UNIT 3
DELIVERING
THE BOMB
BFS - 57-95

The Crossroads: The End of World War II, The Atomic Bomb and the Origins of the Cold War

This exhibit contains graphic photographs of the horrors of war. Parental discretion is advised.

[*Editor's Note*: The following is the verbatim text of the original Smithsonian script including a few parenthetical indications of material that was to come. This reproduction omits all photographs and their captions, but retains an illustration, a chart and a few facsimiles of documents from the planned exhibition.]

Historical Controversies:
Was the Decision to Drop the Bomb Justified?

After fifty years, the controversy over this question remains heated. Many analysts continue to argue that the bomb ended the war quickly and saved lives—even if the American deaths in an invasion of Japan would have been significantly lower than the post-war estimates. On the other hand, other scholars have argued that the atomic bombings were unnecessary; a number of options were available to President Truman, but he decided to go ahead anyway because he wished to intimidate the Soviets.

The current consensus of most scholars is that the Soviets did play a role in the thinking of Truman and his advisers, but saving American lives and shortening the war were more important. Most historians also agree that there was scarcely any "decision to drop the bomb." Truman merely approved the preparations already underway; the Manhattan Project had a great deal of momentum and the strategic bombing of German and Japanese cities made atomic bombing easier to accept.

It is also clear that there were alternatives to both an invasion and dropping atomic bombs without warning—for example, guaranteeing the Emperor's position, staging a demonstration of the bomb's power, or waiting for blockade, firebombing and a Soviet declaration of war to take their toll on Japan. Since these alternatives are clearer in hindsight and it is speculative whether they would have induced the Japanese government to surrender quickly, the debate over "the decision to drop the bomb" will remain forever controversial.

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August 6, 1945, 2:00 a.m., Tinian Island, the Central Pacific. Bathed in floodlights, the B-29 "Enola Gay" awaits take-off on an historic mission: dropping the first atomic bomb on Japan. The head of the Manhattan Project, Gen. Leslie Groves, had warned the "Enola Gay's" commander, Col. Paul Tibbets, to expect "a little publicity," but Tibbets and his crew are stunned by the scene on the tarmac. Movie cameramen, photographers and reporters surround the crew. Groves is determined that this is one moment in history that was not going to go unrecorded. Soon thereafter, at 2:45 a.m., the aircraft took off.

The beginning of the "Enola Gay's" mission was the culmination of over a year's work. The U.S. Army Air Forces had modified its most advanced bomber, the B-29, and had created a new, special military unit for delivering atomic bombs. This unit's mission was so secret that, with few exceptions, the nature of its weapons was concealed even from its members.

The B-29: A Three-Billion Dollar Gamble

Although ultimately chosen to deliver the first atomic bombs, the Boeing B-29 Superfortress was conceived, designed, and rushed into production as a very long-range conventional bomber. Of the total wartime production of over 2,000 aircraft, only 15 were sent to the Pacific as potential atomic bomb carriers before the war's end. Most of the rest formed the backbone of what was, by the spring of 1945, the most powerful and destructive bomber force of World War II.

The B-29 was the most technologically complex mass-production aircraft of World War II. The program to build it also represented the largest commitment of resources to a single military aircraft up to that time. Initiated in response to German victories in Europe during 1939 and 1940, the B-29 program eventually cost over 3 billion dollars—1 billion more than the Manhattan Project.

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DESIGNING A SUPERBOMBER

In the wake of Nazi Germany's quick victory over Poland in 1939, Major General Henry H. "Hap" Arnold, Commander of the Army Air Corps, asked the War Department for authority to initiate design studies for a very long-range heavy bomber. After formulating its requirements for the new bomber, in January 1940 the Air Corps requested design proposals from four aircraft firms: Boeing, Lockhead, Douglas, and Consolidated. On September 6, 1940, the Boeing Company received a $3.6 million contract covering the construction of a wooden full-size mock-up and two prototypes. The new bomber received the designation XB-29.

STRETCHING AERODYNAMIC LIMITS

To meet the Air Corps' performance requirements for the new bomber, Boeing engineers stretched existing aircraft technology to the limit. To reduce drag (air resistance) and provide great lift at high speed, designers selected a long, narrow wing incorporating a newly designed, aerodynamically efficient airfoil. Flaps as large as the wings of some fighters would reduce the high landing speed inherent in such a heavy bomber. Flush riveting of most of the aircraft's skin produced a smooth, strong surface. Tight-fitting low-drag cowlings enclosed the B-29's four massive 2,200 hp Wright Cyclone R-3350 engines. Even the aircraft's rounded nose contributed to drag reduction by eliminating a vertical windscreen.

Boeing's design efforts resulted in a combination of flight and landing characteristics that compromised neither. As a result, although the B-29 carried a larger bombload over greater distances at higher altitude and speed than any other bomber of World War II, it proved surprisingly easy to fly.

A TECHNOLOGICAL GAMBLE

For the first time on a combat aircraft, heated pressurized compartments allowed crewmen to fly at high altitudes without

bulky clothing and oxygen masks. A 10-m (33-ft) tunnel, 86 cm (34 in) in diameter, ran through the aircraft's two bomb bays and connected two of the compartments. Bunks in the rear compartment allowed crewmen to sleep on long duration flights. The tail gunner's pressurized position remained isolated from the rest of the aircraft.

The complexity of the B-29 represented not only a major technological achievement, but also a significant gamble for Boeing and the Army Air Corps. If unforeseen problems turned up in the B-29's engines or internal systems during flight testing, the entire program could be endangered.

A TROUBLESOME GESTATION

As Boeing proceeded toward the construction of the first prototype B-29, the program began to suffer from numerous delays. Over 900 changes were made to the basic design between 1940 and 1942. One of the most important was inclusion of a new type of defensive armament system incorporating four remotely-controlled machine gun turrets connected to a computer-assisted fire-control system. To provide electrical power for the fire control system, the pressurization system, and the aircraft's massive propellers, designers used over 125 electric motors, necessitating weight reduction for the rest of the aircraft.

To eliminate further delays and speed production of the first prototypes, the B-29 Liaison Committee was established in April 1942 and empowered to make binding decisions for the program. As the year progressed, various subcommittees helped coordinate the assembly of the B-29 prototype, which made its first test flight on September 21, 1942.

THE ENGINE CRISIS

Although the B-29 exhibited excellent flying characteristics, its engines caused problems from the beginning of flight testing. After several near-accidents, an engine fire caused the second prototype to crash on February 18, 1943, killing Boeing's chief test pilot and ten others on board. A Senate investigating com-

mittee determined that engine quality control had been deficient, precipitating a crisis for the B-29 program. In response, General Arnold set up the "B-29 Special Project" under General Kenneth B. Wolfe. Arnold expected Wolfe, one of the Army Air Forces' most experienced engineering officers, to ensure that the first B-29 would be ready for combat by the end of 1943.

Improved quality control, a redesigned engine cowling, improved lubrication and better cooling helped to reduce the R-3350's tendency to catch fire. The problem, however, persisted well into the B-29's service life.

SUPERFACTORIES FOR A SUPERBOMBER

Following the Japanese attack on Pearl Harbor, the U.S. Army Air Forces ordered over 1,600 B-29's, even though the aircraft had never been flown. Although Boeing had already begun construction of a massive new factory for B-29s at Wichita, Kansas, the Army recognized that the order far exceeded Boeing's plant capacity.

