordinates into war zones, without ever having fired a weapon in anger himself.

"I know he felt it, particularly[10] having people with combat experience under him," Arnold's son Henry Jr. recounted. "I think that's why he leaned so heavily on these people."

Eaker understood the value of chain of command. He assembled a team of six men and flew to Britain. This crew was standing in a New York

airport ready to depart for England when a Washington friend approached Eaker. The man said, "Why do you want to go off to war?[11] You have a pretty wife, a reputation and plenty of brains. You could land a good administrative job in Washington."

"This is what I have been waiting for all my life," Eaker said. "This is what I have been training for for 24 years."

The US Army founded the Eighth Air Force on January 28, 1942, with Eaker as its first commander. The Eighth Air Force's job was to play the primary role in winning the skies over Nazi Germany.

"Germany First" might have been the plan. But Americans were not going to like it. Roosevelt had a keen sense of what America desired. "There were times,"[12] his chief of staff, Adm. William Leahy, wrote, "when I felt that if I could find anybody except Roosevelt who knew what America wanted, it would be an astonishing discovery."

What America wanted was vengeance, for the sucker punch at Pearl Harbor. Vengeance was not the most admirable impulse, but it was real, it was raw, and FDR knew it.

The signs were everywhere. When the famous George Gallup polled Americans, he found that 97 percent supported[13] Congress's declaration of war on Japan. Reports of violence against Japanese businesses in California were routine. All that winter, the US Treasury Department's mail room flooded with letters from angry citizens sending donations, hoping that their money would be used to attack Japan. The letters poured in with the slogan "Remember Pearl Harbor," with donations from one cent to $200.

"If this buys only one screw[14] for a bomber I will be happy," wrote one woman who sent $5. One American sent $100 with a note saying, "Use it to buy bombers."

In a meeting in the White House, Roosevelt ordered Arnold to plan a mission. "How should we go about it?"[15] Arnold wrote of this meeting. "What problems of supply would it involve? . . . I said that from the viewpoint of both Japanese and American psychology, it was essential that Japan be bombed as soon as possible." Arnold took from these meetings the president's desire to show Japan "the real meaning of war."[16]

On January 4, 1942, Arnold met with Adm. Ernest J. King, the highest-ranking Navy officer outside of the president's chief of staff, Leahy. The

United States possessed no air bases anywhere near the Japanese mainland, nowhere close to the range of any of the USAAF's bombers. Arnold and King came up with a plan. It was an audacious idea that originated with a Navy submariner named Captain Francis "Frog" Low, and had gone up the Navy chain of command. Could US forces launch a bomber attack from the deck of an aircraft carrier? Launching single-engine fighters from aircraft carrier runways was treacherous but routine. Launching bombers—this had never been done.

Arnold kept notes from his meeting with King, and he scribbled the following: "We will have to try bomber[17] takeoffs from carriers. It has never been done before but we must try out and check on how long it takes."

Arnold needed to find a brilliant and fearless commander to attempt this mission. Enter forty-five-year-old Jimmy Doolittle. Arnold had known Doolittle since the days of the Billy Mitchell trial, and he trusted Doolittle's patriotism, intellect, and talent as much as any other pilot. Doolittle had grown up in Alaska and had earned a doctorate in aeronautics from MIT, one of the first such doctorates ever awarded in the United States. During the 1920s he had pioneered aeronautical maneuvers and technical innovations. Doolittle seemed the perfect man for the job. In Arnold's office in the Munitions Building, he briefed Doolittle on the idea.

"Jim," Arnold said, "I need someone to take this job over."[18]

"And I know where you can get that someone," Doolittle responded.

"Okay, it's your baby. You'll have first priority on anything you need to get the job done. Get in touch with me directly if anybody gets in your way."

Doolittle was charged with planning a mission to attack mainland Japan —requisitioning the equipment, modifying the aircraft, recruiting the crews, and keeping everyone's mouth shut. The secrecy made getting things done tricky. "Whenever I had resistance[19] from someone," Doolittle recalled, "and my using General Arnold's name didn't get something done fast enough, I called or saw Hap personally and the path was suddenly cleared." Doolittle was hoping the plan would clear a path all the way to Tokyo.

Doolittle chose the North American B-25 Mitchell, named appropriately for "old Billy" himself. It was a twin-engine medium bomber with a top speed of almost 330 mph. Critically, it had a manageable takeoff speed and could

carry a wallop of bombload. Doolittle named the mission "B-25 Special Project," and after a thorough but speedy study, he wrote a memo to Arnold.

"The purpose of this special project[20] is to bomb and fire the industrial center of Japan," read the first sentence.

As a joint Navy–Army Air Forces mission, the plan was to sail carrier-borne bombers to within range of Japan, launch them, make the attack runs, then land in China. "The greatest nonstop distance[21] that any airplane will have to fly is 2,000 miles," Doolittle wrote Arnold.

Under Doolittle's direction, the airplanes underwent modifications, while pilots practiced takeoffs on airfields marked with boundaries outlining the size and shape of aircraft carrier runways. Engineers mounted electrically operated 16 mm motion picture cameras on the planes, cameras that could snap sixty pictures at half-second intervals. The United States Rubber Company crafted extra-collapsible leakproof gas tanks. The Navy chose the most appropriate ship: the USS *Hornet*, a carrier with a flight deck of about 810 feet. Fully loaded, this gargantuan ship displaced more than twenty-five thousand tons.

On February 2, Doolittle watched cranes hoist two B-25s aboard the *Hornet*, in port at Norfolk, Virginia. Then the ship sailed far enough out to sea so it was out of sight from land. Two pilots made takeoffs that day, in the B-25, as the *Hornet* cruised at 20 knots into a headwind. This proved that takeoff was possible. Still, Doolittle worried how much space would be available for takeoff once the ship's deck was loaded with B-25s bow to stern.

"General," Doolittle said in a meeting in Arnold's office, "it occurred to me that I'm the one guy on this project[22] who knows more about it than anyone else. You asked me to get the planes modified and the crews trained and this is being done. They're the finest bunch of boys I've ever worked with. I'd like your authorization to lead this mission myself."

"I'm sorry, Jim," Arnold said. Doolittle was too valuable. "I need you right here on my staff. I can't afford to let you go on every mission you might help to plan."

Doolittle played his hand, and ultimately Arnold gave him permission. Doolittle would fly the lead plane. On the morning he left on his mission, he told his wife, "I'll be out of the country for a while. I'll be in touch as

soon as I can." He kissed her goodbye and could tell that she knew: she might never see her husband again.

On April 1, San Franciscans awoke to a sunny day. In San Francisco Bay, the *Hornet* was visible with B-25 bombers crowded on the deck. Civilians could see it as it maneuvered under the Golden Gate Bridge and out to sea.

The *Hornet* traveled as part of Task Force 16.2, comprising sixteen ships total. The mission was so top secret, Arnold was left in the dark. There would be no communiques.

On April 17, the *Hornet* reached its launching point, on rough seas about 850 miles from the center of Tokyo. Doolittle gathered his team: five airmen each for sixteen B-25s. "We all gathered around a bomb[23] that had been brought on deck and a Navy photographer took pictures," Doolittle recalled. A Navy man named Mitscher read aloud statements from Admiral King and General Arnold. "The group was in a lighthearted mood, and several wrote slogans on the bomb," Doolittle remembered.

Each crew member carried survival gear: a gas mask, flashlight, firearm, clips of ammo, a hunting knife, emergency rations, a canteen, a compass, a life jacket, and a pint of rye whiskey for "medicinal purposes."[24] Each aircraft held a five-man rubber lifeboat. The crews loaded their planes. In the cockpit of the lead B-25, Doolittle looked out on the *Hornet*'s runway as it heaved up and down. High winds ripped across the flight deck.

"Our airplane was maneuvered[25] into position," he recalled. "My crew was in place. Ran both engines up, tested them and gave the thumbs-up signal to the officer holding the checkered signal flag. We were ready. I glanced at my watch. It was 8:20 A.M. ship time."

On April 20 in Washington, Arnold was handed a telegram that came in from the American embassy in China. It read, "TOKYO SUCCESSFULLY BOMBED.[26] DUE BAD WEATHER ON CHINA COAST BELIEVE ALL AIRPLANES WRECKED. FIVE CREWS FOUND SAFE IN CHINA SO FAR."

The mission was so top secret, there were no headlines, no news reporting whatsoever. In a subsequent message, Doolittle reported, "Enemy pursuit took off[27] to attack us and there was intense antiaircraft fire. There were also many barrage balloons . . . At least two enemy planes were shot

down. 15 of our planes have been located in East China . . . Six [airmen] are believed to have been taken prisoners. Seven are missing. Sergeant Factor [he meant Cpl. Leland Faktor] is dead."

Soon the news began to spread through Washington: Doolittle had bombed Tokyo. And lived! Arnold wrote the president on May 3 regarding "a more complete picture of this mission."[28] The Naval Task Force encountered enemy patrol and sunk two Japanese ships. "Although the seas were heavier than at any time during the trip," Arnold wrote, "the rise and fall of the ship being as much as 50 feet and the spray breaking over the deck, the take-off was made with General Doolittle leading in the first ship. The last airplane took off about 9:20."

When the crew's whereabouts were discovered, the news proved grim. Among the 80 raiders, one had died bailing out of his aircraft, two had drowned, and four were seriously injured and getting medical treatment in a Chinese location dangerously close to Japanese troops. One of the B-25s landed in Soviet territory, and eight of the raiders were now POWs in the hands of Japanese.

On May 19, Arnold met Doolittle and his wife, Jo, at Washington Airport and whisked them to the White House. Flanked by Arnold and Marshall, Doolittle bent over so he could look at Roosevelt eye to eye as the president sat in his chair. "Jimmy, I'm proud of you,"[29] FDR said as he pinned a Medal of Honor to Doolittle's chest. "All America is proud of you and as their President, it is my privilege to present you with the Medal of Honor for the raid on Tokyo." The White House released a statement from Doolittle, who said his mission "exceeded our most optimistic expectations."

The next day, the news finally broke in the press. America went wild for Doolittle, the celebrations echoing the party fifteen years earlier that welcomed Lindbergh home after his transatlantic flight. Americans wanted to know everything about the diminutive pilot, how Doolittle had been an amateur boxer as a youth, how he could pilot airplanes fearlessly but, reportedly, feared modern electric elevators.

The Doolittle Raid has since become the stuff of legend, a historical chapter often used to demonstrate the magic of American courage and patriotism, and the power of the bomber airplane. As is often the case, the real story is more complex. The sixteen B-25 bombers dropped an

estimated fourteen tons on Japanese targets, damaging factories, ammunition depots, and naval facilities. But the real gain was in morale.

The Japanese Imperial Army, meanwhile, retaliated with a brutal bloodletting. While Americans celebrated Doolittle, Japanese soldiers went hunting for American airmen in China, killing masses of Chinese citizens in the process. China's leader Chiang Kai-shek wrote to the US State Department: "After they had been caught[30] unawares by the falling of American bombs on Tokyo, Japanese troops attacked coastal areas of China where many of the American flyers landed. These Japanese troops slaughtered every man, woman, and child in these areas—let me repeat—these Japanese troops slaughtered every man, woman and child in these areas."

Estimates of Chinese civilians killed from these attacks has reached as high as 250,000. Doolittle's raid might have "exceeded our most optimistic expectations,"[31] as the airman put it. But it also blew away any expectations of a "moral war" in the Far East.

17

We do not have to become heroes[1] overnight. Just a step at a time, meeting each thing that comes up, seeing it is not as dreadful as it appears, discovering that we have the strength to stare it down . . . The thing to always remember, you must do the thing you think you cannot do.

—ELEANOR ROOSEVELT

On April 1, 1942, Arnold reported to the White House for an afternoon conference with Roosevelt. Arnold wrote in his notes, "I discovered that our meeting[2] with the President was a very secret one, in which everybody came through the back door and left the same way so that nobody could see who was present."

Roosevelt addressed the topic of "the 'all-out' offensive" against Nazi Germany. It included, as Arnold noted, "the actual movement of air units to England." Roosevelt wanted to know how soon the United States could begin bombing operations. A lot of details needed addressing. The president suggested that Arnold go to Britain to coordinate with Churchill and the British air marshals "at once."[3]

Arnold also got a personal invite from the chief of the Royal Air Force's Bomber Command, Arthur Harris. "Come on over and let's[4] clean up!" Harris wrote. "1000 bombers per raid, instead of 2–300 as now, and we've got the Boche by the short hairs." Harris's plan was to use bombers to "devastate and annihilate," he wrote Arnold. "There is no other way of doing it, either in Germany or, and still more so, Japan."

Arnold arrived in London in a private train car with General Dwight Eisenhower and a retinue of aides on Tuesday, May 26. "It was necessary to reach[5] a whole new understanding about air matters between our two

countries," he recorded. He was met quickly by Harris. "I recall his coming around,"[6] Harris later said. "I remember him coming into my office and saying, 'Bert, the thing that strikes me so much about this country is this terrible threat hanging over you all, but I walk through these government departments like the Air Ministry, and it's all quiet. Nobody's running about . . . There doesn't seem to be any sort of atmosphere of panic or urgency.'"

Arnold, Harris thought, believed that the United Kingdom was going to lose this war.

London had changed since Arnold visited a year earlier. The country had come so close to defeat in the Battle of Britain, many believed that one more German air attack could have tipped the scales. Germany had run out of resources, now spread thin by the conflict with the Soviets in the East. The Battle of Britain had ended for the time being.

"London is a different city,"[7] Arnold journaled. "People are not the diffident, harried, listless ones I saw last year, they have pep and show an interest in life. . . . That look of almost fearful bewilderment is gone."

In a sign that many took as hope, a peculiar "fire flower" that liked to sprout out of scorched earth was spotted in the ruins of buildings leveled by Nazi bombardment. That flower had not been seen in London since the aftermath of the great fire of 1666.

Arnold's deputy Eaker had set up headquarters for the Eighth Air Force near the British air command's main offices, in a rural spot outside London called High Wycombe. It was a heavily wooded region, so the buildings would be hard to spot from the air. The Americans had taken over the Wycombe Abbey school for girls, a sixty-acre campus with historic buildings and parklands.

The Eighth Air Force still had almost no equipment, with many of the airfields yet to be built. At the new headquarters, Arnold watched what few staff officers Eaker had on hand, keeping themselves busy playing touch football. One Eighth Air Force commander, Curtis LeMay with the 305th Bombardment Group, recalled training his airmen in the US preparing to leave for Britain: "I had just thirty-five pilots.[8] Of course, we were also supposed to have thirty-five airplanes, but we had only three. We had no navigators, no bombardiers, and no gunners."

In Arnold's first meeting with Churchill on this trip, at No. 10 Downing Street, he faced a Herculean task. Arnold was the loudest voice in Roosevelt's ear, demanding that airplanes coming off American assembly lines be given to American forces and not foreign powers. From Churchill's point of view, Arnold was the man stopping airplanes from reaching the British. Arnold had to argue his point to the prime minister in front of a delegation of angry British leaders.

Subsequent meetings with Churchill grew only more contentious. Arnold kept notes of these meetings; Churchill's desperation jumps off the page: "The planned effort in the air[9] against our enemies must not dip," Churchill told Arnold. "The optimum striking force must be brought against Germany. It is only right and it is very essential that you create your own Air Force, and it must fight alongside ours. The maximum number of your American air units must be brought to England to fight against Germany as soon as possible . . . Everything possible must be done to get them here soon . . . We can only do it with your planes."

Britain's "Bomber" Harris heard Arnold's argument. "I recognized the whole[10] time that Arnold himself was balancing on a knife-edge," Harris recalled. "Naturally enough, his first care was for the interests of his own country, and rightly so."

Churchill was furious. Arnold could not back down. Arnold explained that it was his job to deliver airpower to the American people, so America could begin to fight. "I told him the people[11] of the United States knew that; that they wanted a United States Air Force now; they wanted action in Europe." Both agreed, the situation was desperate. Harris summed it up in a memo to Churchill that began, "Victory, speedy and complete,[12] awaits the side which first employs air power as it should be employed . . . We ourselves are now at a crossroads."

Arnold spent the week in heated discussions that took place in smoky offices, in the back of speeding cars, and over cups of tea and tumblers of sherry. On Thursday, May 28, he spilled his frustration into his diary. "Our conference talks[13] are getting us nowhere." At the same time, he earned respect from his British counterparts. One Royal Air Force figure named John Slessor described Arnold:

> He was an intensely likable person[14] was Hap Arnold, transparently honest, terrifically energetic, given to unorthodox methods and, though shrewd and without many illusions, always with something of a schoolboy naivete about him. In spite of his white hair and benignly patriarchal appearance, he was a bit of a Peter Pan . . . He had lived through years of frustration which had done nothing to impair his effervescent enthusiasm or his burning faith in the future of airpower. No one could accuse him of being brilliantly clever but he was wise, and had the big man's flair for putting his finger on the really important point.

The biggest strategic disagreement had to do with day versus night bombing, and target ideology. The British were sending out bombing missions at night, attacking urban populations, while American strategy was setting up to bomb strictly military targets using radar and bombsights from high altitude, during the day.

"I bloody well don't think[15] you can do it," Harris told Arnold. "We've tried. We know. We've even tried it with your [B-17] Fortresses."

"Sure," Arnold replied, "you tried it with one or two B-17s at a time. We don't plan to do it that way. We're going to send them out in mass formations."

"It doesn't matter a tinker's damn what you send them out in," Harris fired back. "The Boche have too many fighters, too much flak, too much bloody power."

The Americans remained insistent: precision daylight bombing of vital centers was the fastest, most economical way to win a war, with the least loss of life—on both sides. That was what they were building their aircraft to do and training their airmen to do. As Arnold put it: "If the sources of 90 percent[16] of German electric power were destroyed in one week, the results might be decisive. All industry would halt. Light and water facilities would be cut off. Hospitals would be closed, sanitation systems would cease to function. Much necessary transportation would be paralyzed."

Harris argued furiously against the American way of thinking. "I said that the Americans with[17] their bombing ideas were, I was certain, going to be up against two difficulties," he explained. One was accuracy. Could bombers—even with this new technology called radar, and the most modern bombsights—hit their targets from high altitudes? The other concern was anti-aircraft fire and dogfights with German fighter aircraft. "They [the Americans] were going to have very, very heavy casualties," Harris believed. "Much heavier than they thought."

"Let the Yanks bloody[18] their noses," said Britain's Air Marshal Portal. "They'll find out the same as we did, that you can't do daylight bombing."

The United States planned to send in their bombers without fighter plane escort, banking on the old adage that "the bomber would always get through." B-17 and B-24 bombers were built with their own firepower, machine guns in turrets fore and aft, above and below. The British believed the bombers would get shot out of the sky. An American pursuit plane with the speed and range to accompany big bombers on their missions did not exist.

"There wasn't a man on the[19] Air Force[s] staff, from General Arnold on down, who wouldn't have given his neck for a long range fighter," Eaker recalled. "Nobody in industry, or in the scientific community, however, had brought in any drawings for one."

On May 30, Arnold visited Chequers—the Prime Minister's official country house—for a dinner. Present was Churchill; the American ambassador, John Winant; the American State Department official Averell Harriman; the American Navy aviator and commander Admiral John Henry Towers; and the British air ministers Charles Portal and Lord Hastings Lionel "Pug" Ismay. Arnold had never seen anything like Chequers, a fifteenth-century mansion set on some 1,500 acres. The mood at Chequers was electric. The British leaders were usually a decorous bunch, but this night was different. "I have remarked before,"[20] Arnold later wrote, "that often, during the forty years in which I watched air power grow up, I happened, with uncanny luck, to be present at the turning points. This night, the 30th of May, in some ways topped them all."

As Arnold and Churchill dined, the Royal Air Force sent out the largest bombardment operation ever launched, up to that time. The first "Thousand Bomber Raid" sent out all that Britain had, from 715 twin-engine Wellingtons to Oxford trainer aircraft that were unlikely to even reach the target—the German city of Cologne. "As an airman who had preached[21] bombardment for so many years," Arnold recalled, "I was as thrilled as the Prime Minister."

But for Arnold, it was also a tricky night. All week he and his subordinates had argued for their strategy: precision daylight airstrikes against strictly military and industrial targets. Of all the nights when he would be trying to convince Churchill and the Royal Air Force advisors of the wisdom of America's plan, Britain was proving how effective night

bombing of a populous city could be. “It was not merely the difference[22] between night and day operations,” Arnold recalled, “it was a whole new conception of target values, the big beginning of ‘night area bombing,’ as opposed to an attack on a precise industrial or military objective.”

Arnold called Roosevelt’s aide Harry Hopkins in Washington in the early hours that morning. “Arnold indicated he was coming home[23] at once,” Hopkins noted, “[and] that he felt his mission had been very successful.” Before leaving Britain, Arnold made the prime minister a bold promise. By July 4—a day of obvious symbolism—the American Eighth Air Force would join the fight in the skies over Nazi-occupied Europe. Arnold said, “We will be fighting with you.”[24]

The firestorm that swept through Cologne during Britain’s first “Thousand Bomber Raid” shocked the western world. A front-page *New York Times* story described a “history making raid”[25]—“an inferno” that was, in the words of one flight officer who took part, “almost too gigantic to be real.”[26]

One British airman described the view of Cologne from above: “It was strange to see[27] the flames reflected on our aircraft. It looked at times as if we were on fire ourselves, with the red glow dancing up and down our wings.” Recalled one German citizen from the ground: “The sirens sounded about[28] ten o’clock and in half an hour Cologne lay practically in ruins—I came out of the air-raid shelter and Cologne was a wall of flames.”

The firestorm became political, even philosophical. The attack used fire as a weapon on a scale never seen before. It destroyed some fifteen thousand buildings, killing hundreds of civilians. The British dropped leaflets on Germany from above, warning of civilian casualties. “No part of the Reich is safe,”[29] the leaflet stated. “People who work in [factories] live close to them. Therefore we hit your houses, and you.”

From the first day of World War II, Roosevelt had spoken out against “the ruthless bombing from[30] the air of civilians in unfortified centers of population.” Arnold too had publicly condemned “area bombing.” “Use of incendiaries against cities[31] is contrary to our national policy of attacking only military objectives,” he said.

As Eaker recalled: “Arnold feared the reaction[32] of the U.S. public to the urban area bombing of women and children.”

Secretly, however, the United States continued to work on its own incendiary weapons. The first test of a napalm explosive occurred on Independence Day in 1942, on a soccer field on the campus of Harvard University. Soon after, Washington's National Defense Research Committee and the Standard Oil Company began tests of the new napalm incendiary bombs on structures—simulated attics in residential buildings—to see if the bombs could penetrate roofs when dropped from above. Other tests occurred at Edgewood Arsenal in Maryland, where scientists tested the effect of the incendiary bombs on objects typically found in industrial settings, such as workbenches and storage bins.

Whether or not the Americans would change their strategy and use firebombs against urban areas remained to be seen. In 1942, the strategy was clearly set. General Haywood Hansell: "The idea of killing thousands[33] of men, women, and children was basically repugnant to American mores."

Ever since Arnold had received Special Order 95, back in 1911, to study the art of flying under Wilbur and Orville Wright, his job had been to figure out how airplanes should be used in war. The debate was still alive.

Daylight flying or night?

Precision military targets or urban areas where civilians lived?

High-explosive bombs or bombs that started unquenchable fires?

Arnold could not deny the power of Britain's shock to Cologne. "You can't hit a town like Cologne,"[34] he wrote, "without its having a definite effect upon the morale of the entire German people." America's aviation leaders had to confront the question: Could they be wrong? Could the British be right?

18

> The new air weapon is contemptuous[1] of miles. With the circumference of the earth annihilated by sustained flight, the old concepts of space have simply evaporated.
>
> —ALEXANDER DE SEVERSKY, 1942

On July 4, 1942, the Eighth Air Force flew its first mission, just as Arnold had promised. Six Douglas A-20 "Boston" light bombers attacked targets in Nazi-occupied Holland. "U.S. Bombers in Action[2]—First Raid from England," shouted the London *Express*. The American aircraft were joined by six Royal Air Force bombers, and the mission was not a success. Only two of the American aircraft dropped any bombs, and two were shot out of the sky by German anti-aircraft gunners.

It was all the Eighth could muster—a whimper rather than a bang.

The Eighth Air Force flew its first real mission on August 17; a dozen B-17 bombers attacked marshaling yards in Nazi-occupied France. It was the first of twenty-four raids American bombers with American crews flew during the rest of 1942. When the results would be studied in the White House by Roosevelt and his aides, Treasury Secretary Morgenthau recorded in his diary, "Neither Hopkins nor the[3] President are very confident." Churchill wrote that fall, "By the end of September[4] the number of American Air Force personnel [stationed in Britain] has risen to about fifty-five thousand. So far the results have been pitifully small."

Delays in airplane production kept Arnold's staff near panic. "The airplane production situation[5] appears to be getting progressively worse," the White House statistician Isador Lubin wrote Roosevelt on August 8. "Not only have we failed to meet your directive as announced in January [a

schedule of 60,000 planes for 1942], but we have failed even to realize the schedule that had been laid out before we entered the war."

Roosevelt fired off a memo that landed on desks all over Washington. "I am concerned by the figures[6] on production of combat planes," he wrote. "The bomber deficit in July seems to be the most serious . . . I think you should hold a clinic on this patient. Then you can let me know what disease he is suffering from and how he can be cured!"

Alarms came from across the Atlantic as well. Churchill wrote Roosevelt: "We must aim at nothing[7] less than having an Air Force twice as strong as the German Air Force by the end of 1942. It is the very least that can be contemplated, since no other way of winning the war has yet been proposed."

As the weeks and months passed, the blockages in the factories compounded. In November, Harry Hopkins wrote the president, "Despite all the talk[8] about reorganizing the flow of raw materials, and despite the fact that the aircraft construction program was the subject of conversation through the entire months of September and October, it appears that not a Goddamn thing has been done to overcome production difficulties."

Roosevelt once again heightened the number of aircraft he wanted to produce, to 82,000 in 1943. The United States was scheduled to deliver 1,709 planes to the Soviet Union, 3,305 to Britain, and 340 to other Allied nations. Many of these airplanes could not be delivered, because they had not been built.

Delays resulted from manpower shortages, difficulties getting factories completed, and shortages of aluminum and rubber. Rationing rules left Americans short on gas and tires (legal speed limits had been reduced to 35 mph to save on both), which meant workers could not commute to their jobs. Military services continued to swell, leaving communities short on labor to work in factories.

At one point, the government conducted a newspaper and radio campaign to collect aluminum to build airplanes. Households donated seventy thousand tons of pots and pans. The movie director Archie Mayo turned his Hollywood mansion into an "aluminum depot" so stars like Jack Benny and Betty Grable could donate aluminum coffee pots and pie pans.

At the same time, theater commanders all over the world continued to clamor for more airplanes. "The Air Force is now[9] called upon to perform almost the impossible," Arnold wrote in his diary. "Fight in 8 different

theaters and maintain aerial supremacy in all of them . . . Frederick the Great's thoughts on the subject . . .: He who wants to defend everything saves nothing."

The Allies were losing the war. "America had never seen darker[10] days," according to Jimmy Doolittle. Arnold recalled one meeting in the White House in which Roosevelt lost his patience. "This is the first time that[11] I ever heard the President express even a possibility that we were not going to win the war," he wrote in his notes.

Arnold was desperate for good news, and on September 21, some arrived. On this day, the big hangar doors of Boeing's Plant 2 pushed open and out rolled the first B-29 Superfortress, designated XB-20-BO, or experimental bomber type 29. The B-29 prototype had no gunner turrets yet. It lacked much of the sophisticated equipment it would need to fly into a war zone. But officials wanted to know if in fact their calculations were correct—if the aircraft would fly.

The superbomber stood on three sets of wheels, each tire nearly as tall as the engineers swarming around it. The wingspan stretched nearly half the length of a football field, totaling 141 feet 3 inches. From the tarmac to the top of the vertical fin, the airplane stood 27 feet and 9 inches high. The aircraft was filled with what Arnold called "Buck Rogers" equipment, such as a Sperry fire control system that could be controlled remotely with experimental periscopic computers. The metal fuselage was shaped like a 99-foot cigar, tapering at the front into a greenhouse cockpit, where the pilot, copilot, and bombardier sat with full view of the horizon ahead of them.

"As she crouches on the[12] runway," one observer remembered, "the B-29 looks like a gargantuan burnished projectile. She has a ruthless, implacable air about her, a hidden malice that seems riveted into her shiny strength." When the Wright-Cyclone engines ignited, the turbochargers let out a wheezing groan and the three-spoke props whirled in spinning shadows. "As she came to life in one-two-three-four engine order, the Superfort trembled like an aroused giant. Instruments jittered nervously in their rubber mounts. Odd sounds filled the greenhouse. High pitched whirs and buzzes and hisses added their clamor to the rising din of the big turboed engines."

That day, Boeing test pilot Eddie Allen "hopped" the prototype from the runway, flying it fifteen feet up and then down again, three times in preliminary tests, in anticipation of the day's main event—a full shakedown. Allen was a curious figure who had played a key role in the development of the B-17 bomber. One airman described him in these words: "A vegetarian who practiced[13] yoga, dabbled in Egyptology, and enjoyed poetry, he was nothing less than the world's greatest test pilot."

If anyone could fly this behemoth, Allen could.

At 4:30 p.m. on September 21, Allen aimed the bomber down a runway and throttled into the horizon. The wheels left the ground. After a seventy-five-minute flight, he set the aircraft down, climbed from the cockpit, and declared, "She flies."[14]

The Allies launched Operation Torch on November 8, 1942—the invasion of North Africa. Torch's Supreme commander, General Dwight Eisenhower, led a three-pronged attack on the coast, landing 107,000 American and British troops at Casablanca, Algiers, and Oran. Torch aimed to begin an offensive that would ultimately lead to Berlin, while drawing Nazi forces away from Germany's eastern front, where Soviet casualties had reached unbelievable numbers.

"HURRAH![15]" Roosevelt cabled Churchill.

"OKAY FULL BLAST," the British leader responded.

Arnold had placed Maj. Gen. Tooey Spaatz in charge of Torch's air plan—a joint operation with naval forces. The pressure was staggering. "As this is our first major[16] effort in the war," Arnold wrote Spaatz, "it is of the utmost importance that everything possible be done to ensure its success." He wanted "decisive results . . . relentlessly . . . from now on."

In the war's first major paratrooper mission, Army C-47 Skytrains flying out of England dropped soldiers into the desert war zone. The US Navy launched swarms of Curtiss P-40 Warhawk and Grumman F4F-4 Wildcat fighter planes off the decks of aircraft carriers. As airborne vehicles crisscrossed above desert battlefields, little went as planned. Still, the role aviation played in Torch was unprecedented. The day before the mission launch, Arnold wrote Spaatz that airpower "provides the greatest single[17] contribution to the combat power of nations in all the world's history."

"The mission of the Army Air Forces is[18] clearly defined," Arnold wrote. "It is to destroy the capacity and the will of the enemy for waging war. If our considered requirements are met, we are confident that this mission can be carried out with decisive results." In emphasis that was Arnold's own, he wrote, "*No other offensive effort open to us can bring us this success*."

At one point, Allied airpower started a campaign to destroy Nazi installations ahead of the advance of the American First Army. "The weight of daily attack[19] during this period," Arnold reported to the War Department, "was heavier than any air force had ever delivered in collaboration with an attacking army. . . . We blasted a channel from Medjez-el-Bab to Tunis."

In November 1942, soon after the launch of Operation Torch, Arnold and endless hordes of military and government officials began to move across the Potomac into the new Pentagon, the largest office building ever created, and a symbolic home of the Arsenal of Democracy on the edge of the American capital city. Army Gen. Leslie Groves oversaw the construction, which was at the time not entirely complete. This was the first time Groves's name came into the spotlight in Washington—but not the last.

The Pentagon was itself a small city, with some twenty-one thousand employees moving around its five stories and endless corridors and escalators. One employee described "narrow stairways that seemed[20] to end in No Exit passageways suitable for disappearances of Alice's white rabbit." Arnold's corner office, Room #3E1012, was in the Pentagon's "E Ring"—the outer ring of the five-sided building where the most powerful offices were located.

"Just getting settled down[21] in our offices in the Pentagon Building over in Arlington," Arnold wrote a friend. "The old merry-go-round is still going around but not always so merry. What is 'hot' today is old stuff tomorrow."

In a moment of introspection, Arnold wrote a letter to his son Hank, who had begun his career in the Army recently. "It was 33 years ago that[22] I graduated from West Point and those 33 years went by very rapidly—so fast that I wonder sometimes whether it really has been 33 years . . . ," Arnold wrote. "You are entering the Service at a period when the profession of arms is undergoing a complete change—change insofar as training is

concerned, change insofar as materiel and the application and employment of materiel is concerned. New ideas are coming to the front every day."

Arnold's command was growing so quickly, it required trained statisticians to keep track. "By the end of 1943,"[23] *The New York Times* reported, "the United States Army Air Forces will number 2,500,000 officers and men, by all odds the largest military air force." The *Times* called the expansion "one of the most amazing military feats of all time."

"The number of men now in training[24] in the air every day is well over 120,000," Arnold wrote in a memo to the War Department, "approximately equal to the population of Camden, New Jersey, or Savannah, Georgia. It is twenty-five times as many people as were in the air in this country five years ago."

Every day the American people consumed more radio, newspaper, and magazine stories about the rise of airpower. The film colony rolled out movies with airplanes in starring roles, such as *Dive Bomber* (1941, with Errol Flynn), *Flying Tigers* (1942, John Wayne), and *Captains of the Clouds* (1942, James Cagney). Aviation pioneer Alexander de Seversky's literary polemic *Victory Through Air Power* made #1 on the *New York Times* bestsellers list, while Walt Disney's animated film version of the book earned Academy Award nominations. Another film, *Air Force* (1943, co-written by William Faulkner and directed by Howard Hawks), was conceived by Hap Arnold himself, after Pearl Harbor, as a thinly veiled marketing "vehicle" for the Air Forces.

Although he operated out of the public eye, Arnold himself had become a major national figure. He appeared on the cover of *Time* magazine's June 22, 1942, issue with the headline, "Arnold of the Air[25]: Six Continents are his battlefield." "'Hap' Arnold is not merely[26] the commanding general of the Army Air Forces," a *Washington Post* profile stated. "In a very real way he is a symbol of that fighting arm and, in fact, of American air power. Arnold grew up with Army aviation. He played a prominent role in its early struggles and its tremendous expansion over the past few years. His personal ups and downs show a curious parallel with the vicissitudes of American military aviation over the past three decades."

The country built nearly 25,000 combat aircraft in 1942—well under Roosevelt's schedules, and yet, the number increased nearly every week. In 1938, the year Arnold had taken command of the Air Corps, the country employed 7,000 in aircraft assembly plants. In 1943 that number hit

271,000. In 1938, the country had 4 military aircraft engine assembly plants. In 1943 that number reached 22. Fighter planes rolled from factory assembly lines, notably the P-38 Lightning, a single seater with a service ceiling of 44,000 feet and a top speed of 414 mph. The P-40 Warhawk was widely considered "the best U.S. fighter"[27] at the time of Pearl Harbor, and the only fighter in large-scale production.

In poll after poll, the country had chosen the heavy bomber as its favorite weapon, which made it an even greater symbol of a democracy at war, as it had been vetted as if by democratic process. "Our heavy bomber is our[28] greatest weapon," John Steinbeck wrote in his 1942 book *Bombs Away: The Story of a Bomber Team*. A *Fortune* magazine reporter summed up what America was feeling: "These are terrific stakes.[29] No piece of armament that we are forging is more important [than the heavy bomber]. The Allied nations have desperate need for a breakthrough weapon. The heavy bomber has the range and striking power that global war demands . . . It may save our honor, our hopes—and our necks."

19

The principal weapon in today's[1] World War is the airplane.

—PROFESSOR HORACE W. GILBERT OF HARVARD, "PLANES PLANES PLANES PLANES PLANES," *CHRISTIAN SCIENCE MONITOR*, JULY 25, 1942

By the end of 1942, the Eighth Air Force measured more than fifty thousand Americans, living in cities and villages around airfields still under construction northeast of London. There were so many, the British had taken to calling their buildup "the Friendly Invasion." The Eighth Air Force was now flying combat missions regularly over Nazi-occupied territory, clashing with Luftwaffe interceptors amidst explosions from the dreaded German 88 anti-aircraft guns. "When these encounters occurred,[2] even in the early days," Arnold wrote, "they were savage and bloody on both sides."

The AAF's bomber crews were all volunteers. Every one of them chose to fly. They had come of age in Depression-era America and had grown up in a period of anti-militarism. And yet, they also came of age in the era of Lindbergh. They had lived through the Golden Age of civilian flight. They were the first generation to grow up with the Model T, the first to know the sensation of machine-powered speed as part of their quotidian lives.

That did not make their flight training any easier. Each who attempted to join the ranks of America's airmen understood he was beginning an adventure that was wholly new to the human experience.

Arnold had gone through flight training himself as a young man and understood the mental strain that faced a flying soldier. He himself had buckled emotionally under the stress, and the sense of failure still haunted him. Now, new systems were in place to weed out the "weak" and find the

best, who could most be trusted with expensive machinery high in the skies. "He must find out,"[3] Arnold wrote of the aspiring airman, "by communing with himself, whether he has the ruggedness of mind and character and the stoutness of physique to undertake the undoubted rigors of a military flying career. He must undertake to find out whether he possesses those ephemeral but nonetheless existent qualities of leadership which will qualify him to direct the work and the undertakings of others and at the same time subordinate himself to the direction and control of proper military superiors."

Most of all, according to Arnold, these men required courage. "Courage is an intangible[4] human quality," he believed, "incapable of measurement."

Most American airmen were between the ages of nineteen and twenty-five. Some came from wealthy families; others had grown up without shoes. They were highly valuable. They had received more training than airmen from any other country, which was one of the reasons why the Air Forces' buildup took so long. In the fiscal year 1943, the Army Air Forces would fly 3,352,000,000 miles within the United States—most of that training miles—a distance equal to 134,000 trips around the equator.

Each crewman had qualified for bomber duty by passing batteries of tests developed by psychologists. The Aviation Cadet Qualifying Examination measured everything from chart reading to accuracy of perception to tests that measured a candidate's ability to withstand mental pressure. Motor coordination. Finger dexterity. Cadets answered questions such as, "Do you like girls?,"[5] "Do you wet the bed?"

Army Air Forces psychiatrists told bomber crew trainees that aircraft would "enable the man to escape[6] the usual limitations of time and space." Flying would give them "a feeling of aggressive potency[7] bordering on the unchallenged strength of a superman" and "an overwhelming sense of the vastness of the universe."

Fighter pilots were individualists. As Arnold wrote, "The fighter pilot is a throw-back[8] to the knights of King Arthur." Even flying in packs or formation, the pilot was solitary at the controls of his machine. As Eaker described the experience, "No soldier is ever so alone as the pilot who sits with eyes glued to dimly lit instruments and climbs through wet clouds to the battlegrounds above." A bomber crew, on the other hand, was its own

integrated society, eight to ten soldiers serving roles as interdependent and highly specialized as the biological functions within the human body.

"Nowhere in the world[9] are the lives of men as interdependent as in a bomber on a mission," according to Arnold. Pilots, copilots, navigators, aerial engineers, radio engineers, aerial gunners, and bombardiers—all of them were trained in unique schools so they could do their jobs under harrowing conditions, the training lasting anywhere from ten to twenty weeks.

Bomber crewmen learned the reality of danger during training, as flight crashes were routine. In 1943, 298 B-24 bombers crashed during training in the United States, killing 850 airmen. "The Army Air Forces use[10] every means to teach accident prevention," Arnold reported, "such as films, lectures, books, posters, and periodic tests. Safety officers test flying equipment under all conditions, study take-offs, landing, weather conditions, airport clearances, and the like . . . even matters of fliers' diets are studied . . . Every accident, however trivial, is investigated."

Still, with so many novice pilots flying, the rate of fatal pilot accidents was rising, from 0.77 per thousand hours[11] in 1942 to 0.83 in 1943.

With graduation, each airman received his Escape Kit. This was a rite of passage, as it was the moment when each had to reckon with the potentialities he could face. The Escape Kit held candy bars, a shot of morphine, a map of Europe, and a compass. From the first missions aboard unpressurized B-17 and B-24 bombers, the crews faced otherworldly conditions in the skies. "The temperature at 23,000 ft.[12] has been as low as 44 degrees below zero Fahrenheit . . . freezing up oxygen masks," Eaker reported from Europe.

The gunners in turrets found their oxygen hoses too short, which meant they often flew without them, suffering the debilitating symptoms of anoxia. Vibration and engine noise rattled the nerves, as did the keen sensation of being hunted in the clouds.

Among the flight reports consumed by AAF leaders in Washington, thus far in early 1943, were individual stories of survival that illuminated the power of humanity's will to live. Arnold forwarded one report to the president about a Fifth Air Force bomber "shot down in flames"[13] after takeoff from an airfield in Australia. "The plane was attacked by three 'Zero' [Japanese Mitsubishi-built] fighters shortly after the take-off, when

the craft was at an altitude of between 150 and 200 feet. Witnesses at the airdrome last saw the plane headed out to sea . . .

"A sergeant was the only survivor," the report continued. "Held in the bomb bay, he escaped serious burns by flattening himself on the floor. He said the ship was completely in flames before it struck the water. He recalled that he suddenly found himself swimming near the craft, and that three or four bodies were also in the sea, either swimming or floating. The sergeant said he swam for 36 hours with nothing on but a life vest."

Another story of survival came from none other than Eddie Rickenbacker, the World War I ace pilot who was still flying. He wrote a memorandum on November 18, 1942, describing his experiences after his B-17 bomber ran out of gas over the Pacific. Rickenbacker was riding as a passenger at the time. During the crash landing, "all of our emergency rations[14] (water and food) were destroyed and scattered to the extent that we were entirely without water and food after getting the entire crew of eight men into the life rafts," Rickenbacker wrote.

High seas and dehydration caused some of the men to become "violently ill." Intense daylight heat and frigid nights caused indescribable suffering, and on the fifth day, one of the crew stopped breathing. Rickenbacker had to remove the body from the rubber life raft in the high seas without tumbling into the ocean himself. One of the airmen captured a seagull and the soldiers ate it raw. "Sharks followed us from the moment we landed," Rickenbacker wrote. These were fifteen-footers.

The airmen had no knowledge of their whereabouts and feared drifting toward atolls held by enemy Japanese. Ultimately, they were rescued after 24 days, and all but the one survived.

Les Schrenk, of Long Prairie, Minnesota, joined the Army Air Forces on his nineteenth birthday. In what seemed like no time at all, he went through training and was flying over Europe as a ball turret gunner in a B-17, with the Eighth Air Force's 92nd Bomb Group, 327th Squadron. Schrenk would remember the freezing temperatures. "We made fun of the[15] [electrically heated flying] suit, saying that it must have been designed by the enemy because on three different missions it burned out and I had no heat," he recalled. "You're flying in a very cramped environment. The temperature is 60 or 70 below zero."

Still, the intensity of aerial combat, as he fired his machine gun at enemy interceptors, would make him break out into a sweat.

On Schrenk's tenth mission, on February 22, 1942, he was aboard a B-17 named *Pot o' Gold.*

> The mission was to bomb Denmark [he said]. We had already bombed the target, and we were being attacked by a large formation of Ju 88s, Bf 109s, and Fw 190s. We got hit in our right fuel tank. It caught fire. I heard the voice of the navigator asking, "What is the nearest landing?!" The pilot came back and said, "Twenty minutes due east!" Our plane was burning and exploding for that full 20 minutes. The explosions kept getting louder and louder. . . . There was one last explosion, and it blew the right wing tip off.

Schrenk and his crew bailed out, employing their parachutes. "I came down like a ton of bricks because the parachutes were so small," he said. He spent six months in a Nazi prison camp, then was forced to march for eighty-six days in winter, as the Germans fled a Soviet advance. He slept at night in snowy fields or abandoned barns, with one blanket for five men. "We relied on each other's warmth to stay alive," he recalled.

When Schrenk took off on that B-17 mission, he weighed 185 pounds. When he was liberated by British soldiers, he weighed 93.

With the commencement of bomber operations, so, too, began the routine tracking of men killed. Ira Eaker was once asked, "What does it do to your guts[16] when you know you have to send men out, and by the thousands they're going to be killed?" He answered, "Well, you know that you yourself are not going to be there long unless you get control of any failure due to fear—that you've got to expect losses. And you'll have disastrous losses at times due to weather, operational conditions, and enemy concentrations. You have to be prepared to take that without changing your plan or changing your morale, or you'll be sent home."

Arnold, on one occasion early in the war, described sacrifice in these words, writing to a friend whose son had perished in combat: "You have the proud satisfaction[17] of knowing that your son died while bravely fighting for this country, and I hope this will afford you some comfort. I am certain he accomplished the kind of job you expected and wished him to do."

A major part of the general's job was to command soldiers into battle. In order to do that, Arnold had to help them to see themselves as serving a

larger purpose. In 1942, he gave a filmed message to the "The Officers and Men of the United States Army Air Forces."

> To all of you [Arnold said],[18] who are doing hundreds of big and little jobs in the vast family of the Army Air Forces, say to yourselves, I am a truly important part of a mighty and powerful machine. To keep that machine moving forward, we must not, we shall not break down. Fellows, we are faced with a tough job. But I know that we can do it. And with all due reverence, I say, by God, we will do it.

When casualty reports arrived on Arnold's desk, he agonized over the numbers, which represented so much more than ink on a page. He struggled with the reality that he was sending tens of thousands of young Americans into harm's way, having never seen real combat himself. "Everybody in the Air Force[s][19] that was killed during the War," said Arnold's personal wartime pilot, Pete Peterson, "he personally signed a letter to their nearest relative. It wasn't a rubber stamp deal. He personally had these letters, and he had a man on his staff who did nothing else but write these letters."

One of Arnold's subordinates, Gen. Jacob Smart, witnessed him collapse into tears after hearing of a raid's casualty report. As historian Dik Daso has written, "This for Arnold was the[20] side of combat that most others did not see—the agony of his command. But more pragmatically, as long as casualties remained below certain predetermined numbers, his decisions to continue raids were both agonizing and simple: the war had to be won."

Arnold took comfort in a poem called "Letter to Saint Peter," otherwise known as "A Prayer for Our Fallen Soldiers." It reads, in part:

> *Let them in, Peter[21]; they are very tired;*
> *Give them the couches where the angels sleep.*
> *Let them wake whole again to new dawns fired*
> *With sun, not war; and may their peace be deep.*
> *Remember where the broken bodies lie;*
> *And give them things they like. Let them make noise.*
> *God knows how young they were to have to die!*

20

> Putting this first 60,000[1] plane armada in the air—more than our industry had built since the Wright brothers first flew; more than all the Axis factories turned out last year—rates as one of the prodigious feats in history.
>
> —DONALD DOUGLAS, DECEMBER 13, 1942

By 1943, in order to further the mission towards victory, the US Army Air Forces had expanded into new fields of innovation that not even Henry Arnold had foreseen. From meteorology to medicine, from photography to firefighting—the exigencies of war forced the USAAF to blaze new pathways in modern life that would help soldiers survive, but also, would benefit populations even abroad, after the violence was over.

Chief among all the Air Forces' noncombat endeavors was the Air Transport Command. Using America's civilian airliners as its launching point, the ATC became a global airborne circulatory system, carrying humans, airplane parts, medical supplies, building supplies, field kitchens, anything that needed to be moved. Stories of gladiatorial combat miles above the earth transfixed the world. The effort to create airpower logistically was a far less seductive story, but this effort was critical and staggering in its scope.

In 1942, the ATC flew 4.8 million miles *every month*. In 1943, that mileage hit 12.5 million monthly miles.

Every airbase around the world needed some 150,000 items of maintenance and supply. For every pilot overseas, Air Forces statisticians found, the AAF needed to transport an average of nine tons of supplies, every month. To move those people and supplies around, the Army had created a global network of flight routes, airfields, and scheduled takeoffs.

"Before this war is over,"[2] Arnold told his personal pilot, Pete Peterson, "I'm going to have every major airline in the United States flying overseas, hauling military cargo."

Donald Douglas's aircraft were the workhorses of the Air Transport Command. The C-54 Skymaster—an Army cargo plane converted from Douglas's DC-4 civilian airliner—was powered by four 1,450-horsepower engines. It measured 117.5 feet in wingspan. It could carry 28,000 pounds of cargo or 49 passengers. The C-47 Skytrain (based on the Douglas DC-3) carried 30 passengers, 28 paratroopers, or 7,500 pounds of cargo. By the end of the war, the Army Air Forces had accepted almost 10,000 Skytrains.

Critical to the ATC's expansion was the Women's Army Corps—the WACs. Already in 1943, nearly 20,000 women performed roughly 200 different jobs at airfields around the globe. More than 1,000 female pilots flew cargo with the Women Airforce Service Pilots—the WASPs—including Jacqueline Cochran, the head of the WASPs, who flew with both the British and American commands and was regarded as a world-class pilot by both.

The ATC required the building of airfields, the trailblazing of air routes, logistics systems that could be understood and utilized in countless nations . . . In other words, everything needed to lay the groundwork for the international civilian airline industry of the future. As Arnold wrote in 1943, "Starting with only two officers[3] and one clerk in a small room, today's Air Transport Command totals over 85,000 officers and men."

"In all our air transport operations[4] . . . ," Arnold wrote in a secret 1942 directive, "we must consider the effect of our current project activities on U.S. air transport operations, both military and civil, after the war."

Growth of the Air Forces spurred huge advancements in medicine. To treat soldiers fighting in every climate—jungle, desert, Arctic, and five miles up into the ether—American doctors and scientists trailblazed new surgical methods and new understandings of "combat fatigue," so psychiatrists could treat what we now call post-traumatic stress disorder.

The Army Air Forces built a new institution, the School of Air Evacuation, at Bowman Field in Kentucky, to train seven thousand flight nurses. The AAF developed methods to build mobile flight hospitals in remote places and transport them to others so medical treatment could move with the agility of modern air war. Crews flew two field hospitals over the

Owen Stanley Mountains in Papua New Guinea in 1943. The Air Forces flew a fifty-bed field hospital from one location in Sicily forty-four miles to another and set it up in 2.5 hours.

Air evacuation enabled medical personnel to save countless lives. “Trips which would take[5] weeks by hospital train or ship are now flown in a day,” Arnold wrote in a memorandum to the War Department. “Air evacuation is an outstanding example of successful co-operation among Army Air, Ground, and Service Forces.” The Air Forces had to mass-produce portable medical equipment that airmen could carry with them, such as their “frying pan kits”—first aid kits that contained Benzedrine tablets for relief of fatigue, halazone for chlorinating water, Atabrine for malaria, boric acid ointment to treat burns, sulfadiazine to treat infection, iodine swabs, salt tablets . . .

No one knew how the human body would respond to sustained flight speeds of a P-47 Thunderbolt fighter plane—more than 400 mph. Nor how some would respond to the flight ceiling of a Flying Fortress—more than 35,000 feet. Aviation engineers worked with medical corps to develop oxygen systems and clothing to withstand frostbite conditions.

At Ford’s Willow Run bomber plant, Charles Lindbergh flew experimental flights in a P-47 at record elevations—about twelve thousand feet higher than the summit of Mount Everest—to see how the human body would respond. Ford built a hyperbaric chamber that could effect altitude and temperature conditions high up in the atmosphere, taking a human up to sixty thousand feet and seventy degrees below zero even as he sat still in a chair on earth.

“Combat fatigue” was as old as combat itself, but it seemed to strike bomber crews with a particular vengeance, and could disturb airmen before they even saw combat. “From the start of aviation[6] it had always been apparent that the task confronting the flight surgeon was different from that of the ordinary doctor in the Army,” Arnold recorded, speaking of “the special psychiatric problems of flight under the most nerve-racking combat conditions.” In the States, the AAF established seven new rehabilitation centers with cutting-edge psychiatry departments.

“Every known facility[7] is being used to aid these physically and psychologically wounded soldiers,” Arnold wrote, “to make a new place for themselves in military or civilian life.”

Key to the success of global aerial operations was the work of Army and Navy engineers—the builders of airfields. "Modern war is a war[8] for air bases," Arnold recorded. "The bulldozer must accompany the plane."

At the time of Pearl Harbor, the Air Forces had few airfield installations outside of North America. By the beginning of 1943, engineers had built 33 in Europe, 20 in Australia, 21 in the Pacific Islands, and 23 in Asia. When the Allies first landed in North Africa, during Operation Torch, aircraft could land at nine airdromes, but within a few months, there were nearly 100.

These airfields required technology and construction know-how that had not existed just two years earlier. To build landing strips, for example, the Air Forces innovated new portable steel "landing mats." These were, in Arnold's words, "one of the outstanding developments[9] of the war." Navy ships carried huge pierced strips of steel, developed in the United States, to foreign theaters, where they were rolled out like beach towels, creating strips that aircraft could use for landing. By 1943, 175 million square feet of this material was employed around the world.

For the American bombing strategy to work, the bombardiers would have to hit their precision targets from twenty thousand or even thirty thousand feet, in all kinds of flight conditions. Arnold relied on MIT's Radiation Laboratory to innovate new radar systems. At its peak during the war, the "Rad Lab" employed 3,500 people with a budget of close to a million dollars per month. Radar would go down as one of the most critical technological innovations of the war; without ground-based radar, many war historians believe, the Battle of Britain would have been lost. While the technology was still in its infancy at the beginning of the Eighth Air Force's operations in Europe, scientists worked desperately to improve it.

But the most common obstacle bomber crews faced was the same one that challenged early adventurers who built the first seagoing boats millenniums earlier: the weather.

During the early years of World War II, the Air Forces built a new world-wide weather service—which became the foundation for modern weather prediction. Arnold sent officers to Cal Tech to study under Dr. Irving Krick, the founding professor of the institution's Department of Meteorology. No one had ever figured out how to forecast weather days in advance, and Krick claimed he could do it. He was right, to some degree.

Krick had performed weather-forecasting services for industries such as Hollywood, famously predicting the weather for the makers of the 1939 movie *Gone with the Wind*, choosing the perfect night to film the burning of Atlanta.

Could Krick perform similar meteorological miracles for the Army? And teach those methods to a new generation of weatherpeople? Meanwhile, the Army Air Forces increased its meteorology department 9,000 percent, according to Arnold's reporting to the War Department, while setting up the first weather stations in remote locations all over the globe.

In 1942, the Army Air Forces recorded a short film of the XP-59A, America's first jet aircraft. Millions of dollars went into rocketry research under Dr. Theodore von Kármán. Scientists worked with photography experts to develop camera equipment—notably, the K-19B—that could take spy photos at night without getting blinded by anti-aircraft searchlights.

But the most surprising R&D employed under the umbrella of the Air Forces dug deep into humanity's oldest form of alchemy.

In April 1943, the National Fire Protection Association's chief, Horatio Bond, returned from a trip to Britain where he was studying incendiary warfare and firefighting tactics. He invited two engineers into his office in Washington, where he gave them a critical mission: they were to go to England as part of the United States' Economic Warfare Division, and study alongside the British on how to make incendiary bombs increasingly effective. So began firefighters' contributions to the Air Forces. One of those two engineers, James J. McElroy, recalled, "There were physicists and chemists[10] and statisticians and every other imaginable professional background in on this matter of the effectiveness of air force operations, but fire engineers were looked upon as interlopers."

Not anymore. "For the first time in[11] the history of warfare," McElroy explained, "the development of modern aircraft capable of lifting heavy bomb loads and carrying them for long distances has made large-scale fire destruction of industries and homes not only possible but predictable within reasonable limits."

Working with British operatives, the Americans studied alongside architects and engineers, poring over aerial photos of bombed sites in Nazi-occupied Europe. They studied attack reports and interviewed bomber

crews, in an attempt to learn how to predict the combustibility of an industrial structure. What kinds of bombs best caused buildings to burn? What kinds of structures were most vulnerable to different sorts of incendiaries? The research found, for example, that the most important factor in determining the combustibility of a building was the ability of the initial bombs to break through the roof. Which led to the idea of loading bomber aircraft with combinations of firebombs and traditional explosives.

Equally important was to devise firebombing strategies that set fires faster than firefighters could put them out. “It is now felt that[12] to be successful,” McElroy figured, “incendiary attack must overwhelm civilian fire-guard by the use of sufficient high explosive or drive him underground for sufficient time to allow an incendiary bomb to initiate fire.”

These fire engineers initially focused on Nazi Germany, but in short time, they turned to Japan, putting together a top secret document on the highly combustible structure of Japanese metropolises. Unlike German cities, where buildings were mostly built out of honeycombed concrete walls, Japanese cities were built out of wood. The American fire protection team found two British civilians who had spent sixteen and twenty years respectively working in Japan, who were familiar with firefighting techniques. With their aid, the American team put together a thorough study that made even themselves shudder with fear, in anticipation of what might become of cities like Tokyo.

“That document,”[13] McElroy later wrote, “proposed to bomb Japan and burn out ten cities, with a total of 1,693 tons of incendiary bombs.”

Soon a Joint Army-Navy Target Group was set up in the Pentagon in Washington. NFPA chief Horatio Bond explained: “A kind of technician new[14] to military and air experts, the fire protection engineer, was being used to determine the vulnerability to fire of enemy cities and industrial targets. The air force planners might be expected, because of experience and training, to evaluate air factors, but how fires are started or spread on the ground was completely outside their field of experience.”

All these endeavors found their nerve center in Hap Arnold’s Pentagon office. His daily life had become a relentless, grinding montage of problem-solving. The Air Forces’ size and its endeavors were so vast, the man in charge felt as if he was losing control.

"Arnold no longer had the small,[15] tightly knit staff to which he had become accustomed, but an immense organization," recalled Laurence Kuter, at this time serving as a deputy chief of staff. "There were branches and sections and offices with hundreds of officers and Civil Servants, far too many for him now to know personally." The Army Air Forces "continued to serve as a . . . transmission or gearbox between the mercurial interests of the Chief and the minor inertias inevitable in his huge organization."[*]

"We had squadrons in every[16] known climate in the world—that's a fact," said Assistant Secretary of War for Air Robert Lovett. "For a thing like that to work, there has to be not only good organization, but there has to be a belief in something."

That something was airpower itself.

Part III

The Rise of Airpower



The “Big Three” at the Tehran Conference in 1943.
Arnold is in back, second from left.

Getty/Hulton Archive/Stringer

It was this feeling of the unknown.[1] What were we going to face? What was a mission going to be like? We were very green, not really prepared for it. There were ten of us: pilot, copilot, navigator, bombardier, engineer, radio man, second radio man, second engineer, and two gunners. I was a rear gunner. Our first mission was over Aschersleben—I’ll never forget it—in the heart of Germany. It was an airfield. I was a nineteen-year-old kid. I remember planes flying, and I remember the cold. At 30,000 feet, to see so many planes and fighter planes and bombers, it was just awesome. Let me put it like that: awesome. It was just surreal.

—BENJAMIN NAPOLITANO, B-24 AIRMAN

21

I wonder if the frightful[1] mental strain of commanding a large air force in war can ever be realized except by the very few who have experienced it.

—ARTHUR "BOMBER" HARRIS, HEAD OF THE ROYAL AIR FORCE BOMBER COMMAND

On January 5, 1943, Arnold received orders to prepare for what would turn out to be his longest trip away from Washington during the war years. "You are directed to proceed[2] on or about Jan 8 1943 [from] Washington DC to Casablanca thence proceed to such places as necessary on temp duty for approximately 30 days in connection with AAF matters," his orders read. "Authority is granted . . . to proceed to such places as necessary for the performance of this mission."

A meeting at Casablanca in Morocco was in the works, a historic conference of wartime leaders from the United States and Britain. It would be the first major overseas wartime meeting, and of all the wartime conferences, Casablanca would be the most critical for the future of airpower.

Not long after sunrise on January 9, members of the American Joint Chiefs of Staff, along with their teams of advisors, met at Washington National Airport[*] and boarded two Douglas C-54s. In total, Arnold's odyssey would cover forty days and 27,842 miles. He had packed for winter weather as well as summer weather, and he carried top secret papers in a lockbox with detonators attached in case of emergency.

For days, the C-54s hopped across the globe en route to the Middle East. Arnold still loved to fly and took over the controls for two-hour stints. Flying over Brazil, he jotted his impressions in his journal: "Mile after mile

of level[3] pasture land with thousands of cattle, wide Amazon River mouth." Two days later, over Morocco: "Barren soil for thousands[4] of miles, sand dunes without end. Out of the north comes a view of high, snow-covered mountains, high mountains, 14,000 feet."

While the Joint Chiefs made for Casablanca, Roosevelt and his staff left Washington aboard a pair of Pan American airboats. "The President was carried[5] on to the plane this morning in the dark," journaled Harry Hopkins. "It taxied out of the harbor and long before sunrise took off with few people knowing the President was on his way to Africa. I sat with him, strapped in, as the plane rose from the water—and he acted like a sixteen-year-old boy, for he has done no flying since he was President."