Chrysler Corporation would produce the new bomber's engine, at a massive plant to be built in Chicago. General Motors' Fisher Division would be responsible for forgings, castings, stampings and various B-29 subassemblies. Bell Aircraft Company would build center sections and fuselages and, after some delays, entire aircraft in Marietta, Georgia. Additional B-29 factories were eventually established by Boeing at Renton, Washington, and the Martin Company in Omaha, Nebraska.

The first production B-29s began to roll off the assembly lines during July 1943. By war's end, the four B-29 assembly facilities and engine factories had produced over 2,000 aircraft and 18,000 engines, a signal achievement.

The B-29 and the Bombing of Japan

CREATING A NEW AIR FORCE

By October 1943, President Franklin Roosevelt had begun to

lose patience with the B-29 program. General Arnold had promised that at least 150 B-29s would be available to begin bombing Japan from China by January 1, 1944. Aware of the President's dissatisfaction, Arnold activated the first B-29 combat unit, the XXth Bomber Command, in late November, and its parent organization the Twentieth Air Force, in April 1944. Arnold selected General Kenneth Wolfe, already deeply involved in the B-29 program, to command the XXth Bomber Command from an airfield near Salina, Kansas. Unlike all of the other Army Air Forces, the Twentieth Air Force would be directly under the command of the Joint Chiefs of Staff.

The mission of the Twentieth Air Force would be the destruction of Japanese war industries as outlined under the "Air Plan for the Defeat of Japan," drafted by Wolfe and formalized by President Roosevelt, British Prime Minister Churchill, and the Combined Chiefs of Staff at the Cairo Conference in November 1943.

CREW TRAINING

Following activation of XXth Bomber Command, General Wolfe prepared plans to train 452 combat crews. As personnel trickled into their bases in late 1943, they found B-29s in such short supply that many were forced to train in older heavy bombers. By the end of the year, the average crew had less than 30 hours of flight time in the airplane they would be taking into combat. Although more B-29s became available for training during early 1944, the crews left for their first combat deployment with much still to learn about their complex, temperamental bombers.

THE BATTLE OF KANSAS

The first B-29s off the assembly lines required extensive modification to make them ready for combat. Under pressure from President Roosevelt to deploy the 150 B-29s of the XXth Bomber Command to India by April 15, 1944, Army Air Forces Commanding General Arnold visited the modification center at

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Salina, Kansas, in early March, expecting to find the first contingent of new B-29s ready to begin the long flight to Asia. Arnold was shocked to find that none of the new bombers were ready and no one could say exactly when the modifications would be completed.

To speed up the process, Arnold imposed greater Air Force control over program management, assigned the B-29 priority over all other aircraft programs, and diverted workers from Boeing's assembly lines to the Salina, Kansas, modification center.

Laboring on B-29's parked outdoors in freezing temperatures, Boeing workers modified just enough bombers by the end of March 1944 to equip the first units going overseas. The last of the 150 bombers left by April 15. The episode quickly became known as "The Battle of Kansas."

EARLY B-29 OPERATIONS IN ASIA

The first B-29s arrived in India during May 1944. Early bombing raids against targets in Japanese-held China and Southeast Asia were conducted from air bases in China. The first attack on Japan since the Doolittle Raid, a strike against coke furnaces and steel plants in the city of Yawata, was staged from Chengtu, China, on June 15, 1944.

The B-29 crews operating from China faced enormous obstacles, however. Because Japanese forces blocked overland routes to Chengtu, all food, fuel, bombs, ammunition, and other supplies had to be flown to the base over the Himalaya Mountains from India. In some cases, it was estimated that supply aircraft burned 12 gallons of fuel for every gallon delivered to a Chinese airstrip within striking distance of Japan. Moreover, B-29 crews taking off from Chinese bases had to fly a 5,000 km (3,200 mi) round trip to reach those few cities in western Japan that were within their range. Operations were hampered by mechanical failures, the strain of very long flights at high altitude, and poor bombing results.

BASES IN THE CENTRAL PACIFIC

The "Air Plan for the Defeat of Japan" called for the largest share of the strategic bombing campaign to be conducted from bases in the central Pacific. After the seizure of the Marianas Islands, five great airfields would be constructed there, allowing a new B-29 organization, the XXIst Bomber Command, to begin large-scale bombing of the Japanese home islands. On August 27, 1944, the Twentieth Air Force's Chief of Staff, Major General Haywood S. Hansell, took command of the XXIst Bomber Command and began to formulate plans for the campaign from the Marianas.

BULLDOZERS BEFORE BOMBERS

Although the XXIst Bomber Command faced fewer logistical difficulties than had the XXth, the construction of airfields and support facilities in the Marianas represented a substantial accomplishment. After the capture of the island of Saipan in June 1944 and the islands of Tinian and Guam in early August, Army airfield engineers and Navy Seabees constructed the five largest air bases ever built to that time, each capable of handling several hundred B-29s. With the completion of two airfields on both Tinian and Guam during the spring of 1945, the islands had been totally transformed, setting the stage for the last great air campaign of World War II.

EARLY B-29 OPERATIONS IN THE MARIANAS

Operations from Saipan began on November 24, 1944, reducing the length of a round-trip flight to Tokyo to 4,800 km (3,000 mi). Most significant Japanese targets were now within the range. Additional airfields on Guam and Tinian allowed more B-29 groups to join the offensive.

Still, problems remained. Major General Haywood Hansell, commander of XXIst Bomber Command, wanted to continue the high-altitude precision-bombing techniques first tried in Europe. Crews attacking targets in Japan from 9,000 m (30,000 ft),

however, experienced a powerful and unknown phenomenon—jet-stream winds of over 320 km/h (200 mph). These high winds either pushed bombers along at ground speeds approaching 800 km/h (500 mph) or slowed them nearly to a standstill. Bombing accuracy was very difficult to achieve. Hansell ordered his bombers to attack at lower altitudes, but unpredictable weather often obscured targets anyway. By the end of 1944, B-29s had dropped 1,550 tons of bombs during seven raids on Japanese aircraft factories and steel plants. It was estimated that only one bomb in 50 had fallen within 1000 feet of its target.

"Oh, I get that lonesome feeling
When I hear those engines whine,
Those 29's are breaking up
That old gang of mine.
There goes Jack, there goes Bill
Down over Tokyo.
We all hope it's home we go
How soon we do not know.
A goddamned Zeke rammed old Pete,
We wept to see him go,
Heavy flak riddled Jack,
He couldn't make Iwo.
Oh they say it's thirty missions
But it's more like twenty-nine,
Those 29s are breaking up
That old gang of mine."

Song by an anonymous B-29 crewman, sung to the tune of "Those Wedding Bells Are Breaking Up That Old Gang of Mine"

CITIZEN AIRMEN

As the U.S. Army Air Forces expanded dramatically during World War II, it drew in men from every geographical region and background in America. Although the Air Force provided practically no flying opportunities for anyone other than white males, the B-29 units nevertheless contained a remarkably diverse mix of airmen. Almost all were volunteers, motivated by patriotism and

sense of wartime duty. Flight pay, the prospect of rapid promotion, and the glamour of aviation attracted others. As one of the Army Air Forces' highest priority units, the Twentieth Air Force attracted the best flyers among those still training in the United States.

Although many senior officers came from combat units, most B-29 crewman had not yet been overseas when they arrived at the great airfields in the Marianas. These citizen airmen faced an enormous responsibility—to take a complex, often dangerously temperamental aircraft into combat halfway around the world and deliver what their superiors hoped would be the final knockout blow against Japan.

A HAZARDOUS BUSINESS

Although loss rates for American bomber crews bombing Japan rarely approached those suffered by those over Germany, combat aircrews in the Pacific nonetheless faced a host of dangers, particularly during the early stages of the Marianas campaign. Operating B-29s at the limit of their performance was often disastrous for crews attempting to take off with a full load of fuel and bombs. Japanese anti-aircraft fire and fighters sometimes posed a significant threat over the target. Nor was abandoning a wounded B-29 over Japan a good idea—capture by the Japanese often meant execution.

The 2,400 km (1,500 mi) return flight over open ocean proved too much for many weary aircrews in damaged bombers. Others ditched at sea after running out of fuel on the long return flight. Although patrol aircraft and submarines rescued many downed crews, others disappeared into the Pacific without a trace. By war's end 417 B-29s had been lost in combat and through operational accidents with 3,015 crewmen listed as killed, wounded, or missing in action.

HAVENS FOR DAMAGED BOMBERS

By the spring of 1945, B-29 losses had dropped to very low levels on most missions. Although some bombers continued to be lost to battle damage or lack of fuel during the long return

flights, emergency airfields constructed in Iwo Jima, roughly halfway between Marianas and Japan, provided a much need haven for aircraft unable to limp home.

Establishment of bases capable of handling B-29s on Okinawa, after its final capture in June 1945, provided another escape option for crippled aircraft. Finally, Japanese air defenses proved rather less than formidable against B-29s bombing from low-altitude at night. These defenses became even less effective as a result of bombing, naval blockade, and the general deterioration of Japanese society during the spring of 1945. By war's end, Japanese air defenses had claimed only one of every five B-29s lost during the war.

A SHIFT IN TACTICS

Dismayed with the poor results achieved by XXIst Bomber Command under General Haywood Hansell, General Arnold fired Hansell and appointed Major General Curtis E. LeMay, a veteran of the European air campaign, on January 20, 1945.

Under pressure to attack Japanese cities with incendiary bombs, LeMay instituted radical changes in the tactics employed by the B-29s. Instead of high altitude daylight precision attacks, his bombers would conduct area raids at night, flying very low altitudes. Under those circumstances, enemy air opposition and antiaircraft defenses were expected to cause fewer problems. LeMay stripped the aircraft of their guns, ammunition and three crewmen, raising the operational bomb load for a single airplane from three to six tons. Most of the bombs would be incendiaries. Reasoning that dispersed factories could be destroyed and civilian morale shattered by burning residential areas, LeMay ordered his crews to bomb by radar, with an entire city, or a major section of it, as the target.

MODEL M-50 INCENDIARY BOMB

Along with the Model M-69 and M-47 incendiary bombs, the M-50 provided XXIst Bomber Command with the ideal weapon for burning Japanese cities. B-29s released bundles of individual

M-50s, which burst to scatter the individual bomblets at a preset altitude. Although not as effective as the jellied gasoline-filled M-69, the magnesium-filled M-50 was virtually impossible to extinguish.

BURNING JAPAN

The fire bombing campaign, which began in earnest with the great raid against Tokyo on the night of March 9–10, proved destructive beyond LeMay's wildest expectations. During the next five months, LeMay's bombers destroyed one half of the total area of 66 cities—burning 178 square miles to the ground. By the beginning of the summer of 1945, the destruction wrought by the B-29s was so complete that LeMay warned his superiors that by September he would run out of targets.

The cities of Hiroshima, Kokura, Niigata, and Nagasaki, however, had been largely spared from the aerial onslaught. The task of destroying them would be given to a unit recently arrived in Tinian's North Field—one trained to drop atomic bombs.

The World's First Atomic Strike Force

"...start training crews to drop the bomb, if and when we make it and drop it."

Henry H. "Hap" Arnold, Commanding General, Army Air Forces, to his deputy Lt. Gen. Barney Giles, 1944

By the summer of 1944, Manhattan Project scientists had made significant progress on the atomic bomb. Slowly but surely, the Army Air Forces had worked most of the glitches out of the B-29. It was time to create and train a combat unit to deliver the new weapons.

The Army Air Forces quickly realized that a standard bomber group would not be able to carry out the mission. To ensure secrecy, a uniquely organized, self-contained group was needed. For eight months, this "composite group" trained in isolation for a mission, the details of which were kept secret even from them.

Only on August 6, 1945, when the "Enola Gay" returned safely from its atomic attack on Hiroshima, would the 509th Composite Group understand their own role in history.

SELECTING AN ATOMIC COMMANDER

"You have to put together an outfit and deliver this weapon. We don't know what it can do...you've got to mate it to the training, the ballistics—everything. These are all parts of your problem."

General Uzal Ent to Lt. Colonel Paul Tibbets, September 1944

Almost a full year of planning went into selecting a commander for the new 509th Composite Group. Three days before a decision was reached, Paul Warfield Tibbets' name was added to the list of nominees. After an unorthodox interview designed to test his fundamental honesty, Tibbets was told he would command a unit that would be responsible for dropping an atomic bomb.

In 1944, "atomic power" did not have much meaning. Only after Tibbets learned that the atom bomb would have "an explosive power equal to that of several thousand tons of TNT," would he begin to understand the colossal potential of his mission.

PAUL W. TIBBETS: "AN INDEPENDENT OPERATOR"

Paul Warfield Tibbets was an obvious choice to command the 509th. Born in 1915, Tibbets' love of aviation led him to abandon his medical education to pursue a far less promising career in aviation at age 22. Joining the U.S. Army Air Corps cadet program in 1937 earned his father's wrath but also secured him a place in history.

By fall 1944, he had extensive combat experience, including the first daylight raid by an American bombing squadron on German-occupied Europe. As a 97th Bombardment Group officer in the North African and European Theaters he had gained leadership experience. A veteran of the B-29 testing program, he was one of the most experienced Superfortress pilots.

Tibbets offered more than his stellar service record. According

to his memoirs, he "gained a reputation as an independent type of operator. In the European theater, [he] was called on to do things for which no formula or standards had been established." An innovator, he took on a project with an underdeveloped airplane and an undeveloped bomb and successfully executed it.

CREATING THE 509TH COMPOSITE GROUP

"Never before and never again would such a group exist."

Paul Tibbets, 1993

Standard bomb groups were comprised of four bomber squadrons, plus maintenance and ordnance squadrons. The 509th Composite Group was not a standard unit. Instead, it was comprised of one bomb squadron with its own, dedicated support squadrons. Grouping bomber and support squadrons together under one central command was an unorthodox but necessary strategy for keeping the 509th's mission secret.

The U.S. Army Air Forces selected various squadrons for the Group, while Tibbets hand-picked pilots and crewmen with whom he had experience flying. In addition to reviewing each candidate's performance record, the Air Forces made extensive security checks on each potential member. In late summer 1944, qualified squadrons and individuals were detached from their parent organizations and reassigned to what would become the 509th Composite Group.

THE 393RD BOMBER SQUADRON

Before Tibbets' took command of what would become the 509th, the Army Air Forces had already selected a bomber squadron to form the core of Tibbets' atomic strike force. One of Tibbets' first tasks was to approve the choice of the 393rd.

The members of the 393rd had already completed two-thirds of their training in Nebraska and were eagerly anticipating the day they would be ordered to move to the Pacific. To the surprise and disappointment of the combat-ready 393rd, they received a transfer to an air base in Utah.