No American president had ever flown overseas—a testament to the infancy of aviation. Only one had ever flown at all, Roosevelt's distant cousin Theodore. Not since Abraham Lincoln had an American president visited troops in an active theater of war, as Roosevelt was about to do.

Because of heavy winds, the president's plane flew low over the Atlantic, not much more than a thousand feet above the ocean, cruising at 105 mph. The aircraft was named *Dixie Clipper*, built by Boeing for Pan Am. It was a famous airplane. Pan Am's *Dixie Clipper* made the first-ever scheduled passenger airline flight from America to Europe. When it took off from New York's Long Island Sound at Port Washington with passengers aboard on January 28, 1939, bound for Lisbon, five thousand spectators turned out to watch. Now it was flying the president on a secret mission.

Arnold was unhappy that Roosevelt was flying aboard a civilian Pan Am aircraft. He asked his buddy Donald Douglas to build a special airplane for Roosevelt to use in the future—with modifications for the disabled president. Douglas quickly got to work on the first presidential aircraft, which would be ready for the next time Roosevelt needed to fly.

The delegations landed in Casablanca, where the mood felt electrified. During the thirteen months since Pearl Harbor, the Axis powers had proven almost unshakable. By all accounts, the Allies faced a losing war. But the tide was beginning to shift.

Also at this same time, the first public news stories about Hitler's "Final Solution" shocked the world. "One is almost stunned[6] into silence by some of the information reaching London," Edward R. Murrow reported over CBS radio, days before Roosevelt and Arnold left for Casablanca. "Some of

it is months old, but it's eye-witness stuff supported by a wealth of detail and vouched for by responsible governments. What is happening is this: Millions of human beings, most of them Jews, are being gathered up with ruthless efficiency and murdered. When you piece it all together . . . you have a picture of mass murder and moral depravity unequaled in the history of the world."

The American and British officials decamped in a Casablanca resort hotel called Anfa. Arnold was surprised to find his son Henry Jr. stationed at the hotel, which had been commandeered by the American Army. "The last I had heard of him,"[7] Arnold recorded, "was from Kasserine, barely getting out as Rommel made that last dash of his through the Pass."

The British and American officers had assigned rooms. They were given instructions as to where the offices and conference rooms were in the hotel, and directions to the dining room on the third floor, where breakfast, lunch, dinner, and tea would be served at strict times. Laundry service. Barber service. The Army had worked out all the details. From the moment the conference discussions began, Arnold found himself at the center of a firestorm.

Thus far the Eighth Air Force had sent out numerous missions against Nazi-occupied territory, mostly in France and the Netherlands, but none had done any real damage, and none had reached Germany itself. The American bombers flying at high altitude were having trouble hitting their targets. Their radar systems and bombsights needed vast improvement, as did the bombardiers and navigators at the controls. With a war at stake, and lives on the line, poor results had left Arnold and the Army Air Forces vulnerable to open rancor.

"During the Casablanca Conference,"[8] Arnold wrote in a memorandum, "I was put on the defensive by both the British and United States for not having our heavy bombers bombard Germany. First the matter was taken up by Portal, then by the Prime Minister, and finally by the President. The matter became so serious that I called for Eaker and Spaatz."

The two were both in England, commanding the Eighth Air Force. "I didn't know there was[9] a conference going on," Eaker recalled. "That's how carefully the security was kept . . . When I got this message [from Arnold], I went down to see the chief of the R.A.F. and his aide told me that he had

gone to the conference. Then I knew that there was a high level conference."

Eaker had to find an aircraft and crew for him and Spaatz, and they took off immediately. By the time they got to Casablanca, they found their boss agitated. Arnold told them that Roosevelt had bowed to Churchill's request to give up on daylight precision bombing, and join the British in night area bombing. Eaker told Arnold this "made no sense at all."

"General, that is absurd,"[10] Eaker said. "Our planes aren't equipped for night bombing; our crews are not trained for it. We'll lose more planes landing on that fog-shrouded island in darkness than we lose now. . . . If our leaders are that stupid, count me out. I don't want any part of such nonsense!"

For years now, the Army Air Forces had invested in airplanes equipped to fly precision, high-altitude missions; they had built schools to train thousands of airmen how to fly such missions; they had designed bombsights to do the job. The Americans believed their plan would work, but it would require time and patience. Eaker was the one with his boots on the ground at Eighth Air Force headquarters, who knew of the operations with the most intimacy. Arnold told him, "If you feel that strongly[11] about it, you ought to see Mr. Churchill. Because in my judgment that's the only way you can get this decision over."

The pressure now bearing down on Eaker felt excruciating. He crammed all night—putting together a position paper called "The Case for Day Bombing." The next morning, in a Casablanca meeting room, Churchill descended stairs wearing a Royal Air Force uniform. During heated discussions, Eaker argued that radar and bombsight technology would be improved, and that the young American airmen would gain experience and skill. "Day bombing is the bold,[12] the aggressive, the offensive thing to do," read the first sentence of his position paper.

Churchill relented. "When I see your President[13] today," he said, "I shall tell him that I withdraw my suggestion that U.S. bombers join the RAF in night bombing."

"We had won a major victory,"[14] according to Arnold, "for we would bomb in accordance with American principles, using the methods for which our planes were designed. After that I had a talk with the President and with General Marshall on the same subject and, as far as they were concerned, the matter was settled."

When the Casablanca meetings ended, the two governments issued the historic Combined Chiefs of Staff 166/1/D directive. This plan, dated January 21, 1943, became the foundation of strategic aerial objectives for the rest of the European war. In essence, the Americans would bomb by day and the British by night.

The top secret plan was called "The Combined Bomber Offensive."[15] The directive ordered "the progressive destruction and dislocation of the German military, industrial, and economic system, and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened." It listed five key strategic "vital center" targets: (1) German submarine construction yards, (2) German aircraft industry, (3) transportation, (4) oil plants, and (5) other enemy war industries. Meanwhile the British would continue to drop bombs by night, on urban populations.

At Casablanca, Operation Tidal Wave also took shape, a bold mission to attack Hitler's most critical source of oil, the Ploesti oil fields in Romania's Transylvanian Alps. If this war was a mechanized war, what could stop the Nazis faster than the destruction of their oil supply?

As for the Far East theater, the Combined Chiefs of Staff concluded, "It is our purpose during 1943[16] to work toward positions from which Japan can be attacked by land based air." And that meant "increasing the air force in China." Thus far, only China offered land where air bases could be built to put Japan within range of the Allied bombers.

Roosevelt gave Arnold a new mission. He was to go to China and smooth out this plan with China's leader, Generalissimo Chiang Kai-shek. At the end of the Casablanca Conference, Roosevelt gave Arnold a letter addressed to the Generalissimo, which Arnold was to hand-deliver. It began, "This note will be given to you[17] by Lieutenant General Henry H. Arnold, U.S. Army, the commander of our Air Force . . . I have been meeting with the Prime Minister and our respective Chiefs of Staff to plan our offensive strategy against Japan and Germany in 1943. I want Arnold to talk all this over with you in the greatest detail because I think it would be best that I not put it on the cables [lest the communications be intercepted]."

Arnold's mission required deft diplomacy. It would also require him to fly through the Himalayan mountains above Japanese-held positions—over "the Hump"—the most dangerous cargo air route in the world. Arnold said goodbye to his son Hank, leaving him behind in a war zone.

22

That's the way it goes[1] in this man's army—one wins, one loses.

—HENRY ARNOLD

On the morning of January 25, 1943, Arnold landed in Algiers, a Mediterranean port city in Africa. He remained for only ten hours, but during that time, he met with ten combat groups. He wanted to know everything about their experiences, their aircraft, and their morale. He ate rations with them, inspected their tents, and talked to them about their head colds and fears.

Their makeshift desert quarters were dismal. One airman described the scene upon arriving at this field in Algiers: "As we piled out of the airplane,[2] anxious to see our new base, my heart sank. This was not the civilized war we had expected to fight, for there were no barracks, no paved streets, nothing but insects, heat, and dirt."

Still, Arnold's spirits lifted as the airmen shared their experiences. "The stories of the pilots are[3] interesting beyond telling," he wrote in his diary. "Thrilling. While we were sitting in a long dugout covered with canvas, 2 bunks, one in each end, mud just like Texas gumbo for walls, chilly, almost cold, a small table, improvised oil stove made out of [a] gas drum, talking about operations, planes, and training, shooting Huns, technique for shooting down Huns, the telephone rang." The group commander grabbed the phone and learned that one of the pilots who had been shot down in Axis-held territory had run, walked, hid in the desert, ridden a donkey at night, and was now reporting in, safe and ready for duty.

"I knew that he would make it,"[4] the commanding officer said. "I knew that he was still alive and would come back."

Arnold flew on to Cairo. "The Pyramids and Sphinx[5] in the afternoon sun, as we came in for a landing, look very small, almost insignificant from our 2,000 feet. Cairo spread all over the map with tents, marching soldiers, Arabian truck columns, and tank-testing yards on all sides. It is by far the most warlike area we have seen yet [in Africa]."

In the Egyptian metropolis, Arnold inspected the famous Cairo caves, where many believed the sandstone was originally taken to build the pyramids. Now the Royal Air Force was using these caves as an aviation repair shop. A vast lighting system illuminated rows of airplanes in various forms of undress. Eight hundred men, British and Egyptian, worked on Allison engines, straightening damaged propellers, and so on.

In Basra, a city near the convergence of the Tigris and Euphrates Rivers, Arnold discovered a bizarre scene. Russian and American soldiers shared an air base in the desert. Douglas Aircraft had some 1,500 employees in Basra, working on aircraft, helped by eight hundred enlisted mechanics and engineers. The Russian soldiers were living high. They had brought in female "interpreters," but these interpreters spoke no English. The Russians drank and wanted to dance with the American soldiers. "At first," Arnold remembered, "that was just too much[6] for an American boy, and many fights resulted."

Flying over the Persian Gulf, Arnold saw hundreds of miles of desolation. At one point, to cure the boredom, he grabbed a .50-caliber gun and fired shots through an open door into the night. In Karachi, he and his crew prepared to fly over the Hump into China. The Americans had been flying over the Hump since April 1942. Japanese forces occupied all of China's coast, with its ports and inland rivers, as well as all of Manchuria to the north and Indochina and Burma to the south. So flights over the Hump were the only way to get supplies into China.

"That is the route our supplies[7] must travel *after* they have already been shipped more than 10,000 miles—supplies not only for our Fourteenth Air Force but to help equip the Chinese Army and to build and defend China's airdromes," Arnold wrote at the time. "If our men veer to the north they meet 22,000-foot peaks while to the south they drift over Japanese-held Burma. It is no country to crash land." The trip was roughly equivalent, in

distance, from New York to Detroit, but it saw wind gusts with no warning that could hit 150 mph.

On the evening of February 4, Arnold dined while his crew prepared a B-17 for the flight. Already, members of his team had taken off that afternoon, headed over the Hump. "The weather was fine,"[8] Arnold recorded. "And the weather changes so rapidly and so violently over this southern end of the Himalayas that I said we too would start for Kunming immediately after dinner."

"So we took off about[9] 10 o'clock at night—pitch dark—and climbed right to 18,000 feet, in the B-17," recalled Arnold's pilot, Peterson. The temperature in the unpressurized cabin plunged. "My navigator had never been over 10,000 feet in his life, so he wasn't aware of what the lack of oxygen would do to you." Arnold was strapped into the back with the 10th Air Force's commander, Maj. Gen. Clayton Bissell, beside him. "Saw Everest in all its glory[10] . . . ," Arnold journaled. "There are so many high peaks that it is difficult to say which is the highest."

Arnold noticed something odd. He felt, as he journaled, "all the emotions that come[11] with an occurrence in which anything can happen." When he asked how far the flight was from the landing field in Kunming, he heard the answer, "In about 20 minutes, sir."[12] When he asked the same question twenty minutes later, he got the same answer. Ultimately, his pilot, Peterson, walked to the back of the plane to brief the boss.

"We got lost,"[13] Peterson said. "This was a real serious thing." The navigator had ignored protocol to wear his oxygen mask and was suffering anoxia. He appeared punchy and listless. "I couldn't contact anybody on the ground station," Peterson added. "I think that everybody was gone for the night. So we kept on flying . . . I didn't have enough gas to last till daylight."

Arnold recorded his thinking: "There is always the possibility[14] of Jap planes . . . They probably have radar . . . If we turn back into the wind, do we run out of gas in the mountains? Do we jump? If so, when? . . . What should we take with us if we have to jump? What will the people back home think if they hear that the Commanding General, U.S. Army Air Forces, and the Commanding General, Tenth Air Force, and others with us have been taken prisoners?"

Now taking oxygen, the navigator began to think clearly and was able to make contact with a ground station. He barked to Peterson, “Turn 4 degrees left.”[15]

“We finally landed[16] about 6½ hours after starting on a 2½ hour flight,” Peterson recalled. There was barely any gas in the tanks. Arnold waited until morning to tell Peterson, “Pete, I think we ought to[17] plan our trips better.”

A fresh layer of snow blanketed Chongqing when Arnold’s flight landed on February 5. He arrived with Gen. Joseph “Vinegar Joe” Stilwell, the United States Army commander in the CBI (China, Burma, India theater), who also served as Chiang Kai-shek’s American chief of staff. A village sat on a plateau high above the airfield, and to get there required a climb of 347 steps. The two American generals were told through an interpreter to sit in chairs, and Chinese porters carried them up.

Arnold found China in icy desperation. Chiang Kai-shek’s leadership—and the entire country—hung by a thread. Not only was China threatened by Japanese forces all along the coastline, but by Chinese communist forces under the leadership of Mao Zedong, in the north. As the leader of the Republic of China, Chiang Kai-shek had one thing going for him: Roosevelt was adamant that China survive, and America had promised to supply the tools of war for Chiang Kai-shek’s army to fight. These supplies all had to fly over the Hump, and Arnold’s Air Transport Command, the ATC, was responsible.

The Roosevelt administration saw China’s role in the East as critical not only to fight Japan but to the security of the postwar world. He had envisioned a radical recasting of global political power, envisioning a new international organization called the United Nations. This body “should be world-wide in scope,”[18] as he put it, with “regional councils” headed by what he called the world’s “Four Policemen.” “The real decisions would be made by the United States, Great Britain, Russia and China,” Roosevelt predicted. Thus, he had thrown America’s might behind Chiang Kai-shek’s government as an ally.

Inside the palace, the Generalissimo appeared—a thin, bald figure with a warm smile. Chiang Kai-shek had held power in China since 1928. Arnold produced the letter that Roosevelt had given him to deliver. The

letter reminded the Generalissimo of the American president's "everlasting appreciation of the service[19] that your armies are giving to our common cause."

The conferences began. Arnold had with him Stilwell and an assistant, while the Generalissimo's right-hand man and ambassador to the world, T. V. Soong, sat by his side. Soong had studied at Harvard, spoke clear English, and served as interpreter. The group spoke of the global situation, the Casablanca Conference, and China's Air Force. The talks continued over a lunch of beef broth, fish and potatoes, roast duck and carrots, Chinese spinach, hot biscuits, lemon meringue pie, and hot tea, which helped alleviate the bitter cold, even inside the palace. The Generalissimo expressed confidence in the American air commander who was helping to lead the Chinese Air Force against the Japanese—Gen. Claire Chennault.

But that was all the praise the Chinese ruler was willing to give. Chiang Kai-shek was desperate for airplanes. He, too, understood how the airplane was changing warfare, and he needed more. Arnold's notes reveal the Chinese leader's frustrations: "He wanted a firm commitment[20] for 500 planes at a given time. He would not listen to logic or reason when it came to realities as to logistics. He wanted to build up the Chinese Air Force."

This drumbeat carried through the next two days of meetings and came to a climax on February 7. Arnold awoke that morning in the palace and noticed four more fresh inches of snow outside. "House so cold,"[21] he wrote, "that water pipes in the bathroom froze; water brought in wooden buckets." Following breakfast, the Generalissimo and Soong requested a final meeting.

"I am going to be very[22] frank with you," Chiang Kai-shek said. "More so than I usually am. The conference so far has been a failure and I want you to tell the President so for me. It has accomplished nothing. Our Army has been carrying on at war now for six years. We have gotten no supplies from anyone." He demanded an "independent Air Force in China who will be directly under me. Without this we have no Air Force."

This statement must have rankled Arnold, who knew how hard the Americans had been working to fly supplies over the Hump—dangerous missions that resulted in the loss of American airmen.

Chiang Kai-shek demanded 10,000 tons a month of supplies, flown over the Hump, and 500 more airplanes delivered by November. Arnold was diplomatic. The tonnage carried over the Hump in December had been

1,700, he explained. “I have arranged to bring[23] it up to 4,000 by the month of April.” He explained that he could accommodate the 500 American aircraft. But that would also require endless rivers of gasoline. Every gallon of 100-octane aviation fuel would have to be flown over the Hump by the US Air Transport Command. And, additional airfields would have to be built in China—and fast.

Arnold flew out on February 8. He wrote in his diary, “The Generalissimo does not[24] impress me as a big man; he casts aside logic and factual matters as so much trash.” Arnold flew around the world, through India and Sudan, Brazil and Puerto Rico. He returned to the Pentagon to a mountain of paperwork, endless decisions to make, and critical briefings with the president. The day he reached Washington, however, he was immediately alerted to a terrible tragedy, one that required his attention above all other matters.

On February 18, 1943, at Boeing’s Seattle factory, engineers used a tow truck to pull a B-29 prototype called the XB-29 onto a runway. In the pilot seat sat Boeing’s most experienced aviator, Eddie Allen.

Thus far the B-29 had flown short flights and gotten rave reviews. It was “unbelievable for such a large[25] plane to be so easy on the controls,” according to Army Air Forces test pilot Donald Putt. It was “easier to fly than a B-17.” Now Allen was preparing to take the prototype up on its most ambitious shakedown flight yet.

“No one knew better than[26] Eddie Allen that the Superfortress had to work,” recalled Curtis LeMay in his book *Superfortress*. “Boeing had its reputation on the line, and so did Hap Arnold.”

By this time, the federal government had once again upped the ante, with Arnold’s urgent backing. Not two, not three, but five factories were tooling up to build the B-29. Never in history had so much manufacturing investment gone into any vehicle, certainly not one that had yet to be tested in real-time conditions. Boeing was set to run three factories: one in Seattle, one in Renton, Washington, and a main facility in Wichita. Bell’s plant in Marietta, Georgia, neared completion, and the Glenn L. Martin Company had signed contracts to build B-29s at a new factory in Omaha, Nebraska. Martin had just recently broken ground.

According to the Army's official history of World War II, "The B-29 program was the[27] most complex joint production undertaking of the war." Already, three of the world's largest airplane manufacturers were beginning to train workers on the thousands of different kinds of jobs needed, in five factories, in four states—riveters, metal workers, lathe operators, engine technicians—to build this airplane that did not yet fully exist.

Soon after Allen took off in the prototype on February 18, an engine problem grabbed his attention. Engine No. 1 caught fire at five thousand feet. An engineer aboard named Fritz Mohn closed the engine's cowl flaps to try to deprive the fire of oxygen, then attempted to blast an extinguisher using the remote-control fire suppression system—itself a marvel of new technology. At the same time, the control tower at Boeing's Renton airfield received the first warning. Allen made the decision to land as soon as possible.

"Coming in,"[28] he radioed. "Had fire in engine and used CO_2 bottle and think we have it under control."

The control tower replied, "Tell us if at any time you think you need fire equipment."

At 12:21 p.m., Allen radioed Boeing's Renton airfield. "Renton, 2400 feet descending. Request immediate landing clearance. Number one engine was on fire. Propeller feathered and trouble not serious. Order crash equipment stand by." A minute later, the B-29 flew over Seattle's Lake Washington bridge and Allen radioed again to report his location. The tower heard these words from the cockpit: "Allen! . . . Better get this thing down in a hurry—the wing spar's burning badly!"

Allen radioed: "Have fire equipment ready. Am coming with a wing on fire."

A truck driver saw the B-29 from a nearby highway. "Flames were shooting[29] out from the bomber's engines," he recalled. "It got awfully low. Then I saw two men leap from the plane. Their parachutes seemed to open but it was too low to do them any good. One of them landed on a high tension wire. There was a blinding flash."

The aircraft crashed into Seattle's Frye meatpacking plant, igniting an explosion that could be seen for miles. The impact hurled meatpacking workers off their feet, and many feared they had been bombed by attacking Japanese aircraft. "We were sitting there talking[30] when a blasting impact

knocked us all over the room," recalled one meatpacker. "Then a heavy explosion bowled us over again. The room was in flames."

Another meatpacker: "I thought, 'My God![31]' The Japs have come!"

Arnold was traveling when he heard the news. The entire crew was killed, including Eddie Allen. Nineteen meatpacking workers perished, as did a firefighter. Arnold had made the B-29 the biggest gamble of his career, and one of the biggest gambles in American military history. He called Gen. Oliver Echols, the commander at Wright Field, who had overseen some of the B-29 project.

"Look," he said, "we're in trouble[32] on this thing. What are we going to do?"

23

> No one can guarantee[1] the future of the world. There are some who fear it will tear itself to pieces, and that an awful lapse in human history may occur. I do not believe it. There must be hope. The alternative is despair, which is madness.
>
> —WINSTON CHURCHILL

Following the Superfortress crash in Seattle on February 18, 1943, Arnold called in his top aviation brains. Gen. Emmett "Rosie" O'Donnell was one of them.

"What the hell is the matter[2] with that airplane?" Arnold asked O'Donnell.

"We've got bad engines on them."

"What do you mean bad engines?"

"They catch on fire."

Arnold grabbed his telephone, dialed Wright Field, and asked to speak to Gen. Bill Knudsen, FDR's production czar, who headed a committee on the B-29. As a former General Motors chief executive who had worked his way up from the factory floor, Knudsen was regarded as the most brilliant production man in the country. "I want you in here tonight,"[3] Arnold barked. In front of a gathering of top Army aviation officials, Arnold demanded that the B-29 problems get ironed out immediately. "Now, goddamn it,[4] I want that engine fixed," he said, "and that's top priority job, and I don't want any aspirin answers either. I want it fixed."

The aviation people feared that the project was too ambitious. Following the B-29 accident, "a big hue and cry came up[5] in Congress and every place else," said K. B. Wolfe. "It was too far in the future. Too big an airplane; this, that and the other."

Arnold said, “The airplane is going to be built.”[6]

Arnold put a group of his best Army test pilots and engineers on a “Secret B-29 Special Mission,” with Wolfe in charge. Wolfe and a big team soon arrived at Boeing’s Wichita factory, ground zero for B-29 production. An Army aviator named Leonard “Jake” Harman was tasked with test-flying the only other existing B-29 prototype. The day came when a nervous Harman got into the cockpit to take the airplane up.

“So they got out there[7] on the ramp [of the airfield], get this thing all wound up with movie cameras all around, and so forth,” Wolfe remembered. Boeing’s new CEO, Oliver West, joined Wolfe in the control tower. “He and I were sitting up on the third floor there, where you could look out over the field.” They watched Harman roar by and lift off, then suddenly the airplane started to bank sideways. Wolfe thought: “My God, we are going to lose the second one.”

Harman struggled with the aircraft, which wobbled over the airfield as it came in for a landing. The pilot was able to taxi back to the tower safely. When he got out, Wolfe asked him what happened.

“I’ll be damned if I know.”[8]

There was a lot of work left to do, and no time to do it.

Around this same time, the first reporting on the B-29 hit the press. “From time to time, during[9] recent months, the American public has been tantalized with guarded references to a new ‘super bomber,’ an aerial dreadnaught destined to play the principal role in the final smashing of the Axis,” one reporter wrote. “But none of the references had the official blessing of the U.S. War Department, and none identified the secret warplane. To Americans, the huge bomber seemed little more than a rumor they could only hope proved true. Last week, the War Department identified the mystery ship as the Boeing B-29.”

This article called the new superbomber “the most important U.S. weapon of this war.” “Just when the B-29 will first throw its shadow across Axis lands,” the story continued, “the Army is not telling. The Army’s plans for the ship also are a secret, although General Arnold revealed that the final test, that is actual combat, of the B-29 is not now far distant.”

American aviator Eddie Rickenbacker, hero of the First World War, gave a statement: “No nation could survive[10] the pounding a fleet of those

planes can deliver and they will be out in mass production next year."

As five factories tooled up to build the B-29, Arnold pushed the program relentlessly forward. He assigned the first bomb wing—the Fifty-Eighth—to a new airfield called Smoky Hill, north of Wichita, to begin training to fly the most sophisticated aircraft ever imagined. The Fifty-Eighth was officially activated on May 1, 1943. "Building and perfecting superbombers,[11] according to strict specifications, was one problem," he wrote in a War Department memo. "Training pilots, co-pilots, flight engineers, navigators, bombardiers, radio operators, and gunners to equally strict specifications was another."

Starting with what Arnold called a "nucleus of hand-picked battle-wise veterans," the Fifty-Eighth Bomb Wing began its training, destined ultimately to become one of the most important bomb wings in all of history.

After Arnold returned from China, he briefed the president on his visit with Chiang Kai-shek, in the White House. Not unexpectedly, Roosevelt throttled up the pressure to get airplanes over the Hump. The entire strategy of the Far East war depended on it. On February 24, Roosevelt's chief of staff, Adm. William Leahy, wrote Arnold and the Army's chief of staff, Gen. Marshall, asking for a massive increase.

"And he wants the increase[12] to begin without delay," Leahy wrote. "The President is sure the additional planes can be found."

Soon after, on March 10, 1943, the American Air Forces officially launched the Fourteenth Air Force, based in China, to be commanded by Claire L. Chennault. Arnold knew that the Fourteenth would face tremendous Japanese resistance. The war in the air would reach another level of fury. Two months before the Fourteenth was launched, Arnold received a report from Gen. George Kenney—an MIT man and a World War I combat aviator, who was commanding the Fifth Air Force and serving as Douglas MacArthur's top air officer in Australia. "I am convinced,"[13] Kenney wrote, "that America, including the War Department, has no conception of the problem confronting them in this theater. The Jap is still being underrated . . . The Jap asks no quarter and expects none. His psychology is win or perish and I believe that it is the national psychology . . . He has nothing but contempt for a man who surrenders."

In Europe, the Eighth Air Force's mortality rate rose, while morale plunged. One aviator recalled, "At coffee tables and in[14] mess halls and reading rooms, the crews developed a new and morbid game. Graphs were plotted, replotted, discussed, and examined." The crews were mathematically plotting their dimming chances of survival. Each airman had to fly twenty-five missions before he could go home.

"They understand the law[15] of averages," Eaker wrote Arnold. "They have seen it work on their friends."

"The current position of the[16] Eighth Air Force is not a credit to the American Army," its commander, Ira Eaker, wrote Arnold in another communique. "After 16 months in the war we are not yet able to dispatch more than 123 bombers toward an enemy target." Winter weather over Europe made flying nearly impossible, even with the latest radar systems.

Arnold insisted on more attack missions. He wrote a blistering letter to Eaker. "You are well aware of the[17] fact that I have eight youngsters' mouths to feed," Arnold wrote, referring to the eight Air Forces in combat zones. Eaker was "perhaps finding many excuses and alibis for not going on missions," Arnold wrote, "which with more aggressive leaders might be accomplished."

The AAF could not train crews fast enough to replace the airmen killed and those who had completed twenty-five missions. "Replacement crews are going[18] overseas who haven't fired a gun at altitudes over 16,000 feet," Arnold wrote in a memo to his Training Command. "This is a hell of a way to send these boys overseas, and I will have to explain why they are sent. You might just as well start writing [condolence] telegrams now for me to sign."

Gen. Curtis LeMay commanded the 305th Bombardment Group, part of Eaker's Eighth Air Force. "I lost nearly half my crews[19] before we started getting any replacements," he recalled. "Missions kept stacking up . . . old and new targets. There was Lorient, Wilhelmshaven, Hamm, Emden. . . . We made up crews of anybody and everybody. We went around scratching the bottoms of barrels and bins. We took people out of offices. Bombardiers assumed navigators' chores. As for gunners, if anyone wanted to go and shoot, we'd walk him once through the armory shop, and he was a gunner. That went for cooks, medical orderlies, supply people, truck drivers, anybody, everybody."

At the same time, the airplane factories continued to report massive delays. Senator Harry Truman of Missouri—chief of the Senate Special Committee to Investigate the National Defense Program (the "Truman Committee")—released a devastating report about airplane production in mid-1943. Truman's report began with the following sentence: "The airplane has proven to be[20] the most important single weapon in the present war."

The report delved into the reasons for production delay—pointing to "enormous waste of manpower[21] and increased dollar cost"—while pointing out that America's ability to produce airplanes "will largely determine the result[22] of the war."

The effort to launch American airpower was, at this point, a failure. "Far from dropping bombs[23] on Germany," Churchill wrote in a private memo, "the American daylight bombers have not ventured beyond Lille [France] . . . Meanwhile, the American public has been led to believe that a really serious contribution has been made by the American Air Force[s]. Considering the American professional interests and high reputations which are engaged in this scheme, and the shock it would be to the American people and to the Administration if the policy proved a glaring failure, we must expect most obstinate perseverance in this method."

"Hap was having a hell of a time[24] hanging on," recalled Assistant Secretary of War for Air Robert Lovett. Was Arnold losing faith in daylight bombing? "I think so. I can't document it but I think he was beginning to worry about it because the attrition rate was too high."

On February 28, ten days after the B-29 crash that killed Eddie Allen, Arnold went to the White House for a Sunday meeting with the president, Marshall, Lt. Gen. Brehon Somervell, and Sir John Dill of Britain. Afterward, he went for a rest at his home on the grounds of Fort Myer. Arnold told his wife that he was suffering chest pains and needed to rest. She called the base medical officer, Dr. Lee Martin. When the doctor arrived, he found Arnold unhappy to see him.

"He's very stubborn,"[25] Eleanor Arnold said. "I can't do anything with him."

After a quick examination, Dr. Martin told Arnold he was suffering "the cardinal signs and symptoms of a coronary."

"You don't know what you're talking about," Arnold said.

"I'm going to give you an injection . . . General, roll up your sleeve."

Arnold ended up in an ambulance, en route to Walter Reed Hospital.

For weeks, his subordinates had watched his energy drain and his anger grow explosive. "He'd get red in the face,"[26] said Maj. Gen. Willard Wolfinbarger. "He'd get red as a beet." Now at Walter Reed, Arnold struggled to face up to his own mortality. "The sudden realization that a man[27] isn't as good physically as he had thought himself to be comes as a distinct shock," he later wrote.

The doctors demanded a rest, and so Arnold was forced to run the Army Air Forces from his hospital bed, and later, from a friend's apartment in Coral Gables, Florida, away from the Pentagon beehive. Now so close to realizing his life's dream—the rise of true American airpower—Arnold feared losing his command.

At one point, his doctor visited Roosevelt in the White House. "Hap works hard and[28] he has to fly a lot," the president said. "If he continues as commanding general, is it likely to endanger his life?"

His doctor answered, "Yes, Mr. President, it might. But he has asked me to point out that whenever his combat crews go on a mission, they endanger their lives. He sees no reason why he shouldn't do so."

Roosevelt pondered this, then said, "Fair enough."

While Arnold was gone, the cause of his illness remained a secret. The press was told he had a case of pneumonia. Meanwhile, he received another promotion. He was now a four-star general, ranked as high as any other figure in the American military. "I used to go down and see[29] him at the hospital and talk over what had to be done," recalled Robert Lovett. "The decisions were made along the line of a policy which he had previously laid out, and which we discussed with great frankness. That, I think, is a fair picture of why the organization worked with such precision and smoothness, when you were dealing with such vast numbers and such extraordinary distribution."

Arnold was still recovering when a terrible story broke in the press. Ever since the Doolittle Raid a year earlier, Doolittle's 1942 bombing of Tokyo had taken root in the American psyche. Doolittle had become an icon. Now, in March 1943, American newspapers reported the horrifying truth that the last of the American airmen who had gone down in Japanese-occupied China after the Doolittle Raid had been executed.

Returning to Washington from Florida, Arnold met with Roosevelt to discuss the affair. Roosevelt issued a formal condemnation of the Japanese government and the killers themselves, promising to "bring these officers to justice"[30] for the "diabolical crimes." Arnold's statement could not contain his rage. He spoke not to the Japanese nor to the American people, but to the airmen under his command.

"In violation of every rule[31] of military procedure," Arnold said, "and every concept of human decency, the Japanese have executed several of your brave comrades who took part in the first Tokyo raid. These men died as heroes. We must not rest—we must redouble our efforts until the inhuman war lords who committed this crime have been utterly destroyed."

24

> Then the Lord rained[1] down burning sulfur on Sodom and Gomorrah—from the Lord out of the heavens. Thus he overthrew those cities and the entire plain, destroying all those living in the cities.
>
> —GENESIS 19:24–25

On March 28, 1943, at the US Army's Dugway Proving Ground in remote northwestern Utah, scientists and engineers with the National Defense Research Committee (NDRC) and Standard Oil began construction of a new village. Or, at least, that is what it appeared to be. In fact, it was something far different.

A group of architects oversaw the building of what they called a "German Japanese village," carefully modeled with replicas of buildings that existed in Germany and, more particularly, Japan. Inmates from Utah prisons were recruited as construction workers. These were mock buildings created for the sole purpose of destruction.

NDRC leaders wanted absolute specificity. They hired consultants who had worked in Germany and Japan and knew how the structures there were built. The architects designed them with the same thickness, same dimensions, and same materials as the buildings found in Berlin and Tokyo. The NDRC found an importer of Japanese furniture in San Francisco, who helped construct replica Japanese pieces to be placed in the buildings. Project organizers had spruce wood milled and conditioned to a moisture content similar to the buildings in Tokyo neighborhoods. Homes were filled with low tables, sitting pillows, sliding paper screens, even chopsticks, as they would be in Japan. Narrow roads were built to represent the congested urban centers of cities like Tokyo and Yokohama.

Attention to detail in these constructions went so far as "the curtains, children's toys,[2] and clothing hanging in the closets," according to one official report. "Nothing was overlooked."

Beginning in May 1943, bombers began to fly over Dugway Proving Ground, dropping magnesium and napalm explosives on the replica village. Researchers evaluated the effectiveness of the different bombs on the different types of structures. Firefighters swarmed in, using techniques that were used in Japan, to see if the firefighting methods worked to quell the blazes.

The research concluded that if the right incendiary bombs were dropped in the right places in "Little Tokios,"[3] "fires would sweep an entire community," causing "tremendous casualties." It found that the M-69 napalm incendiary was the most effective firebomb in starting unquenchable fires in cities. Mass production of the M-69 was to begin, immediately.

Japan, all knew, was particularly vulnerable to incendiary attack. It was a wide-open secret. *Harper's Magazine* published an article in January 1943 that began, "A morbid fear hangs over[4] Japan. It has haunted the cities of the island empire for years. It has reached the proportions of a national psychosis . . . Japan fears air raids . . . Japan's congested paper-and-plyboard cities are more vulnerable to bombing than the cities of any other major military power in the world." There were still Japanese people alive who could remember the Great Fire of Tokyo in 1881 that destroyed more than ten thousand buildings.

"The Japanese public," *Harper's* concluded, "has an inborn dread of fire."

That same spring, as Arnold recovered from his heart attack (he had a second one in May 1943), subordinates noticed a change in the chief of the American Air Forces. When he returned to the Pentagon, he maintained his trademark smile, but the eyes above it had grown colder. Desire to defeat the enemy had become so obsessive, he began to indoctrinate his subordinates in the ugliest realities of war. In correspondence with one of his sons, Arnold referred to Japanese as "termites": "We are going to have to stamp[5] out each one individually, just as you have to with termites."

At one point, he was informed of American protests against the killing of civilians in bomb raids. A memorandum went out to his staff. It read: "[General Arnold] wants the Air Staff[6] to realize that this is a brutal war and that the way to stop the killing of civilians is to cause so much damage and destruction and death that the civilians will demand that their government cease fighting."

The British had proven that in bombardment, burning down targets was easier than blowing them up. Arnold began to pay closer attention to the new chemical weapons emerging from Air Forces R&D—incendiary bombs built specifically to burn cities to the ground. The strategy remained, as he wrote to the Eighth Air Force's commanding general, Eaker, on April 10, 1943, bombing "applied with precision against[7] vital objectives." But the bombers' lack of accuracy, and the scalding successes of the British, continued to make incendiary warfare more seductive.

Arnold sensed the anger boiling in the collective American psyche; while some protested killing civilians, far more others (including high-level officials) wanted the bombers to burn enemy cities until the war ended in victory. Every day it continued, American soldiers lost their lives.

Were Arnold and his commanders aggressive enough? Should they not use all the weapons at their disposal, to win this war and bring the boys home?

Arnold wrote out his strategy to use firebombs in a memorandum to an assistant chief of staff. "As far as can presently be[8] seen incendiary bombs will be used by the 8th air force for the following three purposes: a) Burning down suitable industrial objectives . . . b) Starting fires by day in the densely built up portions of cities and towns to serve as beacons for the R.A.F. to exploit at night. c) Burning down the densely built-up portions of cities and towns by day attack alone when the occasion warrants."

Arnold listed specific firebombs—notably, the M-69 napalm explosive, which he referred to as the "6 lb oil and rubber" bomb—as the most promising weapons. This activity marked the beginning of a historic shift in the rise of airpower.

On the night of July 24, 1943, civilians sleeping in their homes in Hamburg, Germany, awoke to the sound of air raid whistles and bombers roaring overhead. The aircraft appeared in the sky in greater numbers than ever

before. Hamburg was home to vital factories in the Nazi war machine—U-boat plants in particular. Which made the metropolis a prime target.

The weather in Germany's largest port city was clear. Over the next hours, 791 Royal Air Force bombers split the sky so their exhaust trails could be seen in moonlight. Bombs rained down, setting buildings on fire. Firefighters worked tirelessly into the morning. With daylight, the thunder of bombers again roared over Hamburg. Eaker's Eighth Air Force moved in to attack precision targets. The flames set by the British bombers at night served as a beacon for American aircraft. The United States used mostly conventional bombs, unlike the British. However, the conventional explosives dropped onto already smoldering fires escalated their spread.

The Luftwaffe engaged the bombers, and losses were again high. "Intense flak and strong fighter[9] opposition were encountered," an Eighth Air Force communique reported. "A large number of enemy aircraft were destroyed by the unescorted bombers."

The following night, the Royal Air Force hit Hamburg again with incendiary weapons. The British named this mission Operation Gomorrah, referring to the book of Genesis and the burning of those "wicked" and "immoral" cities. As the historian Jörg Friedrich put it: "Nothing in war history up to[10] that time was even remotely comparable to the annihilating capacity of those hordes in the sky."

For the first time, the British bombers employed "Window," an ingenious invention noteworthy for its simplicity. Airplanes dropped bunches of aluminum strips that German radar mistook for enemy aircraft, drawing gunfire away from the actual bombers and in the direction of phantom aircraft.

All week, night and day, the bombers flew and the firestorm spread. Dry weather and summer heat joined record numbers of bombs to create an artificial meteorological event. Tornadoes of fire sucked in oxygen that further fueled raging winds, creating an atmosphere that had never existed before on earth. Citizens of Hamburg reported "a blizzard of red snowflakes."[11] Torched human bodies lay "marked with a waxen pallor[12] like dummies in a shop window." Rational minds sought shelter, but shelters underground and inside buildings became literal ovens, baking people to death.

One eyewitness claimed that Hamburg "ceased to exist."[13] A source in Germany described the horror: "Huge conflagrations created[14] cyclone-like

firestorms; the asphalt of the streets began to blaze."

Because the incendiary weapons were used mostly by the British (though they were also used by US bombers), the American press and the American president had enough wiggle room to remain mum on the subject of killing civilians. Time would pass before statistics came into play: some forty to fifty thousand people were killed. In the moment, the American press treated the raid as an act of war upon an enemy nation. "The overall picture was one[15] of coordinated Allied bombing at its best," *The Washington Post* reported. Roosevelt sent numerous communiques to Churchill during the week of the Hamburg raid, focused mostly on the Allied invasion of Sicily led by Eisenhower. Hamburg was never mentioned. Nor did Roosevelt speak publicly about it.

Operation Gomorrah stunned German leadership. The Nazi head of war production Albert Speer later said, "Hamburg . . . put the fear[16] of god in me." Hitler was enraged. As Speer recalled, "He repeated several times[17] that he would avenge these lost lives upon the Jews."

Following the Hamburg raid, the American Air Forces began a new and relentless campaign to gain air superiority over Nazi Germany. It began with Operation Tidal Wave—an attack on the refineries of Ploesti in Romania's Transylvanian Alps, Hitler's greatest source of oil.

"The whole Ploesti episode[18] began on a high note as far as I was concerned," recalled a B-24 pilot of the Eighth Air Force, Col. William R. Cameron. "After six months of combat operations in very cold and hostile skies over Europe, we were shifted, without explanation, to low-level formation practice over the green fields of England. We were told that for the time being, at least, there would be no combat—and it was springtime. There were new crews and new B-24s to replace those that had been lost, and losses had been severe for our group. We didn't understand then that this relatively pleasant interval was preparation for an exceptional mission."

The plan to attack Ploesti had crystalized at the Casablanca Conference six months earlier, and had gestated ever since. It was going to be a crucial test for the bravest of airmen, and also, of the Consolidated B-24 Liberator bomber. Arnold knew his men were going after one of the most fortified Nazi installations in Europe, and that casualties were certain to be high.

"No mission of the war[19] was more carefully planned," he recorded, "with full knowledge of the odds against it."

The Air Forces recruited 1,763 airmen, at least one from every state in the American union. After an initial training schedule, all flew to recently liberated airfields in Libya, along with teams of mechanics, engineers, mess tent operators, and logistics officers. The living was hard in the rat-infested desert. There was little drinking water, none for bathing, and no escape from the brutal Saharan heat. For weeks the airmen practiced flying over the barren sands in four-engine bombers, at treetop level. "When you go 200 miles per hour,[20] at an altitude of eight feet, you really know you're going 200 miles per hour," remembered one of the pilots, Capt. Philip Ardery.

Commanders brought in a Connecticut architect, who used photographs he found in a Cambridge library in England to construct a miniature replica of Ploesti and its nine surrounding oil refineries. British intelligence helped by collecting photos from civilians who had vacationed there. A film crew created a forty-five-minute movie instructing crews on how to find Ploesti from above and where strategic targets were located. The filmmakers used a child's tricycle with an 8 mm camera attached to circle the replica city, which was so detailed that an Allied officer who had once lived in Ploesti could pick out his apartment building.

The plan was to fly from Libya 2,400 miles round trip, and to attack while skimming the earth's topography, low enough to avoid anti-aircraft fire and to avoid tipping off radar on the approach.

On August 1, while the fires in Hamburg still burned, the American airbase at Benghazi came alive at 2 a.m. It was already so hot, the airmen joked that they could bake bread in the cockpits of the B-24 Liberator bombers. Each of the four-engine airplanes was loaded to 64,000 pounds, greater than their prescribed takeoff weights, with extra fuel tanks in the bomb bays for the thirteen-hour trip. In total, the aircraft carried 622,000 pounds of bombs, plus smaller boxes of firebombs that the airmen could throw out their windows on the oil installations.

By sunrise, the aerial armada made way over the Mediterranean in V formations of three planes each, so that the aircraft spread out five miles across the sky. Arnold later remarked on the courage of this fighting fleet: "As one of their key[21] formation leaders suddenly spiraled down unexplainably into the Mediterranean, not a voice broke radio silence. The

deputy leader, a young lieutenant, moved up to take his place, and the formation flew on."

Nearing the target, the aircraft descended to attack level. One of the pilots—a captain named John R. "Killer" Kane, in the cockpit of a Liberator named *Hail Columbia*—saw the city come into focus. "In the distance toward Ploesti,"[22] Kane described, "the sky was the ominous black of a threatening thunderstorm . . . As I was looking toward Ploesti, I saw all hell break loose, the whole area just burst into flames."

Flak guns boomed and the sky filled with explosions. German 88 anti-aircraft gun barrels stuck out of church towers, rooftops, even hay bales in fields. The Germans had a train they called Die Raupe—or "the Caterpillar"—loaded with flak guns, and it began to roll along its tracks, the guns firing out windows as Die Raupe chased aircraft flying just feet above. One of the pilots recalled, "We flew through sheets of flame,[23] and airplanes were everywhere, some of them on fire and others exploding. It's indescribable to anyone who wasn't there."

"We had to shoot our way in,"[24] Kane recounted. His gunners fired 2,500 rounds in ninety seconds. The aircraft attacked from such low elevation that some were blown apart by their own bombs.

When the final surviving Liberators turned back for northern Africa, Ploesti's refineries stood alight and smoldering. The bombers landed in Benghazi at night, and the shell-shocked aviators mingled at the base, trying to figure out who had lived and who was left behind. When a pilot named Reginald Phillips was asked for his impression of the mission, he was so tired that he could barely move his jaw. Phillips said, "We . . . were . . . dragged[25] through the mouth . . . of hell."

Of the 178 bombers that took off, eighty-eight returned, and few remained undamaged. Some had tree branches poking out of their bomb bay doors, due to the low-level attack runs. The casualties were so high, military leaders named this day "Black Sunday." For the first time in history, the Army awarded five Medals of Honor for valor from a single operation.

The Nazis sent in slave laborers to make repairs, and in a short time, the refineries were mostly running again. Arnold vowed his bombers would return to Ploesti. Already a new mission plan was in the works.

Two weeks after the Ploesti raid, the Eighth Air Force flew its infamous Regensburg and Schweinfurt missions—Operation Double Strike.

"Regensburg was the day[26] when the GAF [German Air Force] threw everything against us which they could possibly throw," recalled Curtis LeMay, mission commander, who flew aboard the lead plane to Regensburg on August 17, 1943. "I didn't have anything to do with dreaming up this operation. The first I ever knew about it was when General Eaker came out to Elveden Hall and told me the story . . . He wanted me to lead this mission . . . The idea was that if we could knock out ball-bearing production, that would automatically cut industry out of the future picture. The German war machine would grind to a halt."

The plan was to fly two missions at once. The Eighth Air Force's Third Air Division would launch B-17s in the early hours to bomb the Messerschmitt airplane factory in Regensburg. The First Air Division would then send up a second attack on the ball-bearing plant at Schweinfurt, totaling 376 four-engine bombers. The Americans believed that the first attack wave would engage the Luftwaffe fighters, leaving the second a free path to its target. On the day of the mission, however, the American airmen found themselves socked in with weather. LeMay described the scene: "It was so foggy that[27] we had to lead the airplanes out with flashlights and lanterns, in order to get them onto the runway."

LeMay had trained his pilots in the art of instrument flying, so his command flew on time en route to the Messerschmitt factory in Regensburg. The Schweinfurt attack group, however, was delayed roughly three hours. Those fateful hours enabled the German air force to attack the first wave, land and refuel, then attack the second. The result: all-out war five miles up in the sky, as the unescorted American bombers traveling at some 180 miles per hour faced enemy fighter planes that attacked like swarming bees.

One Flying Fortress copilot named Beirne Lay, who flew over Regensburg, described the combat: "As the fighters passed us[28] at a high rate of closure, the guns of our group went into action. The pungent smell of burnt powder filled our cockpit, and the B-17 trembled to the recoil of nose and ball turret guns . . . The members of the crew sensed trouble. There was something desperate about the way those two fighters came in fast, right out of their climb . . .

“I watched two fighters explode not far beneath, disappearing in sheets of orange flame, B-17s dropping out in every state of distress, from engines on fire to control surfaces shot away, friendly and enemy parachutes floating down and, on the green carpet far beneath us, numerous funeral pyres of smoke from fallen aircraft.” One American airman was seen freefalling in somersault right through speeding formations of B-17s, unable to pull his chute.

Arnold was in Washington at the time. His personal pilot, Pete Peterson, recalled being with him when news of the great losses came in. “That’s when we lost 62 bombers,”[29] Peterson said. “Naturally, he felt very deeply about this. Again, he recognized this was war, this was part of war, and although it hurt him deeply, I don’t think he took it out on anybody or expressed it orally. I just think he had a very deep feeling about the thing.”

More than six hundred American airmen were killed, missing, or captured.

Soon after the first raid on Schweinfurt and Regensburg, the American heavy bombers returned over Schweinfurt’s ball bearing factory, to attack again. This time the American airmen faced something never seen before. German aircraft fired air-to-air missiles from beneath their wings. A single rocket could take out a bomber with a direct hit. Germany’s scientists had beaten the Americans in the race to build rockets and weaponize them—yet another leap forward in the science of air warfare.

Eaker wrote in his report to Arnold: “Yesterday, the Hun sprang[30] his trap. He fully revealed his final counter measure to our daylight bombing.” Eaker tried to describe the missiles his airmen saw. He wrote of “large formations [of] twin-engine fighters in waves, each firing large numbers of rockets suspended under wings. Firing began at long range . . . Rockets were lobbed in barrage quantities into formations. The very effective rocket attack points very strongly to use [of] proximity fuses.”

Once a bomber was wounded, Eaker reported, the German fighters deftly finished the job. The most haunting part of the story, for Arnold, was the sophistication of the enemy’s aerial weapons systems. The Nazis had their own long-haired scientists, delving into futuristic inventions. Arnold had sought to launch a study of rocketry in the American Air Forces even before Pearl Harbor.

If the Germans could beat the Americans in this new field, what other aeronautical inventions were to come next?

"No such savage air battles[31] had been seen since the war began," Arnold later wrote. "Our losses were rising to an all-time high."

The British had warned the Americans that high-altitude, daylight bombing would not work. The Schweinfurt and Regensburg missions came to symbolize the danger of precision daylight bombing, but there were numerous other smaller missions that saw tremendous casualties. "All across Germany, Holland[32] and Belgium," an American navigator named Elmer Bendiner recalled, "the terrible landscape of burning planes unrolled beneath us. It seemed that we were littering Europe with our dead."

On the final day of August 1943, Arnold traveled to England. He wanted to see the airmen of the Eighth Air Force, and to lift their morale. These airmen were "youngsters," he wrote in his diary, who had no choice but to become "matured and experienced men[33] in a very short time." Arnold saw some of the shot-up airplanes that had made it back to base. Some had "holes in wing and fuselage[34] large enough to put a wheelbarrow through."

Arnold visited wounded soldiers in a field hospital. "Most of them battle casualties," he wrote, "far too many in for frostbite,[35] fingers and toes lost due to intense cold [at high altitudes]. Half a minute without oxygen and a man is dead at 30,000 feet. When oxygen fails, off come gloves to get new mask or make repairs, and then fingers on hand are frozen. We must: (1) get better clothing (2) get better heating units (3) get better oxygen equipment and do it fast."

A glaring problem faced American air commanders. The old adage that "the bomber would always get through" was now an accepted falsity. From Britain, Arnold wrote his deputy Barney Giles about the "absolute necessity for building[36] a fighter airplane that can go in and come out with the bombers . . . About six months remain before deep daylight penetration of Germany begins. Within this next six months, you have got to get a fighter that can protect our bombers."

Arnold took a lot of heat for the failure to produce a fighter plane with enough range to go all the way into Germany with the bombers and return. Which infuriated him. As Eaker put it, "[It] is just like saying you[37] can't understand why we didn't have a great big Cadillac in 1910; the state of the art just hadn't developed to that point."

The Army Air Forces were working on a new aircraft that Arnold believed was finally going to solve this conundrum. Its story goes back to the fall of 1942, when the United States and Britain partnered on the development. “The Royal Air Force is very keen[38] about the P-51,” Arnold wrote Roosevelt on November 12, 1942, “and we have installed Rolls Royce engines in two of them . . . We think so much of them that we have already given orders for approximately 2200.”

In Detroit, the Packard Motor Company signed contracts to build the Rolls-Royce Merlin, a liquid-cooled V-12 that was the jewel of the Royal Air Force. When paired with the North American P-51 fighter plane, the results in initial testing proved astounding. North America’s chief executive J. H. “Dutch” Kindelberger, based in Los Angeles, wrote Arnold, “We expect this airplane to be[39] the best in the world in every department, including high speed, rate of climb and ceiling . . . We are concentrating every effort on the development.”

Time remained critical. According to intelligence figures, the Nazis were working desperately to gain more airpower, and German fighter force had increased by 22 percent since the beginning of 1943. “If we do not now strain[40] every nerve to bring enough force to bear to win this battle,” Britain’s Air Chief Marshal Sir Charles Portal pronounced in a “Most Secret” memo, “we may well miss the opportunity to win a decisive victory.”

25

It is vital to our common[1] safety in the present War to bring the Tube Alloys project to fruition at the earliest moments.

—EXCERPT OF THE SECRET ATOMIC BOMB "QUEBEC AGREEMENT," SIGNED BY FRANKLIN ROOSEVELT AND WINSTON CHURCHILL, AUGUST 19, 1943

From time to time,"[2] Arnold recalled, "I had heard rumors and whisperings of what was going on in connection with atomic development, and occasionally one of my scientific friends would give me a little insight into what the problem really was. Then, one of them actually in the 'know' opened up and told me enough of the story to fill in a few vacant places in the mosaic I had been making."

Nowhere in Arnold's diaries or archives does he reveal the exact time when he learned about the war's greatest secret. But evidence suggests it was soon before the Quebec Conference—codename Quadrant—which opened officially at 10:30 a.m. on August 14, 1943.

On that day, military delegations from the United States and Britain began a weeklong conference in Quebec City's Chateau Frontenac, a sprawling castle hotel on the bank of the St. Lawrence River. Their goal was to nail down strategies they could present to the state leaders when they arrived. The main focus of Quadrant was the planning of Operation Overlord—the ground invasion of Nazi-occupied Europe. Roosevelt and Churchill arrived in Quebec City on the seventeenth, the same day of the infamous first Schweinfurt-Regensburg raid.

Arnold's key role at Quebec was to deliver a paper called "Air Plan for the Defeat of Japan."[3] Its mission statement: "To accomplish, by a combined aerial offensive, the destruction of the Japanese military,

industrial and economic systems to such a degree that the nation's capacity for armed resistance is effectively eliminated, within 12 months after the defeat of Germany." The plan called for a massive boost in resources to be flown over the Hump into China, "by the employment of approximately 4,000 B-24 airplanes converted to cargo airplanes and tankers," to accomplish "a flow of approximately 596,000 tons per month."

For the first time, Arnold introduced the B-29 Superfortress to the Allied leaders. "B-29 heavy bomber aircraft[4] possess a tactical radius of 1,500 miles with a bomb load of ten tons, and are the best suited aircraft for the bombing of Japan from available bases," Arnold explained. The plan called for the building of new airfields with massive runways big enough for the superbombers, in China.

Arnold promised that he could begin delivering B-29s to China by March 1.

There was another reason why the urgency to build the B-29 increased, yet again. At Quebec, Roosevelt and Churchill signed the Quebec Agreement, an accord between the United States and Britain concerning the building of the atomic bomb, a project so clandestine that even in this secret memo, the bomb could only be referred to as "tube alloys."

"First," the Quebec Agreement read, "that we will never use this agency[5] against each other. Secondly, that we will not use it against third parties without each other's consent. Thirdly, that we will not either of us communicate any information about Tube Alloys to third parties except by mutual consent."

Details of the Manhattan Project remained a mystery, and plenty of naysayers were sure that this atomic bomb was going to be a dud. Nevertheless, the project was far enough along that the Allied leaders needed to begin planning for the bomb's employment. "My scientific friends and I[6] discussed how this device would be used and carried," Arnold later wrote. "Always the answer was: the airplane." The bomb, he believed, would be a large and heavy object, and would have to travel a huge distance to reach its target. It would become an agent of airpower.

"There was only one plane[7] that had the sufficient range to carry the bomb to the objective we were after—Japan," recalled Arnold. That was the B-29 Superfortress.

While Arnold was at the Quebec Conference, teams of engineers and aviators swarmed Smoky Hill Army Airfield, a 2,600-acre installation in Kansas. Their mission: to turn the superbomber into a working airplane that could be mass produced. Arnold had K. B. Wolfe in charge, along with a test engineer named Pearl H. Robey and Army Air Forces aviator LaVerne "Blondie" Saunders.

The first B-29s stood[8] on the tarmac at Smoky Hill. The aircraft had four 2,200-horsepower 18-cylinder engines, ten .50-caliber machine guns in its turrets, a 20 mm cannon in its tail, a 357 mph max speed, a 220 mph long-range cruising speed, and a nearly 33,600-foot flight ceiling. The aircraft flew with an electric nervous system made up of almost 10 miles of wiring. To make one B-29, it took 27,000 pounds of sheet aluminum, over 1,000 pounds of copper, and 600,000 rivets.

The B-29 was the first combat bomber with a pressurized cabin, designed to maintain the pressure of eight thousand feet, even when the crew of ten airmen was thirty thousand feet up. It had an analog computer system that allowed gunners to remote-control the machine guns in four turrets, which helped to keep these gunners safer, as they sat deep inside the vehicle's fuselage. Only the tail gunner held the actual gun in his hand.

One flyer recalled the experience of taking flight in this superbomber. "On take-off," he reported, "the big ship came into her own.[9] In eighteen seconds she was airborne, lifting her tremendous weight off the runway with gentle aplomb, tucking her wheels carefully into place, climbing in wide circles above the flat, green Kansas prairies. Soaring upward, she gathered speed confidently, pushing the vibrant needles of her air speed indicators to an astounding figure, a figure that compared with top-notch fighter speeds!

"Over the cavernous bomb bay, I crawled to the aft firing station [where aerial gunners fired the remote-control machine guns located in turrets around the aircraft], and on past the myriad electric motors (150 of them throughout the ship) past the crew bunks and the ammunition stores to the whipping tail gunner's position. It seems like the ship was endless."

To mass produce the Wright Cyclone engines, General Motors broke ground on a new factory on the outskirts of Chicago. This 475-acre site embodied many superlatives; the largest corporation in the world was building the largest factory in the world, to produce the world's most powerful aviation engine for the most destructive airplane. All through

early 1943, steam shovels, bulldozers, cranes, and concrete mixers churned the land as the factory rose out of the ground. “Eight miles of road way[10] and eight miles of railroad tracks have been laid inside the grounds,” the *Chicago Daily Tribune* reported on the first day of 1943. One building alone was designed to cover eighty-two acres. Planners were expecting to pour 420,000 cubic feet of concrete to finish the foundation. They expected the plant to produce a million pounds of steam every hour.

“No comparable effort[11] ever has been put behind any other single war weapon,” wrote journalist Frank Sturdy, “and this in itself is a measure of the Army’s confidence in the Super Fortress [*sic*] and the job it is expected to do in crushing the enemy.”

In July 1943, a new test pilot arrived at Smoky Hill to work on the Superfortress, a tall and handsome figure with black hair and the physique of a marathon runner. Paul Tibbets had grown up in Cedar Rapids, Iowa, the son of a confections wholesaler named Paul W. Tibbets Sr. and a mother named Enola Gay Tibbets.

The first time Tibbets heard of the B-29 was the week of his twenty-eighth birthday. He was summoned to Washington, where one of Arnold’s key airmen, Maj. Gen. Eugene Eubank, assigned Tibbets to the superbomber program. This was one week after the death of Boeing’s Eddie Allen in the B-29 prototype crash in Seattle. At the time, the odds were stacked against this project’s success. As Tibbets recalled, “In Washington, where I reported[12] for assignment to the B-29 program, I found that the big bomber project was in shambles.”

General Eubank told Tibbets, “I don’t know whether we’ll ever have a B-29.”[13]

Tibbets had started his flight training six years earlier at Randolph Field in San Antonio, Texas, and the Army commissioned him as a second lieutenant with pilot rating a year later in 1938. In 1942, Tibbets served as a deputy group commander in the Eighth Air Force, and flew the lead plane in the first daylight bombing mission over Germany. He had proved himself to be an elite pilot with leadership qualities that grabbed the attention of his superiors.

Now at Smoky Hill, Tibbets laid eyes on the aircraft for the first time. “It was a giant[14] compared with the B-17,” he recalled. Tibbets could not

wait to get his hands on this machine. “I immediately volunteered to[15] fly that airplane.” He began with a “speed run,” a hop from a runway a few feet off the ground. “On the next run,” he remembered, “I gave it full power,[16] pulled the gear up, and retracted those big flaps. Once in the air I felt the thrill of handling an airplane considerably larger than any I had expected to fly when I joined the Air Corps in 1937.”

As shakedown flights continued, Wolfe and his team gathered data and flight impressions. Engineers were data hounds; the more empirical data they had, the faster they could move to improve the aircraft, and the better they could cover their backs if things went wrong.

Performance tests revealed that the Superfortress’s “true speed”[17] (a figure calculated as the speed of an object moving through still air mass), when it was loaded to 100,000 pounds, was 326 mph at 15,000 feet. Up in thinner air, at 20,000 feet, that speed hit 353 mph. In range tests, the B-29 was getting 0.82 miles per gallon of aviation-grade gasoline, flying at 15,000 feet and 223 mph, when loaded to 85,000 pounds. When loaded to 122,000 pounds, that number dropped down to 0.42 miles per gallon. At 100,000 pounds, the plane could take off after 2,340 feet of runway, at a speed of 102 miles per hour. But loaded to its top weight of 130,000 pounds, it needed 4,900 feet of runway, and 120 miles per hour of speed to get off the ground.