Although pleased with the bomber squadron's superior training record, Tibbets asked the Army Air Forces to assign a few others, with whom he had previously served, to the 509th. Integrating this elite group with the bomber squadron added one more dimension to Tibbets' complex assignment.

THE 393RD'S UNIFORM PATCH

The members of the 393rd continued to wear their flight jackets with the 393rd insignia even after they had been transferred into the 509th Composite Group. After the war, the 393rd's insignia was changed to incorporate the mushroom cloud into its imagery.

TOM CLASSEN AND THE 393RD

Lt. Col. Tom Classen, a distinguished combat veteran and experienced pilot took command of the 393rd in the early months of 1944. All but a few of its members were inexperienced. Classen quickly turned them into a combat-ready squadron.

After the 393rd bomber squadron became a part of the 509th Composite Group, Classen's role changed. Classen continued to train bomber pilots, but Tibbets also assigned him broader responsibilities. As Tibbets' Deputy Commanding Officer, Classen oversaw the Group's everyday affairs.

SOMETHING NEW: A MILITARY POLICE COMPANY

Attaching a military police squadron to a bomber squadron was "something entirely new," according to the 509th yearbook. Guarding the 509th's atomic secrets, however, was a full-time job. While Tibbets prepared his air crews to deliver the bomb, the 395th Military Police Company completed a rigorous training program that prepared them to meet any enemy ground forces as well as curious fellow troops or civilians.

1ST ORDNANCE SQUADRON

The members of the 1st Ordnance Squadron were responsible for assembling the atomic bombs. In a unit unique to all standard Army organization, they worked closely with the

Manhattan Project scientists.

The technical and military security requirements for the squadron were exacting. The Army Air Forces accepted only one-fifth of those who met the basic qualifications. They warned those chosen that their jobs would be hazardous due to the experimental stage of the work.

THE 1ST ORDNANCE SQUADRON YOU'RE GOING TO BE A HERO

"Colonel, if you get any trouble from anybody, you can call on me."

General Henry "Hap" Arnold to Paul Tibbets

"...if this is successful, you'll be a hero. But, if it fails, you'll be the biggest scapegoat ever."

General Uzal Ent, Commanding General of 2nd Air Force, to Paul Tibbets

Tibbets was given "broad authority" for someone of his rank. Bypassing the usual chain of command, Tibbets answered directly to "Hap" Arnold, or to Leslie Groves, the head of the Manhattan Project. While this autonomy would greatly aid Tibbets in carrying out his mission, it would sometimes cause ridicule and envy among other B-29 groups.

TIBBETS' PRIVATE AIRFORCE

In wartime, personnel transfers were not uncommon. Faced with training an entirely new group of men, commanding officers often requested the transfer of men with whom they had flown in combat. With luck, the Army Air Forces met their requests.

With the help of "Silverplate," the code name for the Army Air Forces' involvement in the atomic project, Tibbets successfully transferred anyone he chose to the 509th. He selected men who had been part of his regular bomber crews in Europe and North Africa. Others he had worked with on the B-29 testing and training program.

Tibbets was not altogether successful at integrating crewmen

he hand-picked with the bomber squadrons of the 393rd. Within themselves, however, each 393rd bomber crew was a tightknit group, loyal to each other, and entirely dependent on each other in the air.

OLD FRIENDS

Tom Ferebee, who had been the bombardier in Tibbets' regular crew in Europe, was Tibbets' first choice for his 509th crew. Ferebee would take the bombardier's position on the first atomic mission—to Hiroshima—and acted as Tibbets' unofficial adviser. Ferebee recommended "Dutch" van Kirk, the regular navigator, and Wyatt Duzenbury, the regular first engineer, from their European bomber crew.

Tibbets also selected a number of airmen he had met in the B-29 training program, including pilots Robert Lewis, Charles Sweeney and Don Albury, and gunnery instructor, George Robert Caron.

RADAR COUNTERMEASURES

Although 509th navigators would learn to navigate without radar, Jacob Beser was assigned to the 509th group as a radar countermeasures officer. Beser, an engineering student, would help develop a system that would detect and block enemy radar. Because of the nature of his job, Beser was one of the few members of the 509th besides Tibbets who was told the mission's atomic secrets.

WENDOVER AIR FORCE BASE: "LEFTOVER, USA"

In the fall of 1944, the various squadrons of the newly formed 509th Composite Group met at Wendover Air Force Base in Utah. Described as "Leftover Field" by Bob Hope, Wendover was "the end of the world, perfect" according to Tibbets. The base was close to a bombing range, reserved for the 509th's use, and close to Los Alamos, where Manhattan Project scientists were designing the atomic bombs. Tibbets knew that his men would detest the base's primitive conditions and isola-

tion. Because the base offered so few distractions, however, Tibbets was sure that he would command their full attention to the mission.

ARRIVAL AT WENDOVER

"Don't ask what the job is. That is a surefire way to be transferred out."
Paul Tibbets to the 393rd, September 1944

Rats, heat, desert, primitive accommodations, rancid drinking water, and termites welcomed the 393rd flight and ground crews to Wendover Air Force Base. Barbed wire and military police were everywhere. Nothing within sight gave them a clue to why they had been transferred to Wendover instead of the Pacific.

The first meeting with their new commanding officer intrigued them but hardly satisfied their curiosity. Tibbets told them that they had been "brought here to work on a very special mission." He divulged little more, but did add, "You are going to take part in an effort that could end the war."

"The place sounded so...awful that there just had to be a good reason for my being there."
Jacob Beser, 1975

"WELCOME TO ALCATRAZ"

"Don't ask any questions. Don't answer any questions from anybody not directly involved in what we will be doing."
Paul Tibbets, September 1944

Members of the 509th quickly learned that Tibbets intended to enforce the strictest security precautions. The Manhattan Project sent 50 special agents to help the military police unit monitor the 509th. They tapped phone calls, censored mail, and used subtle means to remind the unit that they were always under surveillance.

Tibbets counted on working the 393rd so hard that they would

not have time to complain about Wendover, the often-irritating security measures, and their apparently lost chance to go overseas. While at Wendover, the 393rd crews learned a new way of flying and gained more experience flying B-29s.

WILLIAM "DEAK" PARSONS AND THE BOMB

Months before the various squadrons of the 509th assembled at Wendover, Manhattan Project scientist and Navy Captain William "Deak" Parsons was developing a fusing device that would trigger the atomic bombs to explode at a specified altitude above their targets. He was also designing the casings for the two atomic bombs. In the fall of 1944, Parsons flew with Ferebee to test drop the various experimental bomb casings and determine the best design.

"PUMPKIN" MISSIONS

On each training flight, 509th bomber crews dropped bombs filled with high explosives. Manhattan Project scientists stationed at a safe distance from the aiming point, analyzed the bomb's flight pattern, watched to see if the bomb's fusing mechanism worked, and investigated the bomb's impact.

Shaped like the "Fat Man" type bomb and painted bright orange, these bombs earned the nickname "pumpkins." The pumpkin missions were a vital element in the test phase of Manhattan Project bomb development.

OUT OF THE BOMB'S WAY

Manhattan Project scientists calculated that the bomb's explosion would cause a shock wave powerful enough to destroy an airplane flying too close. To prepare their crews to safely escape the predicted shock wave's effect, Tibbets and Classen taught the 393rd crews to roll their planes in a steep, diving turn after they dropped their bomb load. Executing this maneuver ensured that they would be miles from the blast site by the time the bomb exploded.

Tibbets expected his pilots to learn how to execute the highly unorthodox escape turn. He did not, however, explain to them

why their lives and the lives of their crews depended on mastering this maneuver. Caught by surprise the first time he experienced the turn, Tibbets' tail-gunner said it felt "like a roller coaster."

LOTS OF FUN

Tibbets, a perfectionist, had great expectations for the 509th. Tension levels rose as his officers and enlisted men followed a high-paced training schedule, performed unorthodox flying maneuvers, and worked under seemingly excessive security precautions. Activities from hiking in the canyon country surrounding the base to gambling at the State Line Casino relieved the tension.

SPECIAL TRAINING: BATISTA FIELD, CUBA

In January 1945, Tibbets sent ten of his fifteen crews to Cuba for special training. Under Tom Classen's charge, the crews carried out long-distance navigational training over water at night. They also continued practicing high-altitude bomb runs.

THE UNTOUCHABLES

No matter what stunts the members of the 509th pulled, invoking the code name *Silverplate* rescued them from the consequences of their high jinks. They soon earned the reputation of being "untouchable." To some extent, Tibbets encouraged his crews' spirited off-duty antics. He believed that they helped build *esprit de corps*.

OVERSEAS: THE 509TH GOES TO TINIAN

In June 1945, the 509th Composite Group travelled to its overseas base on the small Pacific island of Tinian. By the time the 509th arrived on Tinian, in June 1945, the 313th Bombardment Wing was well-established, having participated in dozens of missions over Japan. The 313th Bombardment Wing, composed of 192 B-29 crews, arrived on Tinian in December 1944 and occupied the island's North Field. With his Silverplate clear-

ance, Tibbets, however, was able to displace 313th combat veterans from some of the island's best accommodations on North Field.

One step closer to the war, the 509th practiced dropping conventional bombs, grew increasingly impatient with security measures, and tried to entertain themselves. They anxiously awaited the day when they would finally carry out their mysterious mission.

BOMBING ISLANDS: ROTA, TRUK, MARCUS ISLAND

Training missions in the Pacific began on June 30, 1945. Each mission focused on a different aspect of combat flying, including navigational techniques, instrument calibration, and visual and radar-aided bomb drops. The nearby islands of Rota and Truk provided targets for the crews in training.

A "flurry of excitement" accompanied the announcement of the Group's first combat mission. On July 6, five crews bombed the runways of the Japanese airfield on Marcus Island. During the Marcus Island raids, the 509th dropped various sizes of bombs on the island with varying degrees of success and with little enemy resistance.

BOMBING "THE EMPIRE": JAPAN, 1945

On July 20, 1945 the 509th made its first airstrike on Japan. Ten crews loaded their planes with Fat-Man shaped high-explosive bombs, called Pumpkins, and took off at 0200 hours. More than twelve hours later, all ten crews returned safely to Tinian. Because of poor weather conditions, however, only five crews had been able to bomb their primary targets visually. Four had used radar to drop their bombs on secondary targets. The tenth had jettisoned its bomb load in the ocean because of engine failure.

Before dropping the atomic bomb, the 509th flew three more "Pumpkin" missions to Japan. Largely due to variable weather conditions, the results of these missions ranged from "fair to unobserved" to "effective and successful." From these missions to the Nagasaki raid, cloud cover posed a constant threat to the 509th's success.

TENSION IN PARADISE

From the moment Tibbets' crews arrived, the other B-29 squadrons stationed on Tinian questioned them. Why had the 509th supplied its own mechanics instead of using the already existing support squadrons on the island? Why did the 509th fly ten-plane bombing runs instead of standard hundred-plane-strong raids? Why was the 509th fed luxuriously in a separate mess while other bomber squadrons based on Tinian ate regular military rations? Why did the 509th members refuse to divulge information about their mission?

Envy and curiosity sparked one Tinian inhabitant to write a poem dedicated to razzing the inactive and seemingly unimportant 509th.

SURVIVAL GEAR

The commander of the 313th Bombardment Wing already stationed on Tinian quickly learned that Tibbets' crews "knew more about airplanes and navigation" than his combat veterans. But the 509th had not yet learned about air sea rescue, ditching and bail-outs, dinghy drill, and survival, even though extensive training at Wendover and Batista Field had prepared them to operate their B-29s with great precision. Each crew member was fitted with a survival vest equipped with items that would help him if he had to abandon his airplane.

GETTING AROUND

By the time the 509th arrived on Tinian, the island looked like "a huge airport." Seabees had erected quonset huts, constructed runways, and built an extensive network of roads. Tinian had reminded one New York City-born Seabee of the island of Manhattan and had laid out the streets according to its plan.

Based at Tinian's North Field, the 509th bartered with the Seabees to obtain vehicles to get around the island. William "Locke" Easton, pilot, and other 509th members, traded liquor for Seabee-built scooters.

WAITING TO "WIN THE WAR"

As at Wendover, the 509th followed a rigorous training schedule. After completing their training in the Pacific, however, they found they had a surprising amount of leisure time. Swimming, horseshoes, baseball, and racing scooters helped them bide their time until Tibbets finally called them to carry out their mission that "was going to win the war."

The B-29 Superfortress "Enola Gay"

On August 6, 1945, the "Enola Gay" dropped an atomic bomb on Hiroshima, Japan, and changed the face of warfare. This aircraft, Army Air Forces serial number 44-86292, only received its name on the night before the mission, when Col. Paul Tibbets named the aircraft after his mother.

Manufactured under license by Martin Aircraft in Omaha, Nebraska, the "Enola Gay" was delivered to the 393rd Bombardment Squadron, 509th Composite Group, on June 14, 1945. Like the other "Silverplate" aircraft, it was specially modified for its atomic mission. All gun turrets were removed except for the tail guns and the aircraft incorporated the latest technology: the newest version of the huge R-3350 engines, Curtiss Electric reversible propellers and pneumatic bomb-bay doors.

The "Enola Gay" arrived at Tinian on July 2, 1945, and flew its first combat mission with conventional bombs four day later. After returning to the United States in November 1945, the aircraft was modified for the Bikini atomic tests of 1946. It flew back to the Pacific in April 1946, but was not used in those tests.

THE MARKINGS OF THE "ENOLA GAY"

The stencils of crew names on both sides of the nose were added after the Hiroshima raid and do not include all those who were on the mission. Omitted from the twelve who flew on August 6 were crew members who were from the Manhattan Project or were closely related to the bomb: Capt. (USN) William

S. Parsons, "Little Boy" project leader and bomb commander, Lt. (USAAF) Morris R. Jeppson, Parson's assistant in arming the atomic bomb, and Lt. (USAAF) Jacob W. Beser, the radar countermeasures officer. Not all ground crew who worked on the "Enola Gay" were included in the stencils either.

The "Enola Gay" flew on August 6 with the "circle R" tail markings of another B-29 squadron to confuse Japanese intelligence. The 509th's regular tail insignia was a horizontal arrow in a circle. The four small "Fat Men" markings on the port side of the nose were added after the war and indicate the number of times the aircraft carried an atomic bomb.

THE RESTORATION OF THE "ENOLA GAY"

In July 1946, the Air Force stored this historic aircraft at Davis Montana AFB, Arizona. Col. Tibbets flew it to Park Ridge, Illinois, on July 3, 1949, where it was accepted by representatives of the Smithsonian. The "Enola Gay" was moved to Pyote AFB, Texas, in February 1952 and it remained there until December 2, 1953, when it made its last flight to Andrews AFB, Maryland, just outside Washington, D.C. In 1960–61, Smithsonian technicians disassembled the "Enola Gay" and stored its components indoors at what is now the Paul E. Garber Preservation, Restoration and Storage Facility in Silver Hill, Maryland.