After examining flight data and engineering bugs, Boeing and Army officials continued to request changes to the B-29. “Engineering changes—detested[18] by manufacturers, but vitally necessary in this program—were always the number one headaches,” recalled William Knudsen, Roosevelt’s top production executive and head of the B-29 Liaison Committee. Arnold’s pilot, Pete Peterson, recounted a moment while visiting Boeing, to track the B-29’s progress. “This was a very critical period.[19] Because they weren’t getting these B-29s out so we could raid Japan.”

Arnold said, “OK—there’ll be no more changes[20] on these B-29s. What’s holding up production is engineering changes. Every engineer here has got his own ideas and he wants to get them in this airplane. The design is frozen, so we can get production out, unless it’s a safety-in-flight item.”

The order went down the chain of command. Arnold’s deputy called Wolfe on the phone and said, “If the airplane will fly and bomb[21] and shoot,

that is all we want and we must accept the airplane as it is rather than make continuous changes."

At the same time, Wolfe gave Tibbets orders to fly B-29 serial number 41–18335 to Eglin Field* in Florida, "as soon as practicable[22] for the purpose of conducting gunnery firing tests." The B-29 was moving into the next stage. Now, there existed a functional flying machine. With six months remaining before the first B-29s were expected by Roosevelt and Chiang Kai-shek to arrive in China, Wolfe ordered Tibbets to begin testing the aircraft's effectiveness as a weapon.

On October 11, 1943, Arnold sent what had to be the most humiliating memorandum of his life, to the president in the White House.

"In connection with the bombing[23] of Japan from China by B-29s," Arnold wrote, "I regret exceedingly to have to inform you that there has been a holdup in production of engines. It looks now as if it will be impossible to get the required number of B-29s together in China to start bombing before the first of March, and with the possibility of not getting them there before the first of April."

The president blew his proverbial top. He wrote Arnold's boss, General Marshall, "The worst thing is that[24] we are falling down on our promise to China every single time. We have not fulfilled one of them yet. I do not see why we have to use B-29s. We have several other types of bombing planes." But none had the range to carry the payload that the Superfortress would. None other could reach a target in Japan with any comparable effectiveness.

Arnold called in every favor he could. The commander of the Army Air Forces was so confident that this airplane would live up to its billing, he went public with his first statements on this clandestine project, on November 4. "We now have a superbomber,"[25] he declared. "It is the B-29 . . . evolved in secrecy during the past several years. This battleship of the air is armored heavily with multiple-gun and power turrets. It can fly at very high altitudes . . . When it enters combat, today's long range will become medium range and today's heavy bombers will consequently become light heavies."

"The Army's worst-kept secret,[26] the new Boeing B-29 heavy bomber, finally emerged yesterday from under wraps," reported *The Washington*

Post on November 5. “It’s all right now to say there is a B-29 . . . Now, at last, Arnold speaks right out in a formal statement.”

Arnold had made a lot of promises, to Roosevelt and Churchill, to the War Department, and now, to the American people. The final test of the B-29—combat—approached.

26

> After a period of desperate,[1] if resourceful, maneuvering with consistently outnumbered forces, the United Nations have mounted and are about to mount greater crushing aerial offensives on every front. The Army Air Forces are now in the process of fulfilling an historic and decisive mission.
>
> —GENERAL ARNOLD, MEMORANDUM TO THE WAR DEPARTMENT, JANUARY 4, 1944

Flying over the edge of Africa into the Middle East on November 27, 1943, Arnold stared down at the planet's contours. "Over desert and more desert[2] and more desert, Suez Canal, shore of the Mediterranean Sea, miles of desert," he journaled. "Passed Beersheba, the Dead Sea . . ." Over the mouth of the world's most important river, he scribbled, "The Nile, cradle of civilization,[3] a valley, probably most fertile in the world, 2,000 miles long, providing sustenance for mankind . . . for over 50 centuries. How come? Why did it start and continue here?"

Arnold found himself in the desert outside Cairo staring up at the Sphinx, while President Roosevelt sat beside him in his wheelchair. The sixty-six-foot-tall stone cat had a way of transfixing its beholders. Its meaning was a mystery.

"Hap," Roosevelt said, "here we are,[4] three of the world's most silent people: the Sphinx, you, and I."

Arnold chuckled. "That was the first time in my life," he thought, "anybody had ever accused me of being silent."

On December 4, leaders from the United States, Britain, and China met for a conference in Cairo, to come to agreements on how to win the war against Japan. It was the first Allied war meeting with Chiang Kai-shek,

Madame Kai-shek, and a Chinese delegation present. This meeting would play a critical role in the rise of airpower. Here in Cairo, the Allies cemented a plan to invade the Mariana Islands, tiny volcanic atolls in the South Pacific that were surrounded by thousands of miles of Pacific Ocean. In the middle of the vast Pacific, B-29 airfields could be carved out of the jungle, bringing mainland Japan further into the range of the Superfortress.

"A strategic bombing force[5] will be established in Guam, Tinian, and Saipan for strategic bombing of Japan proper," read a war plan called "Specific Operations for the Defeat of Japan, 1944." This plan committed tens of thousands of American sailors and soldiers to combat. The mission to capture Guam, Tinian, and Saipan would turn out to be one of the most impactful of the Pacific War.

Directly following this Cairo Conference, the Americans and British traveled onward to the largest city in Iran—Tehran. The meetings at the historic Tehran Conference—codename Eureka—took on an entirely different flavor due to the presence of the Soviets. KGB security teams overwhelmed the city.

The Tehran Conference was the first "Big Three" meeting—the US, the UK, and the Soviet Union. Joseph Stalin's appearance left some of the Americans in awe. He was arguably the world's most mysterious man. Stalin had risen to power during the communist revolution. He had taken over the Communist Party in 1922 and ushered the Soviet Union into the Industrial Age. He was now the feared dictator of some 190 million subjects. He appeared of average size, his unassuming smile revealing a set of tobacco-stained, cracked teeth.

State Department Russian expert George Kennan described him in these terms: "An unforewarned visitor[6] would never have guessed what depths of calculation, ambition, love of power, jealousy, cruelty, and sly vindictiveness lurked behind this unpretentious façade. I was never in doubt, when visiting him, that I was in the presence of one of the world's most remarkable men—a great man, if you will, primarily in his iniquity, ruthless, cynical, cunning, endlessly dangerous; but for all of this—one of the truly great men of the age."

Arnold and Stalin talked for a long period; the Soviet leader knew a surprising amount of detail about American aircraft—their performance statistics, their armament. Stalin, too, was a believer in airpower, and naturally, he asked Arnold to supply American-made heavy bombers. "I

told him if he wanted heavy[7] bombers he would have to send his engineers and maintenance and combat crews to the United States to go through our schools," Arnold remembered.

By the late fall of 1943, the Allied leaders shared a newfound, growing optimism. The assembly lines in America neared maximum production. Ships, trucks, amphibious vehicles, and weapons of all kinds poured out of manufacturing facilities at incredible rates. Airplane production spiked. In the Tehran Conference's first plenary meeting between Roosevelt, Churchill, and Stalin, at 4 p.m. on November 28, Churchill said, "Although the British and American[8] air forces were very large and undertaking great operations, it was expected that the United States air force would be doubled or tripled within the next six months."

All of this war production led to a defining moment at the Tehran Conference. On November 30, officials gathered to celebrate the prime minister's sixty-ninth birthday. The seating chart showed thirty-four dinner guests around a long table. Roosevelt, Churchill, and Stalin sat beside one another, protagonists in an epic story of war that, each knew, would be chronicled by historians for generations to come.

"I think about a hundred toasts[9] and speeches must have been given," Arnold recalled. "Stalin went around the table and clicked glasses with all the military men. He drank his liquor out of his own bottle—it was rumored there was nothing but water in it."

During Stalin's speech that night, he put World War II and airpower in perspective. "I want to tell you,"[10] Stalin said, "from the Russian point of view, what the President and the United States have done to win the war. The most important things in this war are machines. The United States has proven that it can turn out from 8,000 to 10,000 airplanes per month. Russia can only turn out, at most, 3,000 a month. England turns out 3,000 to 3,500 . . . The United States, therefore, is the country of machines. Without the use of these machines . . . we would lose the war."

Roosevelt loved a good party, and this one was particularly good. "If there was any supreme peak[11] in Roosevelt's career," his speechwriter, Robert Sherwood, later wrote, "I believe it might well be fixed at this moment, at the end of the Tehran Conference."

Ever since Franklin Roosevelt's "Magna Carta" airpower meeting in the White House in 1938, momentum had been building—at times with alacrity, at others times with heartbreaking setbacks. Now at the beginning of 1944, the tools were in place.

The leadership was in command.

The Air Forces possessed fleets of B-24 and B-17 bombers.

The aviation schools had fortified the Army Air Forces with pilots, navigators, engineers, bombardiers, gunners, and mechanics.

The superbomber was nearly ready to go into mass production.

Finally, Arnold and his commanders had a fighter plane with a range that could accompany heavy bombers to their targets and back, that could take on the best of the Luftwaffe. The North American P-51 Mustang, powered by the British-designed and American-built Rolls-Royce Merlin engine, was reaching the Eighth Air Force in large numbers. Its performance astounded pilots, who were sure that the P-51 Mustang would go down in history as World War II's greatest fighter plane.

In England, Carl Spaatz headed up a new organization called the United States Strategic Air Forces in Europe (USSTAF), an overall command comprised mainly of the Eighth and Fifteenth Air Forces, the latter of which was activated on November 1, 1943, with Doolittle in command. The USSTAF was ready to engage the enemy in the climactic air battles of the European war.

On January 1, 1944, from his office in the Pentagon, Arnold sent his top-ranking officers an order: "The time is short, the enemy's[12] means are limited . . . This is my personal directive to you: DESTROY THE ENEMY AIR FORCES, IN ITS FACTORIES, ON THE GROUND, AND IN THE AIR."

Spaatz set the date for all-out attack on February 20, 1944. On the night before, the skies appeared impenetrable with winter weather. Airmen aboard weather planes took off and returned with warnings of low visibility and icy conditions.

At the crucial hour, before sunrise on the twentieth, the decision bore down on Spaatz. The loaded bombers were ready for takeoff. One of Spaatz's top commanders, General Haywood Hansell, recalled, "The risks were so great[13] and the conditions so unfavorable that none of the

subordinate commanders was willing to take responsibility for the launch without a direct order from General Spaatz personally."

Then, the gray winter clouds dissipated with sunrise on the twentieth. Spaatz gave the go order for Operation Argument, a plan to lure out the Luftwaffe fighters and engage them in a deadly brawl, at which point, fleets of heavy bombers would enter the fray and roar on to their targets.

"It was a momentous, dangerous,[14] and highly successful command decision," Hansell remembered. The fighters took off first, and so began what the press named "the Big Week." On that first day, a thousand bombers took off to attack Nazi Germany, escorted by P-51 Mustangs.

The fighter planes were loaded with "drop tanks" for extra fuel—tanks that could be jettisoned when empty—giving these single-engine fighters the mileage to travel huge distances. With a pair of 108-gallon drop tanks, the P-38 Lightning could now take off from England, fly all the way to Berlin, and back. With a pair of seventy-five-gallon drop tanks, the P-51 Mustang could roar past Berlin nearly to Prague, with enough fuel to make it back.

For six days and nights, Operation Argument dispatched an average of 768 fighters and 722 heavy bombers daily from the Eighth and the Fifteenth Air Forces. British bombers flew at night. Secret military documents listed the American bombers' "vital center" precision targets on the ground in Nazi Germany: eleven Luftwaffe fighter plane factories, fifteen bomber factories, seventeen airplane engine plants, twenty submarine yards, thirty-eight locomotive building shops, thirty-seven electric plants, fourteen aluminum plants, two synthetic rubber plants, and twenty-three oil plants.

One gunner reported, "The Luftwaffe had all their[15] planes up but their trainers." Another wrote, "We caught flak, rockets,[16] and trailing attacks. Twenty-millimeter shells came zinging past." The fighter pilots could maneuver these new aircraft with precision unimaginable a few years before. According to Arnold, "Only a fighter can swoop[17] low and drop a bomb within the entrance of a railroad tunnel to collapse a mountain upon a railroad line, or glide in diagonally to skip a bomb into the piers of a great bridge or against the gates of a canal lock."

During the Big Week, the Army Air Forces flew some four thousand bomber sorties, dropping more than 20 million pounds of bombs on Nazi-held territory—mostly with conventional explosives (rather than firebombs). Arnold's forces lost more than 200 heavy bombers, with about

2,600 casualties. Transporters from the ATC flew into the war zone day and night with gasoline, ammunition, and other supplies, and flew back with the wounded. As the Allied ground armies pushed toward Berlin from the east and west, the airplanes obliterated any "line" between the warring factions. "The real importance of the air war,"[18] theorized Hitler's production chief Albert Speer, "consisted in the fact that it opened a second front long before the invasion of Europe. That front was the skies over Germany."

At the end of the Big Week, Arnold wrote to the secretary of war, "The week of 20–26 February 1944,[19] may well be classed by future historians as marking a decisive battle of history, one as decisive and of greater importance than Gettysburg."

"From now onwards,"[20] Churchill wrote, "the U.S. 8th Air Force was able to bomb targets in Germany by day with high accuracy and ever increasing freedom."

27

Weapons of ancient times[1] were hands and nails and teeth
Then axes hewn from trees of the forests
flame and fire as soon as men knew them.

—LUCRETIUS, APPROXIMATELY 60 BCE

In the beginning of 1944, the Army Air Forces reached its peak in manpower. Some 2,385,000 Americans now served in this military force, up from 297,103 at the time of Pearl Harbor. That did not include the roughly 422,000 civilians whose jobs directly contributed to the air war. The Air Forces' commanding general marveled at the fact that, only a few years earlier, as he put it, he "knew literally every man in the Air Corps."[2] Between the schools, the airplane factories, the subcontractors, the committees in Washington—the effort to build airpower reached into every community in the United States.

"No man, no group of men[3] and no combination of groups could possibly have created the Army Air Forces," Arnold wrote to the War Department in 1944. "We have become a reality through the outpouring of the will and energy of an entire nation. In the most direct and personal sense, the building of what is now the world's largest air force involved one hundred and thirty million people. Our enterprise reached into the lives of every American."

By May 1944, the Army Statistical Control Division estimated that, to fight Germany alone, Air Forces schools would complete the training[4] of 140,000 combat gunners, 305,000 aircraft mechanics, 125,000 radio operators, 140,000 pilots, 240,000 skilled aircraft technicians, and 46,000 bombardiers and navigators. American factories produced nearly 85,946

aircraft in 1943, according to the War Production Board, and that number would increase by roughly 13 percent in the following year. The Air Transport Command was on its way to reaching its wartime peak of 209,000 military personnel and 104,000 civilian workers. (That number measures almost 2¼ times the size of American Airlines, in 2025.)

In January Arnold personally invited the most powerful figures in military and government to a debut flight ceremony of a new Army Air Forces flying machine at Bolling Field on the twenty-sixth, at 3 p.m. "I have invited the President[5] and the Vice President and would be delighted if you would join the party," Arnold wrote in a personal invitation to a dozen of Washington's top brass. The Bell XP-59A Airacomet—America's first jet aircraft—flew for the first time in front of an audience of administration officials.

After the demonstration, the president wrote Arnold of the first American jet, "the possibilities in the field[6] it has opened to us are staggering to the imagination."

Under Arnold's watch, the Army Air Forces procurement reached a new high at the beginning of 1944, at over $3 billion monthly.[7] One of the greatest stories of the war was the spending; the Roosevelt administration had relied on the philosophy of economist John Maynard Keynes, who argued that in times of emergency, "public authority must be called in aid to create additional current incomes through the expenditure of borrowed or printed money."[*] In other words, the federal government could spend almost without restraint, and 37 percent of all the War Department spending went to the Air Forces—roughly $43,500,000,000.

The building of actual aircraft made up 82.5 percent of that total, or $36,000,000,000. For training in the US alone, the Air Forces had constructed 1,600 miles of paved runways, and had consumed some 2.4 billion gallons of gasoline.

As of 1944, the B-17 heavy bomber anchored the public's fascination. "Such is the fame of the B-17[8] Flying Fortress that stories of its exploits have already become legendary," recorded one aviation expert. The B-17 could "absorb tremendous punishment,"[9] Eaker wrote Arnold, regaling the story of one that had been hit with seven 20 mm shells through a wing (three of which burst a gas tank), one hundred small-caliber bullets through its fuselage and tail, and still landed even though "one engine was knocked

out and half of one propellor was gone [and] three of the crew members were injured."

The B-24 Liberator heavy bomber was harder to fly, but its mass-production efforts were growing so vast, it had become an industry unto itself. Four companies built this one four-engine aircraft: Consolidated (its original designer), Ford Motor Company, Douglas Aircraft, and North American. As the author Stephen Ambrose has written, "The number of people involved[10] in making it, in servicing it, and in flying the B-24 outnumbered those involved with any other airplane, in any country, in any time." The B-24 would become the most mass-produced American military aircraft in history and has remained so to this day, with 18,482 built.

To ensure that future generations would understand the scope of American airpower, and what airpower was accomplishing in the war, Arnold engineered a media campaign that hit its peak at the beginning of 1944. He brought in a team of historians to make a record of the Air Force's actions.

"As you know, history is[11] often a stepchild, relegated to some distant date in the future, and consigned to the treatment of professors and researchists who necessarily deal with the subject in academic fashion," he wrote his subordinates. "We don't want that to happen this time; we want the public now and after this war to understand what air power really is; we want credit to go where credit is due. We have assembled a group of competent historians here who are already hard at work."

A plan to bring in Hollywood filmmakers got even more attention. One morning, one of Arnold's staff, Maj. Gen. James P. Hodges, was in his office when he heard his "squawk box" buzz. "Hodges," he heard Arnold say, "come down here to see me!"

"So I went down,"[12] Hodges recalled, "and he just laid me out, up one side and down the other, because the motion picture program . . . was not what he thought it ought to be."

"You get the lead out and get started on that motion picture business," Arnold barked. "I want pictures, pictures, pictures, everywhere pictures."

Airpower's most important public relations program became the US Strategic Bombing Survey. Established by the secretary of war in 1944, under a directive from President Roosevelt, the survey sent a group of crack researchers out to begin documenting the destruction that American bombers had wrought upon the Axis powers. A board of 12 officers was

supported by 300 civilians, 350 military officers, and 500 enlisted men—all working on this one report. The Strategic Bombing Survey would ultimately culminate in official volumes that historians would cite in their work for generations to come.

Arnold summed up his public relations campaign in a statement he made to one of his deputies, George Kenney: "In short, we want the people[13] to understand and have faith in *our way of making war."*

On March 6, 1944, American four-engine bombers struck the heart of Berlin for the first time. Hitler's chief of propaganda, Joseph Goebbels, wrote in his diary, "The picture that greeted my eye[14] on the Wilmhelmplatz was one of utter desolation."

At the beginning of the war, Goebbels had journaled these words: "What can the USA do faced[15] with our arms capacity? They can do us no harm." His tune had changed. "Blazing fires everywhere,"[16] he now wrote. "Meanwhile I learn that my mother and my mother-in-law were bombed out completely in Moabit. Their homes have simply vanished."

On April 5, the American bombers returned to Ploesti, Romania, to destroy the oil refineries, dropping nearly 1.2 million pounds of TNT on this single mission. "We really clobbered them[17] that day," a bombardier aboard a B-24 Liberator named *Maiden USA* recalled. "Flames shot high in the air and we could see secondary explosions in the refinery and loading areas."

On July 4, a day of obvious symbolism, the Air Forces' 332nd Fighter Group flew its first mission in the P-51 Mustang. These were Tuskegee Airmen, escorting B-17 bombers over enemy territory, in some of their more than fifteen thousand sorties flown between 1943 and 1945.

All spring and summer the bombers pounded Berlin relentlessly. "Hell itself seems to have[18] broken over us," journaled Goebbels. While Berlin crumbled, American losses remained high. Curtis LeMay, commander of an Eighth Air Force bomb wing, described his work with brutal honesty: "You find yourself encountering[19] considerable tragedy, as well, in overcoming a natural grief concerning casualties among the people whom you've led. You possess a natural inborn repugnance against killing people; yet you know you're going to have to do it . . . You must train yourself grimly to adopt a

philosophical attitude with regard to those losses. If you're going to fight you're going to have some people killed."

Arnold was even more businesslike in his communiques to Eaker and Spaatz. "We may as well frankly[20] admit that this is going to be a bloody battle," he wrote Eaker. "The side will win which can make good its losses. In other words, the side which has the most reserve strength."

On March 8, 1944, Arnold arrived at Smoky Hill Army Airfield in Salina, Kansas. All winter long, delays continued to hamper B-29 production. Arnold needed to see the operation for himself.

"I was appalled at what[21] I found," he later wrote. The operation was "so chaotic,"[22] he explained to one subordinate, "that it was obvious upon my arrival that schedules could not possibly be met." The program was "void of organization, management, and leadership . . . a disgrace."

Arnold had already pushed the date he promised to deliver a force of B-29s to China, from March 1 to April 15. He could not push that date again. So began "the Battle of Kansas," a desperate five-week campaign to get the B-29s ready. Maj. Gen. Lauris Norstad, then a rising star in Arnold's milieu, captured the urgency: "Arnold's life was that B-29[23] . . . He was into every damn detail of that B-29."

"For Hap Arnold,"[24] LeMay later wrote, "the Battle of Kansas was no clever euphemism applied to a logistical setback—it was Stalingrad."

"If we are to get a place[25] in the sun at all in the Pacific," Arnold wrote Spaatz in 1944, "in my opinion, it will have to be through the B-29s . . . Everything coming out of the Pacific now is 'Navy, Navy, Navy.'"

Engine fires remained the biggest problem. During development, twenty-nine B-29s had crashed, and the Army's Office of Flight Safety found that fourteen out of those crashes were the result of power plant malfunctions, of twenty-three different kinds.

Army officials, civilian engineers, and aviation experts flew into Smoky Hill in Salina, where airplanes were lined up on tarmac in the outdoors, in winter. A snowstorm swept in, and the Army issued workers high-altitude flying suits to keep them warm as they worked day and night outside in the elements. One of the officers in charge was test pilot Paul Tibbets, who had now flown the B-29 more hours than anyone. He recalled, "They could get the civilians[26] from Marietta, Wichita, and everywhere else, and bring them

in to Salina, to form this task group of maintenance people to work on each of these airplanes 24 hours around-the-clock. . . . This is a hectic thing, I'm telling you."

Icy forty-mile-per-hour winds blew snowdrifts that brought visibility on the airfield down to a few feet. "It is mighty cold,"[27] Tibbets recounted, "and it was, Gosh, we got people with pneumonia, flu, and what not. It was a tragic situation . . . This was the only way we could do it. So we did."

Arnold believed only a miracle could get these heavy bombers to China. "He bullied the program through,"[28] the newspaper columnist Marquis Childs wrote of Arnold. "He risked everything on its success."

At the same time, on the other side of the planet, another miracle had to come together to make this plan work: the building of airfields in rural China, with runways long enough for these giant bombers to operate.

Chinese engineers chose locations for the airfields around the city of Chengtu, the capital of the Szechuan Province, often referred to as the last outpost of Chinese civilization bordering the towering mountains to the west. One historian later called the building of these airfields "the greatest engineering accomplishment[29] since the building of the Great Wall of China."

The engineers put out a call to local villages for labor, and within two weeks, Chinese workers emerged from villages within a 150-mile radius of each of the fields. One estimate put the number at three hundred thousand workers, all in blue peasant garments, many of them children. They were paid from twenty-five to forty cents per day by the American Army, bigger payouts than they had ever seen in their lives.

At each construction site, the countryside came alive with workers hauling stone using archaic wheelbarrows and tandem baskets, methods used to build structures in China for centuries. They carried stones from riverbeds and hammered them by hand into gravel that was used to form runways. Mixtures of mud and water held the gravel firm in a paste, then some 150 workers used ropes to pull giant rollers over the stone to form the landing strips. The rollers could not be stopped easily once they were moving, and workers who accidentally stumbled in front of them were crushed under their weight. According to one report, more than eighty Chinese workers died during the construction.

To capture this unprecedented phenomenon, the Army sent cameramen to China. In America, theatergoers saw newsreel footage of the workers

building these runways. “This is one of the amazing[30] stories behind China’s war effort,” the narrator told audiences. “This shows how people with bare hands and the most primitive tools transformed once swampy rice fields into firm rock bedded runways for the planes of the united nations.”

The film showed a B-29 in flight. “This is one of the giant new planes, the American B-29 Superfortress,” the narrator told US audiences. “Their raids from bases in China may soon affect the entire course of the war.” Apparently, the Army saw no harm in publicizing this work, for once the B-29s were flying, nothing could stop them, even if the enemy knew they were coming. However, the location of these airfields was kept secret (“somewhere in western China”).

On March 26, Army pilot Jake Harman—who had flown some of the initial B-29 shakedowns—led the first B-29s out of Smoky Hill in Kansas. Harman’s airplane was named *Gone with the Wind.* Groups of Army officials watched the first wave of giant bombers disappear into the Midwestern skyline, hoping these aircraft could help put an end to this war.

The Superfortresses flew from Kansas to Newfoundland, Canada, then to Marrakesh. In Cairo, bombers were held up as the engines malfunctioned in the desert heat, which hit 115 degrees Fahrenheit. Following the freezing winter climate of Kansas, the Saharan sun wreaked havoc on the metallurgy. Oil leaked and ignitions failed. Flying out of Karachi, temperatures soared to 120 degrees, then dropped to below freezing at high altitudes as the pilots saw Mount Everest come into view.

Along the way, one B-29 was lost at Marrakesh; the crew survived, but the aircraft burned. Two more Superfortresses went down near Karachi. One vanished into the Indian Ocean.

Army test pilot Jake Harman landed the first B-29 in India, on April 2, 1944. K. B. Wolfe was already there, sweating it out in a shack near the airfield. Soon more B-29s arrived. Harman, Wolfe, and Brig. Gen. Blondie Saunders then led crews over the Hump into China.

“The scheme of operations[31] had been dreamed up like something out of *The Wizard of Oz*,” recalled one pilot. “Fields had been built and were still being built, up around Chengtu in China, to accommodate our huge new bombers.” It was the only way to do it: “Haul the stuff by air over the hump of the highest mountains in the world. . . . Everything had to be flown in—every single item.” A single B-29 had to fly seven trips over the Hump

to bring in enough gasoline to China for that one ship to make an attack run at Japan. The ATC flew 13,999 tons of cargo in January 1944, increasing to 43,896 tons in January 1945.

The navigator aboard Saunders's B-29 recalled their flight on April 24: "The flight over the Hump[32] was by-God amazing; perfect weather, incredible mountain valleys and gorges, tiny villages on the lesser mountains . . . And there was China! A most amazing landscape of thousands of cultivated rice paddies. For the first time in my life I had the feeling of being in a different world." When the aircraft landed, thousands of Chinese laborers lined up on each side of the runway. "Everywhere the Chinese would smile and yell 'Ding Hao'—which means 'very best.'"

The Japanese knew the B-29s were coming. Days after the first superbombers flew over the Hump, Japan launched a new offensive deeper into China. The commander of the Fourteenth Air Force, General Claire Chennault, warned Roosevelt: "The Japanese offensive,[33] which I anticipated in my last letter to you, opened 17 April. Crossing the Yellow River in force, the enemy rapidly over-ran Horan and north Anwhei Provinces [he likely meant Hunan and Anhui] . . . Chengtu and the Szechuan plain, the heart of Free China, will be directly threatened. . . ." The Imperial Japanese Army had launched Operation Ichi-Go ("Operation Number One")—one of the largest Japanese military offensives in history—with a plan to neutralize the new US airbases in China.

The offensive would ultimately mobilize a half-million soldiers, along with 100,000 horses and 800 tanks. Before it was over, tens of thousands would be dead.

Two days after Jake Harman landed the first B-29 in India, the Army quietly activated a new Air Force: the Twentieth. The founding of this historic Air Force saw no bugle blowing, no press conference, no ceremonial announcement. From the start it was different from all others.

Arnold was designing the Twentieth to become the first global strategic Air Force. Its number was unique; fifteen other Air Forces existed, but numbers sixteen to nineteen were not used. The Twentieth was named to set it apart from others. Most important, the Twentieth Air Force would have no field commander, as all others did. Unlike all other Air Forces, this one would be commanded in Washington, by Hap Arnold himself.

The Twentieth Air Force's workhorse would be the B-29. Arnold wanted total control.

Instant communications between China, India, and Washington were key to the Twentieth's success. Arnold called in Maj. Gen. Harold M. McClelland, head of the Army Air Forces communications, and demanded "Top Secret security with[34] instantaneous coding and read-out by teleprinters." And he wanted this communications system "in operation twenty-four hours a day."

McClelland said, "Yes, sir."

As was so often the case with Arnold, this move was a tremendous gamble. Could a global air force commanded from Washington succeed? Field commanders were furious, and vocal that the plan would not work. Arnold blazed ahead.

K. B. Wolfe had overseen the most development work on the B-29, so Arnold gave him command of the Twentieth Air Force's fledgling XX Bomber Command in India and China. For his Twentieth Air Force chief of staff in Washington, Arnold chose the rising star Haywood S. Hansell, nicknamed "Possum." Hansell was one of the so-called Bomber Mafia, the class of commanders who had come out of the Air Corps Tactical School at Maxwell Field in the 1930s. As Hansell later recalled, "I have always believed[35] the wartime establishment of the Twentieth Air Force was one of the most important events in United States Air Force history."

Four days after the Twentieth was activated, the "Old Man" spoke to the press while visiting wounded airmen in a hospital in Florida. "We are just reaching[36] top strength now," said Arnold, whom a reporter described as "the smiling, four-star chieftain of the United States Army Air Forces." "The Japanese war will not be won simply by taking New Guinea, by taking the Marianas, or by taking the Philippines," he said. "The Jap war will not be over when we have driven them out of China. It is going to be tough going until we finally clean up Tokyo itself."

On May 6, 1944, Arnold wrote, "I am not satisfied[37] . . . that present conventional operations—conducted with however great skill—represent the full and final use of our air power. We require radical thinking in the employment of a power radically different from those which have been developed during the past millenniums of warfare."

As always, Arnold desired *bigger, faster, stronger, better.* He challenged himself and his subordinates to dream. What were they not yet thinking of? What existing tools could be employed in new ways?

One Harvard scientist named Louis Feiser (a key figure in the invention of napalm), along with a Los Angeles dentist named Lytle S. Adams, imagined a novel use of airpower, in which thousands of bats armed with tiny incendiary bombs could be released from bombers. The hibernating mammals liked to take refuge in dark attics and cellars, ideal places to detonate firebombs. The planners imagined a surprise attack on Tokyo with fires "popping all over the city[38] at 4am." Since a single bat weighed about a half ounce, a single bomber could transport two hundred thousand of them. The Army put this idea to the test at an airfield in Carlsbad, California, and high winds accidentally caused a theater to burn down, as well as an officers' club and an Army general's car.

A more realistic idea came from a target committee that Arnold had created, called the Committee of Operations Analysts (COA), which consisted of mathematicians, physicists, even an architect. This group came up with a plan in 1944 to use the firebombs that the Army Air Forces' chemical weapons division had developed to destroy housing in Tokyo, Kawasaki, Yokohama, Osaka, Kobe, and Nagoya. These cities had a combined total of 20 percent of Japan's entire population.

"No other industrial nation,"[39] the COA reported in 1944, "is dependent upon so small an area for so substantial a portion of its manufactured products."

Vannevar Bush, head of the National Defense Research Committee, wrote the following remarks: "Advance estimates of force[40] required and the damage to Japanese war potential expected from incendiary bombing of Japanese cities indicate that this mode of attack may be the golden opportunity of strategic bombardment in this war—and possibly one of the outstanding opportunities in all history to do the greatest damage to the enemy for a minimum of effort."

Japan, with its wooden cities, presented an almost irresistible target. The opportunity to cause "catastrophe of such magnitude," Bush concluded, was "entirely unprecedented in history."

28

B-29's Make Debut[1]

—*NEW YORK TIMES* FRONT-PAGE HEADLINE, JUNE 16, 1944

In the months leading up to D-Day in the spring of 1944, German citizens looked up into the sky and saw the Arsenal of Democracy roaring over them. In March, the American Air Forces flew bombing missions on 23 days. The effort increased in April. With clear weather in May, heavy bombers flew 25 out of 31 days. To neutralize the movement of Nazi troops, the bombers hit railway targets with 76,000 tons of bombs. Using mostly conventional explosives on precision military and industrial targets, the Allies hit Dusseldorf, Manheim, Dortmund, Bremen, Essen . . .

Arnold described the airmen flying these missions in these words: "These kids less than a year[2] before were soda jerkers, mechanics, salesmen in Kansas, Wisconsin, Texas—but they met the best that Germany could offer, and won."

"The day raids by American[3] bombers are creating extraordinary difficulties," Joseph Goebbels wrote in his diary. "Industrial and munitions plants have been hit very hard . . . Some eighty to one hundred thousand inhabitants without shelter . . . The people in the West are gradually beginning to lose courage. Hell like that is hard to bear."

Way back in 1909, the year that Arnold had first witnessed a flying machine while standing on a Paris street, Thomas Edison had been asked about how the future could be shaped by airplanes. He said, "The time is coming when[4] a means of attack will be discovered that cannot be resisted." Now, in 1944, Goebbels wrote in his diary, "The Americans drop their

bombs[5] with extraordinary precision from an altitude of eight to nine thousand meters [around twenty-six to thirty thousand feet]. The population has the paralyzing feeling that there really is no protection against such daylight attacks."

Arnold, Spaatz, and Eaker, it seemed, were right all along. American daylight precision bombing had proven its worth. After the war was over, Hitler's second-in-command, Hermann Goering, was asked which was more effective: American daylight precision bombing or British nighttime "area bombing"? He answered, "The precision bombing, because[6] it was decisive. Destroyed cities could be evacuated, but destroyed industries were difficult to replace."

Mission reports coming into the Pentagon documented extraordinary losses among American airmen and aircraft. April saw the most losses so far in the war, with 422 heavy bombers downed. In the two months preceding D-Day, the Allied Air Forces lost twelve thousand men and more than two thousand planes. But the mission to conquer the skies over Europe was a success. For each lost airplane, many more were coming.

In the early hours of June 6, 1944, under the cover of night, the largest air armada in history banked down over the beaches of Normandy, France, flying five hundred feet above the breaking waves. "As dawn broke,"[7] recalled one Army captain aboard a ship off the coast, "we could observe one of the most impressive sights of any wartime action. Wave after wave of medium and light bombers could be seen sweeping down the invasion beaches to drop their bombs."

Operation Overlord began. The first wave of warplanes to attack the coast on D-Day were twin-engine B-26 Marauders, built by Glenn L. Martin outside of Baltimore. Flocks of Waco wooden invasion gliders followed, whistling engineless over the Normandy beaches, nearly 1,500 aircraft strong. A great majority were built by Ford Motor Company at its Kingsford mill in northern Michigan, while many more American attack gliders were built by Boeing in Kansas. The gliders carried soldiers, tanks, guns, and ammunition. They were the first aircraft ever built that were designed to crash-land.

At the same time, the largest fleet of warships ever seen moved in on the French coast: 900 ships in total, with 9 battleships, 23 heavy cruisers, and 104 destroyers. More than 1,000 landing craft began unloading men

and motorized vehicles onto five beachheads—1,700 vehicles onto Utah Beach alone.

By the time General Eisenhower set foot on the sand, it was littered with broken machinery. Ike's blue eyes scanned the beach, and he marveled at the number of wrecked vehicles of all kinds. "There was no sight in[8] the war that so impressed me with the industrial might of America as the wreckage on the landing beaches. To any other nation the disaster would have been almost decisive," Eisenhower recorded. "But so great was America's productive capacity that the great storm occasioned little more than a ripple in the development of our build-up."

In the United States, the first official announcement of the D-Day invasion came at 3:32 a.m. Washington time. Eisenhower had recorded his "Order of the Day" speech, and American radio played it repeatedly all day long.

"Soldiers, sailors and airmen[9] of the Allied Expeditionary Force," Eisenhower spoke, "you are about to embark upon a great crusade, toward which we have striven these many months. The eyes of the world are upon you. The hopes and prayers of liberty loving people everywhere march with you."

In cities and towns across America, church bells tolled, fog horns whistled, and police cars blasted their sirens. The invasion had been rumored for months; now it was on. "It is the most exciting moment[10] in our lives," New York City's Mayor Fiorello La Guardia told crowds.

At 10 a.m. Washington time, America observed a moment of silence. Giant roaring factories fell quiet. Pedestrians in streets stood with heads bowed, many weeping as they knew their brothers and sons were storming the beaches of Normandy. Because of the time difference in Europe, America's morning newspapers already had banner headlines announcing that the climactic battle of the war across the Atlantic had begun.

In the White House, Roosevelt sat in the Oval Office with his dog, Fala, readying for his press conference. At 4:10 p.m., he turned to his aide Charlie Fredericks and said, "All right, Charlie,[11] bring in the 'wolves.'" The room flooded with bodies. Roosevelt's press conference began with a moment of silence that bordered on the bizarre because of the explosive excitement in the room. Not a person stirred for roughly two full minutes. Roosevelt then lit a cigarette and began answering questions. He held his

trademark black cigarette holder "cocked at the angle[12] they say he always has it," recalled one in the room, "when he is pleased with the world."

Asked about "air losses," Roosevelt said they were "light"—about 1 percent. The president urged Americans to pray for the wounded and dead. "You just don't land on a beach and walk through . . . to Berlin," he said. "And the quicker this country understands it the better."

The Allies put 3,467 heavy bombers in the air on D-Day, 1,654 medium bombers, and 5,409 fighter planes. Air supremacy had by this time become so complete, the enemy put up little resistance. Flak guns shot down 113 Allied aircraft on the first day of Operation Overlord, but the Luftwaffe shot down zero.

One week after the landing in Normandy, Eisenhower drove in a jeep with his son, 2nd Lt. John Eisenhower, who had graduated West Point on D-Day before flying to France to assist his father. John said, "You'd never get away with[13] this if you didn't have air supremacy."

Eisenhower answered, "If I didn't have air supremacy I wouldn't be here."

Arnold arrived in London on June 10—four days after D-Day. By 9 a.m. that morning, he was in Eisenhower's London headquarters.

Ike chain-smoked cigarettes and spoke with a Midwestern accent. A member of his staff described him as "a living dynamo of energy,[14] good humor, amazing memory for details, and amazing courage for the future." Arnold was pleased with everything Eisenhower had to say, especially about the role airpower was playing in Overlord. "Talked over war with Ike[15] and his staff," Arnold journaled. "Very optimistic."

Two days later, Arnold reached the beach in Normandy. Wrecked boats of all kinds rocked in the waves. He recorded the "ever present sound of explosions[16]: bombs, mines being set off by engineers." Each day some 15,000 more troops went from ship to shore. Arnold estimated that between 1,500 and 3,000 tons of supplies were landing daily. It was a "regular mad house but a very orderly one." On the day he wrote these words in his diary, he estimated some 4,000 American and British aircraft flying, with not a single German Air Force machine in sight. He wrote a quick note to his wife:

"My darling Beadle,[17] you can never imagine or conceive the number of ships en route between England and N. France and the tremendous concentration of ships at the beaches and yet not a single German plane has hit a ship. The German A.F. seems to have been bombed and fought out of existence."

Arnold was mistaken, however. Nearing midnight on June 15, nine days after D-Day, he was in a hotel room in the Gibson House in London when air raid sirens blared. He then felt an impact so severe, as he put it, "the force of the explosion[18] just about lifted all of us out of our beds."

In the morning, he left his hotel to investigate, and was dumbfounded by what he saw. "Rockets? Pilotless planes?[19] Bombs?" he journaled. "What were they? They were pilotless planes, over 300 of them have landed in and around London. One of them just missed the Gibson House, came down out of the clouds in a dive, levelled off and then started a slow turn and finally crashed into the ground, exploded about 1½ miles away."

London was reliving the Blitz, only now the Germans were firing Vergeltungswaffe 1 missiles, or "Vengeance Weapons." These "V-1" bombs were the world's first land-to-air cruise missiles successfully deployed. Arnold called the new weapon a "drone" in his diary. "No one can predict[20] where they will hit; you can hear them coming with a swishing noise; they are hard to dodge. One went over General Eisenhower's headquarters while we were there."

The missiles were roughly twenty-nine feet long, and each weighed nearly four thousand pounds. Arnold estimated their top speed at 340 mph. They were "based on jet principles,"[21] he reckoned. In fact, they were pulse-jet missiles, an ingenious new invention that used jet-powered, forced air, fuel, and fire, and otherwise few moving parts. The missiles used an autopilot system and could strike a target as far off as the city of London when fired from launchers on the coast of France or Holland.

The V-1 missiles presented yet another twist in the narrative of airpower, and they became a deadly nuisance. As sophisticated as they were, they were not sentient enough to seek out strategic targets. These were terror bombs. To Arnold they meant the escalation of scientific warfare and the escalation of indiscriminate killing.

If the Nazis could strike England with pilotless missiles from France, could they launch these missiles from boats at Washington or New York?[*]

The same week that Eisenhower launched Overlord, K. B. Wolfe readied the first B-29 attack on Japanese-held territory. As head of the Twentieth Air Force's new XX Bomber Command, Wolfe organized a small mission and told his men, "This marks the beginning[22] of the organized destruction of the Japanese industrial empire."

On the afternoon of June 4, 1944, crews prepared their B-29s at an airfield in India. Already, some twenty thousand American forces were stationed in the area to fly and support the upcoming missions. The airmen were briefed on their target: precision strikes with conventional explosives in Bangkok, in enemy-held Thailand. It would be a small shakedown run in preparation for bigger attacks on Japan proper. Wolfe argued to fly the Bangkok mission himself.

"Sorry," Arnold wrote him, "you are not to accompany[23] the shakedown raid."

The Superfortresses were going to fly without escort fighter planes. "This was really the most[24] controversial point of all," recorded the Twentieth Air Force's chief of staff, Haywood Hansell. "Seasoned experts on every hand assured us the B-29s would simply be shot out of the air."

At sunrise on June 5, Jake Harman—flying the lead airplane in the Bangkok raid—started down the runway and eased his B-29 off the ground. By 6:30 a.m., ninety-eight of the one hundred B-29s planned for this mission were airborne; one had mechanical failure and another crashed on takeoff, cartwheeling in flames. All but one of the eleven crew were killed. The other crews kept flying, although eighteen aircraft soon turned back due to mechanical issues. After 1,300 miles, the B-29s reached the skies over Bangkok, at twenty-five thousand feet, cruising at 200 mph. Bomb bays flipped open. At the moment the Superfortresses began to release bombloads, lead pilot Jake Harman turned to his copilot and said, "Well, that's the first 10,000 pounds[25] of bombs out of a B-29 to strike the enemy."

Ten days later, B-29s took off from Chinese airfields for the first attack on Japan itself. Wolfe planned to send seventy-five bombers, but only sixty-eight got into the air that morning. The target: the Imperial Iron and Steel Works in Yawata, a small inland city that stood east of Kobe. Unlike the Bangkok raid, this mission flew at night. Again, Harman commanded the lead plane, naming his wing of aircraft the "General Billy Mitchell Group."

An Associated Press reporter flew aboard one of the B-29s. He wrote as his aircraft neared the target: "We have been calm,[26] intent on reaching

Japan, but our hearts are pounding now, partly from natural fright, mostly from anticipation of the big moment we have been waiting for since Doolittle hit Tokyo. We are in the forefront of scores of Superfortresses . . . As Colonel Harman, commander of the 'General Billy Mitchell group,' told us before take-off, 'If ever there was a juicy target, this is it.'"

On the ground in Yawata, a Japanese eyewitness saw the oncoming superbombers in the night sky.

"Now all the city is black,"[27] he recalled. "Suddenly in the north we heard the sound of plane engines. The orders were flashed everywhere and all the sounds on the street stilled. The propeller noise of the enemy planes spread over the whole sky. Minute by minute the noise approached. At this moment there was a shot, like a skyrocket, into the air. Several tons of shots." Anti-aircraft fire exploded in the dark sky. "But the hateful enemy planes flew on. Suddenly fire dropped from them—one, two, three. These were flares. The whole city could be clearly seen in reddish light. Then came big black things from the white bodies of the planes. Bombs! And boom! Boom! Boom!"

Arnold received a report on the mission, written the day it flew. "Information up to the time[28] of this writing is that four aircraft are unaccounted for," the report read, "one probably lost over the target to AA [anti-aircraft] fire. Individual [i.e., not formation] night attacks were employed, bombing being mainly by radar from altitudes from 8,000 to 18,000 feet. Results are estimated good to excellent with explosions and fires reported."

The Yawata mission caused minimal damage, but it sent morale on the Chinese and Indian airfields soaring. The War Department released a statement at 1:39 p.m. Washington time on June 16: "B-29 Superfortress of the[29] United States Army Air Forces Twentieth Bomber Command bombed Japan today." In Washington, Army chief of staff George Marshall (who rarely dealt with the press) issued a statement: "The attack on Japan by[30] the Superfortress B-29 from distant bases introduces a new type of offensive against the enemy."

Arnold called the mission "the fruition of years of planning[31] for truly global aerial warfare."

On the same day as the Yawata raid, the American Navy and Marines launched the invasion of the Mariana Islands deep in the Pacific, landing first on Saipan as battleships pummeled the island from the sea.

Saipan, Tinian, and Guam were just 1,500 miles from Tokyo—far closer than the airfields of China. Heavy fighting was reported, but Adm. Chester Nimitz assured America that "good progress is being made."[32] From these islands, the B-29—and only the B-29 among all American aircraft—had the range to strike any city on the Japanese mainland. From the moment the fighting commenced, engineers were on hand to begin planning for major runways on these little atolls.

Arnold planned to put a thousand superbombers on the Mariana Islands. "Time was essential,"[33] he later wrote, "and we had to get things moving fast to get the maximum mass bombing of Japan started in the minimum of time."

29

I was the flight engineer[1] on the Wyatt crew [under pilot Second Lieutenant Bert Wyatt], who perished on their sixth mission while returning from a giant raid on Berlin on April 29, 1944. I survived because I was disabled on an earlier mission. . . . Our B-24 Liberator, named *El Lobo*, was hit over the target, lost two engines, but made it halfway home to England. At which point it was shot down by a German fighter plane near the village of Dinklage in northern Germany. In 2006 I traveled to Dinklage. . . . They presented me with several fragments of the plane, which they located with metal detectors. The Germans treated me like a celebrity instead of a guy who helped bomb them to smithereens.

—JACK R. GOETZ, PENN VALLEY, CA

On September 8, 1944, the first V-2 missiles struck Paris, shocking civilians who looked up in the sky to see robot bombs flying at speeds of over 750 miles per hour. Mass explosions leveled buildings. Soon after, the first V-2s struck London. One witness described the V-2 as a "flying telegraph pole."[2]

"Nobody knows where they[3] come from," said another eyewitness.

These rockets confounded experts and infuriated the Allies, especially after one struck a children's nursery in London, killing a number of babies. Scientists and engineers dug through rubble and explosion craters to study the missile's guts and determine how the new robot bomb functioned. Unlike the pulse-jet V-1 cruise missiles, the V-2 was much more advanced. These new weapons were, in fact, the world's first long-range ballistic rocket-powered missiles.

"Rocket experts say the V-2[4] has four tail fins but no plane surfaces such as the original robot bomb had," reported the *Chicago Tribune*. "It is equipped with four radio controlled turbines that operate on a fuel made from liquid oxygen, liquid nitrogen, and potassium permanganate . . . The

weapon is classified as a supersonic rocket because it travels toward its target faster than the speed of sound."

One week after the first Nazi V-2 rocket strikes, Arnold climbed into the cockpit of a North American B-25 Mitchell twin-engine bomber at an airfield in Portland, Maine, and flew it over the Canadian border into Quebec City, remaining in the pilot seat the whole way.

He was heading to Quebec for the Octagon Conference—the first face-to-face meeting for Roosevelt, Churchill, and the Combined Chiefs of Staff in nine months. Octagon began on September 12, 1944. As usual, late nights and long meetings made for a brutal schedule. "The President looked very badly,"[5] Arnold wrote in his diary. "He did not have the pep, power of concentration . . . closed his eyes to rest more than usual."

With the exception of the V-2 rocket strikes, the state of affairs in Europe looked promising. The Supreme Commander of Overlord, Eisenhower, sent a statement to the conference, documenting his progress. "Today, on D plus 95[6] [95 days after D-Day]," Eisenhower wrote, "almost the whole of northern France has been liberated as have substantial parts of Belgium. Our forces have entered Holland and are close to the German Frontier at more than one point . . . My intention is to press on with all speed to destroy the German armed forces and occupy the heart of Germany."

Arnold's major role at Octagon was to officially announce the birth of the Twentieth Air Force. At the 174th meeting of the United States and Britain's Combined Chiefs of Staff, on September 14, 1944, he read a prepared statement:

> The Twentieth Air Force is designed[7] around and includes all B-29 airplanes. The B-29 airplane . . . is a very long range, fast, heavily armed precision day bomber. At maximum combat loading its gross weight is 140,000 pounds at which weight it operates up to 30,000 feet altitudes at a top speed of 370 miles per hour and cruises at 220 miles per hour. During a normal combat mission it burns 450 gallons per hour and at high speed consumes up to 700 gallons per hour. The airplane is operated by a crew of 11 men. A notable feature is the airplane pressurization which results in providing inside pressure equivalent to altitudes of about 8,000 feet when the airplane is actually at 30,000 feet. The most notable feature, however, is probably the central fire control features whereby three centrally located gunners handle, with precision, twelve .50-caliber machine guns and one 22 mm cannon, all remotely controlled.

Then came the tricky part. “The Twentieth Air Force,” Arnold told his audience, “operates directly under the United States Joint Chiefs[8] of Staff. It is commanded by the Commanding General, Army Air Forces.” That is, Arnold himself.

Arnold referred to a map that showed targets inside Japan, and the range of the B-29s that could fly from the Mariana Islands and the Chinese airfields to strike them. The range of these airplanes set them apart from others. If an airplane could fly that far, carrying this amount of bombs, it meant that any target, anywhere, could ultimately become a first-strike hit. This was what Arnold meant by “global airpower,” and why the Twentieth was the first global Air Force.

The British showed concern; they wanted to participate in the control of the B-29s and the Twentieth Air Force. As Arnold wrote in his diary, “There was no doubt as to[9] the Prime Minister desiring for political reasons to be in at the kill when we hit Japan.”

Arnold was having none of it; he would not allow any British participation in B-29 operations. One British officer observed, “General Arnold’s control of[10] the U.S. Air Force[s] is as complete, virtually, as is Hitler’s control of Germany. He is a complete dictator.”

While the American and British military leaders sparred over conference tables in Quebec, the air war reached a new level of fury deep in the Pacific, above tropical islands that might otherwise have seemed like paradise. The advent of aviation in war had made each atoll a critical locus. Any island that could host a landing field was ripe for conquer.

In the Marshall Islands, Charles Lindbergh flew his first combat missions as part of the Thirty-Fifth Fighter Squadron. Lindbergh was forty-two years old, a former pacifist now at war. He recalled standing on a cliff ledge watching B-24 bombers make an attack run on a palm-tree atoll called Enewetak. “The B-24s—eight planes in all[11]—hit on the minute,” he recorded, “first two bombers, then two more flights of three ships each—spread at sufficient intervals to allow the smoke from one flight to drift aside before the next was in position to release its bombs.”

Lindbergh was struck by the precision. “The bombs were perfectly[12] placed, covering the entire length of the ridge. I could see them released with my naked eye—specks curving gracefully through the air—

irretrievable death in flight. Then the flashing concussion waves as they hit, and the great column of smoke shooting skyward. In six minutes it was all over."

A few days later, Lindbergh flew a mission in a P-38 Lightning over an island rimmed by palm trees and sandy beaches. "One is as separated from[13] the surface of that island as though he were viewing it on a motion-picture screen in a theater on the other side of the world," Lindbergh wrote in his diary. "A plane in the sky, an island in the water; there is no thread of realization, of understanding, of human feeling that connects the two. In modern war one kills at a distance, and in doing so does not realize that he is killing."

The heaviest action in the Pacific remained in the Mariana Islands. American forces succeeded in driving the Japanese from Saipan, Tinian, and Guam, and landing engineers on the ground to begin building airfields. Tinian would soon be home to the largest airport in the world. The battle of Saipan saw an end so moribund, it became one of the most memorable stories of the Pacific War. Numerous Japanese military leaders committed hara-kiri, some by beheading, rather than allowing themselves to be captured by American forces. Even more tragic was the fate of more than one thousand civilians who committed mass suicide. In some cases entire families flung themselves from a promontory onto a jagged coast of crashing waves.

Arnold established the XXI Bomber Command in the Mariana Islands. This bomber force would consist of B-29s, as soon as they were ready. To lead the XXI Bomber Command, Arnold chose Haywood "Possum" Hansell, a brilliant intellectual and career airman who had been one of the authors of the daylight precision-bombing doctrine in the 1930s.

"I arrived on Saipan early[14] in October," Hansell wrote in 1944. "Ground crews put up borrowed tents in what was certainly the most disorderly military encampment of the war." Hansell had promised to hit Japan with B-29s in one month's time. The plan was to launch a two-pronged attack—one under Hansell from the Mariana Islands (Hansell's XXI Bomber Command) and the other from the airbases in China and India (K. B. Wolfe's XX Bomber Command), all under the umbrella of Arnold's Twentieth Air Force.

Arnold also wanted new leadership in the China Burma India theater. He ordered Wolfe back to Washington and terminated his command. In his

place, Arnold selected a leader who had emerged as the toughest B-17 commander of the European War: Curtis LeMay.

"No one ever felt it essential,"[15] LeMay recalled, "to explain exactly what this switching me to Asia was all about. At the moment I knew very little relating to the Twentieth Air Force, or what the setup was. I knew practically nothing about the B-29." But he knew that the Twentieth Air Force was something special, and something new. "It was General Arnold's dream,"[16] he later wrote, "of a Strategic Air Force come true."

Curtis LeMay was a product of the American Midwest who had earned a monumental reputation flying missions in Europe. Robert McNamara—at the time a captain with the Army's Office of Statistical Control but also a future secretary of defense in the John F. Kennedy administration—recalled working with LeMay.

"He was the finest combat commander[17] of any service I came across in war," McNamara recounted. "But he was extraordinarily belligerent, many thought brutal."

LeMay had joined the Army as a flying cadet in 1928, during the heyday of Lindbergh, and had risen to the rank of major at the time of Pearl Harbor. As a navigator, pilot, and commander of the Eighth Air Force's 305th Bombardment Group, LeMay had singled himself out for his unique leadership style.

People noticed something odd about LeMay's appearance. Some of his facial muscles were paralyzed due to an earlier case of Bell's palsy. This feature made his expressions appear emotionless, which made his command style even more intimidating. He was known as "the Cigar" because he had one in his lips incessantly, or "Iron Ass," for equally obvious reasons.

When LeMay learned he was going east at Arnold's orders, he confronted the complexity of his assignment. One of the things that made him a brilliant commander in the Eighth Air Force was his knowledge of the B-17 and B-24 bombers. He had flown many missions on these aircraft. He had felt the shock of flak explosions at 250 mph; he knew what the aircraft could take, and what the men aboard them experienced. He now had to study the B-29 and fast.

The Superfortresses still had a reputation for engine fires, which unnerved crews, especially those who would have to fly them over

interminable miles of open ocean. Hansell confided in LeMay: "The engines of the B-29[18] had developed a very mean tendency to swallow valves and catch fire. The magnesium crank cases burned with a fury that defied all efforts to put them out."

Arnold wanted LeMay to move out instantly to India. LeMay convinced his superiors otherwise. "If I'm going to have command[19] of a bunch of airplanes that are strange to me," he said, "I'm going to fly that airplane first." He spent a few weeks in Nebraska, soaring over the flat planes. Then he flew to India in the late summer of 1944. "Kharagpur was like nothing[20] I'd ever seen," he remembered. Headquarters was an installation that had once been a prison; the buildings were dilapidated from the pummeling heat and monsoons. LeMay billeted in what had once been the prison warden's house.

Within his first days in India, LeMay lost one of his most prized assets, the commander and pilot Blondie Saunders, whose B-25 crashed outside the Kharagpur base. LeMay and subordinates went on a search mission and found the wreck in the jungle. Saunders was inside, an engine atop his crushed leg. The aircraft's crew chief was walking around the wreckage talking incoherently. As LeMay described it, "He had a hole in his head[21]—I'll bet you could have put your fist in there. Why he was still alive nobody knew." He died the next day.

As for Saunders, who would have been one of LeMay's key men, he faced a long hospital stay back in the States. For LeMay, it was an inauspicious beginning. One of his best pilots—who knew the B-29 as well as anyone—was gone.

From the airfields in India, the XX Bomber Command flew missions against Japanese-held territory in China and Burma, in the lead-up to the all-out attack on the Japanese mainland. LeMay insisted on flying one himself. "Look here,"[22] he told his superiors in Washington, "I've got to—I've got to fly a mission. I should fly missions regularly; but right now I must fly at least one, at the start. I won't know what's going on until I do."

Days later, LeMay was cramped in the cockpit of a B-29, headed for a target in Japanese-held Manchuria. The machine was more complex than anything he had seen. One B-29 pilot put the cockpit experience in perspective: "It is a maze of intricate[23] machinery, both electrical and

mechanical, and as such must constantly be under the scrutiny and care of highly specialized maintenance men in order to operate properly and effectively. It has more separate electrical motors than Edison could ever dream of. . . . You may never get to look into the heart of a B-29, but if you've ever peeped at the insides of a wired pin-ball machine, and will multiply that by about four million, you'll get what I mean."

LeMay's B-29 was at 25,000 feet when it reached its target. He flew through flak explosions, black and orange cloud bursts that rattled every rivet. His radio operator was wounded. LeMay began to understand what he had to contend with—the men and the machines. He wrote to Arnold's new chief deputy, Lauris "Larry" Norstad, in Washington.

"First," LeMay wrote, "I was very much disappointed[24] in the outfit as a whole . . . Actually, they are very poor as a combat outfit. It is true that some of the people are a little older and have more service than the average outfit, but almost without exception they lack combat experience. Everyone is working like hell on the wrong things."

"Many crews had never dropped[25] a bomb from the B-29," LeMay wrote Arnold, "and very few had flown in formation."

Twelve days after arriving in India, LeMay wrote Norstad: "They [his airmen] are finding out[26] how to fight the same as our first outfits did at the beginning of the war, by the trial and error method. I don't think we can afford to operate our B-29s in that manner. We need experience from the combat outfits. We shouldn't be breaking people into combat in B-29s, it's too expensive . . . We all know that everyone connected with the B-29 has performed a major miracle in getting it along as far as it is."

As for the superbombers themselves, LeMay told Arnold, the biggest problem was takeoff. The aircraft was so large, so heavy, and the runways so dodgy. There had been many crashes, many fatalities. "All crews, in discussing a mission,[27] invariably talk about their take-off and not about flak, fighters, or other enemy opposition," LeMay wrote Arnold. "Even partial power loss from one engine almost invariably results in a crash from which there are very few survivors."

LeMay expressed concerns about the dusty runways, and about the oncoming rains that might turn them to mud. The supply runs over the Hump concerned him as well. "What I am trying to say[28] is, we have no business operating B-29's [*sic*] out of here any longer than is absolutely necessary," LeMay wrote.

At the start, LeMay was able to get only about four missions per month into the skies. His command hit Rangoon and targets in Singapore. He instituted strict new training regimens, teaching fuel conservation and formation flying. He reworked the maintenance crew system to make sure each B-29 had its own crew with a crew chief that, ideally, could do any job; each B-29 had its own sheet metal worker, electrician, engine mechanic, and so on.

As for his command style, LeMay explained: "My personal philosophy is[29] that the best outfits are those wherein a procedure is developed whereby every man who has an idea on a particular subject may bring it forward at the time of discussion, without the slightest criticism or hesitation. He argues for his point of view when you're discussing exactly how you're going to proceed . . . Once the decision is made, however—'This is the way we're going to do it.' Bang. Everybody complies. If a man doesn't comply, his official head should roll."

Like Arnold, LeMay saw himself as a cog in the machine that was giving rise to the airpower of the future, a power that was not just military but philosophical and political. Like Arnold, LeMay was a Mitchell-ite, a believer in the power of flight to change the world. It was as if there was no dividing himself from the aircraft that he flew and commanded. "I wasn't real. I wasn't human.[30] I was a machine," LeMay later wrote. "When I went to the bathroom, it wasn't in the ordinary human process. If I defecated, I defecated nuts and bolts. I was made of metal throughout. Iron Ass LeMay."