Restoration began at the Garber Facility in December 1984 and was completed in (month) 1995. It was by far the largest aircraft restoration project ever undertaken by the National Air and Space Museum, consuming over 50,000(?) person-hours. Except for some historic post-Hiroshima markings, the aircraft has been returned as far as possible to its configuration of August 6, 1945. This extremely thorough restoration will allow the preservation of the "Enola Gay" for decades and even centuries into the future.

WHEN WILL THE "ENOLA GAY" BE ASSEMBLED?

The huge size of this four-engine bomber has made it infeasi-

ble to reassemble the whole aircraft anywhere inside the National Air and Space Museum building, or even at the Museum's Garber Facility outside Washington. Therefore, except for a propeller and a few other smaller components, this exhibit contains only the forward fuselage section, which is slightly less than two-thirds of the airplane's original length.

The "Enola Gay" will be reassembled and put on permanent display at the Museum's new Extension building at Washington Dulles Airport, once that facility is completed sometime in the next decade.

THE "LITTLE BOY" ATOMIC BOMB

A bomb of this type was dropped by the "Enola Gay" on Hiroshima, Japan, on August 6, 1945. Unlike the "Fat Man" plutonium bomb dropped on Nagasaki, the "Little Boy" used uranium 235 as the critical material. Inside the bomb, a shortened smooth-bore 76.2 mm (3 in) naval gun fired a uranium bullet at target rings also made of uranium 235. At the moment of impact, a critical mass was formed, initiating a nuclear explosion. Due to the gun barrel and the heavy casing, the "Little Boy" weighed over four metric tons (8,900 lb), almost as much as the much larger "Fat Man."

The bomb casing shown here was a "War Reserve" training version of the "Little Boy" and was built after the war. Except for the absence of electronic firing circuitry and nuclear material, this bomb casing is virtually identical to the Hiroshima weapon.

THE MISSIONS

Little more than four weeks after their arrival on Tinian, the 509th Composite Group dropped two atomic bombs on Japan. On August 6, pilot Paul Tibbets and his crew of the *Enola Gay* conducted the first atomic strike in history, dropping a gun-type "Little Boy" bomb on the city of Hiroshima. Three days later, Charles Sweeney, piloted the *Bockscar* and its crew on the second and last atomic attack of the war. Because of bad weather over

the primary target—the industrial city of Kokura—Sweeney's crew dropped their implosion-type "Fat Man" bomb on Nagasaki instead.

MISSION NO. 13: THE FIRST ATOMIC STRIKE

In early August 1945, tension rose among the 509th crew members as they anticipated Tibbets' order to "deliver the bomb." Even though their commanding officer still withheld many details from them, the 509th sensed their mission's momentous nature.

A few days before August 6, the projected mission date, Tibbets selected seven crews to attend briefings for Mission No. 13, the first atomic strike. Tibbets and other officials listed targets and described the immediate effect of the bomb, but did not reveal its atomic nature to the excited crews.

AUGUST 4: THE FIRST BRIEFING

Tibbets ordered seven crews to attend the first briefing, on August 4. Although many of them arrived at the briefing hut in high spirits, their mood quickly changed. Military police, armed with carbines, surrounded the building and inside, curtains were drawn. In the darkened hut, they quietly awaited their commanding officer's arrival.

Tibbets was to the point. He told them the bomb was ready to be dropped, announced crew assignments and then unshrouded bulletin boards to reveal aerial photographs of the potential target cities.

SUBSTITUTIONS

Tibbets announced that No. 82's regular crew, with a few substitutions, would deliver the bomb. He assigned himself to the pilot's position, van Kirk as the navigator, and Ferebee as the bombardier. For the most part, Tibbets' crew selections did not surprise the 509th. Bob Lewis, No. 82's regular pilot, however, was greatly disappointed with his assignment as co-pilot.

As Commanding Officer, Tibbets reserved the right to make

changes. He had experiences flying in combat with Ferebee and van Kirk and had the utmost faith in them. The final strike crew, regardless of its overall high skill level, however, had never flown a combat mission together. This situation made some of the crew members uneasy.

"SOME WEIRD DREAM"

"It was like some weird dream, conceived by one with too vivid an imagination."

Radio operator Abe Spitzer's unsanctioned diary, Tinian 1945

After Tibbets announced crew assignments and described primary and secondary targets, Manhattan Project scientist and Navy Captain Deak Parsons briefed the crews about the bomb. He was not able to show them the film footage of the Trinity explosion, because the projector failed. Even without visual evidence to dramatize the bomb's potential effect, however, Parsons's personal descriptions of the bomb test still astounded the 509th.

Even if Parsons had divulged the mission's atomic secrets to the crews, this information might not have made a significant impression on them. Aside from the few engineering students among them, the majority of the 509th members had gained their information about atomic power from the pages of science fiction novels.

PROTECTIVE GOGGLES

Deak Parsons explained that the bomb's blast would create such a bright flash that crews near the explosion would need to wear goggles, similar to those worn by welders, to protect their eyes. Turning the knob on the nose bridge would change the goggle's darkness. Parsons warned that they must adjust the knob to the darkest setting during the bombing.

LITTLE BOY GOES TO TINIAN

On July 26, the U.S.S. *Indianapolis* arrived at Tinian. Aboard

the veteran naval cruiser were the gun and bullet elements of the Little Boy bomb. That same day, two air transports departed for Tinian, each carrying a uranium target.

Once all parts were delivered to Tinian, Manhattan Project scientists and 509th Ordnance specialists began to assemble the bomb, but did not arm it. Deak Parsons, the 509th's atomic bomb specialist, had seen a significant number of B-29s crash on the North Field tarmac. Having considered the possible gruesome results if the *Enola Gay*, loaded with a live atomic bomb, crashed on take-off, Parsons decided to finish arming the bomb once the *Enola Gay* had reached cruising altitude.

On August 1, Manhattan Project commander Groves received a telex informing him that pre-flight assembly of the bomb had been completed and that the mission could be flown any time the weather permitted.

"A TICKLISH PROCEDURE": LOADING THE BOMB

Silverplate B-29 bomb bays had been specially modified to carry their unusually large and heavy bombs. Because there was little clearance with the bomb bay catwalks and only a single shackle and adjustable sway braces held the bomb, loading it was "a rather ticklish procedure," according to one engineer.

0000–0235 HOURS: AUGUST 6

In the early hours of August 6, seven of the 509th's fifteen crews crawled from their cots or tore themselves from their card games to attend one last pre-flight briefing. After eating a quick meal and attending a religious service, they headed off to the flight line where their planes waited.

When they arrived, they were surprised to find camera lights illuminating the field and more than 100 people on the tarmac. Feeling like moviestars, they granted interviews, nervously milled around, and made final checks on their airplanes. Around 2:20 a.m., Tibbets "called a halt" so that they could complete preparations for takeoff.

Tibbets distributed Operations Order #35 to 509th officers.

The order specified that the bomb type to be used was "special" but did not mention that it was atomic.

Tibbets and his crew did not wear flak vests and parachutes during most of the flight. They put on protective gear only after they reached enemy territory.