30

To introduce into the philosophy[1] of War itself a principle of moderation would be an absurdity.

—CARL VON CLAUSEWITZ, *ON WAR* (1832)

As the end of 1944 neared, human civilization stood on the precipice of incalculable destruction. Roughly half the bomb tonnage that would be dropped on Nazi Germany would fall in the next six months. Hitler launched the Battle of the Bulge on December 16, 1944, the last major Nazi offensive. As German resistance faded, American bombers destroyed what was left of Berlin.

"The air war is still the great tale[2] of woe in the present situation," Goebbels wrote in his diary. "The Anglo-Americans have again made very heavy raids on western and south-eastern Germany with damage quite impossible to set out in detail. The situation becomes daily more intolerable and we have no means of defending ourselves against this catastrophe . . . As a result of the war, specially the air war, some six million dwellings have so far been totally destroyed in the Reich."

Anyone who read a newspaper during these days had to come to terms with the immensity of the destruction, and what it could portend for the future. The *New York Times* reporter Drew Middleton commented, "The end of Western urban[3] civilization is no longer an empty phrase but a terrible fact already within the grasp of mankind."

In his bunker, as air raids whistled in Berlin, Hitler grew despondent. Privately, he told one of his subordinates, Capt. Nicolaus von Below, "I know the war is lost.[4] The superior power is too great. . . . I'd like most of all to put a bullet through my head." Then, recovering himself, he said,

“We’ll not capitulate. Never. We can go down. But we’ll take a world with us.”

On November 1, 1944, the first Superfortress appeared over Tokyo. Already, a Superfortress raid had struck Yawata. But this airplane was the first “Superfort” to fly over Japan’s capital city. Piloted by Capt. Ralph D. Steakley, who took off from Saipan, it was armed not with bombs but cameras. This historic flight was made in a B-29 named *Tokyo Rose*.

On the ground, citizens heard the sound of engines and saw the four smoky slipstreams striped against the sky. “The city waited,”[5] recalled one eyewitness. “Millions of lives were suspended in the silence of a radiant autumn afternoon. For a moment, antiaircraft fire shook the horizon with a noise of doors slamming in the sky. Then—nothing; the all-clear was sounded without sight of a plane. The radio announced that a single B-29 had flown over the capital without dropping any bombs.”

At thirty-two thousand feet, the B-29 used cutting-edge cameras to freeze seven thousand images in black-and-white celluloid. All knew—on the ground and in the sky—what this singular aircraft foreshadowed.

Over the next three weeks, the XXI Bomber Command’s chief Possum Hansell presided over excruciating on-again, off-again planning, the major obstacle being weather. Armed with photography that pinpointed innumerable targets clearly on the ground in Japan, Hansell was in charge of the timing to launch the first B-29 attack on Tokyo.

“He [Arnold] left the decision[6] up to me and said if I chose to go ahead, he wished me luck,” Hansell later wrote. “The effect was chilling.” The stakes could not have been higher; field commanders and British officers and seemingly half of the Pentagon were ready to stand up and declare Arnold’s strategy wrong—that it was impossible to command the Twentieth Air Force in the Pacific from an office in Washington. “The whole command structure of the Twentieth Air Force as a worldwide command . . . was in a delicate balance,” wrote Hansell.

On November 24, after numerous mission aborts, 111 B-29s took off from Saipan and Tinian—over 90 percent of the available Superfortresses on the Mariana Islands. Primary target: the Mushashino aircraft factory in Tokyo. As part of Arnold’s publicity campaign, an Associated Press reporter was there to see the Superfortresses take off. His report began:

"The United States launched a[7] mighty aerial weapon—the brand-new Twenty-first Bomber Command of the Twentieth Army Air Force—straight at the heart of Japan today. A great task force of B-29 Superfortresses thundered into the dawn at breath-taking one-minute intervals from this island, which five months ago belonged to Japan. The giant planes dog-legged in the sky to form patterns of nine or twelve as they headed northwest toward the most heavily-guarded target in the Far East—Tokyo itself, some 1,500 miles from this base."

Brig. Gen. Emmett "Rosie" O'Donnell led this mission. In the newspaper coverage, editors included maps, because just about no one in America knew where the Mariana Islands were located.

Hansell waited out the hours in Saipan until the surviving B-29s returned. When it was over, the attack knocked out only about 1 percent of the target. Two B-29s did not return. One was presumed shot down by enemy fighters with no survivors, while the other crashed into the Pacific after running out of fuel 140 miles north of base. The crew of twelve survived more than nineteen hours in two rubber life rafts before a Navy destroyer picked them up.

Hansell's command held a rowdy press conference. "We took them by surprise[8] again," the lead pilot, O'Donnell, said. "We learned quite a bit technically. How to adjust for winds, how the guns function under those conditions."

News of the first B-29 Superfortress strike against Tokyo sent morale skyrocketing in America. Workers at the B-29 factory in Marietta, Georgia, where the aircraft that struck Tokyo were built, were told of the attack during their lunch hour; thousands cheered and some even cried. Despite the minor damage, Arnold gave a statement that appeared on front pages of newspapers across the country.

To the president, he wrote, "The battle is just beginning[9] . . . The systematic demolition of Japan's war production, begun six months ago from China bases, henceforth will be carried out with decisive vigor."

On the night of November 26, an unexpected explosion on the airfield at Saipan shattered the silence. Slumbering airmen jumped from their cots and ran outside their tents to find a towering blaze. Among them was Hansell, who described in a report to Arnold what he witnessed.

"We saw fires and black[10] smoke rising from the field," Hansell wrote. "As we were coming up the hill, there was the most violent explosion I have ever seen. One of our ships with bombs aboard blew up." Hansell called the blast "the most amazing sight[11] I have ever seen. Fifty-caliber ammunition was going off like firecrackers. The scene was an animated illustration out of Dante's Inferno."

Investigation revealed that a small number of surviving Japanese soldiers had been hiding in the atoll's jungle, and they launched a surprise insurgency. They set on fire Superfortresses that were loaded with fuel and bombs. Army forces hunted and killed the insurgents. Still, Hansell was left with mangled aircraft and a lot of questions from the Pentagon. As he recalled, "General Arnold was understandably outraged.[12] He had warned of this possibility but suitable action was not taken to provide defenses."

Arnold was disappointed in Hansell's record at the head of the XXI Bomber Command. He decided on a reorganization. This would prove to be one of the most important command decisions that Arnold would ever make. Curtis LeMay received orders to fly to Guam immediately to take charge.

Already, Arnold had groomed LeMay for the spotlight. He hammered home to LeMay that success of the B-29s was about more than winning the war. As the airpower historian Herman Wolk has written, "In Arnold's mind, the[13] performance of the B-29s in the Pacific was linked directly to the future creation of an independent air force."

"I think the B-29 project has[14] a tremendous significance on the future of the Air Forces," Norstad wrote LeMay, "so what we can do with it now is of the greatest importance."

LeMay understood, writing back: "I think we all agree[15] that the composition and size of our post war Air Force depends a great deal on the B-29 performance in the Pacific."

Arnold continued to push LeMay for results. "Pilots that are weak[16] must either be replaced or trained to a point where they can obtain the maximum from their airplane."

At the time, in Washington, yet another debate had begun in Congress regarding the possibility of a separate United States Air Force. A Virginia congressman named Clifton Woodrum founded a committee in an attempt to replace the military establishment with a new unified "Department of

National Defense." "A unified command over[17] our army and navy has been in actual operation in this war through the Joint Chiefs of Staff," Woodrum said during the first meeting of the "Woodrum Committee." A major part of Woodrum's proposal was the founding of an independent United States Air Force, on equal footing with the Army and Navy.

Arnold was following the proceedings with eagle eyes. He craftily communicated to LeMay all that was at stake. "As I told you before[18] you went out to India, the B-29 project is important to me because I am convinced that it is vital to the future of the Army Air Forces," he wrote LeMay on December 17. "I think we can do better bombing with the B-29 than has been done by any aircraft up to this time and I expect you to be the one to prove this."

LeMay arrived from India in the Mariana Islands on January 7, 1945. The Twentieth Air Force's chief of staff, Norstad, flew in from Washington and had landed the day before. On the island of Guam, presumably in a Quonset hut at headquarters, Norstad told LeMay that a good majority of XX Bomber Command operations was to transfer out of India and China, to the Marianas, where attack opportunities were more plentiful.

"The 20th Bomber Command will[19] be redeployed up here," Norstad told LeMay, "and everything will be under the 21st and under you."

When Possum Hansell joined the other two, the mood grew tense. "So we sat in on a very dramatic meeting,"[20] Norstad recalled, "with Hansell sitting there, and LeMay sitting there, and I was sitting there about . . . 7:30 one morning. So we made the change."

"LeMay is coming here to[21] take over this command," Hansell told his public relations officer. "I'm out." Hansell later wrote, "In all fairness to General Arnold,[22] he cannot be blamed for his impatience. . . . He was under constant pressure and criticism from his associates on the Joint Chiefs of Staff and from higher authority to explain what his Twentieth Air Force was accomplishing."

"The time approached,"[23] Arnold later wrote, "when it looked as if the [atomic] bomb might be nearing completion. Here I was, the only man in the Air Forces, theoretically (and I think I was, actually) who knew anything about it."

Figuring out how to modify B-29s to fly this bomb proved a monumental task. With orders from the top, a team of Army Air Forces aeronautical engineers began work. The time had also arrived to set up a command that could carry this new secret weapon over a target. The Army's executive officer in charge of the Manhattan Project, Leslie Groves, relied on Arnold for three key tasks: providing the B-29s that could drop the bomb, training what Groves called "a highly competent tactical unit"[24] who could fly the planes, and, thirdly, providing absolute reliability that neither task one nor two could fail. Groves also wanted a promise that the Air Forces would be responsible for transportation of all the materials, except the bomb itself, to the launch site in the Marianas, during the final stages of preparation.

Groves worried that the bomb would not fit into the B-29. Even though the Superfortress was the world's biggest bomber, its interior layout could make it unsuitable. Groves wondered aloud to Arnold if the British Lancaster might work, even if it was a far smaller bomber. "This brought from him[25] the characteristic reply that I had hoped and expected to hear," recalled Groves. "That he wanted an American plane to deliver our bomb, and that the [Twentieth] Air Force would make every effort to ensure that we had a B-29 capable of doing the job."

Besides, it was unlikely that the British Lancaster—or any British aircraft—could carry a bomb as big as this one, with the range needed to get it over the target. Arnold believed that only the B-29 could do the job, which would require the best combat flight crews as well.

Arnold chose a mission leader. On September 1, 1944, a combat pilot and seasoned test-flight engineer who had been involved with the B-29 nearly since its birth received orders to fly to Colorado Springs for a meeting. "I had no idea,"[26] Col. Paul Tibbets recalled, "that fate had laid her unpredictable hand on me for an important role in a supersecret program designed to bring a swift end to the war."

Even before Tibbets arrived in Colorado, he knew he was caught up in some strange plot. He had gotten a call from his father, who asked, "Are you in some kind of trouble,[27] son?"

"Not that I know of," he had replied. "What makes you think so?"

"Well, I hear some investigators—I think they were from the FBI—have been down here asking questions about you."

Tibbets arrived in Colorado Springs at the office of Gen. Uzal G. Ent early for a 10 a.m. meeting. Also present was the Navy's William "Deak" Parsons, director of ordnance for the Manhattan Project. General Ent and Captain Parsons briefed Tibbets on the bomb itself. Tibbets had a lot of questions. He had never heard of particles called electrons, protons, and neutrons.

General Ent ordered Tibbets to set up a new command—the 509th Composite Group—to handle the job of delivering this bomb over a target, if in fact the bomb worked. They would have to fly B-29s with all kinds of modifications to carry a mechanism weighing some nine thousand to ten thousand pounds. The crews would train to drop the weapon and then get away as fast as possible to be at a safe distance when it erupted with, theoretically, all the power of a small sun exploding.

"What do you consider a[28] safe distance?" Tibbets asked.

"We're not sure," Parsons answered. "But our best calculations indicate that an airplane should be able to withstand the shock waves at a distance of 8 miles."

Following this meeting, Tibbets flew to Washington, where he was taken to see Arnold. Tibbets later described the moment: "He shakes hands with me,[29] and wants to know what I think of the job. And I tell him I think it's a grand challenge. He said, very matter of fact about it, you could almost say coldly indifferent, because he said, 'O.K. I've told them here to give you everything you want. If you have any trouble, let me know.'"

Soon the twenty-nine-year-old pilot landed in Utah at a base in remote Wendover—a tiny outpost on the border of Nevada, surrounded by high desert so remote it looked like a moonscape. The Army chose Wendover for its proximity to Los Alamos in New Mexico, where scientists headed by J. Robert Oppenheimer were building the bomb, and because it bordered the Salton Sea desert, where bombers could practice dropping dummy bombs out of eyesight of civilians. The Army officially activated the 509th Composite Group on December 17, 1944—the forty-first anniversary of the Wright brothers' first flight.

In his first briefing, Tibbets stood before a group of highly trained airmen, the best in the business in the United States. "You have been brought here[30] to work on a very special mission," he told them. "Those of you who stay will be going overseas. You are going to take part in an effort that could end the war."

At the end of 1944, the US Congress confirmed a new five-star rank for four Army generals: Arnold, Marshall, MacArthur, and Eisenhower. Arnold had reached a level of prestige that had not even existed throughout his career. He considered the honor more for airpower than for himself. Congress had given airpower equal treatment with the Army and Navy. Arnold told one friend, "Naturally, I am very satisfied[31] that the Air Forces was given this additional recognition."

The news came at the same time as the first studies of the German V-2 appeared in American newspapers. Diagrams of the V-2 attempted to explain the complexity of its functions, and for the first time, the words *rocket* and *rocketry* entered the American lexicon. The weapon was a killing robot that captured people's imagination all over the world. "The facts are beginning to come[32] out about the German plans for their V-weapons . . . ," the columnist Marquis Childs wrote in the *Washington Post*. "The facts are far more startling than any fiction H. G. Wells ever dreamed up."

Arnold saw in this new age of atom splitting and rocketry terrifying visions of the future, if America failed to seize the moment. Part of what Billy Mitchell had taught Arnold two decades earlier had nothing to do with airplanes; it was about vision. "I have another job,"[33] Arnold reflected. "That was to project myself into the future." He now asked himself: "*When we added all such developments together, what did it mean for the future? What kind of Air Force must we have? What kind of equipment ought we to plan for twenty years, or thirty years hence?*"

Arnold called on an old friend, whom he considered the ultimate long-haired scientist in the field of aeronautics. Arnold and Theodore von Kármán of Cal Tech had collaborated years earlier, and Arnold had given von Kármán a consultant contract to work on rocket research. That work was ongoing. Now Arnold reached out to von Kármán again.

"Come to LaGuardia Field[34] . . . ," Arnold said over the phone. "I want to talk with you."

Von Kármán was recovering from a cancer but was healthy enough to travel. The two met at LaGuardia Airfield. The aviation historian Dik Daso has written, "The La Guardia meeting[35] holds a somewhat legendary place in the history of Air Force scientific and technological development."

When von Kármán reached the airport on that day, Army staff drove him to a meeting spot at the end of a runway. Arnold waited inside a chauffeur-driven car. He asked the driver to remove himself so he could talk

privately with von Kármán. Arnold talked about supersonic aircraft, airplanes that would operate without pilots and crews, communications systems not yet imagined, even television.

"We've won this war,"[36] Arnold said. "Whether we've won by sheer force or by superior equipment I don't know. But it's won . . . What I am interested in is what will be the shape of the air war, of air power, in five years or ten or sixty-five."

"All right," von Kármán said. "But what can I do?"

"You gather a group of practical scientists for all the new things. I want to know what the impact of jet propulsion is, of atomic energy, of electronics. Get a group and study that in the Pentagon, and make a report." The assignment was to create a think tank that could write the first-ever comprehensive scientific and technological military forecast for the future.

"General," said von Kármán, "I don't like to work in the Pentagon. I can do this only under one condition, that nobody gives me orders—and I don't have to give orders to anybody else!"

"As far as taking orders goes," said Arnold, "I will be your only boss. Nobody will be between us. As far as giving orders is concerned, you don't have to do that. Just tell me what you want, and I will see that it happens." The first thing Arnold wanted done, he said, was for von Kármán to gather the keenest scientists and bring them to Washington. And he wanted this done quickly. When von Kármán exited the car, Arnold was driven away.

The first meeting of von Kármán's new Scientific Advisory Group in Washington occurred at the end of 1944, in the Pentagon. Von Kármán had picked roughly a dozen scientists—figures such as Hugh L. Dryden, a math and physics genius who was also about to become director of aeronautical research at NACA, and Vladimir K. Zworykin, a key figure in the invention of television in the 1930s. When Arnold addressed these figures, he began by putting their work in critical perspective.

"I haven't got anything special[37] to get off my chest," Arnold said. "But every once in a while I like to sort of think out loud and with my thinking out loud sometimes some people have further thoughts." He then described the beginnings, as he envisioned, of the future of airpower.

"I see a manless Air Force.[38] I see no excuse for men in fighter planes to shoot down bombers. When you lose a bomber, it is a loss of seven thousand to forty thousand man-hours, but this crazy thing [the German V-2 rocket] they shoot over there takes only a thousand man-hours. For twenty

years the Air Force was built around pilots, pilots and more pilots . . . The next Air Force is going to be built around scientists." Arnold imagined new developments that could make the United States invincible in the air. Only then could the country be assured security in the future. "We want to fly over enemy territory and look through the leaves of trees and see whether they're moving their equipment."

Americans had long employed the saying, "The sky is the limit." In the future, Arnold believed, there would be no limits at all.

Part IV

The Climax of Airpower



The Hiroshima mushroom cloud, August 6, 1945.

History/Universal Images Group via Getty Images

We knew the world would[1] not be the same. A few people laughed, a few people cried. Most people were silent. I remembered the line from the Hindu scripture, the *Bhagavad-Gita* . . . "Now I am become death, the destroyer of worlds."

—J. ROBERT OPPENHEIMER ON THE TRINITY SHOT, THE FIRST TEST OF AN ATOMIC BOMB, JULY 16, 1945

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> For good or for ill, air mastery[1] is today the supreme expression of military power and fleets and armies, however vital and important, must accept a subordinate rank.
>
> —WINSTON CHURCHILL

American aviation reached its wartime pinnacle in the spring of 1945—military force of such power was unprecedented in the history of the world. The man who commanded this force was himself growing equally explosive. The Pentagon might have been the largest office building, but it was not big enough to contain the personality that Arnold now embodied.

His routine began around 7 a.m. with a read of the cables that had come in the night before, from all over the globe. Then came the intelligence meeting, then the staff meeting at 8:15 a.m. "We'd go in his office[2] about 8:15 and by the time we'd left there, he was livid," remembered Lieut. Gen. William Hall. "He was just storming all over the place. Every day."

Arnold would have a thought and walk up to the first person he saw in a hallway, put his arm around the man, and send him off on an errand that might require a flight across an ocean. Right now! He had grown accustomed to demanding the impossible, from whoever might be in front of him. One story recalled Arnold erupting over fatal P-38 Thunderbolt accidents in training maneuvers on the West Coast. Recalled one subordinate: "He came steaming out of[3] his office, and grabbed the first officer he saw, and he said, 'You get on a plane and get out to the West Coast, and clean up these P-38 accidents.' And it was a young infantryman just wandering around the Pentagon, sightseeing."

On another occasion, Arnold grabbed a random officer in a Pentagon hallway and ordered him to go to California to build a new depot. "Just the

man I was looking for,"[4] Arnold shouted. "You get out and get that depot out [in] San Bernardino built."

"Build a depot?" the officer said. "I don't know anything about building a depot."

"I don't care what you can build. You get out there and get these politicians off my neck."

Arnold's control of the Air Forces remained almost dictatorial. "Whenever General Arnold said something,[5] it was done," according to staffer Hall. "I mean you never saw such complete control as he had."

On January 17, 1945, Arnold was in his office constructing a memorandum when he felt a jolt of pain in his chest. His fourth heart attack would turn out to be his worst. "I did not know how ill I was,"[6] he recounted, "but I knew I was a very sick man." Once again, he was confined to a hospital bed. After years of building airpower, however, airpower was taking on a life of its own. Its rising brutality seemed unstoppable. As one British writer spelled out, "Mankind is Frankenstein.[7] Science, especially the science of aviation, is his monster."

On January 20, three days after Arnold's fourth heart attack, Roosevelt's fourth inauguration drew Washington's elite to the White House. Due to the global emergency, the administration canceled all parades and festivities. Days later, Roosevelt took off for the Yalta Conference, the last of the "Big Three" wartime meetings with Stalin and Churchill.

The President flew aboard the *Sacred Cow* for the first time—the first presidential aircraft and archetype of all Air Force Ones to follow. Arnold had arranged for the administration to have this four-engine flyer custom-built by the Douglas Aircraft Company. It was a Douglas VC-54C Skymaster made with a special elevator to lift the president's wheelchair into the cabin. It had a meeting room aboard with the seal of the United States emblazoned at the center of a conference table, next to a rectangular window of bulletproof glass. Never again would a US president travel without a presidential airplane at his disposal.[*]

While Roosevelt was in Yalta, and Arnold was in a hospital bed, the air war entered its next chapter. On February 3, a thousand US B-17s and nine hundred P-51 Mustangs flew over Berlin, a city mobbed with some 3 million refugees fleeing Soviet forces that continued to close in from the

east. Reports from Berlin described "the most concentrated attack[8] ever delivered against the Nazi capital" and "the most terrible we have had[9] in the whole war."

Ten days later, the Royal Air Force flew the first Dresden night raid. A cultural capital in Germany's eastern frontier, Dresden had thus far remained relatively untouched by the Allied bombers. But on the first night of the Dresden attack, the British set this city's center ablaze. Dresden was a turning point. It opened eyes all over the world to new possibilities in aerial annihilation. "Dresden was one big flame,"[10] wrote Kurt Vonnegut, who was in Dresden and survived by hiding in a slaughterhouse meat locker, later distilling the experience into his novel *Slaughterhouse-Five*. "The one flame ate everything organic, everything that would burn."

In the morning, American Eighth Air Force B-17s attacked Dresden's rail yards, while also restarting the fires that turned the city into a mass of burning embers. The overall effect was a coordinated effort to destroy this metropolis by fire. In four raids, 772 Royal Air Force and 527 American heavies dropped almost four thousand tons of bombs.

A German commentator told *Newsweek* magazine, "Not a single detached[11] building remains intact or even capable of reconstruction. The town area is devoid of human life. A great city has been wiped from the map of Europe. Tens of thousands who lived and worked in the city are now buried under its ruins."

The Dresden attack sparked heated controversy in Washington, as nothing had yet so far. Had the Allies gone too far? Spaatz and Eaker, commanders of the Air Forces in the European theater, were caught off guard. Eaker had written Spaatz just days before the Dresden attack, "We must never allow the[12] record of this war to convict us of throwing the strategic bomber at the man in the street." But now, the Associated Press in the United States reported a major shift in air war policy. "The Allied air bosses have made[13] the long awaited decision to adopt deliberate terror bombing of the great German population centers as a ruthless expedient to hasten Hitler's doom."

For the first time, Air Forces officials faced public ambivalence over their brutality. "As the Germans long ago[14] discovered," one editorial in the *Kansas City Star* noted, "final victories are never gained by terrorizing civilians." Arnold's head of publicity, Rex Smith, sent Spaatz a

communique, warning of "nation-wide serious effect[15] on the Air Forces as we have steadily preached the gospel of precision bombing against military and industrial targets." Air Forces spokesmen deflected criticism and promised that no policy change had occurred.

The destruction in Dresden remained so vast, its death toll could not be accurately measured. One news source in Switzerland guessed at seventy thousand. Decades later, an independent historical commission would decide that about twenty-five thousand people lost their lives. When Secretary of War Henry Stimson approached the head of the Army Air Forces in the aftermath of Dresden, Arnold responded with cold candor.

"We must not get soft,"[16] Arnold wrote. "War must be destructive and to a certain extent inhuman and ruthless."

From his headquarters on the island of Guam, Curtis LeMay began to lay the plans for the destruction of mainland Japan. Those were his orders. As Norstad wrote LeMay, two days after Arnold's last heart attack, "What General Arnold wants is[17] the greatest possible number of bombs dropped on our priority targets in any given period of time. I am sure that you fully appreciate this . . . I believe that you will agree with me that you will have what will shortly become the biggest and best air striking force in the world today."

The buildup in the Mariana Islands was staggering. "The Marianas are becoming[18] a heart of the Pacific War," wrote the famous war correspondent Ernie Pyle on February 25. (Pyle would be shot dead by enemy fire two months after writing these words.) "Scores of thousands of troops of all kinds are here. Furious building is going on. Planes arrive on schedule from all directions as though this were Chicago Airport—only they've come thousands of miles over water. Convoys unload unbelievable tonnages . . . You can take your pick of K-rations or lumber or bombs, and you'd find enough of either to feed a city, build one, or blow it up."

On February 19, the US Marines landed on Iwo Jima, a minuscule island halfway between the Marianas and Tokyo. Arnold intended to use Iwo Jima—once it was taken from the Japanese—as an air installation that could launch fighter planes to rendezvous with the long-range B-29s and escort them to targets on mainland Japan. From the start, the fighting at Iwo

Jima proved costly, as Japanese soldiers remained entrenched inside a network of fortified jungle caves and tunnels.

The enemy's tactics now grew desperate, and the first reports of kamikaze suicide missions reached the Pentagon. In Japanese, the word *kamikaze* translated into "divine wind." Waves of these suicide aviators began to attack at the same time that LeMay took office in the Marianas. On January 8, Arnold wrote a short report called "Ramming of Our Heavy Bombers"; the Japanese, the report stated, "are now putting into practice[19] the ramming of our heavy bombers. The Japanese have gone a step farther in making their attacks suicide." On January 17, an intelligence officer sent Arnold a memo with the subject: "Shackling of Jap Pilots."

"A report has been received[20] [about] an unusual incident from the Lingayen area of the Philippines." A Japanese pilot was killed while attempting a suicide mission. He was "manacled to the rudder controls" of his airplane. "The pilot . . . was dressed in a black dragon gown . . . This has been interpreted to mean that the funeral ceremonies for the pilot have been performed before departure on the suicide mission."

The kamikaze phenomenon created yet another means of weaponizing aviation.

Meanwhile, the pressure continued to mount on LeMay. "You go ahead and get results[21] with the B-29," Norstad wrote him. "If you don't get results, you'll be fired . . . If you don't get results it will mean eventually a mass amphibious invasion of Japan, to cost probably half a million more American lives."

"Our attempts to bomb[22] precision targets at night have failed," LeMay wrote Arnold. A major problem continued to be winter weather. "We have been having a hell[23] of a time with weather lately," LeMay wrote to Norstad. "We have been ready for a strike for the last three days but the weather has been solid to 29,000 feet."

In his office on the island of Guam, LeMay chewed on his cigar as he ideated his next move. Never before in human history had any war general possessed the firepower that was now in his grasp. He had launched ambitious missions, sending 150 B-29s over Tokyo on February 19, another 172 on February 25, and 192 on March 4, all using traditional explosives. Results were poor.

This enemy proved vastly different from what LeMay and his fellow airmen had faced in Europe, where industrialism had grown over decades largely inspired by the methods of Henry Ford. In Europe there were great factories, and neighborhoods around them where workers lived. The factories were the strategic targets. In Japan, according to intelligence reports, war industries were spread out in industrial and civilian neighborhoods, in small shops as well as big factories. Sometimes even in people's homes. There were fewer big targets, and countless smaller ones. Which made eradicating war industry through precision air strikes far more difficult.

LeMay had an idea, albeit a dangerous one. He asked Norstad: "You know General Arnold.[24] I don't know him. Does he ever go for a gamble? What do you think?"

On the Mariana Islands, LeMay had stockpiles of M-69 and M-52 firebombs. Already the Twentieth Air Force had experimented with these weapons against minor targets in Singapore and Japanese-held China. The pressure on LeMay to launch a game-changing attack pushed him to imagine something entirely different. Something he hoped would be spectacular.

"It was against this background[25] that the decision was reached early in March to launch a series of low level incendiary night attacks against Japanese urban areas," according to XXI Bomber Command records. "These operations were not conceived as terror raids against the civilian population. The Japanese economy depends heavily on home industries carried on in cities or settlements close to major factory areas."

LeMay knew that if he asked permission to fly firebombing raids, then Arnold would be "on the hook," as LeMay put it. "And if I don't tell him,"[26] LeMay later wrote, "and it's all a failure, and I don't produce any results, then he can fire me." So LeMay asked no permission at all; he merely hinted in a letter to Norstad on March 3, saying, "I am working on several[27] very radical methods of employment of the force." The aviation historian Gene Gurney would call LeMay's "radical methods" "the greatest one-man military[28] decision ever made."

His idea was to fly B-29s over Japan at low altitudes, and to deliver a blow on a significantly larger scale, using napalm. Field Order No. 43 set a new mission. The official order read, "Primary target: Urban area of Tokyo."[29]

On March 9, 1945, the Twentieth Air Force's unventilated War Room in Saipan was packed full, with every bench filled. Crews for each B-29 sat together, and each had a sign behind bearing the name of that bomber's commanding officer. Walls were covered with maps, charts, and aerial photographs of Japan. "The War Room was so tightly packed,"[30] one account of this meeting reads, "the men standing could barely reach into their pockets for a smoke."

On a stage at the front, a group commander began to speak. "Gentlemen," he said, "for tonight we have[31] a new plan. When you hear it, you won't like it. But after you think about it a while—it makes sense. It *should* work."

Over the course of a lengthy presentation, section leaders spoke: the intelligence chief, weather, radar intelligence, navigation. The overall group commander said, "Your target is Tokyo."[32]

"Tonight," he said, "there is no other target except Tokyo. Tokyo is our primary target, our secondary target, our target of opportunity, our target of last resort. Every single bomb will be dropped inside Tokyo."

Thus far, many B-29s had flown missions over Japan without maximum bomb loads, to keep weight light in the effort to ensure the safe return over the huge expanses of ocean. Arnold had written LeMay to urge that B-29s carry max firepower. "I wish you would drive home[33] to your crews and commanders the necessity for carrying maximum weight of bombs," Arnold had written LeMay. Now on March 9, the mission group commander told crews that they would carry maximum loads—and then more.

"*No guns and no ammunition*[34] *will be carried*," the commander said [emphasis is his own]. "Get that. No guns. No ammunition. First of all, if we carried guns, it is likely we'd open fire on each other. Secondly, we will carry all our weight in bombs and gas." Unlike most other missions over Japan thus far, which attacked from twenty-five thousand to thirty thousand feet, this one would fly far below that. "You will come over the target[35] at an altitude of five thousand feet," the airmen were told.

Loud gasps could be heard in the briefing room. One flyer recalled a "roar of surprise and enthusiasm,"[36] while another heard someone call LeMay "crazy."

"The plan," recalled one airman present, "was almost unbelievable."[37]

Other B-29 missions over Japan had used conventional explosives. This one would require full loads of incendiaries. “The bombs from a single ship[38] must be spaced so as to assure a merging of the fires started by each bomb into a general conflagration before fire fighters have had time to put them out,” the attack plan read. “With a full bomb load of 17,000 lbs of M-69 bombs [napalm bombs], the area burned out by a single ship should be around 16 acres. Using the M-69 bomb, a density of .3 tons per acre, yielding an estimated 70% damage is considered ideal.”

LeMay later revealed his thinking about this mission. “Nothing but bombs in those[39] bomb bays,” he wrote in his memoirs. “We won’t need all that extra gas if we’re not going to altitudes . . . And there’s another way we can save weight. Take out all the defensive armament. Repeat: remove all defensive armament from every B-29. Every gun goes out, all ammunition goes out . . . So if we go in low—at night, singly, not in formation—I think we’ll surprise the Japs . . . Tommy Power is all in favor of this low-level incendiary attack. If we run it, I’ll let him lead.”

Brig. Gen. Tommy Power was a New Yorker whose aviator sunglasses were as much a part of his face as the cigar was of LeMay’s. A talented pilot, and an engine expert, Power helped LeMay develop this low-level incendiary plan. “Our idea was to come up[40] the peninsula which is on the east side of Tokyo, using radar landmarks,” Power recalled. “I had a lot of real good radar people in my wing. I had selected them carefully, from my experiences in Italy.” With a massive number of superbombers over Tokyo, he explained, “we would spread our airplanes out like the leaves of a fan, each one having a particular heading and speed and time to drop.”

Both LeMay and Power believed their strategy would torch Tokyo. Said Power, “There was no question in our minds.”[41]

32

To you, the clever and crafty,[1] bitter beyond all bitterness, who has sinned against the gods in bestowing honors upon creatures of a day—to you, thief of fire, I speak.

—HERMES TO PROMETHEUS, QUOTED IN AESCHYLUS, *PROMETHEUS BOUND*

From the earliest scrawlings on cavemen walls, human beings had expressed an envy of birds. But another noteworthy discourse had also emerged. For centuries, philosophers, warriors, and futurists had wondered what human beings would do with the art and science of flight, if in fact humans could teach themselves to fly like birds.

Some believed that the ability to fly would result in a new kind of utopian society that would have no need for national borders, that human beings would come together, share resources, and there would never again be a need for war. In 1864, for example, the poet Victor Hugo imagined how flying machines could make armies "vanish, and with them[2] the whole business of war, exploitation and subjugation." The flying machine could "compel all nations to keep peace towards each other." An American writer predicted how the flying machine would bring about "Man's Brotherhood"[3]; it would be a "mechanical messiah whose coming would wondrously transform life and society."

The prophets of doom were more vocal. Their apocalyptic phantasms imagined "birds of hell"[4] and "shrieks of agony," "the capital of a great nation, a great army, costly defenses and armament, all at the mercy of [a] few hundred bird men." Long before the Wright brothers solved the mysteries of flight, futurists had imagined the bombing airplane and what it could do to innocent civilians. "More than any other modern weapon,"[5] the

historian Michael Sherry has written, “the bomber was imagined before it was invented.”

Now in 1945, the question that centuries of these thinkers asked would now be answered. Would the ability to fly become an agent of good or evil? The truth was, the airplane was becoming an agent of both. In the “fog of war”—the gray area where the line blurred between the two—heroes could be antiheroes depending on the point of view.

From the point of view of Hap Arnold and Curtis LeMay, however, there was no ambivalence. Mass killing of the enemy meant saving the lives of countless American soldiers. The way LeMay saw it, the airmen had a simple question to ask themselves: “We’re at war with Japan.[6] We were attacked by Japan. Do you want to kill Japanese, or would you rather have Americans killed?”

From the runways of both Saipan and Tinian, on March 9, the first B-29s took off at 5:34 p.m. Tower operators on these airfields chattered by radio as the sky over the Marianas filled with roaring aircraft. A total of 334 bombers left Saipan and Tinian. Aboard the B-29s, crewmen began their journeys, which would last between eleven and thirteen hours en route to Tokyo and back.

Life aboard the bomber during a mission meant interminable periods of discomfort. “For the long-range bomber[7] men it is the slow, deadly approach, the long waiting, the long thinking . . . ,” a journalist who flew with these men wrote. “So much of what lies ahead is in the realm of the unknown: the natural hazards, the enemy opposition, the trials of navigation.”

Forward most in the cockpit sat the bombardier, whose view of the horizon was unobstructed. He had studied meteorology, gunnery, and mathematics. He had been taught to recognize all kinds of enemy ships below, and could mark the differences between American ships and enemy boats. Most imperative was his skill with the bombsight—a mechanism so top secret, the bombardier was taught during his training never to remove it from its canvas bag unless he was in a classroom or on a mission. The bombsight took control of the aircraft and held its speed and course at the moment of bomb release. Part of the bombardier’s job was—in the case of emergency—to destroy this mechanism along with any secret documents aboard.

Behind the bombardier, slightly elevated, sat the pilot and copilot. “The pilot is still in the public[8] mind the darling of the Air Force,” John Steinbeck wrote in his 1942 book *Bombs Away*. The pilot’s experience and knowledge set him apart from other airmen. “It is a strange, almost mystical[9] thing that happens to flying men,” Steinbeck observed. “It is as though the experience had cut them off so that they can only communicate with their own kind, can only be understood by other flying men.”

Behind the pilot, the engineer sat at his station. The engineer liked to think that his craft was uniquely American, for in America the combustion engine came to change the world. “Engines,” Steinbeck wrote, “are in the souls of our people.”[10]

Aerial engineers had to know everything about the thundering Wright Cyclones, as well as the instrumentation, hydraulic systems, fuel, and oil. B-29s required specific expertise in electrical engineering, as almost everything aboard was run by electric motors. As the *New York Times* reporter George Horne, who flew aboard B-29s, put it: “Everything but the hydraulic[11] brake system is run by electricity. This great battleship of the skyways is our nearest approach to the robot raider of the cartoon strip.”

On a good flight, when little goes wrong, the aerial engineer had the least to do, and thus he was trained to substitute for the copilot or for the gunners, in case someone aboard was wounded or killed. But when something mechanical went wrong, the engineer’s skill could become a matter of life or death, for all aboard.

The navigator sat beside the engineer, behind the copilot. By nature, the navigator was a pensive figure. His tools were much the same as his ancestors used on the seas centuries earlier: paper maps (however accurate), sextant and chronometer to give location, and compass to give direction. Flight navigators also used a panoply of modern gauges: air-speed indicators, drift meters, altimeters, directional gyro, bank and turn indicators, and automatic pilots. The navigator’s role was, arguably, the most important on the ship. His job was to get the bomber over the target, and to navigate safely back to base.

In an alcove behind the navigator sat the radio engineer—the contact person between everyone aboard and everything going on outside of the aircraft. Orders came in to him: weather warnings, changes in flight plans, changes in intelligence on the ground. During his training, the radio

engineer learned Morse code, code typing, flight operations, and the intricate workings of his equipment so that he could fix it if it failed.

Aboard the B-29, a long tube connected the forward cabin, where all these airmen sat, to the rear cabin—also pressurized to eight thousand feet—where the gunners worked the Superfortresses's remote-control machine guns in the turrets. Bomber gunners had their own unique reputation. "This is strictly a military specialty,"[12] Arnold wrote. "There is no civil counterpart. It appeals to the old soldier type who likes a trigger in his hand and who likes to feel the power and effect of the whistle of the machine gun bullet."

Or as Steinbeck put it, "Nothing quite like the American aerial gunner[13] has been seen on the face of the earth, but he is a natural descendent of the Kentucky hunter and the Western Indian-fighter."

Most of the bombers were equipped with .50- or .30-caliber guns that could fire at over six hundred rounds per minute. However, aboard the March 9 Tokyo mission, the aircraft were stripped of their armaments to make room for more bombs.

As the armada of more than three hundred B-29s reached the coast of Japan, they descended to their attack altitude. Mission commander Tommy Power could now see Tokyo, which was the third most populated metropolis in the world behind New York and London. Even before the airplanes reached the city, panic on the ground set in.

In the early hours of March 10, the first B-29s appeared over Tokyo. "They were translucid, unreal,[14] light as fantastic glass dragonflies," recalled one journalist who saw them from below.

Air raid sirens shrieked. Searchlights blasted into the skies, capturing in their green and orange cones of light the explosions of the first anti-aircraft cannon shots. Tommy Power recalled moving his B-29 over the city. "We made the run and[15] it was a pretty warm place around Tokyo that night. We were at 5,000 feet, and they had an awful lot of anti-aircraft guns and searchlights—over 500 searchlights . . . We started laying down our fire bombs, going back and forth as the fires built up."

On the ground, recalled one man in Tokyo, "the bomb blasts looked like[16] flaming hair. Here and there, the red puffs of antiaircraft bursts sent dotted red lines across the sky, but the defenses were ineffectual and the big

B-29s, flying in loose formation, seemed to work unhampered." Wind gales blew through the streets, carrying the flames from building to building as more bombs fell. "People came running down[17] the adjoining street and we could hear a crackling like the sound of bonfires—the noise, it seemed, of houses collapsing."

> Hell could be no hotter[18] [he continued]. The inhabitants stayed heroically put as the bombs dropped, faithfully obeying the order that each family defend its own home . . . As they fell, cylinders scattered a kind of flaming dew [napalm] that skittered along the roofs, setting fire to everything it splashed and spreading a wash of dancing flames everywhere. The screaming families abandoned their homes; sometimes the women had already left, carrying their babies and dragging crates or mattresses. Too late: the circle of fire had closed off their street. Sooner or later, everyone was surrounded by fire.

One man recalled seeing "red and yellow flames[19] reflecting from below on the silvery undersides [of the B-29s] so that they were like giant dragon flies with jeweled wings against the upper darkness."

Columns of heat rose off the city with such fury, the Superfortresses bounced through the sky, caught in the grip of air pulses. "I was actually over the target[20] for about an hour and fifty-five minutes," recalled Power, "getting a real good picture of what was going on down below . . . The air was so full of incendiaries that you could not have walked through them, and if you can visualize some 500 searchlights and a fire of this magnitude, you can appreciate that a lot was happening down there."

At headquarters in Guam, LeMay paced until sunrise. "I'm sweating this one[21] out myself," he told a subordinate. "A lot could go wrong . . . If the raid works the way I think it will, we can shorten this war."

For the crews, the return trip could be the most harrowing part of the journey. "We are getting out of there[22] as fast as we can," one B-29 pilot who bombed Tokyo said. "Up to that moment we were working for Uncle Sam, but now it's for us."

In the early hours of March 10, B-29s could be heard approaching Saipan and Tinian, and, one by one, pilots set them down on the tarmac. All but fourteen aircraft returned. One witness to this scene wrote, "At a field in the Marianas[23] they came back from their Tokyo bomb-run and you could have knocked me over with a lollipop when they came piling out of the hatches of a B-29, grinning like any gang of kids who might have come to

the end of a roller-coaster ride. Because that's what struck you—that they were just boys, and you got the idea, as you watched them grab up their gear and head for the interrogation hut, that the B-29s are being flown by everybody's kid brother."

The XXI Bomber Command held a press conference that morning. Tommy Power spoke to reporters, as did LeMay. In the Pentagon, Norstad spoke for Arnold. "If fleets of a thousand of the B-29s are required to finish off Tokyo," Norstad said, "we will produce them—and more."

Power's ship carried sophisticated camera equipment. Officials spent days examining evidence. The effect of it all was stunning. The Tokyo raid of March 9–10 remains the most destructive and deadly mission of any kind, in any war. An estimated one hundred thousand people died on this one night. The Army Air Forces's own official history of World War II reads, "No other air attack of[24] the war, either in Japan or Europe, was so destructive of life and property."

The Tokyo raid overshadowed Cologne, Berlin, and Dresden. Throughout the war, Roosevelt had condemned the bombing of civilians. But now, he remained silent. LeMay had this to say: "We don't pause to shed[25] any tears for uncounted hordes of Japanese who lie charred in that acrid-smelling rubble. The smell of Pearl Harbor fires is too persistent in our own nostrils." Arnold had given no direct order for the low-level incendiary raid. "I didn't need any direct orders[26] from Arnold," LeMay later said. "He expected action out of me."

When Arnold had the chance to view Tommy Power's photos of Tokyo, he wrote LeMay: "Congratulations. This mission shows[27] your crews have the guts for anything."

Following the firebombing of Tokyo on March 9–10, the Twentieth Air Force struck Nagoya on the eleventh, Osaka on the thirteenth, Kobe on the sixteenth, then Nagoya again on the eighteenth. All of those attacks used massive tonnages of incendiaries, with apocalyptic results. LeMay ended the firebombing campaign not because of any protest, nor any moral cogitation, but because he ran out of firebombs.

Arnold wrote him on March 21, "Your recent incendiary missions[28] were brilliantly planned and executed . . . A study of the effect of the Tokyo attack of March 10 and knowledge of the fact that by July 1 you will have

nearly a thousand B-29s under your control, leads one to conclusions which are impressive even to old hands of bombardment operations. Under reasonably favorable conditions you should then have the ability to destroy whole industrial cities should that be required."

In the weeks after, ships arrived in the harbors at Tinian, Saipan, and Guam, unloading crate after crate of supplies. Workers started before sunrise lugging crates of firebombs into storage facilities. "They worked like supermen,"[29] LeMay recalled. "They'd get up at four o'clock in the morning and dig in for two or three hours, helping us with the bombs, and then they'd go on to their regular jobs. There were some Marines . . . they worked like dogs. Anybody we could get our hands on was hauling bombs for us."

As the supply of napalm began to stack high again, LeMay came to a conclusion. Like Arnold, he believed that airpower alone could end this war and win it. He believed there would be no need for a ground invasion, no "grand crusade" like the one Eisenhower had led in Europe. Armed with fleets of superbombers, LeMay felt victory within his own grasp.

What could be a greater statement in support of American military aviation—during this war and after?

LeMay wrote to the Twentieth Air Force's chief of staff, Norstad, "I feel that the destruction[30] of Japan's ability to wage war lies within the capability of this command, provided its maximum capacity is exerted unstintingly during the next six months, which is considered to be the critical period."

33

On Arnold's judgement, billions[1] upon billions of dollars were thrown into the construction of B-17s and fighter bombers. If they had failed, then the blame would have fallen on Arnold. It would have come down on him like a ton of bricks.

—*THE WASHINGTON POST*, MAY 8, 1945

Arnold knew that his own time was short. With failing health, he foresaw a final window of time in which he would be able to stake his claim for the future of airpower. With his staff, he constructed a report to the War Department that sought to put into perspective what the Army Air Forces had now become as the climactic air battles of World War II played out in the skies.

This report was as thick as a novella, and through the press, its message went out to the American people. While the document was vast in scope and granular in detail, its ultimate point hit like an arrow on a bull's-eye: "The United States must be[2] the world's first power in military aviation."

"Our aircraft workers, men and women[3] alike," Arnold reported, "have done what Adolf Hitler was sure that an unregimented people could not do: outthink, outwork, and outbuild his robots."

Arnold's report documented the Air Forces' expansion in surprising ways that most Americans did not yet understand. It drew a picture of how aviation was going to help shape the postwar world. It chronicled everything from new understandings in analog computer-assisted weather forecasting to new designs of clothing that could help humans withstand deadly weather conditions. Frangible bullets, mobile hospitals, radar developments, jet airplanes—all these inventions, borne out of the exigencies of war, would benefit all of mankind, in peace, in the future.

The Air Forces continued to funnel huge amounts into medical innovations, particularly psychiatry. "AAF convalescent hospitals[4] have developed specialized treatment," Arnold's report read, "the results of which are returning our men weeks and months ahead of schedule, rested in mind and body, to assume positions in the AAF or in civilian life." Flight surgeons were innovating ways to treat soldiers suffering devastating wounds that were not visible to the human eye. "These Flight Surgeons,[5] trained to deal with special psychiatric problems of the Air Forces, will be very valuable later, particularly during the post war period," wrote one Army colonel in a memorandum that Arnold forwarded to the White House.

"The system is in many ways[6] revolutionary," wrote the columnist Marquis Childs. "The system employs, of course, the modern techniques of psychiatry. But perhaps the most important element of all is the basic philosophy infused through the whole system—treat the human being, and not just the ailment he is suffering from."

"PTSD" as a term did not yet exist, but the efforts to understand and treat it now did.

The Air Forces had innovated new methods of food production. As Arnold put it in 1945, "the application of science to the[7] development of packaged and tinned foods" played a critical role in feeding warriors in remote locations. New methods in "hydroponics"—what Arnold called "chemical gardens"—would be used after the war in civilian farming, to spur new methods in feeding America and other countries. As an example, Arnold told the story of a program on Ascension Island deep in the Pacific.

"A plot of land was taken[8] over and engineers began construction of concrete beds which were filled with sifted volcanic gravel," Arnold's report read. "Seedlings were planted, [then] a nutrient solution, containing the chemicals necessary for the growth of modern plants, was passed through the beds from two reservoir tanks. Four months later, these 'visiting farmers' were harvesting tomatoes, radishes, lettuce and cucumbers from an 80,000-square-foot area of fertility." Arnold predicted that in the future, "chemical gardens will be established at all remote installations where fresh vegetables cannot be grown by ordinary methods."

One of the most important ventures remained the Air Transport Command. "The growth of the Air Transport[9] Command alone reads like a fairy [tale] story," *Washington Post* columnist Ernest Lindley wrote in 1945. "But the figures are there to prove that it is true." The ATC flew 28 million

miles per month in 1944. By the war's end it would fly 1,200,000 passengers, mostly over foreign routes.

Roosevelt, along with Secretary of State Cordell Hull, had held meetings about what the ATC would become in the postwar era. The assistant secretary of state, Adolf A. Berle Jr., had imagined the basic ideology of an international civilian aeronautical transportation industry centered around "the American plan," operating under "the four freedoms of the air[10]—the right to fly, to land, to set down passengers, mail, and cargo, and to pick them up anywhere in the world."

One example of how the ATC was building the foundation for postwar civilian international air travel was the flight routes it had developed in the South Pacific, joining remote islands to the American West for the first time. In 1945, the ATC flew seventeen scheduled flights round trip, every day, between San Francisco and Honolulu; eleven planes round trip every day between Honolulu and Guam; seven from Guam to Okinawa; four from Guam to Manila . . . This network would have seemed fantastical just three years earlier.

Roosevelt was keenly interested in international air travel. He saw in the future "a very free interchange" whereby aircraft from different countries could take off and land in any other country "for the purpose of discharging[11] traffic of foreign origin, and accepting foreign bound traffic." The Army's ATC could continue to manage this industry, Roosevelt surmised, "until private enterprise was prepared to take over."

Business leaders were preparing for a revolution in commerce. "Of the revolutionary changes[12] in transportation witnessed by the New York Stock Exchange in its century and a half of existence," noted the *Wall Street Journal*, "none has been more dramatic nor more far-reaching than will be the development of air transportation in the post-war era."

"Even those of us intimately[13] associated with air transport," commented American Airlines vice president Charles A. Rheinstrom, "only partially appreciate what is coming in the air transportation of the future."

At the same time that Arnold released his latest report to the War Department, his push to sell the story of the B-29 to the American people reached a crescendo. Early in 1945, the Air Forces invited reporters from

the top newspapers into the B-29 factories for the first time, and even flew them in the cockpits of the superbombers.

One of those reporters was Bob Considine, a famous journalist who coauthored the 1943 book *Thirty Seconds over Tokyo*, about the Doolittle Raid, which was turned into an MGM movie in 1944 that thrilled audiences. "Now that the world's biggest,[14] most potent and newest bombing plane, the Army Air Forces' B-29 Superfortress, has had its baptism of action over Japan, it is permissible to release a flood of data on a craft so mighty that it can be relied upon to shake the farthest-flung Axis resistance and appreciably shorten the war," wrote Considine.

After a flight over the Wichita B-29 factory, he told readers, "The Superfortress is the world's first global bomber. It is so revolutionary in performance and so filled with ultra-magical equipment that the Army has built an entire new air force—the Twentieth—around it . . . The Twentieth Air Force's war theater is the world itself."

The Army flew a *New York Times* writer over Kansas in a Superfortress. "There are automatic ammunition[15] boosters and automatic gun chargers, automatic fire interrupters, [and] six electric motors operate each turret," he reported. "A gunner actually sights directly on an enemy fighter in pin-pointing on a tiny spot of light, the sight enclosing the enemy in a ring of tiny dots of light . . . An automatic computer adjusts for wind velocity, gravity, lead correction, relative speed of enemy."

Many readers of these B-29 stories grasped the meaning of the word *computer* for the first time.

In Marietta, Georgia, reporters were led into the innards of the B-29 plant, which was filled with nine thousand machine tools and twenty-five thousand employees—45 percent of whom were women. "Correspondents were permitted[16] to see for the first time the largest room in the United States, a mile long and three-quarters of a mile wide," reported veteran journalist John Stuart in *The New York Times*. The B-29 assembly line, he wrote, looked "like a block of Empire State Buildings."

A *Christian Science Monitor* reporter called Marietta's B-29 operation a "miracle." The Army Air Forces had made airplane building specialists out of "schoolteachers, salesmen,[17] soda jerkers, hairdressers, granite cutters, ministers, ribbon clerks, bank tellers, farmers, and housewives." Seven percent of Marietta's airplane builders were from the Black population, and reporters marveled over the sight of White and Black workers shoulder-to-

shoulder here in the Jim Crow South—known for its ugly history of racial violence and lynchings.

Black and White workers did the same jobs. So did men and women. To many Americans in the Deep South in 1945, this was as much a miracle as the B-29 itself.

At Boeing's B-29 plant in Seattle, the Army revealed a surprising secret: On the roof of this factory, engineers had built a fake suburban neighborhood. If Japanese bombers were to attack the West Coast, they would pass over this installation, unaware that it was in fact a hulking military factory. The "fake village" had fifty-three houses, twenty-four garages, manicured gardens, three greenhouses, a gas station, and a neighborhood store. The buildings and automobiles were of normal length and width, but built shorter than normal to conserve materials, since a bomber crew from above would not be able to tell the difference. As part of Arnold's publicity blitz, photos of this "town" appeared in newspapers across the country.

Critical to the story was the cost of it all. The first B-29, Arnold recorded, cost American taxpayers $3,392,396.60 (well over $60 million in 2025). By the spring of 1945, that number had reduced to roughly $600,000 per ship.

Even the cafeteria at the Boeing Seattle factory was a story all its own. Food engineers had innovated ways to feed what reporter Kate Archibald called "the city-sized population of the plant."[18] Together, the government and Boeing had developed robot cooks that could turn out 350 pies per hour with little help from human hands. "The kitchen is equipped with a battery of electric kitchen helpers, potato peelers, food choppers, doughnut fryers, flour sifters, mixers, blenders," Archibald wrote. The idea was to build a cafeteria kitchen as innovative as the moving B-29 assembly line itself, while also innovating the kitchens of tomorrow for factories and for families in their homes.

Wichita remained the capital of B-29 production. One Boeing employee tried to put the size of the B-29 factory in perspective: "The warehouses alone are large[19] enough to house 110 regulation basketball courts, and three buildings the size of the Wichita Forum could be dropped in the middle of the final assembly areas with room enough left for a football gridiron on the side." As one aviation employee put it: "This is really Kansas[20] at war."

A Kansan Boeing vice president named J. Earl Schaefer could recall, just a few years earlier, working at a small aviation shop in the middle of the Depression-era Dust Bowl plains, struggling to keep the doors open for all of thirteen employees. Now Boeing's Wichita plant measured 3 million square feet in production and warehouse space. Payroll averaged close to $7 million per month (more than $125 million per month today).

Like Arnold and Roosevelt, Boeing officials also saw a massive civilian and cargo airline industry booming in the postwar era. The company had already created a "double deck luxury transport of the future" version of the B-29 Superfortress, called the Stratocruiser,* which in January 1945 flew from Seattle to Washington, DC, in six hours, three minutes, and fifty seconds. "A new coast-to-coast[21] non-stop record!" Boeing screamed in a national ad campaign.

Rather than incendiary bombs made to burn cities, Boeing's B-29s of the future would fly as Stratocruisers filled with rows of passenger seats, carrying civilians to new destinations many never dreamed they would see.

Arnold had gambled his career on the B-29. All this publicity in the spring of 1945 aimed to make sure the world knew of its success. As LeMay later wrote, "Arnold took a calculated risk[22] of unprecedented proportions—everything could have exploded in his face—and he won."

34

We interrupt this program to bring you a special bulletin from CBS World News. A press association has just announced that President Roosevelt is dead.

—CBS RADIO JOURNALIST JOHN CHARLES DALY ON *THE WORLD TODAY*, APRIL 12, 1945

Arnold awoke at 7:30 a.m. on April 13, 1945, in a hotel room in Cannes, France. He had recovered enough from his heart attack to fly abroad again, in an attempt to get his finger back on the pulse of the war. He traveled now with his own flight surgeon, a physician named Dr. Gilbert Marquardt, who came into his room that morning to deliver shocking news.

"Marquardt came in and told me[1] that President Roosevelt was dead," Arnold wrote in his diary.

Like the shock of Pearl Harbor, Roosevelt's death froze time in the minds of millions. People would remember where they were and what they were doing the moment they heard. Winston Churchill felt "as if I had been struck a physical blow."[2] "Indeed it may be said," he wrote, "that Roosevelt died at the supreme climax of the war, and at the moment when his authority was most needed to guide the policy of the United States."

In Berlin, Hitler huddled in his secret bunker, where he had idled for days on the brink of nervous collapse. When he learned of FDR's death, he rushed to his production chief, Albert Speer, and exclaimed, "We have the miracle[3] I always predicted! The war isn't lost . . . Roosevelt is dead!"

Roosevelt's loss, Arnold feared, was also a loss for airpower. The president had once served as Assistant Secretary of the Navy, and yet, he had turned out to be one of the most important benefactors in the history of

military aviation. Roosevelt's death, Arnold journaled, "may be a calamity[4] of a kind and extent the people of the US do not realize."

Many Americans in uniform were young enough that they could not remember any other president in their lifetime. A big part of the shock was the obscurity of the new president, Harry S. Truman of Independence, Missouri, who was sworn in during a dramatic White House ceremony on the night of April 12. Like most Americans, Arnold knew nothing about Truman. What would be his position on air matters? On war strategy?

"The gravest question mark[5] in every American heart is about Truman," Republican Senator Arthur Vandenberg confided in his diary that night. "Can he swing the job?"

The week of Roosevelt's death, the newspapers continued to report the destruction of Axis nations from the air. The Eighth Air Force went after German airdromes, destroying swastika-emblazoned aircraft while they sat on the tarmac. In a ten-day total ending roughly one week after FDR's death, the Eighth Air Force claimed 1,720 enemy aircraft wrecked. Soon after, an American reporter from United Press International made it to Berlin and proclaimed, "Berlin is dead.[6] As a city, it no longer exists."

While the air operations continued, so too did the liberation of Nazi death camps. Arnold wrote in his diary on April 24 of a friend who witnessed the horror firsthand. "He saw the concentration camps[7] and says that the atrocities were much worse than depicted in the papers; they are indescribable." This, to some extent, explained America's reaction to the destruction of Berlin. Few moralists spoke up for the fate of the German citizens. One *New Yorker* magazine writer described the operations as "a necessary action, efficiently[8] and economically carried out"; "each individual [in Germany] should shoulder his share of the moral responsibility for it."

This *New Yorker* writer echoed what Arnold already knew. Using airplanes, "it is now possible to destroy a city."

On the day of Roosevelt's death (April 12 in the States, April 13 in Japan), B-29s took flight again from Tinian and Saipan, this time their bellies loaded with incendiary bombs. For the first time since LeMay had run out of firebombs weeks earlier, he again commanded hellfire from above. The XXI Bomber Command struck Tokyo. Shell explosions from

anti-aircraft guns flooded the night sky while bright yellow and green cones of light from more than 150 searchlight beams captured glimpses of roaring silver bombers moving through the aerial flames. The B-29s burned a new section of Tokyo beyond recognition. Crews reported “great clouds of black smoke,[9] higher than our plane.”

“We could still hear explosions[10] when we were better than 100 miles away on our trip home,” said Cpl. David Menor of Kansas City, Missouri. “There were fighters and tracers[11] everywhere,” said Sgt. Aubray Pollack of Pampa, Texas.

On the ground in Tokyo, Japanese radio reported: “United States Army Air Forces attacks[12] on Tokyo are known among Japanese as ‘blind’ bombing or ‘indiscriminate’ air raids because nonmilitary business and residential districts have been the targets of these attacks.”

Two days later, the B-29s struck Kawasaki and Tokyo again with firebombs. LeMay told the press that an invasion of Japan’s homeland was going to be unnecessary. “The destruction of Japan’s[13] industry by air blows alone is possible.”

Throughout the war, the United States had publicly embraced an explicit moral doctrine with regards to air war. That now appeared to be gone. Americans were focused on Roosevelt’s state funeral, on the reams of newsprint explaining just who Harry Truman was, and on the exciting news of the collapse of Nazi Germany. The turn in air strategy in the Pacific moved sharply with little public discourse among the American power elite. Historian Max Hastings has written, “There is no documentation[14] to suggest that either Roosevelt or Truman was ever consulted about LeMay’s campaign. Here was an extreme example of the manner in which the higher direction of Americans was left overwhelmingly in the hands of the service chiefs of staff.”

Nor does much discussion of moral warfare appear in Arnold’s private diaries, especially during these days when he was still recovering his health.

With no words of rebuke from Washington or London, the Twentieth Air Force pushed forward. Norstad communicated to LeMay a new list of targets for the B-29s. “With a greater respect we[15] now have for our fire-making ability and the greater weight that we are able to lay down, these new areas which have just been sent to you represent more nearly the top industrial areas,” Norstad wrote. “They also appear to be the most

susceptible to fire attack . . . If we are successful in destroying these areas in a reasonable time, we can only guess what the effect will be upon the Japanese . . . Possibly they may lose their taste for more war. I am convinced that the XXI Bomber Command, more than any other service or weapon, is in a position to do something decisive."

On April 15, 194 B-29s firebombed Tokyo again, while another 194 Superfortresses hit Kawasaki. On April 18, six days after Roosevelt's death, Norstad wrote LeMay: "A glance at the map[16] certainly gives the impression that something over half of Tokyo is now gone. The three Tokyo incendiary operations have certainly been among the most effective in the entire history of bombing. Keep up the good work."

From May 24 to 26, LeMay oversaw yet another firebombing attack, this time with 518 B-29s. Four hundred and sixty-four of them hit Tokyo.

The American airmen saw heavy losses. Reports reached Washington of B-29s getting blown out of the sky. The casualty reports were time-stamped with the eyewitness statements. 11:40 p.m.: "Over the target,[17] on fire in a dive, blew up on ground." 12:07 a.m.: "Seen to blow up 20 miles from coast on route out." 1:07 a.m.: "On east edge of target, on fire for 5 minutes. No parachutes seen." One American prisoner of war in Japan documented kamikazes crashing into two B-29s: "The tiny planes flew against the bombers and exploded, shattering into a thousand pieces. The bombers both burst into flame but remained intact while they came slowly down and crashed."

The next day, the fires continued to spread. "The last of old Tokyo's[18] architectural treasures, the ones that had survived the 1923 Earthquake—were burned to the ground," reported one journalist on the ground. "The Shiba pagoda; the Yoyogi temple where 'the ashes of the true Buddha,' given to Japan in 1942, were kept; the black-and-gold-lacquered tombs of the Tokugawa shoguns; all these perished in the tragic forty-eight hours from May 24 to 26."

American leaders in Washington had little understanding of napalm. What was this new laboratory-derived substance? Arnold defined it in a memorandum to Secretary of War Henry Stimson: "Napalm is a soft gasoline-impregnated[19] jelly which our tests at the AAF Proving Ground in Florida and in experimental drops both in Europe and in the Pacific had

proved almost non-extinguishable. Loaded in 110-gallon tanks with a detonator whose small fuse exploded on impact, napalm could be laid down . . . in a literal blanket of fire."

Life magazine published aerial photos of the devastation. *Newsweek* declared that Japan "quivered under unprecedented[20] American air blows. No Jap—and for that matter few Americans—had ever expected that such attacks could be mounted. In the short space of two weeks, the vital centers of four of Japan's five greatest cities had been burned out." Stimson told the new president, Truman, that he did not want to see the United States "outdoing Hitler in atrocities."[21]

The secretary of war called Arnold into his office, and Arnold reported on June 1. Stimson was a curious figure, a patrician relic of the past who spoke as if he were a character in a Henry James novel. At seventy-seven years old, he had served as secretary of state under Herbert Hoover, and as a brigadier general during World War I. He had spent his career on the cutting edge of international diplomacy and war, but he had never heard of anything like the destruction of Japan by superbombers.

Stimson scolded Arnold for the severity of civilian casualties in Tokyo. "I told him of my promise[22] from [Assistant Secretary of War for Air Robert] Lovett that there would be only precision bombing in Japan," Stimson recorded, "and that the press yesterday had indicated a bombing of Tokyo which was very far from that. I wanted to know what the facts were."

Arnold explained that unlike Germany, Japan's war industries were scattered in small machine shops in residential neighborhoods—sometimes even in people's homes—around urban areas. "Thus it was practically impossible[23] to destroy the war output of Japan without doing more damage to civilians connected with the output," Arnold said, according to Stimson's diary recollections.

"These operations were parts[24] of a whole, steps in a planned progress," Arnold reported to the War Department. The Twentieth Air Force launched Operation Starvation on March 27—an effort to blockade sea routes into mainland Japan since the nation imported much of its food via ships. The mining operation proved yet another method of aerial attack. It employed bombers to drop more than two hundred different kinds of mines developed by American scientists and ordnance specialists—mines weighing between one thousand and two thousand pounds, including magnetic mines, acoustic

mines, all laid in the seas around the Shimonoseki Straits, Kobe, Osaka, Hiroshima, Nagoya, and Tokyo Bay.

"This was the first use of aerial mines[25] as a truly strategic weapon," Arnold reported. Operation Starvation sank or damaged 1.25 million tons of Japanese shipping. Japanese citizens suffered, preaching the slogan of "Yase-gaman," or "strength through skinniness."[26]

At the same time, amphibious invasions of both Iwo Jima (D-Day: February 19, 1945) and Okinawa (April 1) moved America's Arsenal of Democracy onto the beaches of these atolls. Amphibious "amtracs," tanks, tractors, cranes, and trucks loaded with mini-rockets moved from boats to land, while Japanese kamikaze pilots crashed at high speed, sinking thirty-six American ships. "It was hell, plain hell,[27] all the way," one Marine reported. "Our fleet and aircraft had pounded the volcanic mountain until you couldn't believe anything could be alive on it but the Japanese were still there shooting."

Arnold intended to place twelve groups of B-29s at Okinawa. "Bulldozers and shovels were busy[28] on Okinawa air strips on the day our forces landed," he recalled. Okinawa saw more than 12,000 American and 100,000 Japanese combat deaths, plus tens of thousands of civilian Japanese casualties. The bloodshed foreshadowed what would happen if American soldiers attempted to invade Japan's homeland. The Japanese propaganda machine had already begun to create a groundswell of bloodlust for the oncoming invaders. In a radio broadcast, the leader of Japan's Imperial Rule Association told listeners, "The time has come when,[29] like the soldiers at the front, the people in the rear must also transform themselves into human bombs. The Hundred Million must all resolve to die for the emperor."

As the Tokyo-based journalist Robert Guillain wrote, "This was the kickoff[30] of the propaganda campaign for national suicide."

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> It is my earnest wish that[1] you will enjoy continued good health, so that we may have the assurance of your inspired leadership, splendid guidance, and prestige in the building of a separate Air Force after the present war.
>
> —LT. GEN. BARNEY GILES TO HAP ARNOLD, APRIL 30, 1945

On April 28, at Giulino di Mezzegra near Italy's Lake Como, Italian partisans shot to death fascist leader Benito Mussolini along with his mistress and seventeen other fascist followers. Mussolini had been caught trying to flee into Switzerland. As he faced the gun barrels, his last words were, reportedly, "No! No!"[2]

The next day, German military officials wearing civilian clothes signed surrender orders at Caserta, and the war in Italy ended. Also on this day, US forces liberated the Dachau concentration camp, finding more than thirty railcars containing decomposed bodies. More than thirty thousand prisoners were living at Dachau on the day of liberation.

One day later, on April 30, an unconfirmed BBC radio report claimed that "Hitler died at noon[3] today in his underground headquarters in the Tiergarten in Berlin with propaganda minister Goebbels at his bedside." The entire world awaited confirmation. On May 2, during the new president's regular press conference in the White House, a reporter asked Truman, "Mr. President, would you care to comment on the death of Adolf Hitler reported, or Mussolini?"

"We have the best[4]—on the best authority possible to obtain at this time that Hitler is dead," Truman told a packed room. In fact, Hitler had shot himself with his 7.65 mm Walther. Propaganda minister Goebbels followed

the next day; he was found dead with his wife and all six of their children, who were poisoned and laid out neatly, all dressed in white.

German officials signed orders of unconditional surrender on May 7, in Reims, France, effectively ending World War II in Europe. Truman broadcast a short speech at 9 a.m. eastern time on May 8, promising that the United States would continue to fight until "the last Japanese division[5] has surrendered unconditionally."

In cities and towns around the world, pandemonium filled the streets and church bells clanged. *Newsweek* magazine declared V-E Day "The Biggest Holiday in the World."[6] Arnold was in Brazil on the day of surrender. He recorded a speech for broadcast in the United States:

> Air power was our margin[7] of Victory [Arnold said]. And the thing to remember on this, of all days, is that to give us this all-important margin, tens of thousands of the finest men who ever lived lie in nameless graves, scattered everywhere. We must never forget their sacrifice. For many months now, scarcely a day has passed without our B-29s making their appearance over the Japanese homeland. The men in those airplanes know what their job is . . . Remember those men on this day. Remember, although a great battle has been won, their war, and your war, goes on!

Arnold also wanted to send a warning. "We are going to do the same[8] thing to industrial Japan that we did to industrial Germany . . . If Japan wants to continue the war—by God, if Japan wants it, that's what she'll get. And you know what will be left of the area from Tokyo to Nagasaki."

On June 12, Arnold landed on the island of Guam. He found the place to be incredible. The Army and Navy both had headquarters here; Arnold estimated 90 percent Army, 10 percent Navy. The islands held veritable parking lots of B-29s, and Arnold estimated that it required 85 personnel total to keep each of these machines operational. Eight big ships anchored in Guam's harbor. Arnold rode around Guam and journaled: "Wide roads with hundreds[9] of trucks, jeeps traveling from end of island to other, 30,000 trucks, jeeps, etc. . . . 170,000 troops and sailors on Guam."

Tinian was now home to an airport larger than any in Paris, London, or New York City. "Tinian is a miracle,"[10] noted one writer who saw it at the time. "Here, 6,000 miles from San Francisco, the United States armed forces have built the largest airport in the world. . . . From the air this

island, smaller than Manhattan, looked like a giant aircraft carrier, its deck loaded with bombers."

Engineers had built infrastructure to support massive populations on these islands, with amazing speed. They had built, for example, a facility to distill two hundred thousand gallons of drinking water. To aid morale, the Special Services Division built ballfields and had organized a spectator sports program among the Air Forces on Tinian, Saipan, and Guam, with a Marianas Tennis Cup Championship and a baseball league. The Seventy-Third Bomb Wing "Bombers,"[11] the 313th Wing "Flyers," and the Fifty-Eighth Wing "Wingmen" each had their own ball clubs with major league players on their rosters, from the Boston Red Sox, New York Yankees, Detroit Tigers, and a host of minor league clubs.

Meanwhile, a small number of Japanese soldiers continued to hide out in the jungle on these atolls. "Japs are still being killed,[12] being brought in or are surrendering on Saipan, Tinian, and Guam," Arnold wrote in his diary. "30 were taken or killed yesterday."

The week leading up to Arnold's arrival, the Twentieth Air Force had delivered Japan nightmarish blows. On June 5, 473 B-29s took off from Mariana Island runways and struck Kobe with 3,077 tons of bombs, burning out an estimated 4.35 square miles of the city, with 11 Superfortresses lost. On June 7, 458 B-29s—along with an Iwo Jima–based escort of 138 P-51 Mustangs—hit Osaka, dropping 2,540 tons of bombs and burning out an estimate of 2.21 square miles.

Shortly after Arnold's arrival on June 12, he held an informal briefing on the porch of LeMay's quarters. A colonel named J. B. Montgomery—who had received a Medal of Honor for valor in combat in Italy—led an operations discussion. Montgomery used regular butcher paper, purchased from Navy commissary, to create his only visual aid, as that was all he could find. "It was a very effective briefing,"[13] recorded one of Arnold's staff officers, Maj. Gen. Cecil Combs. "And of course, LeMay was sitting there smoking on his cigar."

Arnold listened to the briefing, fully believing that B-29 bombing could end the war. "The B-29s could demolish any[14] damn target in Japan within a certain amount of time," Combs recalled. "The quicker they could have aircraft and bombs the quicker they could do the job. Arnold was completely convinced that if we accelerated the flow of bombers, crews,

and supplies, that they could do it . . . They could destroy any target, and all targets, in Japan, of any military significance."

(Doolittle later wrote in his memoirs, "Hap was convinced[15] that Japan could be driven to surrender without an invasion and was determined to make the bomber offensive decisive. If so, this would be used as evidence that the Air Force should be established after the war as an independent service—something all of us felt was absolutely essential to maintain the peace in the postwar world.")

Arnold asked LeMay, "I'm going to ask you the same question[16] I've been asking everybody else. When is the war going to be over?"

LeMay had not thought about a specific date. After huddling with his team, he came up with October 1. Arnold wrote in his diary how the Twentieth Air Force could end the war by destroying thirty large and small cities, leaving Japan with nothing left with which to fight a war.

Still, Arnold believed that October 1 was not soon enough. To hasten the campaign, he was going to flood the Far East with more airplanes, commanders, and aviators. He announced his decision to bring Spaatz, Doolittle, and the Eighth Air Force from the European theater to the Pacific, and make Spaatz the overall air theater commander, while renaming this juggernaut the US Strategic Air Forces in the Pacific.

On his second day in the Marianas, Arnold met with Adm. Chester Nimitz. White-haired and square-jawed, Nimitz was a year older than Arnold, and as much *Navy* as Arnold was *Air*. As Arnold wrote in his diary, Nimitz was determined to do things "the Navy way."[17] Nimitz expected full command in the Marianas. Nimitz expected full command in Okinawa. Nimitz clearly wanted the Navy in overall command in the Pacific.

The fight for postwar supremacy had already begun: Army vs. Navy. To Arnold, it was a battle he had known almost all his military career.

On Arnold's fourth day in the Pacific, he flew to the Philippines to meet with MacArthur. In MacArthur's headquarters, the two Army generals held a "long, spirited talk,"[18] as Arnold recalled. MacArthur's record in the war was controversial, but as far as Americans knew, he was as big a war hero as anyone. Only Eisenhower rivaled MacArthur's stature in the eyes of America. In his headquarters, MacArthur paced in front of Arnold and raised his voice excitedly. "He feels that Navy is building[19] up a post-war organization and laying plans, completing facilities for such an organization now," Arnold wrote in his diary.

Arnold found in MacArthur a political ally. “MacArthur is for a separate[20] Air Force,” he wrote. “He is willing to organize Army Air in Pacific along those lines now.”

On June 15, to commemorate the first anniversary of the founding of the Twentieth Air Force, Arnold gathered reporters in a briefing room on Guam. LeMay stood by his side. To a packed audience, Arnold announced that in that very moment, 529 B-29s were unloading 3,000 tons of bombs on Osaka. Soon the United States would be able to strike Japan at a rate of 5,480 tons per day, Arnold said.

“Let us go back into the history[21] of the B-29s,” Arnold said. “We had been hunting for an airplane which would carry the war beyond the range of land Army or sea fleet warfare. We finally got the B-29. How good it was we didn’t know . . . We have found the B-29 is the outstanding airplane in the world today . . . No other weapon in the world will do what you can do with the B-29’s.”

He told reporters why the strategy of high-altitude precision daylight bombing in Europe had shifted to night “area raids” in the Pacific. “When we hit Germany there were large factories which we could hit by pinpoint bombing,” he explained. “In Japan there are also large factories, but in addition they can make their crude Kamikaze planes in the backyards of their houses and in small factories and that is why we have to wipe out Japan area by area. It requires the complete and utter destruction of these industrial areas and that is what we will do.”

On this same day, Arnold received a cable from the Pentagon. In three days’ time, Truman was set to hold a critical meeting in the White House to discuss plans to end the war with Japan. Arnold chose to send Eaker to Washington. Why he would not go himself is a question he never answered, but the truth was almost certainly his health. In his diaries, he mentioned twice around this time struggling to climb stairs.

Eaker left immediately on a thirty-six-hour flight. The meeting in Washington would become legendary—both for what was said and for what was not.

In the White House on June 18, 1945, Truman called his meeting to order at 3:30 p.m. Almost all the military brain trust was present, with Arnold’s

notable exception. Marshall, Stimson, Fleet Admiral King, White House Chief of Staff Admiral Leahy, and members of the War Department surrounded the president with strong opinions on the future of the Far East war. Eaker appeared, to speak for Arnold. The Army's chief of staff, Marshall, dominated this meeting, explaining why he believed the invasion of Japan had to move forward.

The situation in Japan, Marshall said, was "practically identical"[22] to the one in Europe before the Normandy invasion. Marshall was convinced that "every individual moving to the Pacific should be indoctrinated with a firm determination to see [the invasion] through," according to the meeting minutes.

Marshall put the number of ground troops at 766,700 American soldiers. He discussed what could be expected in casualties. The United States had suffered roughly 20,000 casualties (killed, wounded, missing) at Iwo Jima, and over 40,000 at Okinawa. Marshall could not estimate how many would be killed in a ground invasion of Japan, but he did say, "It is a grim fact that[23] there is not an easy, bloodless way to victory in war and it is the thankless task of the leaders to maintain their firm outward front which holds the resolution of their subordinates."

Eaker spoke very little in this meeting. All agreed, the Japanese would rise up with every weapon they could. This was no secret. That same week, *Newsweek* published a long article entitled, "Japanese Etch Grim War Plans[24] with Suicide as National Weapon." In Truman's meeting, the secretary of war raised the inevitability of an entire "submerged class"[25] of Japanese—meaning men, women, and children—who would rise up in arms to meet an invasion.

Nevertheless, Marshall set a D-Day of November 1 in motion for what was now called Operation Olympic.

At Guam, Arnold learned of the outcome of these discussions. Once again, he felt the sting of disappointment, a lack of belief among the most powerful figures in America in the value of airpower. He sent a cable to his staff in the Pentagon asking a rhetorical question: "DO THE PEOPLE IN WASHINGTON[26] REALIZE THAT THE BOMBING OF JAPAN—THE SHORTENING OF THE WAR—THE SAVING OF AMERICAN LIVES ALL ARE DEPENDENT TO SOME EXTENT ON THIS ORGANIZATION?"

Arnold had his own plans. The Twentieth Air Force was prepared to move forward with all its efficacy. He wrote in his diary how he would

"press bombing attacks[27] with B-29s and completely destroy Jap industries and major cities." The invasion planning could continue, he thought, "on a postponed basis." In the end, this meant a race to get the job done and Japan defeated, before the invasion on November 1. To Arnold's thinking, the lives of tens, if not hundreds, of thousands of American soldiers hung in the balance.

Absent from Arnold's diaries and his correspondence—for security reasons—was any mention of the atomic bomb. Paul Tibbets and his 509th Composite Group had recently relocated to Tinian, at the time of Arnold's arrival there in June. Like Arnold, Tibbets found the place fascinating.

"Tinian Island became known as[28] Manhattan in the Pacific," Tibbets later wrote. "New York without subways. The nickname originated when a New York member of the Engineering Corps, laying out streets for our military installation, observed with little imagination that the island bore a geographical resemblance to Manhattan. Accordingly, he named the streets he was creating for some of the best known in the Big Apple. Broadway and Forty-Second Street, for instance, was our most important crossroads." The 509th Composite Group decamped on the northern end of the island, in the "Columbia University District."

The group now consisted of 18 B-29s with crews, situated near the island's longest runway of 8,500 feet. The aircraft were referred to as "Silverplate"—modified for specific roles and performance. By the summer of 1945, they were ready to fly.

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This project should not be considered simply in terms of military weapons, but as a new relationship of man to the universe.

—SECRETARY OF WAR HENRY STIMSON, 1945

It was a tired group that boarded a Douglas-built C-54 in Washington on July 10, 1945, for a rain-delayed midnight flight to Europe. As the C-54 ascended over the Atlantic Ocean, Arnold, Marshall, Norstad, and their staffs sat in uncomfortable seats in the cargo hold, their eyes heavy with fatigue. They were bound for Potsdam, Germany, and the last of the major wartime Big Three conferences—codename Terminal. The aircraft flew with its name painted in red cursive letters across its fuselage: *Argonaut IV.*

Stopping in Paris, Arnold walked the streets in the summer heat, just as he had as a young man in 1909, when he first set eyes on an airplane—the Blériot flying machine that he saw hanging on display above the Parisian macadam. Since that time, the Blériot airplane—barely more than a box kite with a small engine—had given way to radar and rocketry, atomic science, and superbombers that could blow up cities.

It seemed remarkable to Arnold, who had just turned fifty-nine, that so much could happen in his short lifetime.

On a flight from Paris to Berlin, he sank deep into thought. If science had changed human life so much in these mere decades, what remained to be seen in the future? What might his children live to see? How should his country be preparing now for the national security challenges of tomorrow? "All of our planning should[1] be directed toward the future," Arnold journaled. "We must have the long-haired professors in Von Karman's board [the Scientific Advisory Group] see all the gadgets and data and

drawings so as to give us a Buck Rogers program to cover the next 20 years. We cannot let the American people down by sniping [slipping?] back to our 1938 position."

In Germany, Arnold rode with a driver and other officials in Hitler's car, a touring vehicle with bulletproof glass and armor plate. Signs of aerial devastation were everywhere. The group visited Hitler's "Eagle's Nest," his official hideout in the mountains. Looters had stolen all kinds of souvenirs, from the doorknobs to pieces of carpet. The elevator man who ran the elevator for Hitler was still working there. Next, the Americans visited a deserted resort hotel where Goering had collected the art treasures that he had looted from all over Europe.

Reaching the Babelsberg suburb of Potsdam, the officials unpacked in their billets. They had received their "Information Bulletin Tripartite Conference"[2] packet alerting them to their quarters (Arnold's was 96 Berliner Strasse). Americans were warned to drink only US ration liquor. "All water from faucets[3] and taps has been found nonpotable," instructions read, "and is condemned by the Medical Authorities."

Security had split Babelsberg into two sections, one for the Soviets and the other for the Americans and Britons. National flags hung from polls outside buildings now marked as "State Department" and "Chiefs of Staff." "Absolutely *everyone* was there,"[4] noted one British official. "It was the last great beano of the war."

On July 16, Arnold and Marshall motored through burned-out Berlin, and took in the shock of the devastation. "We saw Berlin and Potsdam[5] at their worst, not a house for miles, not a building . . . ," Arnold journaled. "People streaming into Berlin on bicycles, pushing carts, baby buggies, old and young, with all their household belongings and no place to go but amid the ruins, stink and smell of rotting bodies and broken sewers."

Public benches stood out amidst the rubble, with "Verboten fur Juden"[6] signs ("Jews forbidden"). An American bomb had crushed a building where the Germans kept their medals; now filthy Nazi Legions of Merits and Iron Crosses lay scattered on the pavement like symbols of Hitler's hubris. The stink of death and of feces emanating from shattered buildings that were being used as outdoor toilets was made more acute by the stifling July heat. Truman recalled driving through Berlin as if it were an apocalyptic dreamscape; he described a "never-ending procession of old men,[7] women, and children wandering aimlessly," "evidence of a great world tragedy."

Almost all of this was the work of airpower—the crushing blows from Allied bomber aircraft. Now Arnold saw these terrifying visions of Berlin with his own eyes, far from the frenetic offices in the Pentagon where generals ordered men into battle. It was a humbling experience. "Twenty-five years, fifty years,"[8] he wrote, "who knows what, to clean up the smell, and more smell."

On July 17, Arnold and Marshall sat over lunch when a messenger arrived, asking them to go see Secretary of War Henry Stimson at once. They found Stimson in his villa with his assistant secretary of war, John J. McCloy. The atmosphere in this villa felt electrified. Stimson showed Arnold and Marshall a cable from an official in Washington named George L. Harrison. It read:

> OPERATED ON THIS MORNING.[9] DIAGNOSIS NOT YET COMPLETE BUT RESULTS SEEM SATISFACTORY AND ALREADY EXCEED EXPECTATIONS. LOCAL PRESS RELEASE NECESSARY AS INTEREST EXTENDS GREAT DISTANCE. DR. GROVES PLEASED. HE RETURNS TOMORROW. I WILL KEEP YOU POSTED.

The cable was a cryptic message that read like something out of a spy novel, and it regarded the atomic bomb. Experiments at Los Alamos in New Mexico, years in the making, had reached a climax. The bomb was real; it had worked. "Dr. Groves" was none other than Leslie Groves, who had built the Pentagon and was the Army's chief executive in charge of the Manhattan Project.

The "press release" mentioned was another riddle; it referred to a public relations issue that needed addressing, as the "Trinity Shot," as the first atomic bomb explosion was called, had alarmed civilians who heard it go off, many miles away.

A new atomic epoch had arrived. The Trinity Shot "did not come as a complete surprise[10] to me," Arnold remembered, "but I had thought the test was a week or two away. From the information we received, the scientists were very well pleased with the results. The sound, it was reported, could be heard fifty miles away, and the flash could be seen for over two hundred miles out in the desert north of El Paso."

A thousand questions presented themselves. Should the Americans tell the Soviets about the bomb? Should it be used against Japan? If so, when? What would be the moral, political, and philosophical implications? Arnold

recalled, “With Secretary Stimson and[11] Mr. McCloy, General Marshall and I discussed the big questions: how soon would we be ready to use the bomb against Japan, and what should the targets be?”

Over the next days, the climactic political conference of World War II lured attention from all over the globe, as Truman, Churchill, and Stalin negotiated agreements and disagreements in a conference room in Potsdam’s Cecilienhof Palace, while teams of reporters and security kept the hallways and the bars packed. The war had forced the United States and Britain, and the Soviet Union, into a strange alliance. Churchill had famously named it “the Grand Alliance,” but its grandiosity had faded. Now that the war was ending, a widening chasm between the east and west emerged. It was political, philosophical, and in some ways inexplicable. In the heated discussions at Potsdam, the Cold War began.

“We [the US and the UK] both believed[12] our next enemy would be Russia,” Arnold later wrote. The Soviets seemed to fear nothing—except airplanes. “They have never had long-range bombers of their own and they apparently do not know the principles of employing them. Tomorrow, however, things may be different.”

But an entirely different narrative also unfolded, behind closed doors. The American and British Combined Chiefs of Staff hammered out the final directives for Japan’s defeat. The Soviets were left out of these conversations, as they were, at this time, not at war with Japan, and as far as the Americans and British knew, they knew nothing of the atomic bomb. Arnold remained taciturn during the meetings, deferring to Marshall, who continued to push for an invasion. According to the final wording of the military plans, “The invasion of Japan[13] and operations directly connected therewith are the supreme operations in the war against Japan.”

On July 16, the Navy heavy cruiser USS *Indianapolis* had pushed out of San Francisco Bay with the bomb loaded in its hull, bound for the Mariana Islands. On July 23, in Babelsberg, Arnold again met with the secretary of war to discuss progress of the bomb. All the plans required to fly it over its target were now in motion. “We talked about the killing[14] of women and children; the destruction of surrounding communities, the effect on other nations, and the psychological reaction of the Japanese themselves,” Arnold

recalled. “We also discussed the possible effect of the weather and the topography on the explosion of the bomb.”

Arnold had an idea: to evacuate a Japanese harbor and detonate an atomic bomb in this location, *after* the war had ended. That way, the effects of the bomb could be studied without killing so many civilians. The bomb would achieve its political purpose: to let the world know of its fury, and thus, it could begin its role as a tool of deterrence. This idea had the tacit benefit of giving the victory to airpower, as Arnold felt sure the B-29s could bludgeon Japan into acquiescence. But his plan fell flat. Truman, Churchill, Stimson, even the scientist in charge at Los Alamos, Robert Oppenheimer, had already concluded that the bomb should be used against a wartime target.

That night, at a banquet dinner for the three powers, Stalin announced, “Now that the war in Europe[15] is over, we have a common enemy in the Pacific, and here’s to our next meeting in Tokyo.” Arnold recalled, “I told Stalin, the Prime Minister and the President that if our B-29s continued in their present tempo there would be nothing left of Tokyo in which to have a meeting.”

On July 24, American and British leaders completed the wording of the Potsdam Declaration—a final ultimatum to Japan, to surrender or face the consequences. The ultimatum did not directly mention an atomic bomb. It did promise “prompt and utter destruction”[16] if unconditional surrender was not forthcoming. It read, in part:

> We call upon the government of Japan to proclaim now the unconditional surrender of all Japanese armed forces, and to provide proper and adequate assurances of their good faith in such action. The alternative for Japan is prompt and utter destruction.

On this same day, Truman and Stimson met privately for one hour—a critical hour for mankind. After this meeting, Truman wrote in his diary, “The weapon is to be used[17] against Japan between now and August 10th.”

Shortly after that meeting, the secretary of war visited Arnold at his billet on the Berliner Strasse. Arnold then communicated with Spaatz, who was now the overall Army air commander in the Pacific Theater. Spaatz later explained that he “would not drop an atomic bomb[18] on verbal orders —they had to be written—and this was accomplished.” The top secret

directive to Spaatz came from Lt. Gen. Thomas T. Handy, the Army's deputy chief of staff, and it began, "The 509 Composite Group,[19] 20th Air Force, will deliver its first special bomb as soon as weather will permit visual bombing after about 3 August 1945." The directive listed four targets: Hiroshima, Kokura, Niigata, and Nagasaki.

On July 26, the heavy cruiser USS *Indianapolis* arrived at Guam and delivered the Little Boy bomb.[*] Paul Tibbets's bomber crews saw the device for the first time. On July 28, Japan rejected the Potsdam Declaration. A Japanese news agency reported that the country would "prosecute the war[20] of Great East Asia to the bitter end."

The following day, July 27, Arnold flew out of Berlin, bound for Paris en route to Washington, DC. Reaching his little house at the Fort Myer Army base on July 30, he found his family suffering exhaustion. Now all Arnold could do was wait. He had time to gain some perspective. Perhaps in this moment he confronted the strange twist in his story.

Arnold was the driving force behind the design and the building of the B-29 Superfortress—the most expensive weapons system in history. If that airplane did not exist, would the Allies be able to deploy this atomic bomb? The only other airplane that could be considered was the British Lancaster, but that was not an American airplane, the dimensions were not conducive, and the Lancaster had significantly less range. Now the B-29 would play a starring role in a story that was about to transfix the world for generations.

As for the moral conundrum, Arnold could not escape a haunting ambivalence. He agreed with LeMay that the stink of Pearl Harbor's bombs still burned in his nostrils. He agreed with White House Chief of Staff Adm. William Leahy, who later wrote, "The best psychological warfare[21] to use on those barbarians was bombs, and we used bombs vigorously." Arnold felt the enemy was deserving of punishment, for the Bataan Death March, for the murder and rape of Chinese civilians, for the executions of the Doolittle Raid airmen, and for Pearl Harbor.

"Apparently," Arnold wrote in his diary in 1945, "the atrocities by the Japs[22] have never been told in the U.S.: babies thrown up in the air and caught on bayonets, autopsies on living people, burning prisoners to death by sprinkling them with gasoline and throwing in a hand grenade to start a fire. If anyone tried to escape they were killed by machine guns as they

came through the door. More and more of the stories, which can apparently be substantiated. There is no feeling of sparing any Japs here, men, women or children; gas, fire, anything to exterminate the entire race exemplifies the feeling."

"No matter how you slice it,"[23] LeMay later said, "you're going to kill an awful lot of civilians. Thousands and thousands. But if you don't destroy the Japanese industry, we're going to have to invade Japan. And how many Americans will be killed in an invasion of Japan? We just weren't bothered about the morality of the question."

On August 1, LeMay issued a warning to Japanese citizens in twelve cities to leave their homes and jobs to save their lives. The press called this list "LeMay's 'death list'[24] of targets marked for fire-bomb destruction." They included Mito, Fukuyama, and Otsu, among others.

The next day, the XXI Bomber Command struck with what the *New York Times* called "the greatest single aerial strike[25] in world history." Nearly nine hundred B-29s set targets aflame with 6,632 tons of conventional and incendiary bombs. The superbombers hit urban areas in Hachioji, Toyama, Nagaoka, and Mito. "The sight was incredible beyond description,"[26] one Superfortress crewman told a reporter. The Japanese, it seemed, were now defenseless. "They knew we were coming but they didn't do anything about it," said another B-29 crewman.

The B-29s had now destroyed vast sections of Nagoya, Kobe, Osaka, Yokahama, Kawasaki, and other smaller cities. Nearly sixty square miles in and around Tokyo had vanished. "The limitless acres of ruin[27] seemed to spread everywhere, like a desert, in a drab and monotonous panorama of hopelessness . . . ," recalled a Tokyo writer named Masuo Kato. "No one knew whether the B-29's would strike that night, or where. Would it be fire bombs again, or high explosives, or both? Night after night, thousands learned the answer as the last fact of their mortal lives."

On Spaatz's orders, LeMay gave the go for the 509th to fly the secret mission. Only recently had LeMay heard of the Manhattan Project. "I didn't know much about[28] this whole thing and didn't ask about it, because it was so hot," he recorded. According to intelligence sources, the primary target —Hiroshima—was "an Army city . . . a major quartermaster depot"[29] with warehouses full of military supplies. "The Ujina Port region is congested

with both fireproof and combustible warehouses, open stores and open factories." As an "Army city," the target fit President Truman's profile; as he wrote in his diary, he wanted "to use it [the bomb][30] so that military objectives and soldiers and sailors are the target and not women and children."

Still, all knew that if "the gadget" worked, it would kill indiscriminately. Hiroshima was a thriving city of 318,000 that had yet to be hit by the Superfortresses, so the bomb's damage could be accurately gauged.

On the afternoon of August 5, on Tinian, Army officials in short-sleeved tan uniforms pushed the Little Boy bomb out to a B-29 that mission commander Paul Tibbets had named that same morning for his mother: *Enola Gay.* Up to that point, Tibbets's B-29 was referred to simply as No. 82, the number painted on its nose. This B-29 had been built by the Glenn L. Martin Company at its Superfortress factory in Omaha, Nebraska.

At midnight, Tibbets gathered the seven flight crews for a final briefing. The crews had learned the details of their mission only forty-eight hours earlier—that they were to fly this gadget called an atomic bomb to its target. During the final briefing, crewmen each received a pair of dark glasses. They were instructed to put them on before the blast, which, they were told, would be like a new sun being born. Tibbets said:

> Tonight is the night we[31] have all been waiting for. Our long months of training are to be put to the test. We will soon know if we have been successful or failed. Upon our efforts tonight it is possible that history will be made. We are going on a mission to drop a bomb different from any you have ever seen or heard about. This bomb contains a destructive force equivalent to twenty-thousand tons of TNT.

The seven flight crews ate their pre-takeoff breakfast just after midnight —critical for nervous stomachs ahead of a thirteen-hour flight. While Tibbets finished his plate of actual eggs (instead of Army-issue fake ones), rolled oats, apple butter, and plenty of black coffee, a flight surgeon handed him a cardboard pill box.

"I hope you don't have to use these,"[32] he said.

Inside were cyanide capsules, one for each of the *Enola Gay*'s crew. It would be better to be dead than to be tortured by the Japanese, if things went poorly. Better to be dead than spill any secrets.

In the pilot seat, Tibbets felt his nerves. The *Enola Gay* was fully loaded with seven thousand gallons of gas and a bomb that weighed over nine thousand pounds. He told himself, "Look, Paul, this is just another takeoff.[33] You've done it many times before. No sweat."

He radioed the control tower and heard an immediate reply: "Dimples Eight Two.[34] Dimples Eight Two. Cleared for takeoff." The *Enola Gay* began its journey down the nearly two-mile runway. The four Wright-Cyclone engines pumped the pistons in their eighteen cylinders. Tibbets needed nearly every foot of the runway as he lifted off at 2:45 a.m.

The Superfortress gained elevation, with hundreds of miles of barren ocean and night sky ahead. The task force began its trip—seven B-29s, including one plane to carry blast measurement equipment, one carrying camera equipment, one spare aircraft, three weather aircraft, and the *Enola Gay*. The crews had studied reconnaissance photos so thoroughly, they carried no maps, for they knew the terrain. In the pilot's seat, Tibbets recalled, "My eleven companions and I[35] were improbable choices to become the messengers of a war god more terrible than any who had walked this earth in all the centuries past."

That night, Arnold paced the halls in his home, all night, as if he was trapped in a cage. "The night of that atomic bomb,"[36] Eleanor Arnold recalled, "he walked the corridor in that big house, back and forth, waiting for the telephone to ring . . . He didn't go to bed, he just walked the floor, and I knew something terrific was happening."

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> We heard a big noise[1] like a "BOONG! BOONG!" Like that. That was the sound. Everything started falling down; all the buildings started flying around all over the place. Then something wet started coming down, like rain. I guess that's what they call black rain. In my child's mind, I thought it was oil. I thought the Americans were going to burn us to death. And we kept running. And the fire was coming out right behind us.
>
> —TOMIKO MORIMOTO, HIROSHIMA SURVIVOR

"Well folks," said Tibbets via intercom in the cockpit of the *Enola Gay*, "it won't be long now."[2]

The task force flew into a cloud-spotted sunrise over a glittering Pacific Ocean. A weather reconnaissance B-29 had already reached Hiroshima, reporting two-tenths cloud cover at fifteen thousand feet. The *Enola Gay*'s copilot, Robert Lewis, was taking notes, and he wrote in his logbook as the Superfortress thundered toward the Japanese islands, "Our primary is the best target,[3] so, with everything going well so far, we will make a bomb run on Hiroshima."

"It's Hiroshima,"[4] Tibbets told his crew.

He leveled the aircraft at thirty-one thousand feet. It was 8:40 a.m. Japan time. Crewmembers pulled on their heavy flak suits. Air speed: 328 mph. "I see it!"[5] yelled the bombardier, Thomas Ferebee.

"From the pilot seat[6] of my airplane," Tibbets later wrote, "I saw the city shimmering 6 miles below in the bright sunlight of an August morning."

Copilot Lewis saw Hiroshima and wrote in his notes, "Perfectly open target."[7]

Two escort B-29s veered away, leaving the *Enola Gay* alone in the sky as it entered the airspace over Hiroshima. There was no flak, nor any fighter interceptors. The bombardier Ferebee centered the crosshairs of his Norden bombsight. Below, just west of the city center, river tributaries flowed through, looking like blood vessels that nourished the various Hiroshima neighborhoods. Ferebee's target point was a T-shaped bridge that spanned the Ota River, called the Aioi Bridge. He made two slight corrections, then looked up at Tibbets and nodded. Ferebee motioned to the radio operator. "A continuous tone signal[8] went out," recalled Tibbets, "telling [the escort crews]: 'In fifteen seconds she goes.'"

With the ship on automatic pilot, the *Enola Gay* let the Little Boy bomb loose. The B-29 jerked upward violently as it shed nine thousand pounds in an instant.

Tibbets threw off the automatic pilot and took control. The crew pulled their dark antiglare goggles over their eyes. Tibbets could not see, so he tossed the goggles to the floor. He pushed the aircraft into a 155-degree dive to the right, as he had practiced over and over. The *Enola Gay* descended 1,700 feet with engines at full power. Forty-three seconds passed. "A bright light filled[9] the plane," Tibbets recorded. "The first shock wave hit us. We were eleven and a half miles slant range from the atomic explosion but the whole airplane cracked and crinkled from the blast."

Navigator Theodore "Dutch" Van Kirk: "The plane bounced, it jumped[10] and there was a noise like a piece of sheet metal snapping." Copilot Lewis recorded "two very distinct slaps[11] on the ship, then that was all the physical effects we felt. We turned the ship so we could observe the results and then in front of our eyes was without a doubt the greatest explosion man has ever witnessed."

"The city was hidden by[12] that awful cloud," according to Tibbets, "boiling up, mushrooming, terrible and incredibly tall. No one spoke for a moment; then everyone was talking. I remember Lewis pounding my shoulder, saying, 'Look at that! Look at that! Look at that!'"

"Fellows," Tibbets said, "you have just dropped the first[13] atomic bomb in history."

The *Enola Gay* flew onward. The navigator Van Kirk thought to himself in that moment, "Thank God the war is over[14] and I don't have to get shot at anymore. I can go home."

At his home, Arnold monitored the five telephones he had rigged in his upstairs library (one direct line went to the White House and another was hooked for direct communication with Guam), plus the private wire machine. The news arrived just hours after the bomb exploded. The message came by wire from Guam. Spaatz wrote:

> HIROSHIMA BOMBED VISUALLY[15] WITH ONE TENTH [cloud cover] AT 052315A [August 5, 7:15 p.m. Washington]. THERE WAS NO FIGHTER OPPOSITION AND NO FLAK. PARSONS [Rear Admiral William "Deak" Parsons] REPORTS 15 MINUTES AFTER BOMB AS FOLLOWS: "RESULTS CLEAR-CUT SUCCESSFUL IN ALL RESPECTS. VISIBLE EFFECTS GREATER THAN IN ANY TEST. CONDITION NORMAL IN AIRPLANE FOLLOWING DELIVERY."

In the following hours, the most shocking news story of all time broke in the press. Americans heard over their radios the voice of Harry Truman, speaking in a prerecorded address. "Sixteen hours ago," Truman said, "an American airplane dropped one bomb[16] on Hiroshima, an important Japanese Army base. That bomb had more power than 20,000 tons of T.N.T. It had more than two thousand times the blast power of the British 'Grand Slam' which is the largest bomb ever yet used in the history of warfare."

Truman spoke of "a harnessing of the basic power of the universe . . . We are now prepared to obliterate more rapidly and completely every productive enterprise the Japanese have above ground in any city."

Like most people who heard the news, Arnold knew that the atomic bomb was more than a weapon; it ushered in a new era of scientific understanding of the universe. As Spaatz put it, the atomic bomb was "the most revolutionary development[17] in the history of the world." Arnold and his fellow elite airmen knew: the bomb left such a shock wave, not just physically but in the human consciousness, that it was going to dominate the narrative regarding the yearslong effort to defeat Japan.

Would the saga of the Superfortress and the rise of American airpower get lost in this mushroom cloud?

In the White House and the State Department, as well as 10 Downing Street and the House of Commons in London, officials anxiously awaited any communique from Tokyo. As the wait continued, on August 8, the first visual report of Hiroshima from American aerial reconnaissance B-29s

reached Washington. It seemed unreal. “They didn’t believe us,” one of the B-29 photographers later said. “They thought we’d made up something until they developed the film.”

The images of Hiroshima, Arnold later recalled, “were indescribable.”[18]

The official report read, “The first aerial reconnaissance[19] photographs taken over the area of what until 9:15 Monday morning was the site of the great Japanese city of Hiroshima have brought back the story of what happened in that one-tenth of a millionth of a second during which the first atomic bomb ever used in warfare delivered its concentrated wallop equivalent to 20,000 tons of TNT. The story can be told in four simple words: Hiroshima is no more.”

That same day, B-29s of the Twentieth Air Force flew again, this time dropping not bombs but leaflets, which rained down on terrified civilian populations in Japan. “America asks that you[20] take immediate heed of what we say on this leaflet. We are in possession of the most destructive explosive ever devised by man . . . We have just begun to use this weapon against your homeland.” It asked Japanese citizens to “petition the Emperor to end the war.”

Also on this same day, August 8, Soviet forces reported to be a million strong charged into Japanese-occupied Manchuria, joining the war against Japan. The Soviet leader, Joseph Stalin, had made his intentions clear: He was interested in “war trophies.” As Soviet forces moved into the Far East, so, too, did overall Soviet influence, filling the power void left by the war’s devastation.

On August 9, in the Far East, the 509th Composite Group flew with a second atomic weapon—the Fat Man implosion bomb. The Superfortress carrying Fat Man was named *Bockscar*, after Capt. Frederick Bock, who did not end up piloting the aircraft, as he was switched to a photography B-29 on this same mission. *Bockscar* made three runs over the primary target, Kokura. The pilot, Maj. Charles Sweeney of Lowell, Massachusetts, then turned for the secondary target, Nagasaki. *Bockscar* was at twenty-nine thousand feet when it released Fat Man, at 11 a.m. local time. A cameraman aboard a B-29 captured the blast on film, as the mushroom cloud climbed thousands of feet into the sky.

Once again, the entire world waited for news from the Japanese government. Arnold and LeMay did not wait; they pushed ahead relentlessly. On the night of August 14–15, LeMay sent out an armada of

superbombers to attack Japan. As the Army's official history reads, "Arnold wanted as big a finale[21] as possible."

This time, the Superfortresses hit the Nippon Oil Company and the adjacent port in Tsuchizaki. According to the operation's official report, "The mission was the longest nonstop[22] combat flight ever made, a distance of 3,740 statute miles from base at Guam to the target on the northern coast of Honshu island and return. . . . 143 aircraft were airborne and 134 dropped 953.9 tons of 100 pound and 250 pound GP bombs [general purpose bombs], on the primary [target]. Results of photo-interpretation brought now familiar words: 'Almost completely destroyed or damaged.'"

Those B-29 bombers were still in the air on the way back to base when Truman announced Japan's surrender.

News of victory brought a groundswell of emotion into the streets of Britain and America. That night, Truman walked out onto the White House lawn to see an impromptu party of seventy-five thousand gathered outside of the gates. The crowd chanted, "WE WANT HARRY![23] WE WANT HARRY!"

At Arnold's home, "that night we had no celebration,"[24] he remembered. "Just a family dinner—or, at least, that's the way it started. Then Air Force generals and their wives began dropping in to extend their greetings and express gratitude that the war was over." Gen. Hal George, who had built and run the Air Transport Command, appeared with his wife. Maj. Gen. St. Clair Streett and Gen. Muir Fairchild arrived with their wives.

"So the night passed,"[25] recorded Arnold, "with Air Officers coming in and out." After "a good bit of brandy," he and his subordinates decided to send a communique to the White House. "I dictated it over my private wire to a clerk at the other end in the White House," remembered Arnold. "We were afterward told it was the first message of its kind the President had received."

Arnold was surprised by the abrupt end to the war. The way the Japanese had fought, he thought it would take four atomic bombs. At this point, he recalled, "all that mattered was to get the boys[26] home as soon as possible."

Once the party ended on the night of August 15, the hangover arrived accompanied by a new sense of existential fear. Airpower had left much of

the world in shambles, and the atomic bursts over Hiroshima and Nagasaki opened the future to unimaginable possibilities. CBS radioman Edward R. Murrow spoke of the future with an eerie economy of words.

"Secular history offers few,[27] if any, parallels to the events of the past week," Murrow told his listeners. "And seldom, if ever, has a war ended leaving the victors with such a sense of uncertainty and fear, with such a realization that the future is obscure and that survival is not assured."

Just as Arnold feared, the story of the atomic bombs usurped nearly all the newsprint and radio time. Proponents of airpower needed to remind Americans and the world that the bomb meant nothing if it could not be put over a target. "It is not the stockpile of atom bombs[28] that will decide the issue," wrote Alexander de Seversky, "but superior means of delivery. And that means superior airpower." On the final day of the war, with the announcement of Japan's surrender, Arnold spoke out. Because of airpower, and the atomic bomb—which was an agent of airpower—victory over Japan required no invasion.

"The surrender of Japan,"[29] Arnold said, "comes after the severest and most concentrated bombing campaign in history and without actual invasion of the homeland. Thus it is the first time a nation has capitulated with its major armies designed for defense of the homeland still intact."

Four days after Japan's surrender, Arnold issued a statement that was quoted in newspapers around the country. It was a plea for the future. He warned Americans to be fearful, that the United States needed "Buck Rogers" ideas to keep wars from happening again. Only strength, he intimated, could keep the peace. Implicit in his words was the idea that if the United States had been properly prepared, if the controlling powers in Washington had listened to the proponents of airpower during the 1920s and '30s, World War II might never have happened.

Already, Arnold explained, the Air Forces were developing radio-controlled bombs that could hit pinpoint targets three thousand miles away. He spoke of a super-super bomber, "considerably bigger" than the B-29, and faster, with longer range. He also warned that weapons of mass destruction—far more powerful than the Fat Man and Little Boy bombs—were not merely possible. "They are probable to the point, almost,[30] of inevitability . . .

"We are now the most powerful nation in the world," said Arnold. "Our possession of power, which in a just proportion, we can make available to

the United Nations in the maintenance of peace, is the best guarantee of maintaining this collective peace. If the nations of the world find they cannot act in concert, our power will be our only resource . . . If we fail to keep, not merely abreast but ahead of technological development, we needn't bother to train any force, and we needn't bother to make any plans for an emergency expansion. We will be totally defeated before any expansion could take place."

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> Was he a man of inordinate ambition?[1] Well . . . if he had one ambition, it was to have a separate Air Force, and to be the fellow that was running it.
>
> —LT. GEN. K. B. WOLFE

On September 2, 1945, in Tokyo Bay, a dramatic ceremony saw Japanese officials sign the documents of surrender on the starboard deck of the USS *Missouri*, the battleship named for President Truman's home state. Both Spaatz and LeMay attended as MacArthur officiated. (Spaatz was the only American officer to attend all three Axis surrender ceremonies, in Reims, France, Berlin, and Tokyo Bay.) Representatives from eight nations stood aboard the ship—China, the United Kingdom, the Soviet Union, Australia, Canada, France, the Netherlands, and New Zealand.

Above Tokyo Bay, 462 B-29 Superfortresses flew in formations. The superbombers came from every one of the Twentieth Air Force's squadrons. No one who saw them could escape the sense of their power but also of their symbolism. They were the Arsenal of Democracy in flight. They were statements of America's industrial, technical, and economic preeminence in the postwar epoch to come.

Those aircraft held eight thousand pounds of bombs, ready to be dropped in the unlikely case of treachery. "Our ears filled with the roar,"[2] recalled one Army official aboard the *Missouri*. Looking over the dramatic scene, LeMay described his feelings: "Like many other folks,[3] probably, I stood there and felt pretty tired."

Arnold had the idea to give the B-29 Superfortress and its crews one final curtain bow. He asked certain pilots to fly B-29s back to Washington, so they could set a record for nonstop flight distance. Three modified B-29s

flew from the Japanese island of Hokkaido to Washington, DC, and although they had to stop in Chicago for fuel, they did set a distance record. The pilots were Barney Giles, Curtis LeMay, and Emmett "Rosie" O'Donnell. Two months later, four B-29s made nonstop flights from Tokyo to Washington—proving that such flights would be possible in the future, with passengers aboard.

America built 3,970 B-29s. The US Army Air Forces ended the war with 2.3 million soldiers, and about 72,000 airplanes.

"During World War II,"[4] according to the Army Air Forces's official history, "the United States conceived, constructed, and employed with devastating success the largest and most powerful air force the world had yet known. In the fullest sense it was a triumph of the American people as a whole, for it was the product of a truly national effort, a remarkable collaboration among the scientific, industrial, and military components of American society."

The Air Forces saw 88,119 airmen lost in service, according to a final report from the Office of the Comptroller of the Army. The destruction caused by Allied bombing has never been matched. Shortly after the war ended, Orville Wright spoke in several interviews about what he had seen in his lifetime. He had just turned seventy-four and had lived through two world wars.

> We dared to hope[5] we had invented something that would bring lasting peace to earth [Wright said]. But we were wrong. . . . No, I don't have any regrets about my part in the invention of the airplane, though no one could deplore more than I do the destruction it has caused. I feel about the airplane much the same as I do in regard to fire. That is I regret all the terrible damage caused by fire, but I think it is good for the human race that someone discovered how to start fires and that we have learned how to put fire to thousands of important uses.

According to the Strategic Bombing Survey, Allied airpower dropped almost 2.7 million tons of bombs on Europe, flying 1.44 million bombing sorties and 2.68 million fighter sorties. Allied air attacks destroyed 3.6 million German dwellings. The enemy in Europe saw 300,000 civilians killed and 780,000 wounded.

In the Pacific War, according to the Strategic Bombing Survey, Allied aircraft dropped 656,400 tons of bombs. B-29s, specifically, dropped 147,000 tons of bombs, much of that number incendiaries. According to

Arnold's records, B-29s destroyed nearly 169 square miles in 60 cities, while the Twentieth Air Force's XXI Bomber Command flew nearly 90 million miles to and from the Japanese mainland. Tokyo saw 90,000 to 100,000 deaths during the March 9–10 firebombing, which is generally considered still today to be the deadliest air raid of all time. In total, according to the Survey, 104,000 tons of the bombs dropped on Japanese territory were aimed at "urban areas." Air attacks destroyed 470,000 barrels of oil, 221,000 tons of foodstuffs, and 2 billion square yards of textiles.

The Survey estimated that Allied air raids, including the atomic bombings, killed 330,000 Japanese civilians. Subsequent estimates have upped that number significantly. According to the National World War II Museum in New Orleans, Japanese military and civilian deaths in total numbered from 2.6 to 3.1 million.

The atomic bombing has become the most controversial act of war in history—even though it is generally accepted that the firebombings of cities like Tokyo, Osaka, and Nagoya caused more loss of life. As for the bomb, Arnold's stance is clear. "Even before one of our B-29s[6] dropped its atomic bomb on Hiroshima," he wrote in 1945, "Japan's military situation was hopeless . . . The fact is that the Japanese could not have held out long, because they had lost control of their air." The B-29s, he wrote, made "Japan bleed internally." Before the Hiroshima bomb, Arnold wrote, "Japan was defeated already by the cumulative destruction of her capacity to make war."

Japan, Arnold believed, was already defeated when Hiroshima was destroyed. The war would have been won without the bomb; it was only a matter of time. The Strategic Bombing Survey agreed with him.

> The Bombing Offensive[7] [according to the Survey] was the major factor which secured agreement to unconditional surrender without an invasion of the home islands—an invasion that would have cost hundreds of thousands of American lives. The demonstrated strength of the United States in the B-29 attacks contrasted with Japan's lack of adequate defense made clear to the Japanese people and to the government the futility of further resistance . . . The atomic bombs and Russian entry into the war speeded the process of surrender already realized as the only possible outcome.

Arnold's final word took the form of a long report to the War Department, released toward the end of 1945. No longer would wars be fought on

battlefields, he noted. Aviation and rocketry now meant every person's backyard was a potential battlefield.

"The danger zone of modern war[8] is not restricted to battle lines and adjacent areas but extends to the innermost parts of a nation. No one is immune from the ravages of war . . . ," he wrote. "Future attack upon the United States may well be without warning."

Modern war's destruction could only foreshadow what lay ahead. "Today," Arnold wrote, "Japanese and German cities lie in ruins,[9] but they merely suggest the vast destruction that can be done with the weapons of tomorrow." He predicted a time when aviation would no longer be bound by earth's gravity. He foresaw "true spaceships"—just like the ones in the *Buck Rogers* science fiction comic strip—"operating outside the earth's atmosphere."

Arnold's predictions left readers with a terrifying vision of the future that cut to the heart of a Hobbesian truth. The human impulse to destroy would eventually take the human himself out of attack. Science would play the increasing role in creating inhuman warriors. "Controlled or directed robots[10] will be of increasing importance," he wrote, "and although they probably will never preclude some form of human guidance, reliance upon direct manual skills in pilotage will gradually decrease."

Some readers rolled their eyes, unable to believe that such predictions could come true. Arnold was not surprised. "I know you people think[11] the old man has lost his marbles and ought to retire," he said in one speech about supersonic aircraft, rockets, and space exploration. "But I hope you'll all remember what I said here today."

"World War II brought unprecedented[12] death and destruction to war-making and peace-loving nations alike," Arnold recorded, "and as any future war will be vastly more devastating, the mission of the armed forces of the United States should not be to prepare for war, but to prevent war to insure that peace be perpetuated."

Less than two weeks after the Nagasaki bombing, on August 22, 1945, Theodore von Kármán submitted to Gen. Arnold the first report of his Scientific Advisory Committee, entitled *Where We Stand*. This report was von Kármán's assignment, given to him by Arnold in the back of a chauffeur-driven car on the tarmac at LaGuardia Airport a year earlier. It

was the first of what became *Toward New Horizons*—a collection of reports from top scientists. On the first page of *Where We Stand*, von Kármán isolated "new aspects of aerial warfare[13] [that] have to be considered as fundamental realities." Von Kármán argued that these postulations would become reality, in a very short time.

- Aircraft, manned or pilotless,[14] will move with speeds far beyond the velocity of sound.
- Due to improvements in aerodynamics, propulsion, and electronic control, unmanned devices will transport means of destruction to targets at distances up to several thousands of miles.
- Small amounts of explosive materials will cause destruction over areas of several square miles.
- Defense against present-day aircraft will be perfected by target-seeking missiles.
- Only aircraft or missiles moving at extreme speeds will be able to penetrate enemy territory protected by such defenses.
- A perfect communication system between fighter command and each individual aircraft will be established.
- Location and observation of targets, takeoff, navigation and landing of aircraft, and communication will be independent of visibility and weather.
- Fully equipped airborne task forces will be enabled to strike at far distant points and will be supplied by air.

Every one of von Kármán's eight "fundamental realities" became self-evident soon after World War II ended.

A short time after von Kármán's first report came out, Arnold helped to found a new organization called Project RAND, originally in partnership with the Douglas Aircraft Company. The name stood for Research And Development, and it eventually turned into the RAND Corporation.[*] On May 2, 1946, RAND released its first report, called *Preliminary Design of an Experimental World-Circling Spaceship*. In more than two hundred pages of charts and mathematical equations, the report showed how a satellite could be put into space and remain in earthly orbit. The authors noted, "An interesting outcome of the study[15] is that maximum acceleration

and temperatures can be kept within limits which can be safely withstood by a human being."

Later in 1946, the first real experiments in American rocketry began with an eye toward air travel beyond the skies. The next step in aviation was to blast humans into space. "In searching for the key[16] to space travel," said a Cal Tech astrophysicist named Dr. Fritz Zwicky, "we first throw a little something into the skies, then a little more, then a shipload of instruments—and then ourselves. This experiment is one of the very first steps in that process."

The first time Henry Arnold testified before Congress, he was twenty-seven years old and the year was 1913. In hearings before the Committee on Military Affairs of the Sixty-Third Congress, Arnold was asked about all kinds of things having to do with the infancy of military aviation and his work with the Wright brothers. The committee wanted to know what kinds of things go through a young aviator's mind while he soared through the clouds. How does one not get lost? How does one maintain control of his machine? Arnold was a young pilot, barely out of training with Wilbur and Orville Wright.

"It is necessary for an aviator[17] to know about the wind currents by the way they strike his machine," Arnold said at the time. "He must be able to follow his map and to know where he is; he must learn to know from the sound of his engine whether it is running all right, and many other things."

When asked, in 1913, if aviation should have its own separate service in the military, Arnold answered in the negative. "Until it becomes able to take care of itself, I think it would be far better with the [Army] Signal Corps," he said. "At the present time it is not able to take care of itself."

Now in 1945, the picture was very different. On October 18, 1945, Arnold testified again, as a fifty-nine-year-old man. In vigorous terms, he demanded a separate air arm, on equal terms with the Army and Navy. The political structure in Washington—with a War Department and a Navy Department, each with its own cabinet official in the president's clan of top advisors—functioned poorly, he testified. The setup was an anachronism. "I say to you with all the[18] earnestness at my command," Arnold told the Senate Military Affairs Committee, "that the security of this country and the maintenance of world peace demand that our military establishment include a co-equal component devoted exclusively to the problems of the air."

Arnold spoke for the dozens of top officials who had led this fight for decades. As Gen. Laurence Kuter put it after the war, "Everybody in the Army Air Corps,[19] that had any steam or vision or energy, was focused on a separate air force." Maj. Gen. John M. "P.D." Weikert: "He [Arnold] said it would come[20]; it had to come, because the Air Force was building up, becoming larger and stronger. He said we'll be larger than the Army some day." Lt. Gen. Fred Dean recalled the chief saying during the war, "Of course we will have a separate[21] air force, but don't worry about that now. It will come."

Soon after cessation of hostilities, the battle for a separate Air Force grew into a Washington maelstrom. Eisenhower testified in favor. Marshall, the most powerful military figure in America, was for it. Other figures such as Admiral Nimitz testified against it.

On December 19, 1945, just five months after the Japanese surrender, Truman delivered a dramatic message to Congress recommending a new Department of National Defense. "We should organize to provide[22] parity for air power," he said. "Air power has been developed to a point where its responsibilities are equal to those of land and sea power." On June 15, 1946, the president delivered another message to Congress recommending the creation of three coequal services, "the Army, Navy, and Air Force."

"The Air Force," Truman said, "shall have the responsibility for the development,[23] procurement, maintenance and operation of the military air resources of the United States."

In 1946, Arnold retired to a family farm he had recently purchased with his wife, in Sonoma, California—a rural ranch they called Valley of the Moon. After a career of manic workaholism, he had very little money. Truman sent Arnold a telegram, which began, "IN THE MORE THAN FORTY YEARS[24] YOU HAVE DEVOTED TO THE SERVICE OF YOUR COUNTRY, YOU HAVE WATCHED AND HELPED THE ARMY AIR FORCES GROW FROM A FLEDGLING CORPS OF TWO AIRPLANES TO THE MIGHTIEST AERIAL FORCE THE WORLD HAS EVER SEEN—AN UNBEATABLE AIR ARM WHICH HAS CONTRIBUTED SO MUCH TO THE VICTORY WE HAVE WON AND THE PEACE WE ARE DETERMINED TO KEEP."

One year after Arnold's retirement, the National Security Act of 1947 made Truman's recommendations law, and the United States Air Force was born. (The Act also founded the National Security Council and the Central

Intelligence Agency.) Postretirement, Arnold was made a five-star general of the Air Force and given a permanent pension. Gen. Carl "Tooey" Spaatz became the first US Air Force chief of staff. (He was later followed by Curtis LeMay, who became chief of staff in 1961.)

Arnold remains the only five-star general in the history of the US Air Force and the only five-star general in two American services.

Five months after Truman signed the National Security Act of 1947, Hap Arnold wrote a letter that became pivotal to his legacy. In this two-page, single-spaced, typewritten missive, he revealed to a lieutenant colonel named LeRoy L. Stefen what he believed to be the "important requisites for a[25] successful military career," but which clearly could apply to any career. The general distilled his thinking on leadership into seven key ingredients.