Each crew member was issued an ashtray before going on board. Tibbets, an ardent pipe smoker, made sure to bring his "smoking equipment" with him on the *Enola Gay*.

A PERFECT PERFORMANCE

Every step of the mission—takeoff, arming the bomb, finding the target, dropping the bomb—posed a potential problem. With the help of favorable weather conditions, however, Tibbets and his crew successfully and safely carried out their mission.

Tibbets recognized that the *Enola Gay,* loaded with bomb and fuel, was 15,000 pounds over its designed takeoff weight limit. Using almost the entire runway, he expertly lifted the plane into the air. At 0300, fifteen minutes after takeoff, Deak Parsons and Morris Jeppson, carefully began the final bomb assembly. Three hours later, the *Enola Gay* and its two escort planes met at the designated rendezvous point above Iwo Jima.

For the remaining hours of the flight, the crew took turns napping and "George," the automatic pilot, steered the bomb toward Japan. Approximately two hours before "bombs away, " Jeppson activated the bomb. They arrived at their target 17 seconds late and Ferebee came very close to the designated aiming point. Groves described the mission as a "perfect performance."

ARMING THE BOMB

"The bomb was now independent of the plane. I had a feeling the bomb had a life of its own now that it had nothing to do with us."

Bob Lewis, Enola Gay's *co-pilot comments on the activation of the bomb*

At 7:15 a.m. (6:15 a.m. in Hiroshima) the weather scout plane over the city of Hiroshima reported to Tibbets that the cloud cover was favorable for a visual bombing of the city. Tibbets

announced to his crew, "it's Hiroshima."

At 7:30 a.m., one hour and forty-five minutes before "bombs away," assistant weaponeer Morris Jeppson once again entered the bomb bay. Throughout the flight, three green plugs inserted into the forward part of the bomb had inactivated the electronic firing circuitry. Jeppson's final task was to replace the green plugs with the red plugs that would open the firing circuit.

BOMBS AWAY

Tibbets handed over control of the plane to bombardier Ferebee and navigator van Kirk. Ferebee trained the plane's Norden bombsight on the target. Then, van Kirk fed Ferebee updated calculations on wind speed and altitude, which Ferebee, in turn, entered into the bombsight's computer. Using the target as a base point, it automatically corrected the course of the airplane. At 17 seconds after 9:14 a.m. (8:14 a.m., Hiroshima time), Ferebee flipped a switch which turned over control of the plane and the bomb to the bombsight's computer. One minute later, it automatically dropped the bomb.

The lightened plane lurched upward, Tibbets took back the controls and turned the *Enola Gay* in the practiced violent escape turn. Eleven miles from the blast, a flash of light filled the cockpit and the first of two shock waves hit the plane. Tibbets announced, "Fellows, you have just dropped the first atomic bomb in history."

FIRST ATOMIC BOMB: HIROSHIMA

"The flash after the explosion was deep purple, then reddish and reached to almost 8,000 feet; the cloud, shaped like a mushroom, was up to 20,000 feet in one minute, at which time the top part broke from the 'stem,' and eventually reached 30,000 feet."

"The stem of the mushroom-like column of smoke, looking now like a giant grave marker, stood one minute after the explosion upon the whole area of the city, excepting the southern dock area. This column was a thick white smoke, darker at the base, and interspersed with deep red.

"Though about fifteen miles from the target when the explosion occurred, both escort aircraft, as well as the strike plane, reported feeling two shock waves jar the aircraft. Approximately 390 statute miles away from the target area, the column of smoke still could be seen piercing the morning sky."

509th Composite Group Administrative Report

"I don't believe anyone ever expected to look at a sight quite like that. Where we had seen a clear city two minutes before, we could now no longer see the city."

Co-pilot Bob Lewis, post-war interview

Courtesy of Frank Shelton

"That city was burning for all she was worth. It looked like...well, did you ever go to the beach and stir up the sand in shallow water and see it all billow up?"

Jacob Beser, radar countermeasures officer

As Tibbets tamped down the tobacco in his pipe, he commented to Bob Lewis on the bomb's impact. "I think this is the end of the war."

A HERO'S RETURN

Over 200 officers and enlisted men waited anxiously for the *Enola Gay*'s return. Twelve hours and thirteen minutes after it left Tinian, Tibbets landed the plane on North Field.

General Carl Spaatz, commander Strategic Armed Forces in the Pacific, and "all the ranking military brass that could be mustered in the Marianas at that time," met the crew as they disembarked. To Tibbets' surprise, Spaatz greeted him, shook his hand, and then pinned a Distinguished Service Cross to his rumpled overalls.

Atomic Might

The Japs well knew,–they had been warned
Of the Allied might that was being formed
But they chose to die for the Rising Sun
And proudly stuck to their ill made gun.
But a thunderous blast, a blinding light,
Brought the 509th atomic might.

It was the 6th of August, that much we knew
When the boys took off in the morning dew,
Feeling nervous, jumpy, sick and ill at ease
They flew at the heart of the Japanese,
With a thunderous blast, a blinding light,
And the 509th's atomic might.

Below like a miniature checker board
Lay a Japanese town in one accord,
Unknowing the might that lay in store
It went to the shelters, the rich and poor,
That's when the thunderous blast, and blinding light
Came from the 509th's atomic might.

From out of the air the secret fell
And created below a scene of hell.
(?)
Has there been displayed such a sight,
As the thunderous blast, the blinding light,
Of the 509th's atomic might.

From ear to tongue, from tongue to press
The story spead (?),–stupendous–nothing less!
From pole to pole, around the earth,
Folks knew now of our powerful worth,
With thunderous blast, the blinding light,
Of the 509th's atomic might.

Oh, God!–that when this War doth cease
And again we turn our thoughts to peace
That you will help us build,–not devastate,
A life of love and truth,–not hate,
Without the thunderous blast, the blinding light
Of the 509th's atomic might.

Sgt. Harry Barnard

In response to the poem, "The 509th Is Winning the War," which had questioned the 509th presence on Tinian, a 509th member wrote "Atomic Might."

"THE GREATEST THING IN HISTORY"

"This is the greatest thing in history."
President Harry S. Truman, August 6, 1945

Sixteen hours after the 509th dropped the "Little Boy" bomb on Hiroshima, President Truman made a radio broadcast in which he announced the atomic bomb to the American public.

While President Truman informed the United States, Hap Arnold sent a cable to Gen. Carl Spaatz, ordering him to enlist B-29 squadrons in an extensive propaganda campaign in the Pacific. In less than 24 hours of receiving the order, Spaatz had arranged for pamphlets, which described the destructive power of an atomic attack, to be printed and dropped over the Japanese islands.

Text of Truman's August 6 Statement on the Bomb

Sixteen hours ago an American airplane dropped one bomb 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.

The Japanese began the war from the air at Pearl Harbor. They have been repaid many fold. And the end is not yet. With this bomb, we have now added a new and revolutionary increase in destruction to supplement the growing power of our armed forces. In their present form these bombs are now in production and even more powerful forms are in development.

It is an atomic bomb. It is a harnessing of the basic power of the universe. The force which the sun draws its power has been loosed against those who brought war to the Far East.

Before 1939, it was the accepted belief of scientists that it was theoretically possible to release atomic energy. But

no on knew any practical method of doing it. By 1942, however, we knew that the Germans were working feverishly to find a way to add atomic energy to the other engines of war with which they hoped to enslave the world. But they failed. We may be grateful to Providence that the Germans got the V-1's and V-2's late and in limited quantities and even more grateful that they did not get the atomic bomb at all.