- Basic Knowledge, which Arnold defined as "exact, clear knowledge . . . of the basics of your profession." "This is your 'technique'; this constitutes your 'tools.'"
- Hard Work. "No outstanding success is ever achieved without it."
- Vision, or "the capacity [to] envision possibilities yet undeveloped: new horizons of activity."
- Judgement. "Not only the judgement that makes quick correct decisions," Arnold wrote, "but the ability to judge human nature, as well."
- Articulateness. "Many an excellent idea is 'stillborn,'" he wrote, "because its originator did not have the ability to 'put it across.' Public speaking courses are excellent aids to acquiring this faculty."
- Properly Adjusted Human Relationships, or the ability to "get along with people." "In the military sphere, if one is going to 'get to first base,' he must be able to handle men successfully." The best advice in this case was "the Golden Rule—the simplest and best code of ethics as yet devised."
- Personal Integrity. "The man who is genuinely respected," Arnold wrote, "is the man who keeps his moral integrity sound; who is trustworthy in every respect. To be successful, a man must trust others; and a man cannot trust others, who does not trust himself."

On January 15, 1950, Arnold was in his bedroom in Sonoma, near a window that overlooked the Valley of the Moon. He lost consciousness and

never awoke. He was 63 years old. His final flight was aboard a Douglas C-54, which carried his body over the country from California to Washington, DC. Eleanor Arnold and family members made the trip in President Truman's aircraft, the Sacred Cow. Flags across the nation flew at half-mast as Arnold lay in repose at Washington's National Cathedral. During the funeral procession, F-84 jetfighters made a flyover, followed by some 30 B-29 bombers.

"Hap died shortly after[26] the war ended," noted Britain's Lord Ismay of the Royal Air Force. "If any man had worked himself to death, it was he."

Arnold was buried at Arlington National Ceremony, in the new light blue uniform of the United States Air Force.

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> The charm of history and its enigmatic[1] lesson consist in the fact that, from age to age, nothing changes and yet everything is completely different.
>
> —ALDOUS HUXLEY

"Tomorrow," Hap Arnold predicted in 1936, "there will be a million bird men."[2] Shortly after World War II, this promise became reality. The aviation industry boomed, and people began to migrate around the globe with ever-increasing ease, changing the landscape of human existence.

Private corporations, fueled by the inertia of war, now launched themselves into a new era of civilian flight. Wartime advancements made airplanes faster, safer, and more comfortable. The ATC had blazed air routes. The Air Force had innovated calculated programs to predict weather. Engineers had learned new ways to lay out sprawling airports. Foreign governments had seen the value that aviation could bring to their own nations. New passenger aircraft with pressurized cabins took off, like the Douglas DC-6; the Lockheed Constellation; and the Boeing 377 Stratocruiser, based on the B-29.

Pan Am, TWA, Eastern, American, and United Airlines expanded faster, it seemed, than the airplanes themselves could fly. In 1955, for the first time, more Americans traveled by airplane than by train. That same year, Pan Am reported its fifty thousandth transatlantic flight, carrying more than 2 million passengers some 200 million miles.

Just as aviation fulfilled its promise in war, it now did in peace. People safely enjoyed the magic of aviation, often wearing dresses and ties on flights, dressed as they might if they were attending church. Gradually, civilian flight became so quotidian, the ties disappeared, making way for

Bermuda shorts and flip-flops. Today, the Federal Aviation Administration's Air Traffic Organization watches over more than 3 million airborne passengers, and over 29 million miles of airspace, every day.

All the while, military aviation also innovated and expanded. Arnold once wrote, "The weapons of today are[3] the museum pieces of tomorrow. So tomorrow, the B-29, the Superfortress of today, will belong in the Smithsonian Institution." A testament to his vision lies in the fact that the most famous B-29, the *Enola Gay*, sits in the Smithsonian's Steven F. Udvar-Hazy museum in Virginia.

In 1947, US Air Force test pilot Chuck Yeager broke the speed of sound in an aircraft—the experimental rocket-propelled Bell X-1. In 1954, Lockheed introduced the F-104 Starfighter, a Cold War fighter bomber that could fly at twice the speed of sound. Then came McDonnell Douglas's F-4 Phantom II in 1958, and the Lockheed SR-71 "Blackbird" in 1964, which could perform stealthy recon missions at eighty-five thousand feet and fly Mach 3. The era of "pilotless airpower" that Arnold predicted also arrived, in the form of intercontinental missiles and drones.

While Billy Mitchell and Arnold had foreseen the invention of Buck Rogers flying machines, they also foresaw the ideology that gave birth to them. Arnold and other top airmen of his generation fought throughout their careers to change the mindset of political leadership in America with regards to military preparedness. Never again would the mistakes of the 1920s and '30s—the isolationism that nearly cost the United States its existence—reoccur. In its place was what Eisenhower later termed the military-industrial complex, an economic and political national state of being that anticipates war at any moment.

In an article for *National Geographic* published shortly before he died, Arnold wrote, "A modern, autonomous, and[4] thoroughly trained air force in being at all times will not alone be sufficient, but without it there can be no national security." That remains true today. Arnold also prophesized that airpower would be the only thing that could maintain peace in the atomic age, and that vision, too, has become real. Nations have long since possessed enough atomic airpower to destroy the planet at the push of a button; the existence of that airpower, and its value of deterrence, is the only thing that keeps humanity from destroying itself.

In the years after World War II, historiography played its inevitable role in shaping the understanding of millions as to what exactly happened. Many air-minded people today would argue that Hap Arnold's role deserves more attention than it has received.

"Just to sum up Hap Arnold,"[5] said World War II airman Maj. Gen. St. Clair Streett, in a 1969 interview, "I think he is—if history ever does him justice—he's the man who won the war." Adolf A. Berle, an assistant secretary of state during the war who was active in civil aviation legislation, echoed that statement: "He had probably done[6] as much as any one military man to win this war."

More vocal were the historians who have taken America to task for its role in killing civilians during World War II. Americanism as an ideology was born bearing an unmistakable moral imprint. This was a place for people to go to escape evils—religious and political—to live in freedom and self-determination. From its founding, America saw itself as a force of good, eventually spilling its own blood on foreign shores to fight evil in two world wars. Yet, through time, historians have come to examine how the line between good and evil was not as clear as it seemed. And that reexamination has most often focused on airpower in World War II.

The dropping of atomic bombs from B-29 aircraft are the glaring examples. "Like all the great advances[7] in technology of the past century," wrote the author and philosopher Dwight Macdonald, "Atomic Fission is something in which Good and Evil are so closely intertwined that it is hard to see how the Good can be extracted and the Evil thrown away." As early as one week after World War II, moralists began to take airpower, and particularly the bomber aircraft, to task. "Every step in the bomber's[8] progress since 1937 has been more cruel than the last," *Life* magazine declared in August 1945. "From the very concept of strategic bombing, all the developments—night, pattern, saturation, area, indiscriminate—have led straight to Hiroshima."

Historians have continued to question the firebombing of Japanese civilians by B-29s. History professor William O'Neill, for example, spoke for many when he wrote that airpower was "the democratic delusion" and the tool that would "lead the United States,[9] at bottom a humane nation, to commit its only real crimes of the war."

In answering for his decision to drop the atomic bombs, Truman chose words that best put into perspective the attitude felt by both Arnold and

LeMay, regarding the controversial decisions they made and the context in which they made them. Using airborne bombs to win the war saved unknowable numbers of American lives, they argued. America and its allies expected that of them. Certainly the families of soldiers and sailors in harm's way did. In order to save those lives, others had to die, and the airplane became the most expeditious tool to deliver results. Truman said, "It occurred to me that[10] a quarter of a million of the flower of our young manhood were worth a couple of Japanese cities, and I still think that they were and are."

"I suppose if I had lost[11] the war," Curtis LeMay said years after it was over, "I would have been tried as a war criminal . . . But all war is immoral, and if you let that bother you, you're not a good soldier."

Epilogue



Truman decorating General Arnold in 1946. A year later, the United States Air Force was founded.

Paul Popper/Popperfoto/Contributor

In the development of air power,[1] one has to look ahead and not backward and figure out what is going to happen, not too much what has happened.

—BILLY MITCHELL

Under a hot Florida sun in January 2025, I pulled a rental car up to the front of NASA's Vehicle Assembly Building at Kennedy Space Center. The first thing that strikes you when you look at this building is the American flag painted across its white face. It appears football-field large. The red and white stripes are six feet thick. And yet, the size of this flag fails to capture the gargantuan ambitions of the activity inside the VAB.

When you enter, you see an interior construction site where workers in hard hats swarm and forklifts zip by. Rocketry components stand in various forms of undress. Signs alert you to the presence of toxic chemicals and high explosives. At the far end, the Artemis II rocket stands half built in a vertical assembly bay. When the rocket is complete, it will stand 322 feet high.

By the time you read this, the Orion space vehicle that will launch on the tip of Artemis II will have flown around the moon. It will have ventured some 250,000 miles into deep space, farther from earth than any manned vehicle has ever traveled.

NASA's Artemis program is named after the Greek mythological goddess of the hunt, of wild animals, and of the moon. The goal of the overall program is to land humans on the lunar surface, to build a home base there, and ultimately to launch people from there to Mars.

"Long term, we want to build[2] a permanent base on the moon," says Tyler Nester, my guide in the VAB and a NASA senior advisor for production. "This will be a proving ground for long-term stays away from earth." NASA officials believe that they can use 3-D printing with resources already on the moon, to build a base. "There's a belief that we can 3-D print some form of shelter and superstructures using lunar regolith, the powder that is on the moon," says Nester. "And the place that they really want to go is around Shackleton Crater. There's water ice there that they think we can appropriate for drinking water, but also to divide hydrogen and oxygen to power systems." Getting to Mars will take some time, Nester says. "Everything has to be designed, built, and tested, so there is total confidence that every component can function in different atmospheres," says Nester. "There is no shoe store on Mars. You can't go to Home Depot."

The Artemis program is one piece of one of the most extraordinary developments in all of human existence: a new space race, with a new mandate to reach deeper into the physical unknown. Another part of this same story is the revolution in private-industry space travel. For the first time, companies like SpaceX, Blue Origin, Sierra Space, Axiom Space, and Relativity Space are constructing their own spacecraft. SpaceX's founder, Elon Musk, and Blue Origin's founder, Jeff Bezos, are rivaling to reach the moon, just as Donald Douglas and William Boeing battled to build the finest airplanes and reach farther into the skies, in the 1920s and '30s. *The Wall Street Journal* has called this twenty-first-century feud "The New

Billionaire Battle for the Moon." Even more telling, the US launched its first new military branch since it created the Air Force in 1947, in 2019: the United States Space Force.

All of which is to say, *this is really happening, and it's happening fast*. All these companies, as well as NASA and the Space Force, are using artificial intelligence, opening up new avenues of design, construction, and vehicle employment never dreamed of before.

All of it is proof that the Arsenal of Democracy is still alive in America, only it looks a little different now. Many of the airplane manufacturers that built the Army Air Forces during World War II are now building components for Artemis, such as Boeing and Lockheed Martin. Many of the fundamental challenges that faced the aviation pioneers are the same that space travelers face today, from cabin pressurization to weather problems during launch to the ability to sustain human life in hostile environments.

The most important parallel, however, lies in the questions: *Why* is the US government and *why* are civilian industrialists doing this? *Why* spend billions and risk lives?

Officially, NASA answers the *why* questions in these guarded words: "We are exploring the Moon[3] for scientific discovery, technology advancement, and to learn to live and work on another world as we prepare for human missions to Mars." But the real answer requires scratching under the surface. In my conversations with NASA officials and other space theorists, a more unnerving ideology has bubbled up. "We are going to the moon[4] because we have to," one government official told me.

The quest to build a bigger presence in space, to build a permanent presence on the moon, and to reach Mars, is no longer a mission defined solely by scientific exploration. It is a matter of national security. Because China, India, Japan, and Russia—not to mention private industrialists with deep pockets, from all those countries—are out to achieve the same goals. Which is why the US Space Force was launched with, as it says on its website, "the widespread recognition[5] that space is a national security imperative."

In other words, all the stark warnings that Hap Arnold issued before his death have manifested in reality. He warned of "true spaceships . . . operating outside the earth's atmosphere." He warned of "controlled or directed robots." Like Billy Mitchell before him, Arnold warned that any nation that controlled the skies controlled the world. Over a half-century

later, that thinking still rings true. Only the future to control life on earth will see a competition not just for control of the skies, but of the heavens.

A Note on Sources and Acknowledgments

Recently I interviewed an Air Force veteran named Col. (USAF, retired) Cesar "Rico" Rodriguez, who expressed gratitude for every fingerprint on the airplanes he flew in combat over Iraq and Yugoslavia, during the Persian Gulf War of 1991 and while serving with NATO forces in 1999. Every fingerprint represented a member of a team from the flight line to the home front. And although Rico was alone in his F-15 Eagle when he engaged the enemy, he trusted his fighter plane because of all the people who had put effort into making that aircraft all that it could be. Every fingerprint mattered. While I could never make a comparison between authoring a book and fighting in combat, I feel the same about the book you now hold in your hands. It says my name on the cover, but it was the effort of many. For that, I am eternally grateful.

From the beginning, it took over four years to write this book. Thank you to so many who helped along the way.

I tried to manifest this book from primary sources, hoping to allow the people whose names appear in it to tell the story themselves. The most important source in shaping this narrative was the Henry Arnold Papers at the Library of Congress, followed by numerous collections in the National Archives, the archives at the Harry S. Truman and Franklin D. Roosevelt presidential libraries, the Columbia University Rare Book & Manuscript Library, and the Curtis LeMay Papers at the Library of Congress. The "Murray Green" collection is oft mentioned in the endnotes; it is part of the archives of the United States Air Force Academy. That collection was provided to me by Air University at Maxwell Air Force Base in Alabama. Thank you to all the archivists at all of these institutions for the important work you do.

Arnold's diaries (including his World War I diary) can be found in his papers at the Library of Congress, and are quoted throughout *Bird Men*. The

World War II diaries are also collected in two volumes, titled *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries.*

During World War II, the heads of the Army (George C. Marshall), Navy (Ernest J. King), and Army Air Forces (Arnold) were required to submit detailed reports to the War Department. Gen. Arnold's three reports proved highly valuable in understanding how he saw the world around him, as it unfolded in real time. These reports can be found in *The War Reports of General of the Army George C. Marshall, Chief of Staff, General of the Army H. H. Arnold, Commanding General, Army Air Forces [and] Fleet Admiral Ernest J. King, Commander-in-Chief, United States Fleet and Chief of Naval Operations.*

First-hand memoirs were highly useful, including *Global Mission* by H. H. Arnold, *Mission with LeMay: My Story* by Curtis LeMay, *The Strategic Air War Against Germany and Japan* by Haywood S. Hansell Jr., *I Could Never Be So Lucky Again* by James H. "Jimmy" Doolittle, and *The Tibbets Story* by Paul Tibbets. The historians who proved most helpful were Dik Daso (*Hap Arnold and the Evolution of Airpower*), Michael Sherry (*The Rise of American Airpower: The Creation of Armageddon*), Kenneth P. Werrell (*Blankets of Fire: U.S. Bombers Over Japan During World War II*), and Herman S. Wolk (*Cataclysm: General Hap Arnold and the Defeat of Japan*). Also, Arnold himself authored or co-authored books that are fascinating windows into his life and times, including *Airmen and Aircraft* (1926), *This Flying Game* (1936), *Winged Warfare* (1941), and *Army Flyer* (1942).

Thank you to my editor at HarperCollins, Matt Harper. This book could never be what it is without your careful reads and brilliant guidance. Thank you, Matt! You are a truly gifted editor. Thank you also to Olivia Kane, production editor Evangelos Vasilakis, and all those who worked on this project at HarperCollins. A special thank-you to Mariner's publisher, Peter Hubbard.

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Finally, and most importantly, this is a book about service and patriotism. Thank you to all those who have served our country, in the past and in our present day.

Notes

THE FLYERS

1. "*Complete control of the air":* "Flying Pastor Forerunner of Flying Disaster," *Chicago Daily Tribune*, October 19, 1919.
2. "*I'll tell you what war is":* Ben Buley, *The New American Way of War: Military Culture and the Political Utility of Force* (Routledge, New York, 2008), 20.
3. "*My job, in brief, was":* Paul W. Tibbets Jr., *The Tibbets Story* (Stein and Day, New York, 1978), 156.

INTRODUCTION

1. "*with wings as eagles":* Isaiah 40:31 KJV, King James Bible Online, https://www.kingjamesbibleonline.org/Isaiah-40–31/.
2. "*chariots of fire":* 2 Kings 6:17 KJV, ibid.
3. "*Learning the secret of flight":* David McCullough, *The Wright Brothers* (Simon and Schuster Paperbacks, New York, 2015), 53.
4. "*In a like manner these":* McCullough, *The Wright Brothers*, 120.
5. "*was synchronized with the evolution":* Dik Alan Daso, *Hap Arnold and the Evolution of American Airpower* (Smithsonian Institution Press, Washington, DC, 2000), xvi.
6. *following the first Congressional:* See "Army Buys New Airplanes," National Museum of the United States Air Force, https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/197527/army-buys-new-airplanes/.
7. "*Everybody expected to be":* Reminiscences of Thomas D. Milling, Oral History, 1959, 4, Henry H. Arnold Project, Columbia University.
8. "*titan of the air":* "Henry Arnold, Titan of the Air," *Los Angeles Times*, January 17, 1950.
9. "*a practical visionary":* "General Arnold—A Practical Visionary," *Hartford Courant*, January 17, 1950.
10. "*a prophet of things to come":* "Gen. Arnold, Wartime Leader of Air Forces, Is Dead at 63," *New York Times*, January 16, 1950.
11. "*The great Army Air Forces":* "Heart Attack Kills 'Hap' Arnold, Wartime Chief of U.S. Air Forces," *Washington Post*, January 16, 1950.
12. "*[A leader] envisions possibilities yet":* Henry Arnold to Colonel LeRoy L. Stefan, November 5, 1947, Air University archives, Maxwell Air Force Base, https://aul.primo.exlibrisgroup.com/discovery/delivery/01AUL_INST:AUL/1281000650006836.
13. "*the greatest manufacturing program":* "Superfortress Most Powerful Bomber in the World," *Los Angeles Times*, June 16, 1944.
14. "*almost our entire economy":* "Superfortress In Dream Stage as War Started," *Chicago Daily Tribune*, June 17, 1944.

15. "*More than anyone I have":* H. H. Arnold, *Global Mission* (TAB Books, Blue Ridge Summit, PA, 1989), 28.

PART I: THE JOURNEY TO AIRPOWER

1. "*We who fly today are":* Henry Harley Arnold and Ira C. Eaker, *This Flying Game* (Funk and Wagnalls, New York, 1936), xvii.

CHAPTER 1

1. "*No bird soars in a calm":* David McCullough, *The Wright Brothers* (Simon and Schuster Paperbacks, New York, 2015), opening epigraph.
2. "*a frail, heroic freak":* Arnold, *Global Mission*, 2.
3. "*England is no longer": The World To-Day: A Monthly Record of Human Progress*, vol. 17 (The World To-Day Company, Chicago, 1909), 904.
4. "*Who had ever seen":* "What Edison Thinks of Aeroplanes," *Washington Post*, August 1, 1909.
5. "*The possibilities of the":* "What Edison Thinks of Aeroplanes."
6. "*In 1912 I got my first":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), vii.
7. "*Except in photographs":* A. Scott Berg, *Lindbergh* (Berkley Books, New York, 1999), 34.
8. "*It must have been":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 13.
9. "*I just knew . . . that I felt":* LeMay with Kantor, *Mission with LeMay: My Story*, 40.
10. "*a human instrument that":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 2.
11. "*The Horse Cavalry!":* Arnold, *Global Mission*, 7.
12. "*The Corps was so small":* Reminiscences of Thomas D. Milling, Oral History, 1959, 4, Henry H. Arnold Project, Columbia University.
13. "*Hap was a good student":* Reminiscences of Frank Lahm, Oral History, 1959, 1, Henry H. Arnold Project, Columbia University.
14. "*For the first time in American":* "Army Officers Try Aeroplane," *Boston Daily Globe,* October 9, 1909.
15. "*May the best men win":* "Aviators in the Air," *Washington Post*, October 23, 1910.
16. "*detailed for aeronautical work":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 40.
17. "*Special Order 95":* Arnold, *Global Mission*, 15.
18. "*Young man, I know":* Coffey, *Hap*, 40.
19. "*You entered it from":* Milling, Oral History, 9–10.
20. "*During this period, we":* Milling, Oral History, 10–11.
21. "*A one-gallon fuel tank was":* McCullough, *The Wright Brothers*, 87.
22. "*They were usually so courteous":* Arnold, *Global Mission*, 26.
23. "*Wilbur was the genius":* Reminiscences of Charles Wald, Oral History, 1960, 8, Aviation Project, Columbia University.
24. "*It was a cow pasture":* Arnold, *Global Mission*, 16.
25. "*The sensation is so keenly":* McCullough, *The Wright Brothers*, 126.
26. "*I just wondered why":* Reminiscences of Alfred V. Verville, Oral History, 1960, 6, Aviation Project, Columbia University.
27. "*Rough, just rode as passenger":* "Flying Report, May 5–13, 1911," box 4, reel 4, Henry Harley Arnold Papers, Library of Congress.
28. "*everybody and everything that":* Arnold, *Global Mission*, 21.
29. "*Number of flights, 28":* Arnold, *Global Mission*, 19.
30. "*I was an aviator!":* Arnold, *Global Mission*, 19.
31. "*Lieutenant Rogers, of the Navy": The Papers of Wilbur and Orville Wright*, vol. 2, *1906–1948* (McGraw-Hill, New York, 2000), 1023.
32. "*They never took themselves":* Arnold, *Global Mission*, 27.
33. "*While others balanced the gliders":* Arnold and Eaker, *This Flying Game*, 12.
34. "*It is hard to find even": The Papers of Wilbur and Orville Wright*, vol. 1, *1899–1905* (McGraw-Hill Professional, New York, 2000), 597.

35. "*Were you scared?":* McCullough, *The Wright Brothers*, 105.
36. "*Flying Machine Soars":* "Flying Machine Soars," *Chicago Daily Tribune*, December 19, 1903.
37. "*Flying Machine Age Has Arrived at Last":* "Flying Machine Age Has Arrived at Last," *Atlanta Constitution*, January 7, 1904.
38. "*I didn't read the paper":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 8, Henry H. Arnold Project, Columbia University.
39. "*More than electric lights":* Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s Over Germany 1944–45* (Simon and Schuster Paperbacks, New York, 2007), 28.
40. "*That was when we went to":* Milling, Oral History, 8.
41. "*A colossal first chapter":* Lieutenant General H. H. Arnold and Brigadier General Ira C. Eaker, *Army Flyer* (Harper and Brothers, New York, 1942), 4.

CHAPTER 2

1. "*Without any blare of trumpets":* "Army Airmen Have Fine Aviation Field," *New York Times*, July 28, 1911.
2. "*On the opening day":* "Army Aviation School Is One Month Old Today," *Washington Post*, July 23, 1911.
3. "*I'll never forget the first one":* Reminiscences of Thomas D. Milling, Oral History, 1959, 29, Henry H. Arnold Project, Columbia University.
4. "*My God, God has come":* Milling, Oral History, 29.
5. "*Uncle Sam's aviation school":* "Army Aviators to Make Long Cross-Country Trips," *Washington Post*, August 6, 1911.
6. "*How different are the planes":* Henry Harley Arnold and Ira C. Eaker, *This Flying Game* (Funk and Wagnalls, New York, 1943), 78.
7. "*As long as the string":* Arnold and Eaker, *This Flying Game*, 78.
8. "*When the airplane was sighted":* Charles DeForest Chandler and Frank P. Lahm, *How Our Army Grew Wings* (Arno Press, New York, 1979), 204.
9. "*The machine looked like":* "Breaks Aero Record," *Washington Post*, September 7, 1911.
10. "*Hundreds of young men":* "College Park Aero Class to be West Point Annex," *Washington Post*, July 30, 1911.
11. "*Army Bird Men Plan":* "Biplane Motor Balks," *Washington Post*, July 18, 1911.
12. "*At Height of 3,000 Feet":* "Army Aviators to Make Long Cross-Country Trips," *Washington Post*, August 6, 1911.
13. "*Death Seizes Bird-Men":* "Death Seizes Bird-Men Soaring Skyward and Dashes Them Lifeless to Mother Earth," *Atlanta Constitution*, January 1, 1911.
14. "*Again, a close friend of mine":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 40.
15. "*We flying men were":* Milling, Oral History, 57.
16. "*There they are!":* Arnold, *Global Mission*, 32.
17. "*I cut out a clipping":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 2, Henry H. Arnold Project, Columbia University.
18. "*Only a Miracle Will Avert War":* "Only a Miracle Will Avert War," *New York Times*, October 6, 1912.
19. "*He informed members of the board":* "Memorandum for Captain Smith," March 26, 1937 (in which original, official Signal Corps notes are reproduced), box 4, reel 4, Henry Harley Arnold Papers, Library of Congress.
20. "*very much disturbed":* "Memorandum for Captain Smith."
21. "*Troops marching along roads":* "Arnold Shows Uses of Air Craft in War," *New York Times*, September 8, 1913.
22. "*His appearance was that of":* "Memorandum for Captain Smith."
23. "*Champion of the Air":* "Champion of the Air," *Washington Post*, October 10, 1912.
24. "*For some unaccountable reason":* 2nd Lieut. H. H. Arnold to Commanding Officer, Signal Corps Aviation School, Washington, DC, November 6, 1912, box 4, reel 4, Henry Harley Arnold Papers, Library of Congress.
25. "*I took in everything":* Arnold, *Global Mission*, 41.
26. "*Come on, Sandy":* Arnold, *Global Mission*, 41.
27. "*spread all over the table":* Coffey, *Hap*, 63.
28. "*A man doesn't face death twice":* Coffey, *Hap*, 63.
29. "*At the present time my nervous system": American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 5.

30. "*It's always pretty well tightened up":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 356.
31. "*I cannot even look at a machine":* Coffey, *Hap*, 63.
32. "*Lieut. Arnold has become so nervous": American Airpower Comes of Age*, vol. 1, 6.
33. "*Gentlemen of the Military Committee":* All dialog in this section is from *Aeronautics in the Army. Hearings Before the Committee of Military Affairs, in Connection with H.R. 5304, 63rd Congress, August 12, 14, 15, and 16, 1913* (Government Printing Office, Washington, DC, 1913).

CHAPTER 3

1. "*The future of our nation": William "Billy" Mitchell's Air Power*, ed. Lt. Col. Johnny R. Jones (University Press of the Pacific, Honolulu, HI, 2004), 31.
2. "*I have called the Congress":* Woodrow Wilson, "Joint Address to Congress Leading to a Declaration of War Against Germany (1917)," National Archives, https://www.archives.gov/milestone-documents/address-to-congress-declaration-of-war-against-germany.
3. "*With the advent of the World War":* Henry H. Arnold, *Airmen and Aircraft: An Introduction to Aeronautics* (Ronald Press, New York, 1926), 36.
4. "*It's perfectly all right":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 35, Henry H. Arnold Project, Columbia University.
5. "*When I'm going to die":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 87.
6. "*That was one of his greatest disappointments":* Eleanor Pool Arnold, Oral History, 42.
7. "*That job—No. 2 man":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 83.
8. "*One day a sharp-faced":* Arnold, *Global Mission*, 37.
9. "*I had been able to flounder":* William Mitchell, *Memoirs of World War I* (Random House, New York, 1960), 99.
10. "*One flight over the lines":* Mitchell, *Memoirs of World War I*, 59.
11. "*The Air Service in particular":* Theodore Roosevelt to M. Henry Bordeaux, June 17, 1918, published in *Delphi Complete Works of Theodore Roosevelt* (Delphi Classics, Hastings, East Sussex, UK, 2021), ebook, pages unnumbered.
12. "*actually, it was worse than that":* Arnold, *Global Mission*, 50.
13. "*no outstanding success":* Henry Arnold to Colonel LeRoy L. Stefan, November 5, 1947, Air University archives, Maxwell Air Force Base, https://aul.primo.exlibrisgroup.com/discovery/delivery/01AUL_INST:AUL/1281000650006836.
14. "*The first time Hap impressed me":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 22–23, Henry H. Arnold Project, Columbia University.
15. "*Our harassed little Aviation Section":* Arnold, *Global Mission*, 58.
16. "*Dr. Millikan was in Washington":* Eleanor Pool Arnold, Oral History, 90.
17. "*At about six to eight hundred feet":* Arnold, *Global Mission*, 75.
18. "*It was in trying to produce":* Arnold, *Global Mission*, 64.
19. "*Nothing like this had ever been tried before":* Mitchell, *Memoirs of World War I*, 241.
20. "*Through the darkness":* Eddie Rickenbacker, *Fighting the Flying Circus* (Frederick A. Stokes, New York, 1919), 269.
21. "*the greatest thing of its kind":* Arnold, *Global Mission*, 81.
22. "*Mitchell returned from [the front]":* Handwritten diary of Henry Arnold, November 9, 1918, reel 1, Henry Harley Arnold Papers, Library of Congress.
23. "*Billy Mitchell was on top":* Arnold, *Global Mission*, 85.
24. "Vive notre General Americain*":* Arnold, *Global Mission*, 85.
25. "*The silence that followed":* Harry S. Truman, *Memoirs by Harry S. Truman: 1945: Year of Decisions* (Konecky and Konecky, New York, 1955), 131.
26. "*as soon as you get back there":* Arnold, *Global Mission*, 87.
27. "*Watching him and listening":* Arnold, *Global Mission*, 86.

CHAPTER 4

1. "*The world stands on the threshold":* William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power* (G. P. Putnam's Sons, New York, 1925), 3.
2. "*the reception in Rome exceeded":* A. Scott Berg, *Wilson* (G. P. Putnam's Sons, New York, 2013), 521.
3. "*the second coming of Christ":* Berg, *Wilson*, 520.
4. "*the resumption of our onward":* Inauguration Address of Warren G. Harding, March 4, 1921, The Avalon Project, Yale Law School, https://avalon.law.yale.edu/20th_century/harding.asp.
5. "*The big problem now":* "Flying Fields to Be Kept Up," *Los Angeles Times*, January 29, 1919.
6. "*We were living in Coronado":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 39, Henry H. Arnold Project, Columbia University.
7. "*not only a top fighting flyer":* "Pearson Gives the Brass Ring and a Free Ride on the Washington Merry Go Round to Eaker," reel 43798, 1173, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
8. "*He was one of the handsomest military figures":* Reminiscences of Ira Eaker, Oral History, 1959, 1, Henry H. Arnold Project, Columbia University.
9. "*Every day there was some news":* Amity Shlaes, *Coolidge* (Harper Perennial, New York, 2013), 194.
10. "*A period of reorganization followed":* Henry Harley Arnold and Ira C. Eaker, *This Flying Game* (Funk and Wagnalls, New York, 1943), 151.
11. "*we were on very tight money rations":* Eaker, Oral History, 35.
12. "*The principal thing he was":* Reminiscences of Carl Spaatz, Oral History, 1959, 25, Henry H. Arnold Project, Columbia University.
13. "*We made air patrols over":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 92.
14. "*He had a growing young":* Eaker, Oral History, 35.
15. "*He would fly for miles":* Spaatz, Oral History, 81.
16. "*Arnold had this quality of":* Reminiscences of Robert Abercrombie Lovett, Oral History, 1959, 19, Henry H. Arnold Project, Columbia University.
17. "*I could see a change in Billy":* Arnold, *Global Mission*, 96.
18. "*There can no longer be any doubt":* H. Paul Jeffers, *Billy Mitchell: The Life, Times, and Battles of America's Prophet of Air Power* (Zenith Press, St. Paul, MN, 2005), 167.
19. *Postwar Gallup polls:* See "Americans and the Holocaust," United States Holocaust Museum, https://www.ushmm.org/m/pdfs/USHMM-lend-lease-presentation-notes.pdf.
20. "*Can you guess why?":* Arnold, *Global Mission*, 96.
21. "*unable to face the fact":* Arnold, *Global Mission*, 96.
22. "*We're going to get them":* Arnold, *Global Mission*, 96.
23. "*Their whole training is that":* "Statement of Brig. Gen. William Mitchell, Assistant Chief of the Air Service," *January 4, 1921, Hearing Before the Committee of House Committee on Appropriations, Army Appropriation Bill for 1922, Sixty-Sixth Congress, Third Session* (Government Printing Office, Washington, DC, 1921), 373.
24. "*The Army fights on land":* "Memorandum on Air Bombing," Statement of Brig. Gen. William Mitchell, Assistant Chief of the Air Service, *Hearings Before Committee on Naval Affairs of the House of Representatives on Sundry Legislation Affecting the Naval Establishment 1920–1921* (Government Printing Office, Washington, DC, 1921), 416.
25. "*You are throwing the Navy":* Jeffers, *Billy Mitchell*, 179.
26. "*the closest thing to undeclared":* Arnold, *Global Mission*, 103.
27. "*We immediately started":* Reminiscences of Thomas D. Milling, Oral History, 1959, 96, Henry H. Arnold Project, Columbia University.
28. "*They tell me that the old":* Milling, Oral History, 97.

29. "*A distinct jolt was":* "Airplanes Fail to 'Sink' the Iowa," *New York Times*, June 30, 1921.
30. "*Rules or no rules":* Arnold, *Global Mission*, 104.
31. "*When a death blow has":* Jeffers, *Billy Mitchell*, 186.
32. "*The sun rose today on":* Jeffers, *Billy Mitchell*, 188.
33. "*Nobody in Washington":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 43.
34. "*It is now necessary to provide": United States Naval Institute Proceedings* 47, no. 47 (July 1921): 1829.

CHAPTER 5

1. "*Nothing in this world can take":* Amity Shlaes, *Coolidge* (Harper Perennial, New York, 2013), 5.
2. "*There was a flying fraternity":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 21, Henry H. Arnold Project, Columbia University.
3. "*was the closest senior officer":* Reminiscences of Ira Eaker, Oral History, 1959, 14, Henry H. Arnold Project, Columbia University.
4. "*Air power doesn't seem to":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 111.
5. "*It is highly unlikely that": The Military Quotation Book: More Than 1,100 of the Best Quotations About War, Leadership, Courage, and Victory*, ed. James Charlton (Thomas Dunne Books, New York, 2013), unnumbered page.
6. "*The public was interested":* Arnold, *Global Mission*, 111.
7. "*was rapidly approaching":* H. Paul Jeffers, *Billy Mitchell: The Life, Times, and Battles of America's Prophet of Air Power* (Zenith Press, St. Paul, MN, 2005), 202.
8. "*recent erratic conduct":* Ibid., 193.
9. "*They always fear to change":* Statement of William Mitchell, in *Aircraft: Hearings Before the President's Aircraft Board*, vol. 1, *September 21–28, 1925* (Government Printing Office, Washington, DC, 1925).
10. "*direct results of incompetency":* Jeffers, *Billy Mitchell*, 222.
11. "*a department of aeronautics":* William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military* (G. P. Putnam's Sons, New York, 1925), 223.
12. "*The former isolation of the":* Ibid., xi.
13. "*a bomb in the lap":* Jeffers, *Billy Mitchell*, 218.
14. "*I have not yet even begun":* Ibid., 214.
15. "*That's good, go on":* "This Is What Mrs Harding Was Reading to Late President When He Said: 'That's Good. Go On, Read Some More,'" *Boston Globe*, August 5, 1923.
16. "*I believe I can swing it":* Shlaes, *Coolidge*, 253.
17. "*Coolidge Revealed as Actual":* "Coolidge Revealed as Actual Accuser of Col. Mitchell," *Washington Post*, October 30, 1925.
18. "*President Coolidge will face":* Samuel Taylor Moore, "Airplanes Land in the Field of Politics," *The Independent* 115, no. 3942 (December 19, 1925).
19. "*almost unbelievable place":* Lieutenant-Commander Clifford A. Tinker, "A Reply to Mitchell's Plan for National Defense," *McClure's Magazine*, December 1925.
20. "*We sort of made a team":* Eaker, Oral History, 14.
21. "*Billy, take it easy":* Dialog quoted in Arnold, *Global Mission*, 114.
22. "*in a purposeless, meaningless":* "Millions Wasted on Air by Navy and Army, Madden Says," *Washington Post*, October 13, 1925.
23. "*No country is ahead of us":* "U.S. Third Power in Air, President's Investigator's Told," *Washington Post*, October 17, 1925.
24. "*He had no hesitancy about":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 56, Henry H. Arnold Project, Columbia University.
25. "*Gentlemen, you have just":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 124; "Air Quiz Ends with a Million Words to Sift!," *Chicago Daily Tribune*, October 17, 1925.
26. "*There was a deathly stillness":* "Mitchell, Found Guilty by U.S. Court Martial, Suspended from Army Service for Five Years," *Atlanta Constitution*, December 18, 1925.
27. "*Colonel Mitchell listened to the":* "Mitchell Found Guilty by Army Court Martial, Suspended for 5 Years," *Washington Post*, December 18, 1925.

28. "*He was a fighter":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 46–47.
29. "*no direct menace to the United States": Aircraft in National Defense, Message from the President of the United States, December 10, 1925* (Government Printing Office, Washington, DC, 1925), 12.
30. "*The administration is firmly in the saddle":* "Big Aircraft Plans Rejected, Economy Policy Prevailing," *Washington Post*, March 4, 1926.
31. "*thereby strengthening the conception":* "1926—The U.S. Army Air Corps Act," Air University, Air Force Historical Support Division, https://www.afhistory.af.mil/FAQs/Fact-Sheets/Article/459017/1926-the-us-army-air-corps-act/.
32. "*In your opinion":* Coffey, *Hap*, 6.
33. "*They tried to disguise their":* Coffey, *Hap*, 127.
34. "*The time of airplane performance":* Arnold, *Global Mission*, 121.

CHAPTER 6

1. "*This hour I rode the sky":* Diary entry of Charles Lindbergh, July 2, 1939, in *The Wartime Journals of Charles Lindbergh* (Harcourt Brace Jovanovich, New York, 1970), 222.
2. "*The news just saturated all":* Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s over Germany* (Simon and Schuster Paperbacks, New York, 2001), 29.
3. "*That golden era of the air":* Henry Harley Arnold and Ira C. Eaker, *This Flying Game* (Funk and Wagnalls, New York, 1943), 36.
4. "*There are sound economic":* Henry Dominguez, *Edsel: The Story of Henry Ford's Forgotten Son* (Society of Automotive Engineers, Warrendale, PA, 2002), 4.
5. "*There is still a newness about":* "The Evolution of the Commercial Flying Experience," exhibit, National Air and Space Museum, https://airandspace.si.edu/explore/stories/evolution-commercial-flying-experience.
6. "*Speed is a magic word in":* Arnold and Eaker, *This Flying Game*, 64.
7. "*Flying by instruments soon":* General James H. "Jimmy" Doolittle with Carroll V. Glines, *I Could Never Be So Lucky Again* (Bantam Books, New York, 1992), 141.
8. "*time and space were eliminated":* Donald Crafton, *The Talkies: American Cinema's Transition to Sound, 1926–1931* (University of California Press, Berkeley, 1999), 49.
9. "*In the annals of titanic":* "A 40-Year-Long Dogfight for Aircraft Supremacy," *Los Angeles Times,* October 25, 1999.
10. "*There's no question he was":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 60, Henry H. Arnold Project, Columbia University.
11. "*I then called in Major Spaatz":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 115.
12. "*We are proceeding as rapidly":* John K. Montgomery to H. H. Arnold, July 27, 1927, reel 4, Henry Harley Arnold Papers, Library of Congress.
13. "*The salary at Pan Am would":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 77, Henry H. Arnold Project, Columbia University.
14. "*In his heart":* Eleanor Pool Arnold, Oral History, 78.
15. "*The Arnolds landed on March Field":* Eleanor Pool Arnold, Oral History, 80.
16. "*The Army had to be partially":* Reminiscences of Ira Eaker, Oral History, 1959, 55, Henry H. Arnold Project, Columbia University.
17. "*To be a military officer":* Eaker, Oral History, 57.
18. "*The machine the Air Corps":* "Typewriter Shortage at March Field—1932," and undated news clipping, reel 43803, 1166, 1168, "Hap" Arnold—Murray Green Collection, United States Air Force Academy.
19. "*Twelve or fourteen of us":* Eleanor Pool Arnold, Oral History, 83.
20. "*ordered and directed that the Secretary":* Executive Order 6591, "Transportation of Air Mail During Emergency Created by Annulment of Domestic Air Mail Contracts," Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/eo/eo0016.pdf.
21. "*We were given ten days":* Arnold, *Global Mission*, 143.
22. "*We took a big load of":* Transcript of interview with Barney Giles, May 12, 1970, reel 43803, 976–80, "Hap" Arnold—Murray Green Collection, United States Air Force Academy.
23. "*Your squadron will run the":* Eaker, Oral History, 41.
24. "*I never shall forget it":* Eleanor Pool Arnold, Oral History, 83–84.

CHAPTER 7

1. "*When I go, I'd like best":* Amelia Earhart, *Last Flight* (Orion Books, New York, 1988), xii.
2. "*The President has ordered":* "Army Pilots Face Blizzard," *Daily Boston Globe*, February 19, 1934.
3. "*My pilots were mostly":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 143.
4. "*It hit us very hard":* Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 84, Henry H. Arnold Project, Columbia University.
5. "*legalized murder":* "Rickenbacker, Fish Deplore 3 Crashes," *Washington Post*, February 18, 1934.
6. "*Never has any government":* "Air-Minded People Is Germany's Aim," *New York Times*, September 10, 1933.
7. "*Our aviation enters a new phase":* "Air-Minded People Is Germany's Aim."
8. "*a nation of flyers":* "Nazi Flyers Canvass Streets for Funds," *New York Times*, June 3, 1934.
9. "*There can be no doubt of her":* "Arming by Reich Held Inevitable," *New York Times*, February 4, 1934.
10. "*Mad Race for Air Power Is On":* "Mad Race for Air Power Is On—Nations Prepare for War Above Clouds," *Washington Post*, June 17, 1934.
11. "*the world at large is due":* "Reich to Be Armed in Air with Mighty Fleet by 1936," *New York Times*, February 11, 1934.
12. "*Within a week":* Arnold, *Global Mission*, 144.
13. "*One Killed in Ohio":* "Two Planes on Way to Washington; Mists Blind Airmen," *Washington Post*, February 23, 1934.
14. "*Another Army Pilot Is Killed":* "Three Others Hurt, One in Leap; Two Suffer from Submersion," *Washington Post*, February 24, 1934.
15. "*Politics was costing the lives":* Arnold, *Global Mission*, 144.
16. "*When you consider how":* "Three Others Hurt, One in Leap; Two Suffer from Submersion," *Washington Post*, February 24, 1934.
17. "*If an army aviator can't fly":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 49.
18. "*America needed, by June":* "The Army Air Corps Alaskan Flight," box 198, reel 198, Henry Harley Arnold Papers, Library of Congress.
19. "*I hear the fishing is great":* Flint O. Dupre, *Hap Arnold: Architect of American Air Power* (Macmillan, New York, 1972), 63.
20. "*Health of Command: Excellent":* "Diary of Army Air Corps Flight to Alaska," June 25, 1934, reel 198, Henry Harley Arnold Papers, Library of Congress.
21. "*That was one of the finest":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 159.
22. "*Our national defense policy": Final Report of War Department Special Committee on Army Air Corps, July 18, 1934* (Government Printing Office, Washington, DC, 1934), 12.
23. "*That's when he really burst out":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 81, Henry H. Arnold Project, Columbia University.
24. "*In Washington," Arnold believed:* Arnold, *Global Mission*, 170–71.

CHAPTER 8

1. "*The Americans cannot build":* Joseph T. Molyson Jr., *Six Air Forces over the Atlantic: How Allied Airmen Helped Win the Battle of the Atlantic* (Stackpole Books, Lanham, MD, 2024), 37.
2. "*I never met anyone":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 45, Henry H. Arnold Project, Columbia University.
3. "*Everybody in the [Air Corps]":* Transcript of interview with Gen. C. R. Smith, April 8, 1970, reel 43798, 879, "Hap" Arnold—Murray Green Collection, United States Air Force Academy.
4. "*We suffered":* Transcript of interview with Ben Kelsey, June 9, 1971, reel 43798, 438–39, "Hap" Arnold—Murray Green Collection, United States Air Force Academy.
5. "*Almost at the same moment":* Arnold, *Global Mission,* 154.
6. "*a turning point in the course":* Ibid., 155.
7. "*15-Ton Flying Fortress":* Mary Wells Geer, *Boeing's Ed Wells* (University of Washington Press, Seattle, 1992), 54.
8. "*When we taxied out":* Transcript of interview with Donald Putt, August 13, 1974, reel 43798, 477–78, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
9. "*It was just as if, when":* Geer, *Boeing's Ed Wells*, 61.
10. "*General Arnold was on the":* Transcript of interview with Eugene L. Eubank, May 8, 1970, reel 43798, 514–18, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
11. "*We must not permit another":* Ibid.
12. "*had only one predecessor":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 130.
13. "*The Government of the Reich will":* Mira Wilkins and Frank Ernest Hill, *American Business Abroad: Ford on Six Continents* (Cambridge University Press, New York, 2011), 272.
14. "*the armed forces of Germany must":* Treaty of Versailles, Section III—Air Clauses, Papers Relating to the Foreign Relations of the United States, The Paris Peace Conference, vol. 13, https://history.state.gov/historicaldocuments/frus1919Parisv13/ch14subch3.
15. "*League of Air Sports":* Paul Roland, *The Illustrated History of the Nazis* (Arcturus, London, 2012), unnumbered page.
16. "*for the defense of the country":* "Germany Drafts Civilian Flying Club Into Army," *Chicago Daily Tribune*, March 12, 1935.
17. "*the withdrawal of the German":* William L. Shirer, *The Rise and Fall of the Third Reich: A History of Nazi Germany* (Simon and Schuster, New York, 1960), 299.
18. "*I was on the [lead] ship":* Transcript of interview with George Kenney, July 18, 1969, reel 43798, 1523–24, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
19. "*We flew a rather loose":* Transcript of interview with C. B. Allen, June 10, 1971, reel 43798, 1551, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
20. "*We flew and flew":* Transcript of interview with Harris Hull, June 2, 1971, reel 43798, 1561, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
21. "*Three of the army's sky":* "'Flying Fortresses' Meet Liner at Sea," *New York Times*, May 13, 1938.
22. "*From then on," Arnold recalled:* Arnold, *Global Mission*, 156.
23. "*I am for the development":* Arnold to Brig. Gen. A. W. Robins, August 15, 1938, reel 43798, 407–8, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
24. "*the two or three smaller planes":* Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (University of Chicago Press, Chicago, 1955), 7.
25. "*distinctly an airplane of aggression":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 61.
26. "*I have never heard Adolf":* Robert E. Sherwood, *Roosevelt and Hopkins: An Intimate History* (Harper and Brothers, New York, 1948), 100.

27. "*We are fighting the Jews":* "The German Leader's Speech," *Irish Times*, September 13, 1938; "Hitler's Threat to Czechs," *New York Times*, September 13, 1938.
28. "*born of the belief that":* Sherwood, *Roosevelt and Hopkins*, 123.
29. "*If one makes a toy":* Sir Nevile Henderson, *Failure of a Mission: Berlin, 1937–1939* (G. P. Putnam's Sons, New York, 1940), 100.
30. "*The President was sure then":* Sherwood, *Roosevelt and Hopkins*, 100.
31. "*I heard the phone ringing":* Arnold, *Global Mission*, 169.
32. "*We rushed out there":* Wolfe, Oral History, 11.
33. "*I can see the plane burning":* Anecdote with dialog recounted in Reminiscences of Eleanor Pool Arnold, Oral History, 1959, 100, Henry H. Arnold Project, Columbia University.
34. "*the loss of Major General":* "Crash Kills Westover, Army Air Corps Chief," *Washington Post*, September 22, 1938.
35. "*Without firing a shot":* Arnold, *Global Mission*, 169.
36. "*You would think you were":* Arthur Schlesinger Jr., "F.D.R. as President," in *The Thirties: A Time to Remember*, ed. Don Congdon (Simon and Schuster, New York, 1962), 415.
37. "*To the surprise, I think, of":* Arnold, *Global Mission*, 177.
38. "*a striking force to back":* Sherry, *The Rise of American Air Power*, 79.
39. "*When I write to foreign countries":* Sherry, *The Rise of American Air Power*, 79.
40. "*everybody began to talk":* Arnold, *Global Mission*, 177.
41. "*It seemed to many":* Sherwood, *Roosevelt and Hopkins*, 142.
42. "*The Fuehrer is not just a lunatic":* William Stevenson, *A Man Called Intrepid: The Secret War* (Ballantine Books, New York, 1976), 97.
43. "*The strength of an Air Force":* Arnold memorandum to Roosevelt, quoted in Arnold, *Global Mission*, 178.
44. *airpower's "Magna Carta":* Arnold, *Global Mission*, 179.
45. "*It was the first time in history":* Arnold, *Global Mission*, 179.

CHAPTER 9

1. "*To build up our Air Force":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 186.
2. "*Somebody had to set the pace":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 23, 12, Henry H. Arnold Project, Columbia University.
3. "*Our maximum delivery":* C. L. Egtvedt to H. H. Arnold, October 28, 1938, reel 198, Henry Arnold Papers, Library of Congress.
4. "*Working at top speed with":* Dwayne L. Wallace to H. H. Arnold, October 22, 1938, reel 198, Henry Arnold Papers, Library of Congress.
5. "*Boy, why some of them didn't":* Transcript of interview with Kenneth B. Wolfe, March 18, 1970, reel 43798, 1465–1466, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
6. "*You can borrow the money":* Arnold, *Global Mission*, 181.
7. "*Air Corps 10,000 Airplanes":* Memorandum for the Chief of Staff, "Air Corps 10,000 Airplanes, Two Year Program," box 92, Subject File Aviation, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.
8. "*But I want to ask you":* Arnold, *Global Mission*, 183.
9. "*We were still back in the preair age":* Marquis Childs, "Arnold's Air Victory," Washington Calling, *Washington Post*, May 8, 1945.
10. "*How about meeting my wife":* Arnold, *Global Mission*, 188.
11. "*General Arnold impresses me":* Diary entry of Charles Lindbergh, April 20, 1939, in *The Wartime Journals of Charles Lindbergh* (Harcourt Brace Jovanovich, New York, 1970), 185.
12. "*Germany is undoubtedly":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 190.
13. "*Hitler held the destruction of":* Arnold, *Global Mission*, 189.
14. "*The discussion centered around":* Diary entry of Charles Lindbergh, May 12, 1939, in *Wartime Journals of Charles Lindbergh*, 200–1.
15. "*Arnold was thinking ahead":* General Curtis LeMay and Bill Yenne, *Superfortress: The Boeing B-29 and American Airpower in World War II* (Westholme Publishing, Yardley, PA, 2007), 24.
16. "*Hap was foremost in believing":* Reminiscences of Carl Spaatz, Oral History, 1959, Henry H. Arnold Project, Columbia University, 60.
17. "*We can put in a lot of":* Mary Wells Geer, *Boeing's Ed Wells* (University of Washington Press, Seattle, 1992), 93–94.
18. "*The fault I can see about Arnold":* Wolfe, Oral History, 47.
19. "*If Arnold had known in 1939":* Coffey, *Hap*, 206.
20. "*I am putting on the uniform":* "Nazis Attack Poles by Land and Air," *Detroit News*, September 1, 1939.
21. "*without mercy":* Adolf Hilter, "The Obersalzberg Speech," August 22, 1939, https://sourcebooks.web.fordham.edu/mod/hitler-obersalzberg.asp.
22. "*aerial attacks, stupendous":* "The Meaning of Blitzkrieg," *New York Times*, April 5, 1940.
23. "That is what will happen to them!*":* Albert Speer, *Inside the Third Reich*, trans. Richard and Clara Winston (Avon, New York, 1970), 303.
24. "*It's come at last":* Jon Meacham, *The Soul of America: The Battle for Our Better Angels* (Random House, New York, 2019), 154.
25. "*The ruthless bombing":* "Appeal of President Franklin D. Roosevelt on Aerial Bombardment of Civilian Populations, September 1, 1939," https://www.dannen.com/decision/int-law.html.
26. "*The war has begun!":* Diary entry of Charles Lindbergh, September 1, 1939, in *Wartime Journals of Charles Lindbergh*, 250.

PART II: THE CREATION OF AIRPOWER

1. "*Every single man, woman":* Franklin Roosevelt, "Fireside Chat #18: Re: War with Japan," speech file, December 9, 1941, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/msf/msfb0004.

CHAPTER 10

1. "*Our Air Force, as a powerful":* Arnold speech to the American Society of Newspaper Editors, April 21, 1939, reel 43803, 2391, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
2. "*Germany required ten years":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 312.
3. "*Should we send our Army":* "Gallup Vault: U.S. Opinion and the Start of World War II," Gallup, https://news.gallup.com/vault/265865/gallup-vault-opinion-start-world-war.aspx.
4. "*Our own air forces are in":* Statement of Col. Charles A. Lindbergh, in *To Promote the Defense of the United States, Hearings Before the Committee on Foreign Relations, February 6, 1941* (Government Printing Office, Washington, DC), 491.
5. "*The President and his advisors rode":* "Roosevelt Inspects Newest Fighting Planes, Varied Types Shown by the Army and Navy," *New York Times*, October 30, 1938.
6. "*If you traveled with him through":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 98–99, Henry H. Arnold Project, Columbia University.
7. "*You never thought the things": Airpower Pioneers: From Billy Mitchell to Dave Deptula*, ed. John Andreas Olsen (Naval Institute Press, Annapolis, MD, 2023), 64.
8. "*He made you do better than":* Reminiscences of Robert Ellsworth Gross, Oral History, 1959, 11, Henry Arnold Project, Columbia University.
9. "*I was called in by Arnold":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 11, Henry H. Arnold Project, Columbia University.
10. *a document listing dollar figures:* "Utilities Estimates Based on 8,000 Workmen," reel 5, Henry Harley Arnold Papers, Library of Congress.
11. "*Arnold had 99 percent":* Wolfe, Oral History, 23.
12. "*What the companies did":* Reminiscences of Robert Abercrombie Lovett, Oral History, 1959, 18, Henry H. Arnold Project, Columbia University.
13. "*We had to finance it on":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 224.
14. "*We had no people":* Wolfe, Oral History, 12.
15. "*Things are moving along as fast":* Henry Arnold to Cliff (Dr. C. H. Arnold), July 2, 1941, reel 1, Henry Harley Arnold Papers, Library of Congress.
16. "*Aircraft enables us to jump":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 24.
17. "*Now it is actually populations":* Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Air University Press, Maxwell Air Force Base, AL, 2019), 174.
18. "*picture, if you can":* Sherry, *The Rise of American Air Power*, 24.
19. "*The more rapid and terrifying":* Douhet, *Command of the Air*, 175.
20. "*A nation's nerve-system":* Sherry, *The Rise of American Air Power,* 26.
21. "*I use the date 1934 to":* Transcript of interview with Donald Wilson, August 21, 1970, reel 43798, 158–59, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
22. "*The airplane gives us a weapon":* Haywood S. Hansell Jr., *The Strategic Air War Against Japan and Germany: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 13.
23. "*The early visionaries and proponents":* Hansell, *The Strategic Air War*, 7.
24. "*Military Air Power": Third Report of the Commanding General of the Army Air Forces to the Secretary of War, 12 November 1945* (Schneidereith & Sons, Baltimore, MD), 61.
25. "*there is no such thing as":* Dik Alan Daso, *Hap Arnold and the Evolution of American Airpower* (Smithsonian Institution Press, Washington, 2000), 144.

26. "*The United States must build":* Arnold memorandum to the Secretary of War, September 24, 1941, reel 5, Henry H. Arnold Papers, Library of Congress.
27. "*The No. 1 job of an air force":* First Report of the Commanding General of the Army Air Forces to the Secretary of War, 4 January 1944, *The War Reports*, 304.
28. "*We realized the first requirement":* Hansell, *The Strategic Air War*, 31.
29. "*The scope of the air proposal":* Hansell, *The Strategic Air War*, 37, 112.
30. "*leaned heavily toward victory":* Barry D. Watts, *The Foundations of U.S. Air Doctrine* (Air University Press, Maxwell Air Force Base, AL, 1984), 19.
31. "*If these air operations against":* Hansell, *The Strategic Air War*, 36.
32. "*General Arnold indicated to me":* Theodore von Kármán with Lee Edson, *The Wind and Beyond: Theodore Von Kármán, Pioneer in Aviation and Pathfinder in Space* (Little, Brown, Boston, 1967), 225–26.
33. "*is always verging on obsolescence":* General of the Army H. H. Arnold, "Air Power for Peace," *National Geographic*, February 1946.
34. "*rocketry was a bad word":* Reminiscences of Theodore von Kármán, 1960, 2, Aviation Project, Columbia University.
35. "*was transformed into the so-called":* Reminiscences of Theodore von Kármán, 3.
36. "*a fanatic belief that air power":* Reminiscences of Theodore von Kármán, 4.
37. "*air power will determine the outcome":* Von Kármán, *The Wind and Beyond*, 268.

CHAPTER 11

1. "*Our ideal, yours and mine":* "Message to Congress of the United States, Delivered May 16, 1940," Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/msf/msf01324.
2. "*I appreciate you people":* Transcript of conversation, March 5, 1940, 4:30 p.m., Henry Morgenthau Diaries, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/morg/md0329.pdf.
3. "*The responsibility for building":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 186.
4. "*Morgenthau hated Hap's guts":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 89, Henry H. Arnold Project, Columbia University.
5. "*Oh, boy, did General Arnold":* Diary entry of Henry Morganthau, March 12, 1940, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/morg/md0330.pdf; Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 85.
6. "*He [FDR] intimated that there":* Arnold, "Memorandum of Record," March 13, 1940, reel 198, Henry H. Arnold Papers, Library of Congress.
7. "*The decisive hour has come":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 15.
8. "*Events in Europe of the last":* "Memorandum for the President, Subject: Program for Creation of Air Power," May 15, 1940, box 83, Stimson Folder, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/psf/psf000329.pdf.
9. "*Here is the Air Forces' great":* Transcript of interview with Lauris Norstad, July 15, 1969, reel 43798, 592–94, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
10. "*every Cabinet member present":* "Grave Congress Hears Roosevelt's Arms Plea," *Washington Post*, May 17, 1940.
11. "*Mr. Vice President, Mr. Speaker":* "Message to the Congress of the United States Delivered by the President," May 16, 1940, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/msf/msf01324.
12. "*If I had asked for twenty-five":* Transcript of interview with Gen. Charles B. Stone, May 8, 1970, reel 43798, 609–14, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
13. "*We hear now that the Army":* "Defense Plans of President Disclosed," *Los Angeles Times*, May 16, 1940.
14. "*What is America but beauty queens":* Arthur Herman, *Freedom's Forge: How American Business Produced Victory in World War II* (Random House, New York, 2012), 13.
15. "*walls of sand that a child":* Goodwin, *No Ordinary Time*, 41.
16. "*It was the dream of my life":* Goodwin, *No Ordinary Time*, 73.
17. *found a "suitable site":* William L. Shirer, *The Rise and Fall of the Third Reich: A History of Nazi Germany* (Simon and Schuster, New York, 1960), 664.
18. "*that conflict would have to be":* Shirer, *The Rise and Fall of the Third Reich*, 686.
19. "*We shall fight on the beaches":* "We Shall Fight on the Beaches" speech, June 4, 1940, International Churchill Society, https://winstonchurchill.org/resources/speeches/1940-the-finest-hour/we-shall-fight-on-the-beaches/.
20. "*The London that we knew":* Goodwin, *No Ordinary Time*, 151.
21. "*There had been fighting":* Jon Meacham, *Franklin and Winston: An Intimate Portrait of an Epic Friendship* (Random House, New York, 2004), 73.

22. "*There are no words to describe":* Report of Edward R. Murrow, September 18, 1940, in *In Search of Light: The Broadcasts of Edward R. Murrow, 1938–1961* (Alfred A. Knopf, New York, 1967), 37.
23. "*Air power today has decided the fate":* "Statement by the Honorable Henry L. Stimson, Secretary of War, Before the Ways and Means Committee, House of Representatives, August 9, 1940," reel 5, Henry H. Arnold Papers, Library of Congress.
24. "*And should the Royal Air Force":* Jörg Friedrich, *The Fire: The Bombing of Germany, 1940–1945* (Columbia University Press, New York, 2006), 56.
25. "*There is one thing that will": The Library of Congress World War II Companion*, ed. David M. Kennedy (Simon and Schuster, New York, 2007), 334.
26. "*this is not a fireside chat on war":* "Radio Address of the President, The White House, December 29, 1940," speech file, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/msf/msf01403.
27. "*We shall need the greatest":* The Prime Minster (Churchill) to President Roosevelt, telegram sent December 7, 1940, *Foreign Relations of the United States: Diplomatic Papers*, vol. 3, US Department of State Office of the Historian, https://history.state.gov/historicaldocuments/frus1940v03/d20.
28. "*Reports from overseas multiplied":* "Statement by the Honorable Henry L. Stimson, Secretary of War, Before the Ways and Means Committee, House of Representatives, August 9, 1940," reel 5, Henry H. Arnold Papers, Library of Congress.
29. "*From being impotent":* Sherry, *The Rise of American Air Power*, 107.
30. "*The effective defense of this":* J. Carlyle Sitterson, "Aircraft Production Policies Under the National Defense Advisory Commission, May 1940 to December 1941," May 30, 1946, Historical Reports on War Administration War Production Board Special Study No. 21, 96.
31. "*It is in bombing, on a scale undreamt":* Robert A. Lovett, "Memorandum: Need for Heavy Bombers," September 22, 1941, reel 5, Henry H. Arnold Papers, Library of Congress.
32. "*Need for Heavy Bombers":* Lovett, "Memorandum: Need for Heavy Bombers."
33. "*I know of no single item":* Franklin D. Roosevelt to William Knudsen, May 4, 1941, reel 198, Henry H. Arnold Papers, Library of Congress.
34. "*The most significant single fact":* Major Alexander P. De Seversky, *Victory Through Air Power* (Simon and Schuster, New York, 1942), 3.

CHAPTER 12

1. "*Aircraft manufacturers currently":* "Profitable Volume Output Ahead for Company on 4 Engine Bombers," *Wall Street Journal*, December 16, 1940.
2. "*A heavy bomber," Arnold wrote:* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 330.
3. "*The process of commissioning":* Henry Stimson to Franklin Roosevelt, October 21, 1941, reel 5, Henry H. Arnold Papers, Library of Congress.
4. "*In row after row":* Scene and dialog from H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 205.
5. "*The conditions here were quite":* Arnold, *Global Mission*, 205.
6. "*This factor [in] man power":* J. H. Kindelberger to General Arnold, November 2, 1942, reel 15, Henry H. Arnold Papers, Library of Congress.
7. "*Frankly I am worried about":* H. H. Arnold to Major General Frank M. Andrews, January 22, 1941, reel 11, Henry H. Arnold Papers, Library of Congress.
8. *fully loaded weight of 55,000 pounds:* Statistics for aircraft come from the National Museum of the United States Air Force. The B-17: https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/196270/boeing-b-17g-flying-fortress/. The B-24: https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/196286/consolidated-b-24d-liberator/.
9. "*We were all very much awed":* Roscoe Smith, oral history, Benson Ford Research Center, Dearborn, MI, 58.
10. "*It was so large and complicated":* Arnold, *Global Mission*, 478.
11. "*People watched this industrial":* Boeing press materials, compiled by Boeing-Wichita Public Relations, first printing January 11, 1945, reel 43813, 734–41, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
12. "*Hap took the chances":* General Curtis LeMay and Bill Yenne, *Superfortress: The Boeing B-29 and American Airpower in World War II* (Westholme Publishing, Yardley, PA, 2007), 19.
13. "*So began the largest single":* Boeing press materials, compiled by Boeing-Wichita Public Relations.
14. "*Military aviation has reached":* "Senate Plans Hearing on Separate Air Force," *Christian Science Monitor*, June 17, 1941.
15. "*The Chief of Staff [George Marshall]":* H. H. Arnold to Major General F. M. Andrews, July 28, 1941, reel 11, Henry H. Arnold Papers, Library of Congress.

CHAPTER 13

1. "*My feelings against Americanism":* William L. Shirer, *The Rise and Fall of the Third Reich: A History of Nazi Germany* (Simon and Schuster, New York, 1960), 895fn.
2. "*So many different problems":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 215.
3. "*Plenty of press men and photographers":* Diary entry of Henry Arnold, April 10, 1941, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 136.
4. "*On that trip to England":* Arnold, *Global Mission*, 215.
5. "*I did all the spade work":* Reminiscences of Elwood Quesada, Oral History, 1960, 31, Henry H. Arnold Project, Columbia University.
6. "*a very savvy man":* Diary entry of Henry Arnold, April 13, 1941, in *American Airpower Comes of Age*, vol. 1, 140.
7. "*My impression of him":* Reminiscences of William Averell Harriman, Oral History, 1960, 8, Henry H. Arnold Project, Columbia University.
8. "*Tour through London":* Diary entry of Henry Arnold, April 13, 1941, in *American Airpower Comes of Age*, vol. 1, 141.
9. "*Signs of bombing everywhere":* Diary entry of Henry Arnold, April 17, 1941, in *American Airpower Comes of Age*, vol. 1, 147.
10. "*Fire departments working everywhere":* Diary entry of Henry Arnold, April 17, 1941, in *American Airpower Comes of Age*, vol. 1, 147.
11. "*I must get the plans and specifications":* Arnold, *Global Mission*, 242.
12. "*Only 140 bombers available for":* Diary entry of Henry Arnold, April 16, 1941, in *American Airpower Comes of Age*, vol. 1, 145–46.
13. "*The sirens started":* Diary entry of Henry Arnold, April 15, 1941, in *American Airpower Comes of Age*, vol. 1, 144.
14. "*We were right in the midst":* Quesada, Oral History, 32–33.
15. "*Hospitals filled":* Diary entry of Henry Arnold, April 18, 1941, in *American Airpower Comes of Age*, vol. 1, 149.
16. "*What would you do if":* Diary entry of Henry Arnold, April 21, 1941, in *American Airpower Comes of Age*, vol. 1, 153.
17. "*Long range bombers must":* Diary entry of Henry Arnold, April 18, 1941, in *American Airpower Comes of Age*, vol. 1, 150.
18. "*We must plan new equipment":* Diary entry of Henry Arnold, April 18, 1941, in *American Airpower Comes of Age*, vol. 1, 150.
19. "*You tell the President":* Arnold, *Global Mission*, 233.
20. "*I just didn't see how":* Quesada, Oral History, 32.
21. "*War is an Air war today":* Diary entry of Henry Arnold, April 21, 1941, in *American Airpower Comes of Age*, vol. 1, 155.
22. "*They needed equipment badly":* Arnold, *Global Mission*, 233.
23. "*the jelly was thrown in gobs":* Arnold, *Global Mission*, 243.
24. "*the start of a new era":* Arnold, *Global Mission*, 243.
25. "*Return to Washington—arriving not":* Henry Arnold, "Notes on Roosevelt-Churchill Conference, 1941," Henry Arnold Papers, Library of Congress; diary entry of Henry Arnold, July 31, 1941, in *American Airpower Comes of Age*, vol. 1, 216.
26. "*the rattlesnakes of the sea":* Donald E. Schmidt, *The Folly of War: American Foreign Policy, 1898–2005* (Algora, New York, 2005), 175.
27. "*Where are we going?":* Diary entry of Henry Arnold, August 4, 1941, in *American Airpower Comes of Age*, vol. 1, 218.

28. "*At last, we've gotten together":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 262.
29. "*The British as usual asked":* Diary entry of Henry Arnold, "The Conference in Retrospect," in *American Airpower Comes of Age*, vol. 1, 233.
30. "*bombing offensive must be":* Mark Skinner Watson, *Chief of Staff: Prewar Plans and Preparations*, vol. 4, pt. 1 (Historical Division, Department of the Army, Washington, DC, 1950), 402.
31. "*Being with them":* Al Cimino, *Roosevelt and Churchill: A Friendship That Saved the World* (Chartwell Books, New York, 2018), back cover quote attributed to Mary Churchill.
32. *The president's menu:* Arnold saved the menus from this conference. Reel 2, Henry H. Arnold Papers, Library of Congress.
33. "*This is a mechanized war":* "Highlights of Churchill's Speech Made on the Night of August 9th Aboard the U.S.S. *Augusta*," reel 2, Henry H. Arnold Papers, Library of Congress.
34. "*After the final destruction":* Text of the Atlantic Charter, Franklin D. Roosevelt Presidential Library and Museum, https://www.fdrlibrary.org/documents/356632/390886/atlantic_charter.pdf/30b3c906-e448–4192–8657–7bbb9e0fdd38.
35. "*Every word seemed to":* Goodwin, *No Ordinary Time*, 267.
36. "*We [the U.S.] were planning for the war":* Arnold, *Global Mission*, 255.

CHAPTER 14

1. "*To conquer the command":* Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Air University Press, Maxwell Air Force Base, AL, 2019), 25.
2. "*Air raid on Pearl Harbor":* Communique pictured on Digital Public Library of America, https://catalog.archives.gov/id/596244.
3. "*it looks as if the Japanese":* William Doyle, *Inside the Oval Office: The White House Tapes from FDR to Clinton* (Kodansha International, New York, 1999), 35.
4. "*The first evidence of hostilities":* Naval Message from CINCPAC (Commander in Chief, Pacific), December 8, 1941, Franklin Roosevelt Museum and Library, Map Room Papers: Hawaii Area, http://www.fdrlibrary.marist.edu/_resources/images/ph/ph006.pdf.
5. "*Pearl Harbor's been bombed!":* Reminiscences of Donald Wills Douglas, Oral History, 1959, 88, Henry H. Arnold Project, Columbia University.
6. "*We all just stood there":* Douglas, Oral History, 88.
7. "*I've been trying to tell this guy":* Douglas, Oral History, 88.
8. "*She came in after a few":* Reminiscences of Ira Eaker, Oral History, 1959, 85, Henry H. Arnold Project, Columbia University.
9. "*It was a beautiful day":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 18, Henry H. Arnold Project, Columbia University.
10. "*We came out at the end":* Reminiscences of Robert Abercrombie Lovett, Oral History, 1959, 36–37, Henry H. Arnold Project, Columbia University.
11. "*there wasn't anything very pretty":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 208.
12. "Senso! Senso!*":* Robert Guillain, *I Saw Tokyo Burning: An Eyewitness Narrative from Pearl Harbor to Hiroshima*, trans. William Byron (Doubleday, Garden City, NY, 1981), 1.
13. "*Upon arriving at the":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 270.
14. "*Got to Washington at 3:50":* H. H. Arnold to Donald Douglas, December 11, 1941, reel 13, Henry H. Arnold Papers, Library of Congress.
15. "*This is war":* "In Air Raid Drills: San Francisco Blackout, New Warnings in New York," *Lawrence World Journal*, December 10, 1941.
16. "*The war will come right to our":* "The Enduring Legacy to a Generation," *Washington Times*, June 1, 2004.
17. "*If you think that this place":* H. H. Arnold to Donald Douglas, December 13, 1941, reel 13, Henry H. Arnold Papers, Library of Congress.
18. "*Who was responsible for":* Herman S. Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan* (University of North Texas Press, Denton, TX, 2010), 90.
19. "*Every possible precaution within":* Radiogram from General Douglas MacArthur to the Adjutant General, "For General Arnold," December 10, 1941, reel 5, Henry H. Arnold Papers, Library of Congress.
20. "*We build things in America":* Arthur Herman, *Freedom's Forge: How American Business Produced Victory in World War II* (Random House, New York, 2012), 166.
21. "*We must use our coming increase":* Henry Stimson to Franklin Roosevelt, April 12, 1942, box 84, Stimson Folder, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/psf/psf000336.pdf.
22. "*Nearly half those who sang":* Winston S. Churchill, *The Grand Alliance* (Rosetta Books, New York, 2010), 384.

CHAPTER 15

1. "*The task of the military airman":* Lieutenant General H. H. Arnold and Major General Ira C. Eaker, *Army Flyer* (Harper & Brothers, New York, 1942), 6.
2. "*there was no second in command":* Transcript of interview with Lt. Gen. Fred M. Dean, February 20, 1973, reel 43803, 1281, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
3. "*He never stopped":* Transcript of interview with Lt. Gen. Donald Yates, January 7, 1970, reel 43803, 1817, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
4. "*He always had a smile":* Transcript of interview with Brig. Gen. Trubee Davison, April 17, 1970, reel 43803, 183, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
5. *It was "her whole life":* Transcript of interview with James Maher, December 28, 1970, reel 43803, 330–32, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
6. *Arnold kept a "Black Book":* Transcript of interview with Mrs. V. Duffie, reel 43803, 1891, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
7. "*If a man came into his office":* Reminiscences of Colonel "Pete" Peterson, Oral History, 1959, 6, Henry H. Arnold Project, Columbia University.
8. "*I guess I don't have to explain":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 319.
9. "*Steve was sitting on a table":* Transcript of interview with Eugene Beebe, August 12, 1970, reel 43803, 81–85, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
10. "*Get a doctor!":* Transcript of interview with Eugene Beebe.
11. "*I came into Arnold's outer":* Transcript of interview with Charles P. Cabell, July 30, 1969, reel 43803, 160–161, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
12. "*There was a great deal of":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 312.
13. "*Even as Chief of the Air Corps":* General Laurence F. Kuter, USAF (Ret.), "The General vs. the Establishment: General H.H. Arnold and the Air Staff," *Aerospace Historian*, December 1974, 186.
14. "'*It can't be done' were fighting":* Kuter, "The General vs. the Establishment."
15. *Cabell and Norstad, "That's you":* Transcript of interview with Charles P. Cabell, 1132–33.
16. "*I'll do the operating":* Transcript of interview with Charles P. Cabell.
17. "*tall, handsome, and intelligent":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 127.
18. "*In view of your past stand":* Diary entry of Charles Lindbergh, January 13, 1942, in *The Wartime Journals of Charles Lindbergh* (Harcourt Brace Jovanovich, New York, 1970), 582–3.
19. "*What do you want?":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 534–35.
20. "*The majority of AAF personnel":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 315.
21. "*The separation of wheels from":* Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s over Germany* (Simon and Schuster Paperbacks, New York, 2001), 61.
22. "*There has never been a time":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 311.
23. "*I'll give you an example":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 40, Henry H. Arnold Project, Columbia University.
24. "*is authorized and directed":* "Executive Order 8974—Control of Civil Aviation," The American Presidency Project, University of California, Santa Barbara,

https://www.presidency.ucsb.edu/documents/executive-order-8974-control-civil-aviation.

25. "*As fast as the contractors":* Boeing press materials, compiled by Boeing-Wichita Public Relations, first printing, January 11, 1945, reel 43813, 734–41, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
26. "*The plant is to produce a new":* "$15,000,000 Army Bomber Plant in Cobb Country to Employ 40,000," *Atlanta Constitution*, January 24, 1942.
27. "*The bomber is called the B-29":* "$15,000,000 Army Bomber Plant in Cobb Country to Employ 40,000," *Atlanta Constitution*, January 24, 1942.
28. "*New schools will be needed":* "Obstacles Removed, Work on Big Bomber Plant Here to Begin," *Atlanta Constitution*, January 25, 1942.
29. "*The Marietta plant is probably":* Gene Gurney, *Journey of the Giants* (Coward-McCann, New York, 1961), 36.
30. "*There just wasn't time to complete":* Boeing press materials.
31. "*Not an hour can be spared":* Secretary of War Henry Stimson, quoted in Maurice Matloff and Edwin M. Snell, *United States Army in World War II, The War Department, Strategic Planning for Coalition Warfare, 1941–1942* (Office of the Chief of Military History, Department of the Army, Washington, DC, 1953), 202.

CHAPTER 16

1. "*The President said that he":* "Conference at the White House, Tuesday Afternoon, 4:45 P.M., December 23, 1941," minutes of meeting, reel 205, Henry H. Arnold Papers, Library of Congress.
2. "*project everything into":* "Conference at the White House, Tuesday Afternoon, 4:45 P.M., December 23, 1941."
3. "*Memorandum by the United States":* "Washington War Conference, American-British Strategy, Memorandum by the United States and British Chiefs of Staff," reel 198, Henry H. Arnold Papers, Library of Congress.
4. "*undermining and wearing down":* "Washington War Conference, American-British Strategy, Memorandum by the United States and British Chiefs of Staff."
5. "*What's up, Boss?":* Dialog from Reminiscences of Ira Eaker, Oral History, 1959, 34, Henry H. Arnold Project, Columbia University.
6. "*He told me I was to go over":* Eaker, Oral History, 138.
7. "*I'll get you some bombers":* Eaker, Oral History, 138.
8. "*You assemble some bright":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 128–29.
9. "*No man should plan air battles":* Parton, "*Air Force Spoken Here,"* 144.
10. "*I know he felt it, particularly":* Transcript of interview with Henry Arnold Jr., August 29–30, 1972, reel 43803, 821–23, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
11. "*Why do you want to go off to war?":* Parton, "*Air Force Spoken Here,"* 132.
12. "*There were times":* Fleet Admiral William D. Leahy, *I Was There: The Personal Story of the Chief of Staff to Presidents Roosevelt and Truman, Based on His Notes and Diaries Made at the Time* (Whittlesey House, New York, 1950), 156.
13. *97 percent supported:* Lydia Saad, "Gallup Vault: A Country Unified After Pearl Harbor," Gallup, https://news.gallup.com/vault/199049/gallup-vault-country-unified-pearl-harbor.aspx.
14. "*If this buys only one screw":* "Thousands Forward Gifts for Bombers," *New York Times*, December 17, 1941.
15. "*How should we go about it?":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 289.
16. "*the real meaning of war":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 97.
17. "*We will have to try bomber":* Arnold's notes, quoted in Gen. James H. "Jimmy" Doolittle with Carroll V. Glines, *I Could Never Be So Lucky Again* (Bantam Books, New York, 1992), 215.
18. "*I need someone to take this job over":* Dialog from Doolittle with Glines, *I Could Never Be So Lucky Again*, 218.
19. "*Whenever I had resistance":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 229.
20. "*The purpose of this special project":* Doolittle with Glines, *I Could Never Be So Lucky Again*, appendix 1, 503.
21. "*The greatest nonstop distance:"* Doolittle with Glines, *I Could Never Be So Lucky Again*, appendix 1, 503.
22. "*I'm the one guy on this project":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 230.
23. "*We all gathered around a bomb":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 251.
24. "*medicinal purposes":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 253.
25. "*Our airplane was maneuvered":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 254.
26. "*Tokyo successfully bombed":* Doolittle with Glines, *I Could Never Be So Lucky Again*, 256.
27. "*Enemy pursuit took off":* Doolittle's communique quoted in "Memorandum for the President (the White House), Subject: Raid on Tokyo," May 3, 1942, box 3 (Safe File, Japan), President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.

28. "*a more complete picture of this mission":* "Memorandum for the President (the White House), Subject: Raid on Tokyo," May 3, 1942.
29. "*Jimmy, I'm proud of you":* Carroll V. Glines, *Jimmy Doolittle: Daredevil Aviator and Scientist* (Macmillan, New York, 1972), 147.
30. "*After they had been caught":* Memorandum quoted in Doolittle with Glines, *I Could Never Be So Lucky Again*, 261.
31. "*exceeded our most optimistic expectations":* "How Doolittle Himself Told Story of Raid," *Washington Post*, May 20, 1942.

CHAPTER 17

1. "*We do not have to become heroes":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 95.
2. "*I discovered that our meeting":* Notes from this meeting from "Memorandum for Record," April 1, 1942, reel 205, Henry H. Arnold Papers, Library of Congress.
3. *British air marshals "at once":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 307.
4. "*Come on over and let's":* Arthur "Bert" Harris to Henry Arnold, April 22, 1942, reel 15, Henry H. Arnold Papers, Library of Congress.
5. "*It was necessary to reach":* Arnold, *Global Mission*, 309.
6. "*I recall his coming around":* Reminiscences of Sir Arthur Travers Harris, Oral History, 1959, 27, Henry H. Arnold Project, Columbia University.
7. "*London is a different city":* Diary entry of Henry Arnold, May 26, 1942, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 298.
8. "*I had just thirty-five pilots":* Bill Yenne, *Hit the Target: Eight Men Who Led the Eighth Air Force to Victory over the Luftwaffe* (New American Library, New York, 2016), 119.
9. "*The planned effort in the air":* "Churchill-Arnold Conference," May 31, 1942, reel 201, Henry Arnold Papers, Library of Congress.
10. "*I recognized the whole":* Harris, Oral History, 23.
11. "*I told him the people":* Arnold, *Global Mission*, 310.
12. "*Victory, speedy and complete":* Arthur Harris to Winston Churchill, July 4, 1942, reel 5, Henry Arnold Papers, Library of Congress.
13. "*Our conference talks":* Diary entry of Henry Arnold, May 28, 1942, in *American Airpower Comes of Age*, vol. 1, 300.
14. "*He was an intensely likable person":* Air Power and Warfare, The Proceedings of the 8th Military History Symposium, United States Air Force Academy, 18–20 October 1978 (Office of Air Force History, Headquarters USAF and United States Air Force Academy, Washington, DC, 1979) 179; Nicholas Evan Sarantakes, *Allies Against the Rising Sun: The United States, the British Nations, and the Defeat of Imperial Japan* (University Press of Kansas, Lawrence, KS, 2009), 93.
15. "*I bloody well don't think":* Dialog from James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 130.
16. "*If the sources of 90 percent":* H. H. Arnold, "The Air Offensive Over Europe," *Our Army*, February 1, 1944.
17. "*I said that the Americans with":* Harris, Oral History, 56.
18. "*Let the Yanks bloody":* Reminiscences of Carl Spaatz, Oral History, 1959, 58, Henry H. Arnold Project, Columbia University.
19. "*There wasn't a man on the":* Reminiscences of Ira Eaker, Oral History, 1959, 144, Henry H. Arnold Project, Columbia University.
20. "*I have remarked before":* Arnold, *Global Mission*, 315.
21. "*As an airman who had preached":* Arnold, *Global Mission*, 316.
22. "*It was not merely the difference":* Arnold, *Global Mission*, 316.
23. "*Arnold indicated he was coming home":* Robert E. Sherwood, *Roosevelt and Hopkins: An Intimate History* (Harper and Brothers, New York, 1948), 582.
24. "*We will be fighting with you":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 102.
25. "*history making raid":* "Cologne Inferno Astonishes Pilots," *New York Times*, June 1, 1942.
26. "*almost too gigantic to be real":* "Cologne Inferno Astonishes Pilots."

27. "*It was strange to see":* "Cologne Inferno Astonishes Pilots."
28. "*The sirens sounded about":* "The Thousand-Bomber Raid on Cologne in 1942," *World History Encyclopedia*, March 28, 2024.
29. "*No part of the Reich is safe":* A. C. Grayling, *Among the Dead Cities: Is the Targeting of Civilians in War Ever Justified?* (Bloomsbury Academic, London, 2006), 43.
30. "*the ruthless bombing from": Bombing Civilians: A Twentieth-Century History*, ed. Yuki Tanaka and Marilyn B. Young (New Press, New York, 2009), 118.
31. "*Use of incendiaries against cities":* Cormac Ó Gráda, *The Hidden Victims: Civilian Casualties of the Two World Wars* (Princeton University Press, Princeton, NJ, 2024), 256.
32. "*Arnold feared the reaction":* Herman S. Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan* (University of North Texas Press, Denton, TX, 2010), 27.
33. "*The idea of killing thousands":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 13.
34. "*You can't hit a town like Cologne":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 147.

CHAPTER 18

1. "*The new air weapon is contemptuous":* Major Alexander P. De Seversky, *Victory Through Air Power* (Simon and Schuster, New York, 1942), 9.
2. "*U.S. Bombers in Action":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 167.
3. "*Neither Hopkins nor the": American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 355.
4. "*By the end of September":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 294.
5. "*The airplane production situation":* Isador Lubin, memorandum to Franklin Roosevelt, August 8, 1942, "Aircraft Production," container 125, Harry L. Hopkins Papers, Franklin D. Roosevelt Presidential Library and Museum.
6. "*I am concerned by the figures":* Franklin Roosevelt, memorandum to Secretary of War, Secretary of the Navy, and Donald Nelson, August 12, 1942, "Aircraft Production," container 125, Harry L. Hopkins Papers, Franklin D. Roosevelt Presidential Library and Museum.
7. "*We must aim at nothing":* Winston Churchill, *The Grand Alliance* (Houghton Mifflin, Boston, 1950), 804.
8. "*Despite all the talk":* Harry Hopkins, memorandum to Isador Lubin, November 13, 1942, "Aircraft Production," container 125, Harry L. Hopkins Papers, Franklin D. Roosevelt Presidential Library and Museum.
9. "*The Air Force is now":* Diary entry of Henry Arnold, September 16, 1942, in *American Airpower Comes of Age*, vol 1, 381.
10. "*America had never seen darker":* Gen. James H. "Jimmy" Doolittle with Carroll V. Glines, *I Could Never Be So Lucky Again* (Bantam Books, New York, 1992), 2.
11. "*This is the first time that":* Arnold's notes, "Conference at the White House, 2 PM June 17, 1942," reel 205, Henry Arnold Papers, Library of Congress.
12. "*As she crouches on the":* "Superfortress Most Powerful Bomber in World," *Los Angeles Times*, June 16, 1944.
13. "*A vegetarian who practiced":* LeMay, *Superfortress*, 58.
14. "*She flies":* Steve Birdsall, *Saga of the Superfortress: The Dramatic Story of the B-29 and the Twentieth Air Force* (Doubleday, Garden City, NY, 1980), 12.
15. "*Hurrah!":* Jon Meacham, *Franklin and Winston: An Intimate Portrait of an Epic Friendship* (Random House, New York, 2004), 201.
16. "*As this is our first major":* Henry Arnold memorandum to his chief of staff, August 21, 1942, reel 5, "North African Operations," Henry Arnold Papers, Library of Congress.
17. "*provides the greatest single":* Robin Higham, ed., *The Writing of Official Military History*, Contributions in Military Studies, no. 171 (Bloomsbury Academic, 1999), 77.
18. "*The mission of the Army Air Forces is":* H. H. Arnold to Assistant Secretary of War for Air, "Aircraft Production for 1943," October 10, 1943, reel 198, Henry Arnold Papers, Library of Congress.
19. "*The weight of daily attack":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 342.
20. "*narrow stairways that seemed":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 219.
21. "*Just getting settled down":* H. H. Arnold to Colonel E. H. Beebe, December 22, 1942, reel 11, Henry Arnold Papers, Library of Congress.
22. "*It was 33 years ago that":* Henry Arnold to "Hank" Arnold, August 13, 1940, reel 1, Henry Arnold Papers, Library of Congress.

23. "*By the end of 1943":* "Army Air Forces Growing Rapidly," *New York Times*, January 3, 1943.
24. "*The number of men now in training":* Excerpt of Arnold's First Report to the War Department, quoted in "Flying Safety," *Military Review*, April 1943, 43.
25. "*Arnold of the Air":* Cover, *Time*, June 22, 1942, https://content.time.com/time/covers/0,16641,19420622,00.html.
26. "*'Hap' Arnold is not merely":* "Air Forces' Stature Raised with Promotion of Arnold," *Washington Post*, March 21, 1943.
27. "*the best U.S. fighter":* See "Famous and Obscure Planes, No. 4," *Air & Space*, September–October 1978.
28. "*Our heavy bomber is our":* John Steinbeck, *Bombs Away: The Story of a Bomber Team* (Viking Press, New York, 1942), 3.
29. "*These are terrific stakes":* "Sorensen of the Rouge," *Fortune*, April 1942.

CHAPTER 19

1. "*The principal weapon in today's":* "Planes Planes Planes Planes Planes," *Christian Science Monitor*, July 25, 1942.
2. "*When these encounters occurred":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 486.
3. "*He must find out":* Lieutenant General H. H. Arnold and Major General Ira C. Eaker, *Army Flyer* (Harper & Brothers, New York, 1942), 24.
4. "*Courage is an intangible":* Arnold and Eaker, *Army Flyer*, 24.
5. "*Do you like girls?":* Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s over Germany* (Simon and Schuster Paperbacks, New York, 2001), 53.
6. "*enable the man to escape":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 215.
7. "*a feeling of aggressive potency":* Sherry, *The Rise of American Air Power*, 215.
8. "*The fighter pilot is a throw-back":* Major General H. H. Arnold and Colonel Ira C. Eaker, *Winged Warfare* (Harper and Brothers, New York, 1941), 36.
9. "*Nowhere in the world":* "Army Air Forces Report: General Arnold Tells Story of Its Accomplishments," *Life*, January 17, 1944, 26.
10. "*The Army Air Forces use":* Excerpt of Arnold's First Report to the War Department, quoted in "Flying Safety," *Military Review*, April 1943, 43.
11. *from 0.77 per thousand hours:* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 318.
12. "*The temperature at 23,000 ft.":* Ira C. Eaker to Commanding General, 8th Air Force, "Lessons learned from Operations to Date," August 25, 1942, reel 66, Henry Arnold Papers, Library of Congress.
13. "*shot down in flames":* H. H. Arnold to Franklin Roosevelt, "Memorandum for the President, Subject: Personal Experiences of Air Forces Officers in Combat Zone," March 23, 1942, box 82, Arnold Folder, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.
14. "*all of our emergency rations":* Report of Eddie Rickenbacker, in letter to "My dear Secretary," November 18, 1942, reel 5, Henry Arnold Papers, Library of Congress.
15. "*We made fun of the":* Author's interview with Lester Schrenk, December 29, 2025.
16. "*What does it do to your guts":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 326.
17. "*You have the proud satisfaction":* H. H. Arnold to Paul L. Bellamy, undated, reel 5, Henry Arnold Papers, Library of Congress.
18. "*To all of you [Arnold said]":* "An Address by Lieut. General H.H. Arnold, Commanding General, Army Air Forces, to The Officers and Men of the United States Army Air forces," Henry H. Arnold Collection, Air University Library, https://aul.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma995893977506836&context=L&vid=01AUL_INST:AUL&lang=en&adaptor=Local%20Search%20Engine.
19. "*Everybody in the Air Force[s]":* Peterson, Oral History, 14.
20. "*This for Arnold was the":* Daso, *Hap Arnold and the Evolution of American Airpower*, 232.
21. "*Let them in, Peter":* Arnold, *Global Mission*, 531.

CHAPTER 20

1. "*Putting this first 60,000":* "After Pearl Harbor, U.S. Aircraft Makers Got That Staggering Order," *Atlanta Constitution*, December 13, 1942.
2. "*Before this war is over":* Reminiscences of Colonel "Pete" Peterson, Oral History, 1959, 8, Henry H. Arnold Project, Columbia University.
3. "*Starting with only two officers":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 318.
4. "*In all our air transport operations":* H. H. Arnold, "Study of Future Air Transport Possibilities," October 10, 1942, reel 198, Henry Arnold Papers, Library of Congress.
5. "*Trips which would take":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 323.
6. "*From the start of aviation":* Arnold, *Global Mission*, 364.
7. "*Every known facility":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 325.
8. "*Modern war is a war":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 325.
9. "*one of the outstanding developments":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 325–26.
10. "*There were physicists and chemists":* James K. McElroy, "The Work of the Fire Protection Engineers in Planning Fire Attacks," in *Fire and the Air War*, ed. Horatio Bond (National Fire Protection Association, Boston, 1946), 130.
11. "*For the first time in":* James K. McElroy, "Incendiary Warfare on Germany," in *Fire and the Air War*, 61.
12. "*It is now felt that":* McElroy, "Incendiary Warfare on Germany," in *Fire and the Air War*, 70–71.
13. "*That document":* McElroy, "The Work of the Fire Protection Engineers in Planning Fire Attacks," in *Fire and the Air War*, 130.
14. "*A kind of technician new":* Horatio Bond, "Applying Fire Experience to the Air War," in *Fire and the Air War*, 188.
15. "*Arnold no longer had the small":* General Laurence F. Kuter, USAF (Ret.), "The General vs. the Establishment: General H.H. Arnold and the Air Staff," *Aerospace Historian*, December 1974, 186.
16. "*We had squadrons in every":* Reminiscences of Robert Abercrombie Lovett, Oral History, 1959, 12, Henry H. Arnold Project, Columbia University.

PART III: THE RISE OF AIRPOWER

1. “*It was this feeling of the unknown”:* Author’s telephone interview with Benjamin Napolitano, 2013.

CHAPTER 21

1. "*I wonder if the frightful":* Sir Arthur Harris, *Bomber Offensive* (Greenhill Books, London, 1990), 72.
2. "*You are directed to proceed":* "Lieutenant General Henry H Arnold 02255 USA Commanding General, Army Air Forces," War Department orders, January 5, 1943, reel 2, Henry Arnold Papers, Library of Congress.
3. "*Mile after mile of level":* Diary entry of Henry Arnold, January 10, 1943, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 459.
4. "*Barren soil for thousands":* Diary entry of Henry Arnold, January 12, 1943, in *American Airpower Comes of Age*, vol. 1, 461.
5. "*The President was carried":* Robert E. Sherwood, *Roosevelt and Hopkins: An Intimate History* (Harper and Brothers, New York, 1948), 671.
6. "*One is almost stunned":* Broadcast of Edward R. Murrow, December 13, 1942, in *In Search of Light: The Broadcasts of Edward R. Murrow, 1938–1961* (Alfred A. Knopf, New York, 1967), 56.
7. "*The last I had heard of him":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 393.
8. "*During the Casablanca Conference":* Memorandum for General Stratemeyer from H. H. Arnold, February 26, 1943, Henry Arnold Papers, Library of Congress, reel unknown (document in the author's possession); also, Parton, "Air Force Spoken Here," 242.
9. "*I didn't know there was":* Reminiscences of Ira Eaker, Oral History, 1959, 123, Henry H. Arnold Project, Columbia University.
10. "*General, that is absurd":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 218.
11. "*If you feel that strongly":* Eaker, Oral History, 124.
12. "*Day bombing is the bold":* Parton, "*Air Force Spoken Here,"* 218.
13. "*When I see your President":* Parton, "*Air Force Spoken Here,"* 221.
14. "*We had won a major victory":* Arnold, *Global Mission*, 397.
15. "*The Combined Bomber Offensive":* "Combined Chiefs of Staff, The Bomber Offensive from the United Kingdom," January 21, 1943, box 26, Map Room File, Franklin D. Roosevelt Presidential Library and Museum.
16. "*It is our purpose during 1943":* "Combined Chiefs of Staff, Conduct of the War in the Pacific Theater in 1943," January 22, 1943, box 26, Map Room File, Franklin D. Roosevelt Presidential Library and Museum.
17. "*This note will be given to you":* Franklin Roosevelt to "My Dear Generalissimo," January 23, 1943, in *American Airpower Comes of Age*, vol. 1, 470.

CHAPTER 22

1. "*That's the way it goes in":* H. H. Arnold to Col. G. C. Brant, February 15, 1939, Reel 12, Henry Arnold Papers, Library of Congress.
2. "*As we piled out of the airplane":* Kenneth P. Werrell, *Blankets of Fire: U.S. Bombers over Japan During World War II* (Smithsonian Institution Press, Washington, DC, 1996), 96.
3. "*The stories of the pilots are":* Diary entry of Henry Arnold, January 25, 1943, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 1, ed. Major General John W. Huston (University Press of the Pacific, Honolulu, HI, 2004), 473.
4. "*I knew that he would make it":* Diary entry of Henry Arnold, January 25, 1943, in *American Airpower Comes of Age*, vol. 1, 473.
5. "*The Pyramids and Sphinx":* Diary entry of Henry Arnold, January 28, 1943, in *American Airpower Comes of Age*, vol. 1, 477.
6. "*that was just too much":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 405.
7. "*That is the route our supplies":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 339.
8. "*The weather was fine":* Arnold, *Global Mission*, 409.
9. "*So we took off about":* Reminiscences of Colonel "Pete" Peterson, Oral History, 1959, 17, Henry H. Arnold Project, Columbia University.
10. "*Saw Everest in all its glory":* Diary entry of Henry Arnold, February 4, 1943, in *American Airpower Comes of Age*, vol. 1, 486.
11. "*all the emotions that come":* Diary entry of Henry Arnold, February 4, 1943, in *American Airpower Comes of Age*, vol. 1, 486.
12. "*In about 20 minutes, sir":* Arnold, *Global Mission*, 411.
13. "*We got lost":* Peterson, Oral History, 16.
14. "*There is always the possibility":* Diary entry of Henry Arnold, February 4 and 5, 1943, in *American Airpower Comes of Age*, vol. 1, 487.
15. "*Turn 4 degrees left":* Peterson, Oral History, 19.
16. "*We finally landed":* Peterson, Oral History, 19.
17. "*Pete, I think we ought to":* Peterson, Oral History, 19.
18. "*should be world-wide in scope":* Dore Gold, *Tower of Babble: How the United Nations Has Fueled Global Chaos* (Three Rivers Press, New York, 2005), 26.
19. "*everlasting appreciation of the service":* Franklin Roosevelt to "My Dear Generalissimo," January 23, 1943, in *American Airpower Comes of Age*, vol. 1, 470.
20. "*He wanted a firm commitment":* Diary entry of Henry Arnold, February 6, 1943, in *American Airpower Comes of Age*, vol. 1, 489.
21. "*House so cold":* Diary entry of Henry Arnold, February 7, 1943, in *American Airpower Comes of Age*, vol. 1, 492.
22. "*I am going to be very":* Diary entry of Henry Arnold, February 7, 1943, in *American Airpower Comes of Age*, vol. 1, 492.
23. "*I have arranged to bring":* Diary entry of Henry Arnold, February 7, 1943, in *American Airpower Comes of Age*, vol. 1, 492.
24. "*The Generalissimo does not":* Diary entry of Henry Arnold, February 8, 1943, in *American Airpower Comes of Age*, vol. 1, 496.
25. "*unbelievable for such a large":* Steve Birdsall, *Saga of the Superfortress: The Dramatic Story of the B-29 and the Twentieth Air Force* (Doubleday, Garden City, NY, 1980), 12.
26. "*No one knew better than":* General Curtis LeMay and Bill Yenne, *Superfortress: The Boeing B-29 and American Airpower in World War II* (Westholme Publishing, Yardley, PA, 2007), 60.

27. "*The B-29 program was the":* Warren Kozak, *Curtis LeMay: Strategist and Tactician* (Regnery History, Washington, DC, 2014), 173.
28. "*Coming in":* Dialog from LeMay and Yenne, *Superfortress*, 61; and Birdsall, *Saga of the Superfortress*, 14.
29. "*Flames were shooting":* "14 Die as Plane Hits Factory," *Chicago Daily Tribune*, February 19, 1943.
30. "*We were sitting there talking":* "14 Killed in Crash of a Bomber Igniting Seattle Packing Plant," *New York Times*, February 19, 1943.
31. "*I thought, 'My God!'":* "14 Killed as Bomber Dives into Seattle Plant," *Washington Post*, February 19, 1943.
32. "*we're in trouble":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 303.

CHAPTER 23

1. "*No one can guarantee":* Jon Meacham, *Franklin and Winston: An Intimate Portrait of an Epic Friendship* (Random House, New York, 2004), 329.
2. "*What the hell is the matter":* Dialog from transcript of interview with Gen. Emmett O'Donnell, December 2, 1972, reel 43813, 700–1, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
3. "*I want you in here tonight":* Dialog from transcript of interview with Gen. Emmett O'Donnell, December 2, 1972.
4. "*Now, goddamn it":* Dialog from transcript of interview with Gen. Emmett O'Donnell, December 2, 1972.
5. "*a big hue and cry came up":* Transcript of interview with Lieutenant Gen. Kenneth B. Wolfe, March 18, 1970, reel 43813, 882–84, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
6. "*The airplane is going to be built":* Transcript of interview with Lieutenant Gen. Kenneth B. Wolfe, March 18, 1970.
7. "*So they got out there":* Transcript of interview with Lieutenant Gen. Kenneth B. Wolfe, March 18, 1970.
8. "*I'll be damned if I know":* Transcript of interview with Lieutenant Gen. Kenneth B. Wolfe, March 18, 1970.
9. "*From time to time, during":* "B-29 Identified as Boeing Plane," November 10, 1942, news clip in archives, source not listed, reel 43813, 1811, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
10. "*No nation could survive":* "Army Gets Bombers Dwarfing Fortress," *New York Times*, October 15, 1943.
11. "*Building and perfecting superbombers":* General Henry Arnold's Second Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 396.
12. "*And he wants the increase":* William D. Leahy to General Marshall and Lieut. General Henry Arnold, February 24, 1943, reel 200, Henry Arnold Papers, Library of Congress.
13. "*I am convinced":* George C. Kenney to General Arnold, January 1, 1943, reel 5, Henry Arnold Papers, Library of Congress.
14. "*At coffee tables and in":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 83.
15. "*They understand the law":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 245.
16. "*The current position of the":* Ira Eaker to Henry Arnold, quoted in Parton, "*Air Force Spoken Here,"* 245.
17. "*You are well aware of the":* Parton, "*Air Force Spoken Here,"* 246.
18. "*Replacement crews are going":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 144.
19. "*I lost nearly half my crews":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 265–66.
20. "*The airplane has proven to be": Investigation of the National Defense Program, Additional Report of the Special Committee Investigating the National Defense Program, Aircraft, July 10, 1943* (Government Printing Office, Washington, DC, 1943), 343.
21. "*enormous waste of manpower": Investigation of the National Defense Program*, 347.
22. "*will largely determine the result": Investigation of the National Defense Program*, 344.
23. "*Far from dropping bombs":* "Most Secret" memorandum from Churchill to Portal, November 2, 1943, quoted in Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who*

Built It, General Henry H. "Hap" Arnold (Viking Press, New York, 1982), 293–94.

24. "*Hap was having a hell of a time":* Coffey, *Hap*, 321.
25. "*He's very stubborn":* Dialog from Coffey, *Hap*, 305.
26. "*He'd get red in the face":* Transcript of interview with General Willard Wolfinberger, January 5, 1970, reel 43803, 994, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
27. "*The sudden realization that a man":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 537.
28. "*Hap works hard and":* Coffey, *Hap*, 309.
29. "*I used to go down and see":* Reminiscences of Robert Abercrombie Lovett, Oral History, 1959, 12, Henry H. Arnold Project, Columbia University.
30. "*bring these officers to justice":* "Roosevelt's Statement: U.S. Will Punish Those Guilty of 'These Diabolical Crimes,'" *Boston Globe*, April 22, 1943.
31. "*In violation of every rule":* Michel Paradis, *Last Mission to Tokyo: The Extraordinary Story of the Doolittle Raiders and Their Final Fight for Justice* (Simon and Schuster, New York, 2020), 36.

CHAPTER 24

1. "*Then the Lord rained":* Genesis 19:24–25 NIV.
2. "*the curtains, children's toys":* John W. Mountcastle, *Flame On!: U.S. Incendiary Weapons, 1918–1945* (Stackpole Books, Mechanicsburg, PA, 1999), 72.
3. "*Little Tokios":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 227.
4. "*A morbid fear hangs over":* Henry C. Wolfe, "Japan's Nightmare: A Reminder to Our High Command," *Harper's Magazine*, January 1943, 187.
5. "*We are going to have to stamp":* Henry Arnold to his son Bruce, March 28, 1943, reel 2, Henry Arnold Papers, Library of Congress.
6. "*[General Arnold] wants the Air Staff":* Colonel William Libby to the Assistant Chiefs of Air Staff: Personnel; Intelligence; Training; Materiel; Maintenance and Distribution; Operations, Commitments and Requirements; Plans; Subject: Protest Against Killing Civilians in Bombing Raids, April 30, 1943, reel 114, Henry Arnold Papers, Library of Congress.
7. "*applied with precision against":* Henry Arnold to Ira Eaker, April 10, 1943, reel 114, Henry Arnold Papers, Library of Congress.
8. "*As far as can presently be":* H. H. Arnold to Assist. Chief of Air Staff, Materiel, Maintenance, and Distribution, April 26, 1943, reel 198, Henry Arnold Papers, Library of Congress.
9. "*Intense flak and strong fighter":* Eighth Air Force communique, quoted in "Yanks Smash at Germany in Record Daylight Raid," *Washington Post*, July 26, 1943.
10. "*Nothing in war history up to":* Jörg Friedrich, *The Fire: The Bombing of Germany, 1940–1945* (Columbia University Press, New York, 2006), 126.
11. "*a blizzard of red snowflakes":* Sherry, *The Rise of American Air Power*, 153.
12. "*marked with a waxen pallor":* Sherry, *The Rise of American Air Power*, 153.
13. *Hamburg "ceased to exist":* "Hamburg Has 'Ceased to Exist' After Week of Shattering Raids," *Washington Post*, August 1, 1943.
14. "*Huge conflagrations created":* Albert Speer, *Inside the Third Reich*, trans. Richard and Clara Winston (Avon, New York, 1970), 369.
15. "*The overall picture was one":* "Yanks Smash at Germany in Record Daylight Raid," *Washington Post*, July 26, 1943.
16. "*Hamburg . . . put the fear":* "Operation Gomorrah: The First of the Firestorms," July 10, 2023, National World War II Museum website, https://www.nationalww2museum.org/war/articles/operation-gomorrah-first-firestorms.
17. "*He repeated several times":* Albert Speer, *Spandau: The Secret Diaries*, trans. Richard and Clara Winston (MacMillan, New York, 1976), 25.
18. "*The whole Ploesti episode":* A. J. Baime, *The Arsenal of Democracy* (Houghton Mifflin Harcourt, Boston, 2014), pt. 5 epigraph.
19. "*No mission of the war":* Arnold, *Global Mission*, 494.
20. "*When you go 200 miles per hour":* Philip Ardery, *Bomber Pilot: A Memoir of World War II* (University Press of Kentucky, Lexington, KY, 1978), 97.
21. "*As one of their key":* Arnold, *Global Mission*, 494.
22. "*In the distance toward Ploesti":* Duane Schultz, *Into the Fire: Ploesti, the Most Fateful Mission of World War II* (Westholme Publishing, Yardley, PA, 2007), 142.
23. "*We flew through sheets of flame":* Schultz, *Into the Fire*, 155.
24. "*We had to shoot our way in":* James Dugan and Carroll Stewart, *Ploesti: The Great Ground-Air Battle of 1 August 1943* (Bantam, New York, 1963), 161.
25. "*We . . . were . . . dragged":* Dugan and Stewart, *Ploesti*, 211.
26. "*Regensburg was the day":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 288.
27. "*It was so foggy that":* LeMay with Kantor, *Mission with LeMay: My Story*, 191.

28. "*As the fighters passed us":* Commanding Officer, 100th Bombardment Group, "Subject: Personal Report of the Regensburg Mission, 17 August 1943," reel 5, Henry Arnold Papers, Library of Congress.
29. "*That's when we lost 62 bombers":* Reminiscences of Colonel "Pete" Peterson, Oral History, 1959, 14, Henry H. Arnold Project, Columbia University.
30. "*Yesterday, the Hun sprang":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 315.
31. "*No such savage air battles":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 160.
32. "*All across Germany, Holland":* William L. O'Neill, *A Democracy at War: America's Fight at Home & Abroad in World War II* (Harvard University Press, Cambridge, MA, 1995), 308.
33. "*matured and experienced men":* Diary entry of Henry Arnold, September 7, 1943, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 42.
34. "*holes in wing and fuselage":* Diary entry of Henry Arnold, September 7, 1943, in *American Airpower Comes of Age*, vol. 2, 42.
35. "*far too many in for frostbite":* Diary entry of Henry Arnold, September 5, 1943, in *American Airpower Comes of Age*, vol. 2, 40.
36. "*absolute necessity for building":* Joseph T. Molyson Jr., *Air Battles Before D-Day: How Allied Airmen Crippled the Luftwaffe and German Army in France* (Stackpole Books, Essex, CT, 2025), 196.
37. "*[It] is just like saying you":* Reminiscences of Ira Eaker, Oral History, 1959, 45, Henry H. Arnold Project, Columbia University.
38. "*The Royal Air Force is very keen":* H. H. Arnold to Franklin Roosevelt, "Subject: P-51," November 12, 1942, President's Secretary's Files, box 82, Franklin D. Roosevelt Presidential Library and Museum.
39. "*We expect this airplane to be":* J. H. Kindelberger to Henry Arnold, November 2, 1942, reel 15, Henry Arnold Papers, Library of Congress.
40. "*If we do not now strain":* Memorandum by the Chief of the British Air Staff (Portal), August 15, 1943, in *Foreign Relations of the United States: The Conferences at Washington and Quebec 1943* (Government Printing Office, Washington, DC, 1970), 1018–19.

CHAPTER 25

1. "*It is vital to our common":* Quebec Agreement, August 19, 1943, Atomic Archive, https://www.atomicarchive.com/resources/documents/manhattan-project/quebec-agreement.html.
2. "*From time to time":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 491.
3. "*Air Plan for the Defeat of Japan":* Memorandum by the United States Army Air Force Planners, "Air Plan for the Defeat of Japan," August 20, 1943, Office of the Historian, US Department of State, https://history.state.gov/historicaldocuments/frus1943/d439.
4. "*B-29 heavy bomber aircraft":* "Air Plan for the Defeat of Japan," August 20, 1943.
5. "*we will never use this agency":* Quebec Agreement, August 19, 1943.
6. "*My scientific friends and I":* Arnold, *Global Mission*, 491.
7. "*There was only one plane":* Arnold, *Global Mission*, 492.
8. *The first B-29s stood:* Boeing B-29 Superfortress, National Museum of the United States Air Force, https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/196252/boeing-b-29-superfortress/.
9. "*the big ship came into her own":* "Superfortress Most Powerful Bomber in World," *Los Angeles Times*, June 16, 1944.
10. "*Eight miles of road way":* "'Waste' Millions at Dodge Plant, but None Cares!," *Chicago Daily Tribune*, January 1, 1943.
11. "*No comparable effort":* "Super Fortress in Dream Stage as War Started," *Chicago Daily Tribune*, June 17, 1943.
12. "*In Washington, where I reported":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 140.
13. "*I don't know whether we'll ever have a B-29":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 140.
14. "*It was a giant":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 147.
15. "*I immediately volunteered to":* Transcript of interview with Paul W. Tibbets, January 7, 1970, reel 43813, 704–9, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
16. "*I gave it full power":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 147–48.
17. *the Superfortress's "true speed":* K. B. Wolfe to Henry Arnold, Subject: Performance Tests of B-29 Airplane, November 10, 1943, reel 198, Henry Arnold Papers, Library of Congress.
18. "*Engineering changes—detested":* Norman Beasley, *Knudsen: A Biography* (Whittlesey House, New York, 1947), 366.
19. "*This was a very critical period":* Reminiscences of Colonel "Pete" Peterson, Oral History, 1959, 31, Henry H. Arnold Project, Columbia University.
20. "*OK—there'll be no more changes":* Peterson, Oral History, 31.
21. "*If the airplane will fly and bomb":* Transcript of telephone conversation, reel 43813, 899–900, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
22. "*as soon as practicable":* K. B. Wolfe to Lt. Col. Paul W. Tibbets, September 20, 1943, reel 122, Henry Arnold papers, Library of Congress.
23. "*In connection with the bombing":* H. H. Arnold to Franklin Roosevelt, October 11, 1943, quoted in Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 334–35.
24. "*The worst thing is that":* Franklin Roosevelt to George Marshall, quoted in Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 5, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945* (Office of Air Force History, Washington, DC, 1983), 21.
25. "*We now have a superbomber":* "It's All Right to Say There's a 'Superbomber,'" *Washington Post*, November 5, 1943.
26. "*The Army's worst-kept secret":* "It's All Right to Say There's a 'Superbomber.'"

CHAPTER 26

1. "*After a period of desperate":* First Report of the Commanding General of the Army Air Forces to the Secretary of War, January 4, 1944, by the General of the Army H. H. Arnold, *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, Fleet Admiral Ernest J. King* (J. B. Lippincott Company, New York, 1947), 303.
2. "*Over desert and more desert":* Diary entry of Henry Arnold, November 27, 1943, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 88.
3. "*The Nile, cradle of civilization":* Diary entry of Henry Arnold, November 27, 1943, in *American Airpower Comes of Age*, vol. 2, 88.
4. "*Hap," Roosevelt said, "here we are":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 463.
5. "*A strategic bombing force":* Combined Chiefs of Staff, Specific Operations for the Defeat of Japan, 1944, Sextant Conference, Papers and Minutes of Meetings (Office, US Secretary of the Combined Chiefs of Staff, 1943), https://www.jcs.mil/Portals/36/Documents/History/WWII/Sextant_Eureka3.pdf.
6. "*An unforewarned visitor":* George F. Kennan, *Memoirs: 1925–1950* (Atlantic Monthly Press, Boston, 1967), 279–80.
7. "*I told him if he wanted heavy":* Arnold, *Global Mission*, 467.
8. "*Although the British and American":* Bohlen Minutes, first plenary meeting, 4 p.m., Foreign Relations of the United States, Diplomatic Papers at Cairo and Tehran, 1943, https://history.state.gov/historicaldocuments/frus1943CairoTehran/d360.
9. "*I think about a hundred toasts":* Arnold, *Global Mission*, 469.
10. "*I want to tell you":* The President's Log at Tehran, Tuesday, November 30, in *Foreign Relations of the United States, Diplomatic Papers, The Conferences at Cairo and Tehran, 1943* (Government Printing Office, Washington, DC, 1961), 468–69.
11. "*If there was any supreme peak":* Robert E. Sherwood, *Roosevelt and Hopkins: An Intimate History* (Harper and Brothers, New York, 1948), 799.
12. "*The time is short, the enemy's": American Airpower Comes of Age*, vol. 2, 132.
13. "*The risks were so great":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 99.
14. "*It was a momentous, dangerous":* Hansell, *The Strategic Air War*, 99.
15. "*The Luftwaffe had all their":* General Henry Arnold's Second Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 361.
16. "*We caught flak, rockets":* General Henry Arnold's Second Report to the War Department, in *The War Reports*, 361.
17. "*Only a fighter can swoop":* General Henry Arnold's Second Report to the War Department, in *The War Reports*, 363.
18. "*The real importance of the air war":* L. Douglas Keeney, *The Pointblank Directive: Three Generals and the Untold Story of the Daring Plan That Saved D-Day* (Osprey, New York, 2012), 234.
19. "*The week of 20–26 February 1944":* General Henry Arnold's Second Report to the War Department, in *The War Reports*, 360.
20. "*From now onwards":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 488.

CHAPTER 27

1. "*Weapons of ancient times": Incendiary Weapons: A Sipri Monograph* (Stockholm International Peace Research Institute, MIT Press, Cambridge, MA, 1975), 15.
2. "*knew literally every man in the Air Corps":* Henry Arnold, "Army Air Forces," *Flying Magazine*, March 1944, 54.
3. "*No man, no group of men":* General Henry Arnold's First Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 303.
4. *Air Forces schools would complete the training:* "Selected Facts and Figures on AAF Achievement of Air Supremacy Over the Germans," Stasticial Control Division, Office of Management Control, July 17, 1944, box 5, reel 5, Henry Arnold Papers, Library of Congress.
5. "*I have invited the President":* H. H. Arnold to the Honorable Harry Hopkins, Admiral Ernest J. King, and numerous others, January 22, 1944, reel 122, Henry Arnold Papers, Library of Congress.
6. "*the possibilities in the field":* Franklin Roosevelt to H. H. Arnold, August 23, 1944, box 82, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.
7. *over $3 billion monthly:* Statistics in this paragraph are from *The United States Army in World War II: Statistics, Procurement*, prepared by Richard H. Crawford and Lindsley F. Cook under the direction of Theodore E. Whiting (Office of the Chief of Military History, Department of the Army, Washington, DC, n.d.), 10, https://www.govinfo.gov/content/pkg/GOVPUB-D114-PURL-gpo122003/pdf/GOVPUB-D114-PURL-gpo122003.pdf.
8. "*Such is the fame of the B-17":* Robert Freeman, "B-17 Flying Fortress," in *The Great Book of World War II Airplanes* (Bonanza Books, New York, 1984), 103.
9. "*absorb tremendous punishment":* Ira Eaker to Commanding General, 8th Air Force, August 25, 1942, reel 66, Henry Arnold Papers, Library of Congress.
10. "*The number of people involved":* Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s over Germany* (Simon and Schuster Paperbacks, New York, 2001), 22–23.
11. "*As you know, history is":* "Arnold Interest in History," Arnold letter from May 5, 1943, reel 43803, 2339, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
12. "*So I went down":* Transcript of interview with James P. Hodges, May 7, 1970, reel 43798, 2469–71, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
13. "*In short, we want the people":* Arnold letter to George Kenney, June 21, 1943, quoted in "Arnold Most Interested in Public Relations," reel 43803, 2380, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
14. "*The picture that greeted my eye":* Diary entry of Joseph Goebbels, November 24, 1943, in *Life*, March 29, 1948, 139.
15. "*What can the USA do faced":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 240.
16. "*Blazing fires everywhere":* Diary entry of Joseph Goebbels, November 24, 1943, *The Goebbels Diaries* (Popular Library, New York, 1948), 591.
17. "*We really clobbered them":* Jay A. Stout, *Fortress Ploesti: The Campaign to Destroy Hitler's Oil* (Casemate, Havertown, PA, 2003), 102.
18. "*Hell itself seems to have":* Diary entry of Joseph Goebbels, November 24, 1943.
19. "*You find yourself encountering":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 312.
20. "*We may as well frankly":* James Parton, "*Air Force Spoken Here": General Ira Eaker and the Command of the Air* (Air University Press, Maxwell Air Force Base, AL, 2000), 328.
21. "*I was appalled at what":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 479.

22. "*so chaotic":* Jon Erwin and William Doyle, *Beyond Valor: A World War II Story of Extraordinary Heroism, Sacrificial Love, and a Race Against Time* (Nelson Books, Nashville, TN, 2020), 17.
23. "*Arnold's life was that B-29":* Herman S. Wolk, "Commander in Chief," *Air Force Magazine*, July 2009, 66.
24. "*For Hap Arnold":* General Curtis LeMay and Bill Yenne, *Superfortress: The Boeing B-29 and American Airpower in World War II* (Westholme Publishing, Yardley, PA, 2007), 69.
25. "*If we are to get a place":* Henry Arnold to Carl Spaatz, September 29, 1944, reel 43813, 167, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
26. "*They could get the civilians":* Transcript of interview with Paul W. Tibbets, January 7, 1970, reel 43813, 704–9, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
27. "*It is mighty cold":* Transcript of interview with Paul W. Tibbets, January 7, 1970.
28. "*He bullied the program through":* Marquis Childs, "Washington Calling: Arnold's Air Victory," *Washington Post*, May 8, 1945.
29. "*the greatest engineering accomplishment":* Gene Gurney, *Journey of the Giants* (Coward-McCann, New York, 1961), 90.
30. "*This is one of the amazing": China Builds Airfields for B-29 Bombers,* 1944 newsreel, YouTube, video, https://www.youtube.com/watch?v=vqaEb7GxZ3A.
31. "*The scheme of operations":* LeMay with Kantor, *Mission with LeMay: My Story*, 322.
32. "*The flight over the Hump":* Gurney, *Journey of the Giants*, 71.
33. "*The Japanese offensive":* C. L. Chennault to Franklin Roosevelt, May 26, 1944, box 83, Chennault Folder, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.
34. "*Top Secret security with":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 162.
35. "*I have always believed":* Hansell, *The Strategic Air War*, 159.
36. "*We are just reaching":* "Arnold Sees Air Forces Near Peak," *Hartford Courant*, April 9, 1944.
37. "*I am not satisfied":* H. H. Arnold to E. L. Eubank, May 6, 1944, reel 114, Henry Arnold Papers, Library of Congress.
38. "*popping all over the city":* Patrick Coffey, *American Arsenal: A Century of Waging War* (Oxford University Press, Oxford, UK, 2014), 103.
39. "*No other industrial nation":* Herman S. Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan* (University of North Texas Press, Denton, TX, 2010), 113.
40. "*Advance estimates of force":* Wolk, *Cataclysm*, 113.

CHAPTER 28

1. "*B-29s Make Debut":* "B-29s Make Debut," *New York Times*, June 16, 1944.
2. "*These kids less than a year":* "Arnold Wants to End the War and Go Fishing," newspaper clip, unknown publication, box 12, reel 12, Henry Arnold Papers, Library of Congress.
3. "*The day raids by American":* William L. Shirer, *The Rise and Fall of the Third Reich: A History of Nazi Germany* (Simon and Schuster, New York, 1960), 1008.
4. "*The time is coming when":* "What Edison Thinks of Aeroplanes," *Washington Post*, August 1, 1909.
5. "*The Americans drop their bombs":* Carl H. Builder, *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force* (Routledge, NY, 2017), digital edition.
6. "*The precision bombing, because":* H. H. Arnold, "'Hap' Arnold Recollects," *Life*, September 12, 1949, 132.
7. "*As dawn broke":* Stephen E. Ambrose, *D-Day: The Climactic Battle of World War II* (Touchstone, New York, 1994), 239.
8. "*There was no sight in":* Dwight D. Eisenhower, *Crusade in Europe: A Personal Account of World War II* (Vintage Books, New York, 2021), 314.
9. "*Soldiers, sailors and airmen":* General Dwight D. Eisenhower's Order of the Day (1944), National Archives, https://www.archives.gov/milestone-documents/general-eisenhowers-order-of-the-day.
10. "*It is the most exciting moment":* Ambrose, *D-Day*, 494.
11. "*All right, Charlie":* Transcript of Roosevelt's press conference #954, Executive Office of the President, June 6, 1944, Presidential Press Conferences, Franklin D. Roosevelt Presidential Library and Museum, http://www.fdrlibrary.marist.edu/_resources/images/pc/pc0160.pdf.
12. "*cocked at the angle":* Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (Simon and Schuster, New York, 1994), 510.
13. "*You'd never get away with":* Ambrose, *D-Day*, 239.
14. "*a living dynamo of energy":* Stephen E. Ambrose, *Eisenhower: Soldier and President* (Simon and Schuster, New York, 1990), 88.
15. "*Talked over war with Ike":* Diary entry of Henry Arnold, June 10, 1944, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 149–150.
16. "*ever present sound of explosions":* Diary entry of Henry Arnold, June 12, 1944, in *American Airpower Comes of Age*, vol. 2, 154.
17. "*My darling Beadle":* Quoted in Dik Alan Daso, introduction to *Hap Arnold and the Evolution of American Airpower* (Smithsonian Books, Washington, DC, 2000), 1.
18. "*the force of the explosion":* Diary entry of Henry Arnold, June 16, 1944, in *American Airpower Comes of Age*, vol. 2, 158.
19. "*Rockets? Pilotless planes?":* Diary entry of Henry Arnold, June 16, 1944, in *American Airpower Comes of Age*, vol. 2, 158.
20. "*No one can predict":* Diary entry of Henry Arnold, June 16, 1944, in *American Airpower Comes of Age*, vol. 2, 159.
21. "*based on jet principles":* Diary entry of Henry Arnold, June 16, 1944, in *American Airpower Comes of Age*, vol. 2, 157.
22. "*This marks the beginning":* Gene Gurney, *Journey of the Giants* (Coward-McCann, New York, 1961), 77.
23. "*you are not to accompany":* Gurney, *Journey of the Giants*, 79.
24. "*This was really the most":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 170.

25. "*Well, that's the first 10,000 pounds":* Gurney, *Journey of the Giants*, 83.
26. "*We have been calm":* "Frequent B-29 Raids on Japan Out Till Gas Supply Improves," *Atlanta Constitution*, June 17, 1944.
27. "*Now all the city is black":* General Curtis LeMay and Bill Yenne, *Superfortress: The Boeing B-29 and American Airpower in World War II* (Westholme Publishing, Yardley, PA, 2007), 81.
28. "*Information up to the time":* Barney M. Giles to General H. H. Arnold, June 16, 1944, reel 200, Henry Arnold Papers, Library of Congress.
29. "*B-29 Superfortress of the":* "B-29s Make Debut," *New York Times*, June 16, 1944.
30. "*The attack on Japan by":* "B-29 Hailed by Marshall and Arnold," *Washington Post*, June 16, 1944.
31. "*the fruition of years of planning":* "B-29 Hailed by Marshall and Arnold."
32. "*good progress is being made":* "Saipan Is Stormed," *New York Times*, June 16, 1944.
33. "*Time was essential":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 564.

CHAPTER 29

1. "*I was the flight engineer":* Jack R. Goetz, interview with the author, 2012.
2. "*flying telegraph pole":* "New V2 Rockets, Faster Than Sound, Hit London, Say Nazis," *Chicago Tribune*, November 9, 1944.
3. "*Nobody knows where they":* "New V2 Rockets, Faster Than Sound, Hit London, Say Nazis."
4. "*Rocket experts say the V-2":* "New V2 Rockets, Faster Than Sound, Hit London, Say Nazis."
5. "*The President looked very badly":* Diary entry of Henry Arnold, September 16, 1944, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 207.
6. "*Today, on D plus 95":* Supreme Headquarters, Allied Expeditionary Forces, Forward on Continent, to War Department, Quebec, Canada, September 9, 1944, reel 202, Papers and Minutes of Meetings, Octagon Conference, Henry Arnold Papers, Library of Congress.
7. "*The Twentieth Air Force is designed":* Minutes of Combined Chiefs of Staff Meeting 174, Octagon Conference, ibid. Also: US State Department, Office of the Historian, Foreign Relations of the United States, Conference at Quebec, 1944, https://history.state.gov/historicaldocuments/frus1944Quebec/d183.
8. "*operates directly under the United States Joint Chiefs":* Minutes of Combined Chiefs of Staff Meeting 174.
9. "*There was no doubt as to":* Diary entry of Henry Arnold, September 14, 1944, in *American Airpower Comes of Age*, vol. 2, 205.
10. "*General Arnold's control of":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 223.
11. "*The B-24s—eight planes in all":* Diary entry of Charles Lindbergh, July 22, 1944, in *The Wartime Journals of Charles Lindbergh* (Harcourt Brace Jovanovich, New York, 1970), 881.
12. "*The bombs were perfectly":* Diary entry of Charles Lindbergh, July 22, 1944.
13. "*One is as separated from":* Diary entry of Charles Lindbergh, September 10, 1944, in *The Wartime Journals of Charles Lindbergh*, 920.
14. "*I arrived on Saipan early":* Haywood Hansell to Curtis LeMay, quoted in General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 333–34.
15. "*No one ever felt it essential":* LeMay with Kantor, *Mission with LeMay: My Story*, 321.
16. "*It was General Arnold's dream":* LeMay with Kantor, *Mission with LeMay: My Story*, 328.
17. "*He was the finest combat commander":* Robert McNamara interview in the documentary *The Fog of War*, directed by Errol Morris (Sony Classics, 2003).
18. "*The engines of the B-29":* Haywood Hansell to Curtis LeMay, quoted in LeMay with Kantor, *Mission with LeMay: My Story*, 323.
19. "*If I'm going to have command":* LeMay with Kantor, *Mission with LeMay,* 323.
20. "*Kharagpur was like nothing":* LeMay with Kantor, *Mission with LeMay: My Story*, 324.
21. "*He had a hole in his head":* LeMay with Kantor, *Mission with LeMay: My Story*, 327.
22. "*Look here":* LeMay with Kantor, *Mission with LeMay: My Story*, 329.
23. "*It is a maze of intricate":* "With a B-29 Over Japan—A Pilot's Story," *New York Times*, March 25, 1945.
24. "*I was very much disappointed":* Curtis LeMay to "Larry" Norstad, September 12, 1944, box 11, Curtis LeMay Papers, Library of Congress.
25. "*Many crews had never dropped":* Curtis LeMay to H. H. Arnold, October 19, 1944, box 11, Curtis LeMay Papers, Library of Congress.
26. "*They [his airmen] are finding out":* Curtis LeMay to "Larry" Norstad, September 12, 1944.
27. "*All crews, in discussing a mission":* Curtis LeMay to H. H. Arnold, October 19, 1944.
28. "*What I am trying to say":* Curtis LeMay to "Larry" Norstad, September 12, 1944.

29. "*My personal philosophy is":* LeMay with Kantor, *Mission with LeMay: My Story*, 311.
30. "*I wasn't real. I wasn't human":* LeMay with Kantor, *Mission with LeMay: My Story*, 218.

CHAPTER 30

1. "*To introduce into the philosophy":* General Carl von Clausewitz, *On War* (Pacific Publishing Studio, 2010), 1.
2. "*The air war is still the great tale": The Goebbels Diaries: The Last Days*, edited and introduced by Hugh Trevor-Roper (Secker & Warburg, London, 1978), 24.
3. "*The end of Western urban":* "Berlin Ruins Held Lesson for World," *New York Times*, June 7, 1945.
4. "*I know the war is lost":* Ian Kershaw, *Hitler: 1936–1945: Nemesis* (Norton, New York, 2001), 747.
5. "*The city waited":* Richard Rhodes, *The Making of the Atomic Bomb* (Touchstone, New York, 1988), 588.
6. "*He [Arnold] left the decision":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 183.
7. "*The United States launched a":* "B-29 Take-Off for Japan Told by Eyewitness," *Los Angeles Times*, November 23, 1944.
8. "*We took them by surprise":* "Easy Mission, Says Chief," *New York Times*, November 25, 1944.
9. "*The battle is just beginning":* George Horne, "Target Tokyo," *U.S.A.: A Portrait of America and Americans in Wartime*, vol. 2, no. 5, 1946, 11, https://books.google.com/books?id=-5syYbZa2RgC&pg=RA2-PA11.
10. "*We saw fires and black smoke":* Hansell's report is quoted in H. H. Arnold to Major General Eugene C. Reybold, December 21, 1944, box 82, reel 82, Henry Arnold Papers, Library of Congress.
11. "*the most amazing sight":* Hansell, *The Strategic Air War*, 193.
12. "*General Arnold was understandably outraged":* Hansell, *The Strategic Air War*, 191.
13. "*In Arnold's mind, the":* Herman S. Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan* (University of North Texas Press, Denton, TX, 2010), 109.
14. "*I think the B-29 project has":* Lauris Norstad to Curtis LeMay, September 23, 1944, box 11, Curtis LeMay Papers, Library of Congress.
15. "*I think we all agree":* Curtis LeMay to Lauris Norstad, November 16, 1944, box 11, Curtis LeMay Papers, Library of Congress.
16. "*Pilots that are weak":* H. H. Arnold to Curtis LeMay, September 22, 1944, box 11, Curtis LeMay Papers, Library of Congress.
17. "*A unified command over":* "Group Studies Single Bureau for Defense," *Chicago Daily Tribune*, April 15, 1944.
18. "*As I told you before":* H. H. Arnold to Curtis LeMay, December 17, 1944, box 11, Curtis LeMay Papers, Library of Congress.
19. "*The 20th Bomber Command will":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 338–39.
20. "*So we sat in on a very dramatic meeting":* Transcript of interview with Lauris Norstad, July 15, 1969, reel 43803, 1629, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
21. "*LeMay is coming here to":* Steve Birdsall, *Saga of the Superfortress: The Dramatic Story of the B-29 and the Twentieth Air Force* (Doubleday, Garden City, NY, 1980), 142.
22. "*In all fairness to General Arnold":* Hansell, *The Strategic Air War*, 212.
23. "*The time approached":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 493.
24. "*a highly competent tactical unit":* Leslie R. Groves, *Now It Can Be Told: The Story of the Manhattan Project* (Harper & Row, New York, 1962), 254.
25. "*This brought from him":* Groves, *Now It Can Be Told*, 254.

26. "*I had no idea":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 152.
27. "*Are you in some kind of trouble":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 153.
28. "*What do you consider a":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 156–57.
29. "*He shakes hands with me":* Birdsall, *Saga of the Superfortress*, 288.
30. "*You have been brought here":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 166.
31. "*Naturally, I am very satisfied":* H. H. Arnold to Mrs. Frank Andrews, January 13, 1945, reel 11, Henry Arnold Papers, Library of Congress.
32. "*The facts are beginning to come":* Marquis Childs, "Precautions for the Future," Washington Calling, *Washington Post*, June 25, 1945.
33. "*I have another job":* Lt. Colonel Marvin L. Davis, USAF, "The Challenge for Logisticians—the Future," *Air Force Journal of Logistics*, vol. 6, no. 3, Summer 1982, 3.
34. "*Come to LaGuardia Field":* Reminiscences of Theodore von Kármán, 1960, 8, Aviation Project, Columbia University.
35. "*The La Guardia meeting":* Dik Alan Daso, *Hap Arnold and the Evolution of American Airpower* (Smithsonian Institution Press, Washington, DC, 2000), 192.
36. "*We've won this war":* Dialog from von Kármán, Oral History, 8–9.
37. "*I haven't got anything special":* Theodore von Kármán with Lee Edson, *The Wind and Beyond: Theodore von Kármán, Pioneer in Aviation and Pathfinder in Space* (Little, Brown, Boston, 1967), 271.
38. "*I see a manless Air Force":* von Kármán with Edson, *The Wind and Beyond*, 271.

PART IV: THE CLIMAX OF AIRPOWER

1. "*We knew the world would":* Interview with J. Robert Oppenheimer, YouTube, video, https://www.youtube.com/shorts/t5zV5S6bDAg.

CHAPTER 31

1. "*For good or for ill, air mastery":* Winston Churchill, speech at the Massachusetts Institute of Technology, Boston, March 31, 1949, in Winston S. Churchill, *In the Balance: Post-War Speeches* (RosettaBooks, New York, 2014), 33.
2. "*We'd go in his office":* Transcript of interview with William E. Hall, February 13, 1970, reel 43803, 2007–8, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
3. "*He came steaming out of":* Transcript of interview with Lloyd P. Hopwood, May 27, 1970, reel 43803, 487, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
4. "*Just the man I was looking for":* Transcript of interview with Lucas Beau, March 25, 1970, reel 43803, 932–33, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
5. "*Whenever General Arnold said something":* Transcript of interview with William E. Hall, February 13, 1970, 1291.
6. "*I did not know how ill I was":* Bill Yenne, *Hap Arnold: Inventing the Air Force* (Regnery History, Washington, DC, 2013), 215.
7. "*Mankind is Frankenstein":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 46.
8. "*the most concentrated attack":* "Forts Batter Heart of Nazi Capital," *Washington Post*, February 4, 1945.
9. "*the most terrible we have had":* "Bombs Bring Death to War Packed Berlin," *New York Times*, February 4, 1945.
10. "*Dresden was one big flame":* Kurt Vonnegut, *Slaughterhouse-Five* (Dell Publishing, New York, 1991), 178.
11. "*Not a single detached":* "Here Was Dresden," *Newsweek*, March 12, 1945.
12. "*We must never allow the":* Adam Makos with Larry Alexander, *A Higher Call: An Incredible True Story of Combat and Chivalry in the War-Torn Skies of World War II* (Berkley Caliber, New York, 2012), 168.
13. "*The Allied air bosses have made":* "More Terror Bombings Decreed for Germany," *Atlanta Constitution*, February 18, 1945.
14. "*As the Germans long ago":* Sherry, *The Rise of American Air Power*, 258–59.
15. "*nation-wide serious effect":* Sherry, *The Rise of American Air Power*, 261.
16. "*We must not get soft":* Ronald Schaffer, *Wings of Judgment: American Bombing in World War II* (Oxford University Press, New York, 1985), 103.
17. "*What General Arnold wants is":* Lauris Norstad to Curtis LeMay, January 19, 1945, box 11, Curtis LeMay Papers, Library of Congress.
18. "*The Marianas are becoming":* "Ernie Pyle: The U.S. Has Done Thrilling Job," *Atlanta Constitution*, February 23, 1945.
19. "*are now putting into practice":* "Ramming of Our Heavy Bombers," H.H.A. to OC&R, January 8, 1945, reel 114, Henry Arnold Papers, Library of Congress.
20. "*A report has been received":* James P. Hodges to Commanding General, Army Air Forces, January 17, 1945, reel 114, Henry Arnold Papers, Library of Congress.
21. "*You go ahead and get results":* LeMay with Kantor, *Mission with LeMay,* 347.
22. "*Our attempts to bomb":* Curtis LeMay to H. H. Arnold, April 15, 1945, box 11, Curtis LeMay Papers, Library of Congress.
23. "*We have been having a hell":* Curtis LeMay to Lauris Norstad, March 3, 1945, box 11, Curtis LeMay Papers, Library of Congress.
24. "*You know General Arnold":* LeMay with Kantor, *Mission with LeMay,* 347.
25. "*It was against this background":* Headquarters XXI Bomber Command, "Analysis of Incendiary Phase of Operations," March 9–19, 1945, box 37, Curtis LeMay Papers, Library of Congress.
26. "*And if I don't tell him":* LeMay with Kantor, *Mission with LeMay: My Story*, 348.

27. "*I am working on several":* Curtis LeMay to Lauris Norstad, March 3, 1945, box 11, Curtis LeMay Papers, Library of Congress.
28. "*the greatest one-man military":* Gene Gurney, *Journey of the Giants* (Coward-McCann, New York, 1961), 210.
29. "*Primary target: Urban area of Tokyo":* Headquarters XXI Bomber Command, Subject: "Report of Operations, 10 March, 1945," April 15, 1945, box 13, Curtis LeMay Papers, Library of Congress.
30. "*The War Room was so tightly packed":* Gurney, *Journey of the Giants*, 213.
31. "*Gentlemen," he said, "for tonight we have":* Gurney, *Journey of the Giants*, 214.
32. "*Your target is Tokyo":* Gurney, *Journey of the Giants*, 214.
33. "*I wish you would drive home":* H. H. Arnold to Curtis LeMay, September 22, 1944, box 11, Curtis LeMay Papers, Library of Congress.
34. "No guns and no ammunition*":* Gurney, *Journey of the Giants*, 216.
35. "*You will come over the target":* Arthur Herman, *Freedom's Forge: How American Business Produced Victory in World War II* (Random House, New York, 2012), 328.
36. "*roar of surprise and enthusiasm":* Herman, *Freedom's Forge*, 328.
37. "*was almost unbelievable":* Gurney, *Journey of the Giants*, 211.
38. "*The bombs from a single ship":* Headquarters XXI Bomber Command, "Analysis of Incendiary Phase of Operations," March 9–19, 1945, box 37, Curtis LeMay Papers, Library of Congress.
39. "*Nothing but bombs in those":* LeMay with Kantor, *Mission with LeMay: My Story*, 348.
40. "*Our idea was to come up":* Reminiscences of Thomas S. Power, Oral History, 1960, 14, Aviation Project, Columbia University.
41. "*There was no question in our minds":* Power, Oral History, 14.

CHAPTER 32

1. "*To you, the clever and crafty":* Aeschylus, *Delphi Complete Works of Aeschylus* (Delphi Classics, 2013), ebook, line 944.
2. "*vanish, and with them":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 5.
3. "*Man's Brotherhood":* Sherry, *The Rise of American Air Power*, 4.
4. "*birds of hell":* Sherry, *The Rise of American Air Power*, 4.
5. "*More than any other modern weapon":* Sherry, *The Rise of American Air Power*, 1.
6. "*We're at war with Japan":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 352.
7. "*For the long-range bomber":* "Target Tokyo: Flight of a B-29," *New York Times*, December 3, 1944.
8. "*The pilot is still in the public":* John Steinbeck, *Bombs Away: The Story of a Bomber Team* (Penguin Books, New York, 1942), 111.
9. "*It is a strange, almost mystical":* Steinbeck, *Bombs Away*, 123.
10. "*are in the souls of our people":* Steinbeck, *Bombs Away*, 140.
11. "*Everything but the hydraulic":* "Target Tokyo: Flight of a B-29," *New York Times*, December 3, 1944.
12. "*This is strictly a military specialty":* Maj. Gen. Henry H. Arnold and Col. Ira C. Eaker, "Winged Warfare," *Flying Magazine*, September 1941, 233.
13. "*Nothing quite like the American aerial gunner":* Steinbeck, *Bombs Away*, 72.
14. "*They were translucid, unreal":* Robert Guillain, *I Saw Tokyo Burning: An Eyewitness Narrative from Pearl Harbor to Hiroshima*, trans. William Byron (Doubleday, Garden City, NY, 1981), 178.
15. "*We made the run and":* Reminiscences of Thomas S. Power, Oral History, 1960, 15, Aviation Project, Columbia University.
16. "*the bomb blasts looked like":* Guillain, *I Saw Tokyo Burning*, 182.
17. "*People came running down":* Guillain, *I Saw Tokyo Burning*, 183.
18. "*Hell could be no hotter":* Guillain, *I Saw Tokyo Burning*, 184.
19. "*red and yellow flames":* Warren Kozak, *LeMay: The Life and Wars of General Curtis LeMay* (Regnery Press, Washington, DC, 2011), 222.
20. "*I was actually over the target":* Power, Oral History, 15.
21. "*I'm sweating this one":* St. Clair McKelway, "A Reporter with the B-29s," *New Yorker*, June 23, 1945.
22. "*We are getting out of there":* "Target Tokyo: Flight of a B-29," *New York Times*, December 3, 1944.
23. "*At a field in the Marianas":* "Airmen Who Take Superforts to Tokyo Are Boys 18 and 19," *Washington Post*, March 9, 1945.
24. "*No other air attack of":* Wesley Craven and James Cate, eds., *The Army Air Forces in World War II*, vol. 5, chap. 20, 615, https://www.ibiblio.org/hyperwar/AAF/V/AAF-V-20.html.
25. "*We don't pause to shed":* A. J. Baime, *The Accidental President: Harry S. Truman and the Four Months That Changed the World* (Houghton Mifflin Harcourt, New York, 2017), 149.
26. "*I didn't need any direct orders":* Sherry, *The Rise of American Air Power*, 283.
27. "*Congratulations. This mission shows":* Richard B. Frank, *Downfall: The End of the Imperial Japanese Empire* (Penguin, New York, 1999), 67.
28. "*Your recent incendiary missions":* H. H. Arnold to Curtis LeMay, March 21, 1945, box 11, Curtis LeMay Papers, Library of Congress.
29. "*They worked like supermen":* LeMay with Kantor, *Mission with LeMay: My Story*, 370.
30. "*I feel that the destruction":* LeMay with Kantor, *Mission with LeMay: My Story*, 373.

CHAPTER 33

1. "*On Arnold's judgement, billions":* "Washington Calling: Arnold's Air Victory," *Washington Post*, May 8, 1945.
2. "*The United States must be":* General Henry Arnold's Second Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 415.
3. "*Our aircraft workers, men and women":* General Henry Arnold's First Report to the War Department, in *The War Reports*, 331.
4. "*AAF convalescent hospitals":* General Henry Arnold's Second Report to the War Department, in *The War Reports*, 413.
5. "*These Flight Surgeons":* John M. Murray, Dr. Frank Fremont-Smith, and Dr. Edward A. Strecker, "Statistics for Training of Flight Surgeons and Air Force Medical Officers to Deal with Acute War Neuroses," February 8, 1944, box 82, President's Secretary's Files, Franklin D. Roosevelt Presidential Library and Museum.
6. "*The system is in many ways":* Marquis Childs, "Air Forces Lead the Way, Washington Calling," *Washington Post*, December 18, 1944.
7. "*the application of science to the":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 465.
8. "*A plot of land was taken":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 465.
9. "*The growth of the Air Transport":* Ernest Lindley, "Air Power: General Arnold's Report," *Washington Post*, February 28, 1945.
10. "*the four freedoms of the air":* Quoted in "The Chairman of the Senate Subcommittee on Aviation (Clark) and the Chairman of the Senate Committee on Commerce (Bailey) to the Secretary of State," May 13, 1944, in *Foreign Relations of the United States, Diplomatic Papers, 1944*, vol. 2, *General: Economic and Social Matters* (Government Printing Office, Washington, DC, 1967), 473.
11. "*for the purpose of discharging":* "Memorandum of Conversation, by the Assistant Secretary of State (Berle)," November 11, 1943, in *Foreign Relations of the United States, Diplomatic Papers, 1944*, vol. 2, 361.
12. "*Of the revolutionary changes":* "War Spurred Airline Developments Hint Revolutionary Changes, Progress in the Future," *Wall Street Journal*, May 18, 1942.
13. "*Even those of us intimately":* "War Spurred Airline Developments Hint Revolutionary Changes, Progress in the Future."
14. "*Now that the world's biggest":* "Mighty B-29s Already in Full Production: Forts," *Washington Post*, June 16, 1944.
15. "*There are automatic ammunition":* "Mighty B-29: Facts About the Army's Plane That Is Blasting Japan," *New York Times*, August 5, 1945.
16. "*Correspondents were permitted":* "B-29 'Father' Sees Its Big 'Hatchery,'" *New York Times*, January 14, 1945.
17. "*schoolteachers, salesmen":* "'All Georgia' B-29's Assembled in Massive War-Bomber Plant," *Christian Science Monitor*, January 18, 1945.
18. "*the city-sized population of the plant":* "Boeing Outdates Dinner Pail with Colossal Cafeteria," *Christian Science Monitor*, November 28, 1944.
19. "*The warehouses alone are large":* Boeing press materials, compiled by Boeing-Wichita Public Relations, first printing, January 11, 1945, reel 43813, 734–41, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
20. "*This is really Kansas":* Boeing press materials.
21. "*A new coast-to-coast":* Boeing Stratocruiser advertisement, as published in *New Yorker*, February 3, 1945.

22. “*Arnold took a calculated risk”:* LeMay and Yenne, *Superfortress*, 19.

CHAPTER 34

1. "*Marquardt came in and told me":* Diary entry of Henry Arnold, April 13, 1945, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 240.
2. "*as if I had been struck a physical blow":* Winston S. Churchill, *The Second World War*, vol. 6, *Triumph and Tragedy* (Bantam, New York, 1953), 403.
3. "*We have the miracle":* Albert Speer, *Inside the Third Reich*, trans. Richard and Clara Winston (Avon, New York, 1970), 586.
4. "*may be a calamity":* Diary entry of Henry Arnold, April 13, 1945, *American Airpower Comes of Age*, vol. 2, 240.
5. "*The gravest question mark":* Diary entry of Arthur H. Vandenberg, excerpted in Arthur H. Vandenberg Jr., ed., *The Private Papers of Senator Vandenberg* (Houghton Mifflin, Boston, 1952), 165.
6. "*Berlin is dead":* "Allied Air Power Eloquent in Berlin," *New York Times*, May 10, 1945.
7. "*He saw the concentration camps":* Diary entry of Henry Arnold, April 24, 1945, in *American Airpower Comes of Age*, vol. 2, 252.
8. "*a necessary action, efficiently":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 145–46.
9. "*great clouds of black smoke":* "B-29's Set Great Tokyo Fires," *New York Times*, April 14, 1945.
10. "*We could still hear explosions":* "B-29's Set Great Tokyo Fires."
11. "*There were fighters and tracers":* "B-29's Set Great Tokyo Fires."
12. "*United States Army Air Forces attacks":* E. Bartlett Kerr, *Flames over Tokyo: The U.S. Army Air Force's Incendiary Campaign Against Japan, 1944–1945* (Donald I. Fine, New York, 1991), 211.
13. "*The destruction of Japan's":* Quoted in Lauris Norstad to Curtis LeMay, April 17, 1945, box 11, Curtis LeMay Papers, Library of Congress; "Mikado's Three Palaces Struck in Raid on Tokyo," *Chicago Daily Tribune*, April 15, 1945.
14. "*There is no documentation":* Max Hastings, *Retribution: The Battle for Japan, 1944–45* (Vintage Books, New York, 2009), 298.
15. "*With a greater respect we":* Hastings, *Retribution*, 308.
16. "*A glance at the map":* Lauris Norstad to Curtis LeMay, April 18, 1945, box 11, Curtis LeMay papers, Library of Congress.
17. "*Over the target":* Kerr, *Flames over Tokyo*, 246.
18. "*The last of old Tokyo's":* Robert Guillain, *I Saw Tokyo Burning: An Eyewitness Narrative from Pearl Harbor to Hiroshima*, trans. William Byron (Doubleday, Garden City, NY, 1981), 211.
19. "*Napalm is a soft gasoline-impregnated":* General Henry Arnold's Third Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 445.
20. "*quivered under unprecedented":* "Japan: In Panic," *Newsweek*, March 26, 1945, 41.
21. "*outdoing Hitler in atrocities":* Richard Rhodes, *The Making of the Atomic Bomb* (Touchstone, New York, 1988), 650.
22. "*I told him of my promise":* Diary entry of Henry Stimson, June 1, 1945, quoted in Godfrey Hodgson, *The Colonel: The Life and Wars of Henry Stimson, 1867–1950* (Alfred A. Knopf, New York, 1990), 324; "Hiroshima: Henry Stimson's Diary and Papers," part 5, May 31, 1945–June 6, 1945, http://www.doug-long.com/stimson5.htm.
23. "*Thus it was practically impossible":* Stimson's Diary, ibid.; Evan Thomas, *Road to Surrender: Three Men and the Countdown to the End of World War II* (Random House, New York, 2023), 49.
24. "*These operations were parts":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 444.

25. "*This was the first use of aerial mines":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 443.
26. "*strength through skinniness":* Guillain, *I Saw Tokyo Burning*, 159.
27. "*It was hell, plain hell":* "Iwo Battle Fury Told by Wounded," *Hartford Courant*, February 25, 1945.
28. "*Bulldozers and shovels were busy":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 446.
29. "*The time has come when":* Guillain, *I Saw Tokyo Burning*, 191.
30. "*This was the kickoff":* Guillain, *I Saw Tokyo Burning*, 191.

CHAPTER 35

1. "*It is my earnest wish that":* Barney M. Giles to General Arnold, April 30, 1945, reel 14, Henry Arnold Papers, Library of Congress.
2. *his last words were, reportedly, "No! No!":* "Cries No! No! As Partisan Shoot Him, Girl Friend," *Washington Post*, April 30, 1945.
3. "*Hitler died at noon":* "Hitler Dead, Reports Insist," *Daily Boston Globe*, April 30, 1945.
4. "*We have the best":* Transcript of press conference, May 2, 1945, box 51, President's Secretary's Files, Harry S. Truman Papers, Harry S. Truman Library and Museum.
5. "*the last Japanese division":* "The President's News Conference on V-E Day," May 8, 1945, The American Presidency Project, University of California, Santa Barbara, https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-v-e-day.
6. "*The Biggest Holiday in the World":* "V-E Day: The Biggest Holiday in the World," *Newsweek*, May 14, 1945.
7. "*Air power was our margin":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 558–59.
8. "*We are going to do the same":* Arnold, quoted in "If Japan Wants It," *Newsweek*, June 25, 1945.
9. "*Wide roads with hundreds":* Diary entry of Henry Arnold, June 13, 1945, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 326.
10. "*Tinian is a miracle":* Michael D. Gordin, *Five Days in August: How World War II Became a Nuclear War* (Princeton University Press, Princeton, NJ, 2007), 60.
11. *Seventy-Third Bomb Wing "Bombers":* The rosters for these teams found in "Harry L. Roberton to Curtis LeMay, Subject: Program of Spectator Sports," August 6, 1945, box 13, Curtis LeMay papers, Library of Congress.
12. "*Japs are still being killed":* Diary entry of Henry Arnold, June 13, 1945, in *American Airpower Comes of Age*, vol. 2, 326.
13. "*It was a very effective briefing":* Transcript of interview with Cecil E. Combs, July 22, 1974, reel 43813, 10–15, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
14. "*The B-29s could demolish any":* Transcript of interview with Cecil E. Combs, July 22, 1974.
15. "*Hap was convinced":* Doolittle, *I Could Never Be So Lucky Again*, 408–409.
16. "*I'm going to ask you the same question":* Transcript of interview with Curtis E. LeMay, August 5, 1974, reel 43803, 27–31, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
17. "*the Navy way":* Diary entry of Henry Arnold, June 14, 1945, in *American Airpower Comes of Age*, vol. 2, 328.
18. "*long, spirited talk":* Diary entry of Henry Arnold, June 17, 1945, in *American Airpower Comes of Age*, vol. 2, 334.
19. "*He feels that Navy is building":* Diary entry of Henry Arnold, June 17, 1945, in *American Airpower Comes of Age*, vol. 2, 334.
20. "*MacArthur is for a separate":* Diary entry of Henry Arnold, June 17, 1945, in *American Airpower Comes of Age*, vol. 2, 334.
21. "*Let us go back into the history":* "3,000-Ton Air Blow at Japan Disclosed by Arnold in Guam," *New York Times*, June 15, 1945.
22. *was "practically identical":* "Minutes of Meeting Held at the White House," June 18, 1945, Harry S. Truman Papers, Harry S. Truman Library and Museum, https://catalog.archives.gov/id/333234614.
23. "*It is a grim fact that":* "Minutes of Meeting Held at the White House," June 18, 1945.
24. "*Japanese Etch Grim War":* "Japanese Etch Grim War Plans with Suicide as National Weapon," *Newsweek*, June 11, 1945, 43.
25. *entire "submerged class":* "Minutes of Meeting Held at the White House," June 18, 1945.

26. "*Do the people in Washington":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 308.
27. "*press bombing attacks":* Diary entry of Henry Arnold, June 16, 1945, in *American Airpower Comes of Age*, vol. 2, 333.
28. "*Tinian Island became known as":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 181.

CHAPTER 36

1. "*All of our planning should":* Diary entry of Henry Arnold, July 13, 1945, in *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*, vol. 2, ed. Major General John W. Huston (Air University Press, Maxwell Air Force Base, AL, 2002), 367.
2. "*Information Bulletin Tripartite Conference":* "Information Bulletin Tripartite Conference" booklet, undated, reel 4, Henry Arnold Papers, Library of Congress.
3. "*All water from faucets":* "Information Bulletin Tripartite Conference" booklet.
4. "*Absolutely* everyone *was there":* A. J. Baime, *The Accidental President: Harry S. Truman and the Four Months That Changed the World* (Houghton Mifflin Harcourt, New York, 2017), 303.
5. "*We saw Berlin and Potsdam":* Diary entry of Henry Arnold, July 16, 1945, in *American Airpower Comes of Age*, vol. 2, 373.
6. "*Verboten fur Juden":* Diary entry of Henry Arnold, July 17, 1945, in *American Airpower Comes of Age*, vol. 2, 373.
7. "*never-ending procession of old men":* Harry S. Truman, *The Memoirs of Harry S. Truman: A Reader's Edition*, ed. Raymond H. Geselbracht (University of Missouri Press, Columbia, MO, 2019), 183.
8. "*Twenty-five years, fifty years":* Diary entry of Henry Arnold, July 16, 1945, in *American Airpower Comes of Age*, vol. 2, 373.
9. "*Operated on this morning":* Baime, *The Accidental President*, 286.
10. "*did not come as a complete surprise":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 585.
11. "*With Secretary Stimson and":* Arnold, *Global Mission*, 585.
12. "*We [the US and the UK] both believed":* Arnold, *Global Mission*, 586.
13. "*The invasion of Japan":* The Combined Chiefs of Staff to President Truman and Prime Minister Churchill, July 24, 1945, in *Foreign Relations of the United States, Diplomatic Papers, 1945*, vol. 2, *The Conference of Berlin (The Potsdam Conference)*, Office of the Historian, US State Department, https://history.state.gov/historicaldocuments/frus1945Berlinv02/d1381.
14. "*We talked about the killing":* Arnold, *Global Mission*, 589.
15. "*Now that the war in Europe":* Dialog quoted in diary entry of Henry Arnold, July 23, 1945, in *American Airpower Comes of Age*, vol. 2, 379.
16. "*prompt and utter destruction":* Potsdam Declaration, see the Atomic Heritage Foundation, https://ahf.nuclearmuseum.org/ahf/key-documents/potsdam-declaration/.
17. "*The weapon is to be used":* Diary entry of Harry S. Truman, July 25, 1945, Harry S. Truman Museum & Library, https://catalog.archives.gov/id/183568382.
18. "*would not drop an atomic bomb":* Interview with Carl Spaatz, quoted in David R. Mets, *Master of Airpower: General Carl A. Spaatz* (Presidio, Novato, CA, 1988), 303.
19. "*The 509 Composite Group":* General Thomas T. Handy to General Carl Spaatz, July 25, 1945, National Security Archive, https://nsarchive.gwu.edu/document/28483-document-60e-general-thomas-t-handy-general-carl-spaatz-july-26–1945-top-secret.
20. "*prosecute the war":* "Japanese Cabinet Weighs Ultimatum," *New York Times*, July 28, 1945.
21. "*The best psychological warfare":* Fleet Admiral William D. Leahy, *I Was There: The Personal Story of the Chief of Staff to Presidents Roosevelt and Truman* (Whittlesey House, New York, 1950), 72.
22. "*the atrocities by the Japs":* Diary entry of Henry Arnold, June 16, 1945, in *American Airpower Comes of Age*, vol. 2, 332.
23. "*No matter how you slice it":* Warren Kozak, *LeMay: The Life and Wars of General Curtis LeMay* (Regnery Press, Washington, DC, 2011), 215.
24. "*LeMay's 'death list' of targets":* "150-Mile Train of 800 B-29s Strike with 6000 Tons," *Washington Post,* August 2, 1945.
25. "*the greatest single aerial strike":* "World Peak Blow," *New York Times*, August 2, 1945.

26. "*The sight was incredible beyond description":* "Japs Hit by Mightiest of All Air Raids," *Monroe Evening Times*, Monroe, Wisconsin, August 2, 1945.
27. "*The limitless acres of ruin":* Masuo Kato, *The Lost War: A Japanese Reporter's Inside Story* (Alfred A. Knopf, 1946), 6–7.
28. "*I didn't know much about":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 379.
29. "*a major quartermaster depot":* "Hiroshima," memorandum, box 195, President's Secretary's Files, Harry S. Truman Papers, Harry S. Truman Library and Museum.
30. "*to use it [the bomb]":* Diary entry of Harry S. Truman, July 25, 1945.
31. "*Tonight is the night we":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 203.
32. "*I hope you don't have to use these":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 204.
33. "*Look, Paul, this is just another takeoff":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 209.
34. "*Dimples Eight Two":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 210.
35. "*My eleven companions and I":* Tibbets with Stebbins and Franken, *The Tibbets Story*, 5.
36. "*The night of that atomic bomb":* Dik Alan Daso, *Hap Arnold and the Evolution of American Airpower* (Smithsonian Institution Press, Washington, DC, 2000), 209.

CHAPTER 37

1. "*We heard a big noise":* "Hiroshima Survivor Recalls Day Atomic Bomb Was Dropped," *VOA News*, October 30, 2009.
2. "*it won't be long now":* Richard Rhodes, *The Making of the Atomic Bomb* (Touchstone, New York, 1988), 708.
3. "*Our primary is the best target":* Rhodes, *The Making of the Atomic Bomb*, 708.
4. "*It's Hiroshima":* Rhodes, *The Making of the Atomic Bomb*, 708.
5. "*I see it!":* Rhodes, *The Making of the Atomic Bomb*, 709.
6. "*From the pilot seat":* Paul W. Tibbets Jr. with Clair Stebbins and Harry Franken, *The Tibbets Story* (Stein and Day, New York, 1978), 5.
7. "*Perfectly open target":* "Hiroshima Log Sold," *Washington Post*, November 25, 1971.
8. "*A continuous tone signal":* Rhodes, *The Making of the Atomic Bomb*, 709.
9. "*A bright light filled":* Rhodes, *The Making of the Atomic Bomb*, 710.
10. "*The plane bounced, it jumped":* Rhodes, *The Making of the Atomic Bomb*, 710.
11. "*two very distinct slaps":* "Hiroshima Log Sold," *Washington Post*, November 25, 1971.
12. "*The city was hidden by":* Rhodes, *The Making of the Atomic Bomb*, 710.
13. "*you have just dropped the first":* Rhodes, *The Making of the Atomic Bomb*, 710.
14. "*Thank God the war is over":* Rhodes, *The Making of the Atomic Bomb*, 711.
15. "*Hiroshima bombed visually":* General James H. "Jimmy" Doolittle with Carroll V. Glines, *I Could Never Be So Lucky Again* (Bantam Books, New York, 1992), 421.
16. "*an American airplane dropped one bomb":* Transcript of Eben A. Ayers press conference, August 6, 1945, box 6, Eben A. Ayers Papers, Harry S. Truman Library and Museum.
17. "*the most revolutionary development":* "The Atomic Bomb: Extension of Remarks of Hon. Homer D. Angell, of Oregon, in the House of Representatives," October 9, 1945, in *Appendix to the Congressional Record*, vol. 91, pt. 12, A4212.
18. "*were indescribable":* H. H. Arnold, *Global Mission* (Harper & Row, Blue Ridge Summit, PA, 1949), 597.
19. "*The first aerial reconnaissance":* "Hiroshima Mission," cable to COMGENUSASTAF (REAR), August 8, 1945, reel 5, Henry Arnold papers, Library of Congress.
20. "*America asks that you":* Michael Kort, *The Columbia Guide to Hiroshima and the Bomb* (Columbia University Press, New York, 2007), 233.
21. "*Arnold wanted as big a finale":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 345.
22. "*The mission was the longest nonstop":* Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 244.
23. "*WE WANT HARRY!":* "Truman Replies to Shouts of Crowd, 'We Want Harry,'" *Christian Science Monitor*, August 15, 1945.
24. "*that night we had no celebration":* Arnold, *Global Mission*, 597.
25. "*So the night passed":* Arnold, *Global Mission*, 598.
26. "*all that mattered was to get the boys":* Arnold, *Global Mission*, 599.
27. "*Secular history offers few":* Broadcast of Edward R. Murrow, August 12, 1945, in *In Search of Light: The Broadcasts of Edward R. Murrow, 1938–1961* (Alfred A. Knopf, New York, 1967), 102.
28. "*It is not the stockpile of atom bombs":* Alexander de Seversky, "The U.S. Air Force in Power Politics," *Air Affairs*, vol. 2, no. 4, Winter 1949, 482.
29. "*The surrender of Japan":* Herman S. Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan* (University of North Texas Press, Denton, TX, 2010), opening epigraph.
30. "*They are probable to the point, almost":* "Gen. Arnold Stresses Preparedness Need in Statement," *Washington Post*, August 19, 1945.

CHAPTER 38

1. "*Was he a man of inordinate ambition?":* Reminiscences of Kenneth B. Wolfe, Oral History, 1959, 48, Henry H. Arnold Project, Columbia University.
2. "*Our ears filled with the roar":* General Curtis E. LeMay with MacKinlay Kantor, *Mission with LeMay: My Story* (Doubleday, Garden City, NY, 1965), 390.
3. "*Like many other folks":* LeMay with Kantor, *Mission with LeMay: My Story*, 390.
4. "*During World War II": The Army Air Forces in World War II*, vol. VI, ed. W. F. Craven and J. L. Cate (University of Chicago Press, Chicago, 1955), 171, https://www.ibiblio.org/hyperwar/AAF/VI/AAF-VI-5.html.
5. "*We dared to hope":* David McCullough, *The Wright Brothers* (Simon and Schuster, New York, 2015), 260–61.
6. "*Even before one of our B-29s":* General Henry Arnold's Third Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 438.
7. "*The Bombing Offensive":* US Strategic Bombing Survey, quoted in Haywood S. Hansell Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Office of Air Force History, United States Air Force, Washington, DC, 1986), 266–67.
8. "*The danger zone of modern war":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 452.
9. "*Japanese and German cities lie in ruins":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 454.
10. "*Controlled or directed robots":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 455.
11. "*I know you people think":* Thomas M. Coffey, *Hap: The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (Viking Press, New York, 1982), 378.
12. "*World War II brought unprecedented":* General Henry Arnold's Third Report to the War Department, in *The War Reports*, 470.
13. "*new aspects of aerial warfare":* Theodore von Kármán, *Where We Stand: A Report Prepared for the AAF Scientific Advisory Group* (Headquarters Air Materiel Command, Wright Field, Dayton, OH, 1946), iv.
14. *Aircraft, manned or pilotless:* Von Kármán, *Where We Stand*, iv.
15. "*An interesting outcome of the study":* "Our History," RAND (official website), https://www.rand.org/about/history.html.
16. "*In searching for the key":* "First Attempt at Moon Made Nine Years Ago," *Los Angeles Times*, July 30, 1955.
17. "*It is necessary for an aviator":* Statement of Lieut. H. H. Arnold, in *Aeronautics in the Army. Hearings Before the Committee of Military Affairs, in Connection with H.R. 5304, House of Representatives, 63rd Congress, August 12, 14, 15, and 16, 1913* (Government Printing Office, Washington, DC, 1913), 88–93.
18. "*I say to you with all the":* "Arnold Advocates Co-Equal Air Force," *New York Times*, October 20, 1945.
19. "*Everybody in the Army Air Corps":* Transcript of interview with Laurence Kuter, April 17, 1970, reel 43798, 182–83, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
20. "*He [Arnold] said it would come":* Transcript of interview with P. D. Weikert, January 5, 1970, reel 43798, 1045–46, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
21. "*Of course we will have a separate":* Transcript of interview with Fred M. Dean, February 20, 1973, reel 43798, 1032–34, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.

22. "*We should organize to provide":* "Special Message to the Congress Recommending the Establishment of a Department of National Defense," December 19, 1945, Harry S. Truman Library and Museum, https://www.trumanlibrary.gov/library/public-papers/218/special-message-congress-recommending-establishment-department-national.
23. "*shall have the responsibility for the development":* "Letter to the Chairmen, Congressional Committees on Military and Naval Affairs on Unification of the Armed Forces," June 15, 1946, Harry S. Truman Library and Museum, https://www.trumanlibrary.gov/library/public-papers/137/letter-chairmen-congressional-committees-military-and-naval-affairs.
24. "*In the more than forty years":* Telegram from Harry S. Truman to H. H. Arnold, February 14, 1946, box 557, President's Personal File, Harry S. Truman Library and Museum.
25. "*important requisites for a":* H. H. Arnold, General of the Army, to Lt. Col. LeRoy L. Stefen, November 5, 1947, Air University Library, https://aul.primo.exlibrisgroup.com/discovery/fulldisplay?vid=01AUL_INST:AUL&tab=Everything&docid=alma995537423406836&context=L.
26. "*Hap died shortly after": The Memoirs of General Lord Ismay* (Viking Press, New York, 1960), 254.

CHAPTER 39

1. "*The charm of history and its enigmatic":* Uwe Rasch, *Aldous Huxley and the Enemies of Freedom* (Centre for Aldous Huxley Studies, University of Munster, Munster, Germany, 2026), 38.
2. "*there will be a million bird men":* Henry Harley Arnold and Ira Eaker, *This Flying Game* (Funk and Wagnalls, New York, 1936), xvii.
3. "*The weapons of today are":* General Henry Arnold's Third Report to the War Department, in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King* (J. B. Lippincott, New York, 1947), 466.
4. "*A modern, autonomous, and":* General of the Army H. H. Arnold, "Air Power for Peace," *National Geographic*, February 1946.
5. "*Just to sum up Hap Arnold":* Transcript of interview with Gen. St. Clair Streett, October 7, 1969, reel 43803, 293, "Hap" Arnold–Murray Green Collection, United States Air Force Academy.
6. "*He had probably done":* Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, New Haven, 1987), 315.
7. "*Like all the great advances":* Gregory D. Sumner, *Dwight MacDonald and the Politics Circle: The Challenge of Cosmopolitan Democracy* (Cornell University Press, Ithaca, New York, 1996), 54.
8. "*Every step in the bomber's":* "The Atomic Age: Editorial," *Life*, August 20, 1945, 32.
9. "*lead the United States":* William L. O'Neill, *A Democracy at War: America's Fight at Home & Abroad in World War II* (Harvard University Press, Cambridge, MA, 1993), 301.
10. "*It occurred to me that":* James Carroll, *House of War: The Pentagon and the Disastrous Rise of American Power* (Houghton Mifflin, Boston, 2006), 44.
11. "*I suppose if I had lost":* Donald L. Miller, *The Story of World War II* (Simon & Schuster Paperbacks, New York, 2006), 459.

EPILOGUE

1. "*In the development of air power": William "Billy" Mitchell's Air Power*, comp. Johnny R. Jones (University Press of the Pacific, Honolulu, HI, 2004), 8.
2. "*Long term, we want to build":* Author's interview with NASA's Tyler Nester, January 27, 2025.
3. "*We are exploring the Moon":* "Artemis," NASA (website), https://www.nasa.gov/humans-in-space/artemis/.
4. "*We are going to the moon":* Author's interview with confidential source, January 27, 2025.
5. "*the widespread recognition":* U.S. Space Force website, https://www.spaceforce.mil/about-us/.

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Photo Section



Second Lieutenants Henry Arnold (*left*) and Tom Milling (*right*) were the first two Army soldiers sent to the Wright Brothers Flying School to learn to fly in 1911.

Library of Congress



The US Army's first airplane base, in College Park, Maryland, in 1911. Arnold and Milling served as the base's first two flight instructors.

Library of Congress



Billy Mitchell around the time of World War I. During the war, Mitchell commanded the first ever mass air attack over enemy lines.

Getty/Bettmann



One month after his historic solo trans-Atlantic flight in 1927, Charles Lindbergh (*right*) came to Dayton to pay respects to Orville Wright (*left*).

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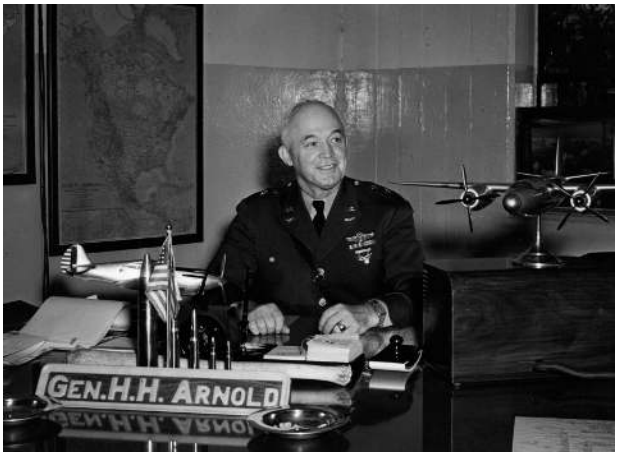
In 1929, Army pilots Carl Spaatz (*left*) and Ira Eaker (*second from left*), with a crew of three others, set a record for the longest flight while refueling in the air. The two became key air commanders during World War II.

Library of Congress



Hitler had cameras mounted on Luftwaffe aircraft as they attacked Poland in 1939. When he saw the footage, he cried out, “That is what will happen to them! That is how we will annihilate them!”

General Photographic Agency/Getty Images



Gen. Arnold in his War Department office in Washington, shortly before the Army brass moved into the new Pentagon building.

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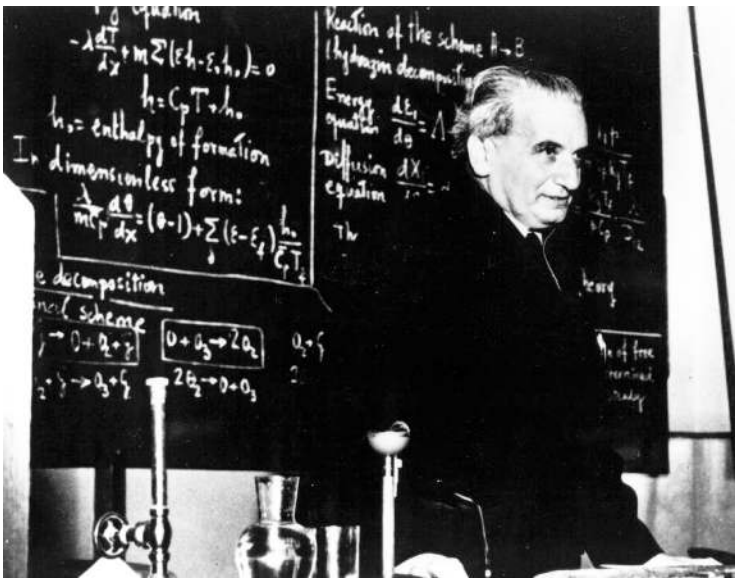
Roosevelt awarding James Doolittle the Medal of Honor after the Doolittle Raid on Tokyo in 1942. Gen. Arnold stands at left with Doolittle's wife, Josephine, while Army Chief of Staff George Marshall stands at right.

Getty/Bettmann



American and British leaders at Quebec in 1944. At this conference, Arnold (*back row, second from right*) formally introduced the B-29 and the Twentieth Air Force, "the first global Air Force."

Getty/Bettmann



Hungarian-born scientist and engineer Theodore von Kármán, a key figure in the rise of airpower and early experiments with rocketry.

Heritage Space/Heritage Images via Getty Images



The 1945 bombing of Dresden showed the world what attacking aircraft could do to a city. “Dresden was one big flame,” recalled novelist Kurt Vonnegut, who was on the ground. “The one flame ate everything organic, everything that would burn.”

Getty/Bettmann



The Superfortress assembly line at Boeing’s factory in Renton, Washington, in 1944. The B-29 “was to be the only case in history,” according to Curtis LeMay, “where airpower had done what all its early pioneers said could be done.”

Boeing



B-29 attacks on mainland Japan, including the atomic bombings, killed hundreds of thousands. Here, the aircraft drop bombs on Japanese-held Burma.

Library of Congress



According to Gen. Arnold's records, B-29s destroyed nearly 169 square miles of enemy territory. Casualties among crews were heavy. Here, a Superfortress crash-lands on Iwo Jima, on January 1, 1945.

FPG/Hulton Archive/Getty Images



Warring nations were in a race to develop airborne and atomic weapons. The Nazis were behind in atomic science, but ahead in rocketry. Pictured: the German V-2, the first operational ballistic missile.

Getty/Bettmann



After the debut flight of America's first jet airplane, the Bell P-59 Airacomet (foreground), Roosevelt wrote Gen. Arnold that "the possibilities in the field it has opened to us are staggering to the imagination."

PhotoQuest/Getty Images



The *Sacred Cow*, America's first presidential airplane, was developed by Douglas Aircraft, and was based on the C-54 Skymaster. Roosevelt's maiden voyage took him to the Yalta Conference in 1945.

United States Air Force



Gen. Curtis LeMay (*center*) was largely responsible for dreaming up the Tokyo firebombing of March 9–10, 1945. Gen. Thomas Power (*right*) led the raid. At left is Gen. Lauris Norstad, chief of staff of the Twentieth Air Force.

Getty/Bettmann



The ground crew of the most impactful airplane ever built, the *Enola Gay,* the B-29 that dropped the atomic bomb on Hiroshima on August 6, 1945. Pilot Paul Tibbets (*center*) named the aircraft after his mother.

United States Air Force



Gen. Arnold welcomes the B-29 crew of the historic, record-setting nonstop flight from Japan to the US, shortly after Japan's surrender. (*From left:* Gen. Curtis LeMay, Gen. Emmett "Rosie" O'Donnell, Arnold, and Lt. Gen. Barney Giles.)

Getty/Bettmann



Astounding leaps forward in wartime aviation gave way to a postwar boom in civilian flight. Pictured: the Boeing 377 Stratocruiser, a civilian airliner that had its roots in the B-29 bomber.

Boeing

About the Author

A. J. BAIME is the *New York Times* bestselling author of *The Accidental President: Harry S. Truman and the Four Months That Changed the World*; *The Arsenal of Democracy: FDR, Detroit, and an Epic Quest to Arm an America at War*; *Go Like Hell: Ford, Ferrari, and Their Battle for Speed and Glory at Le Mans*; and *Dewey Defeats Truman: The 1948 Election and the Battle for America's Soul.* A regular contributor to *The Wall Street Journal* for fifteen years, Baime has also written articles that have appeared in *The New York Times*, *The Washington Post*, and numerous other publications.

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* This site was originally established as an airfield in 1909, before it became a full-fledged Army air base. Now called the College Park Airport, it remains the oldest continuously operated airport in the world.

* Roy C. Kirtland is the namesake of Kirtland Air Force Base in Albuquerque, New Mexico.

* Scott Air Force Base, a major United States Air Force installation outside of St. Louis, is named for Frank S. Scott.

* Rockwell Field, which was for years a major Army and Navy flight base outside of San Diego, was named for Lewis C. Rockwell.

* Charles Kettering was also a health care innovator and is probably most remembered today as the co-namesake of Sloan-Kettering Cancer Center.

* This author was in Manhattan on foot when the Twin Towers went down on September 11, 2001, and could describe the scene in almost this exact language.

* Dwight Morrow was the father of Anne Morrow, who married the aviator Charles Lindbergh in 1929, and also became herself a pilot and a book author.

* The Dearborn Inn still stands and is still open for business.

* Donald Douglas's tight relationship with Henry Arnold did not hurt, in this regard; Douglas's only daughter, Barbara, later married Arnold's son Bruce, in 1944.

* Most took the name Hap to be short for Happy, although there remains some mystery around the origin. As Arnold's grandson Robert Arnold explained to the author, "No one called him Henry. His father called him Harley. His Mother called him Sunny . . . Pretty sure others called him 'Happy' along the way. However, after his mother suddenly died, a big tragedy for him, Sunny was never used again. Hap appeared and stuck."

* The Air Corps Tactical School still exists at Maxwell, only now it is called Air University. Some of the research for this book was done using this institution's archives.

* The four officers were Hansell, Laurence Kuter, Kenneth Walker, and Harold George.

* Today Glenn Martin's company still exists as part of the military contracting and spaceflight behemoth Lockheed Martin.

* Boeing's 307 Stratoliner "Flying Cloud" was the first civilian airplane with a pressurized cabin. That aircraft first flew in 1938 but was hardly used before World War II began.

* For decades, Las Vegas's major airport was named McCarran International, after Senator Pat McCarran, until it was renamed Harry Reid International Airport, in 2021.

* From its early days after completion in 1939, New York Municipal Airport–LaGuardia Field was known informally as LaGuardia Airport, as mentioned in newspaper articles at the time. It was not officially named LaGuardia Airport until 1947. Most official sources spell the New York mayor's name as two words: La Guardia.

* In 1929, Quesada, along with Spaatz and Eaker, set a record for a sustained air voyage with inflight refueling, aboard an aircraft named *Question Mark*—151 hours (more than six days) in airspace over Southern California.

* The Air Forces Aid Society still exists today, as the Air & Space Forces Aid Society, with the same mission: “To help Airmen and Guardians when they need us most.”

* According to the *Silhouette Handbook of United States Army Air Forces Airplanes*, published "by authority of the Commanding General of the Army Air Forces" in September 1942, these forty-eight aircraft included: Heavy bombardment: B-17E, B-24D and E, XB-19 (the latter a Boeing experiment that was bigger than the B-29 but never made it into production). Medium bombardment: B-10, B-18, B-18A, B-23, B-25C and D, B-26B and C. Light bombardment: A-17, A20B and C, A-24, A-29 and A-29A, A-30, A-31. Fighter: P-35, P-36C, P-38D and E, P-39C and D, P-40E, P-43A, P-47B, P-51. Observational and Liaison: O-46A, O-47A and B, O-52, L-1, OA-9, OA-10. Cargo: C-39, C-40A, C-45, C-46, C-47, C-54A, C-60A. Training: PT-17 and 18, PT-19, PT-22, BT-13, BT-15, AT-6A, AT7, AT8, AT9, AT-10, AT-11, AT-12.

* The Air Forces were divided by number: the First Air Force, for defense of the Northeastern United States and the Great Lakes (officially activated on December 18, 1940, under commander Maj. Gen. Herbert Dargue); the Second Air Force, stretching from Washington and Oregon to Montana and as far south as Nebraska (December 18, 1940, under commander Maj. Gen. Millard Harmon); the Third, in the southeast as far west as Louisiana (December 18, 1940, under Maj. Gen. Walter Frank); the Fourth, from Texas to California (December 18, 1940, under Maj. Gen. Jacob Fickel); the Fifth, in Australia (September 20, 1941, under Maj. Gen. Lewis Brereton); the Sixth, covering the Panama Canal (October 20, 1940, under Maj. Gen. Davenport Johnson); the Seventh, in Hawaii (November 1, 1940, under Maj. Gen. Frederick Martin); the Eighth, in Europe (January 28, 1942, under Lt. Gen. Carl Spaatz and Lt. Gen. Ira Eaker); the Ninth, in the Middle East (September 2, 1941, under Brereton); the Tenth, in the "CBI," China, Burma, India theater (February 12, 1942, under Brereton); the Eleventh, in Alaska (January 15, 1942, under Maj. Gen. William Butler); the Twelfth, in North Africa (August 20, 1942, under Maj. Gen. James Doolittle); the Thirteenth, in the South Pacific (January 13, 1943, under Maj. Gen. Nathan F. Twining); the Fourteenth, in the China-Burma-India theater (March 10, 1943, under Maj. Gen. Claire Chennault); and the Fifteenth, in North Africa (November 1, 1943, under Maj. Gen. James Doolittle).

* This airport was itself an engineering marvel. Under orders from Roosevelt, the US federal government began construction in 1938. The site along the Potomac River was mostly underwater, so construction workers moved in 20 million cubic yards of gravel to lay the foundation. Today, Washington National Airport is called Ronald Reagan Washington National Airport, and it is a primary aerial gateway into the nation's capital.

* Eglin Field exists today as Eglin Air Force Base.

* The standard contract between the federal government and private companies supplying the war effort dictated an 8 percent profit, meaning the government covered all costs and paid out the profit margin. As Secretary of War Stimson put it to the president, “If you are going to war in a capitalist country, you have to let business make money out of the process or business won’t work.”

* Evidence found after the war showed that Hitler had a map of New York with a bull's-eye strike on lower Manhattan. A copy of this map today sits in the archives of the Harry S. Truman presidential library: https://www.trumanlibrary.gov/photograph-records/2013–3655.

* The American president's airplane came to be known as Air Force One in 1954. Technically, the term refers not to a specific aircraft but to any aircraft in which the president is aboard.

* The Boeing Stratocruiser civilian airliner was developed from the company's C-97 Stratofreighter military cargo plane, which was developed from the B-29 bomber.

* On its return voyage, the *Indianapolis* fell prey to Japanese submarines. Torpedoes crashed into the hull. The *Indianapolis* sank in twelve minutes. Out of 1,195 sailors, only 316 survived. The *Indianapolis* remains the deadliest single ship maritime disaster in the history of the US Navy.

* The RAND Corporation still exists today, defining itself as a “nonprofit, nonpartisan research organization that provides leaders with the information they need to make evidence-based decisions.”