The battle of the laboratories held fateful risks for us as well as the battles of the air, land and sea, and we have now won the battle of the laboratories as we have won other battles.

Beginning in 1940, before Pearly Harbor, scientific knowledge useful in war was pooled between the United States and Great Britain, and many priceless helps to our victories have come from that arrangement. Under that general policy the research on the atomic bomb was begun. With American and British scientists working together we entered the race of discovery against the Germans.

The United States had available the large number of scientists of distinction in the many needed areas of knowledge. It had the tremendous industrial and financial resources necessary for the project and they could be devoted to it without undue impairment of other vital war work. In the United States the laboratory work and the production plants, on which a substantial start had already been made, would be out of reach of enemy bombing, while at that time Britain was exposed to constant air attack and was still threatened with the possiblilty of invasion. For these reasons Prime Minister Churchill and President Roosevelt agreed that it was wise to carry on the project here. We now have two great plants and many lesser works devoted to the production of atomic power. Employment during peak construction numbered 125,000 and over 65,000 individuals are even now engaged in operating the plants. Many have worked there for two and a half years. Few know what they have been producing. They see great

quantities of material going in and they see nothing coming out of these plants, for the physical size of the explosive charge is exceedingly small. We have spent two billion dollars on the greatest scientific gamble in history—and won.

But the greatest marvel is not the size of the enterprise, its secrecy, nor its cost, but the achievement of scientific brains in putting together infinitely complex pieces of knowledge held by many men in different fields of science into a workable plan. And hardly less marvelous has been the capacity of industry to design, and of labor to operate, the machines and methods to do things never done before so that the brain child of many minds came forth in physical shape and performed as it was supposed to do. Both science and industry worked under the direction of the United States Army, which achieved a unique success in managing so diverse a problem in the advancement of knowledge in an amazingly short time. It is doubtfull if such another combination could be got together in the world. What has been done is the greatest achievement of organized science in history. It was done under high pressure and without failure.

We are now prepared to obliterate more rapidly and completely every productive enterprise the Japanese have above ground in any city. We shall destroy their docks, their factories, and their communications. Let there be no mistake; we shall completely destroy Japan's power to make war.

It was to spare the Japanese people from utter destruction that the ultimatum of July 26 was issued at Potsdam. Their leaders promptly rejected that ultimatum. If they do not now accept our terms they may expect a rain of ruin from the air, the like of which has never been seen on this earth. Behind this air attack will follow sea and land forces in such numbers and power as they have not yet seen and with the fighting skill of which they are already well aware.

The Secretary of War, who has kept in personal touch

with all phases of the project, will immediately make public a statement giving further details.

His statement will give facts concerning the sites at Oak Ridge near Knoxville, Tennessee, and at Richland near Pasco, Washington, and an installation near Santa Fe, New Mexico. Although the workers at the sites have been making materials to be used in producing the greatest destructive force in history they have not themselves been in danger beyond that of many other occupations, for the utmost care has been taken of their safety.

The fact that we can release atomic energy ushers in a new era in man's understanding of nature's forces. Atomic energy may in the future supplement the power that now comes from coal, oil, and falling water, but at present it cannot be produced on a basis to compete with them commercially. Before that comes there must be a long period of intensive research.

It has never been the habit of the scientists of this country or the policy of this government to withhold from the world scientific knowledge. Normally, therefore, everything about the work with atomic energy would be made public.

But under present circumstances it is not intended to divulge the technical processes of production or all the military applications, pending further examination of possible methods of protecting us and the rest of the world from the danger of sudden destruction.

I shall recommend that the Congress of the United States consider promptly the establishment of an appropriate commission to control the production and use of atomic power within the United States. I shall give further consideration and make further recommendations to the Congress as to how atomic power can become a powerful and forceful influence towards the maintenance of world peace.

MISSION NO. 16

While perfect timing characterized the Hiroshima raid, urgency and haste affected the second. Mission planners felt it was necessary to conduct another atomic raid before the Japanese had time to "recover their balance." When they received the news that deteriorating weather conditions threatened to postpone the mission by a week, they quickly changed the projected mission date from August 11 to August 9.

Accelerated preparations introduced a high level of risk into every step of the mission. Although problems occurred from bomb assembly to bomb delivery, Charles Sweeney and his crew successfully dropped their bomb on Japan and returned safely.

"With the success of the Hiroshima weapon, the pressure to be ready with the much more complex implosion device became excruciating... Everyone felt that the sooner we could get off another mission, the more likely it was that the Japanese would feel that we had large quantities of the devices and would surrender sooner."

Post-war interview with member of the "Fat Man" assembly team Bernard O'Keefe

ADDITIONAL BOMBS

"Additional bombs will be delivered on the above targets as soon as made ready by the project staff..."

Gen. Handy, Acting Army Chief of Staff, to Gen. Spaatz, Commander, Strategic Air Forces in the Pacific, July 25, 1945

There was no separate order to drop the second bomb. Acting on the July 25 directive, the 509th Ordnance Squadron and Manhattan Project scientists began to prepare the implosion-type Fat Man bomb for the second mission. The primary target for that raid would be the Japanese arsenal at Kokura.

ONWARD TO KOKURA

At pre-flight briefings similar to those before the Hiroshima

flight, Tibbets assigned six crews and described the two potential targets, Kokura and Nagasaki. The mission's weaponeer then briefed them on the atomic bomb. In the early hours of August 9, crews headed for the airfield.

Heated discussions between Tibbets and crew members took precedence over interviews that morning. A preflight check of the strike plane, *Bockscar*, piloted by Charles Sweeney, uncovered a malfunctioning fuel pump. With no time to fix the defective pump, Sweeney suggested changes in the flight plan. To save fuel, he would rendezvous with the escort planes over the coast of Japan instead of Iwo Jima and would make a refueling stop in Okinawa on the return trip to Tinian.

To add to the mechanical problems, weather conditions were unfavorable. Forecasters predicted that the crews would fly through tropical rain squalls all the way to Japan. At 0347, Sweeney lifted the *Bockscar* off the tarmac. In the sky, "flashes of lightening [sic] stabbed into the darkness with disconcerting regularity."

MONITORING THE BOMB

On the Hiroshima flight, the assistant weaponeer made the final arming of the Little Boy gun-type bomb about two hours before the bomb drop. Because the *Bockscar* flew according to a different flight plan, weaponeer Richard Ashworth armed the Fat Man implosion-type bomb minutes after *Bockscar* left Tinian.

A MISSED RENDEZVOUS

The *Bockscar* crew reached the rendezvous point one minute ahead of schedule at 9:09 a.m. (8:09 a.m., Japan time) Bock's instrument plane arrived three minutes later. Bock made a visual sighting of Hopkins' camera plane, but lost contact with it. Because they had been ordered to maintain radio silence at that point, they could not inquire about its location. Without Hopkins, Sweeney and Bock circled the rendezvous point, waiting for the arrival of the third plane. After forty-five minutes, it

had not appeared. Unsure about their escort's status, but concerned about diminishing fuel reserves, they proceeded to the target.

KOKURA: THE BOMBING THAT NEVER HAPPENED

Although weather scouts had reported that both primary and secondary targets were clear for visual bombing, by the time the *Bockscar* crew arrived over Kokura, at 9:44 a.m. (Japanese time), a thick haze obscured the city. Ironically, smoke from a regular B-29 incendiary attack on a neighboring city had shrouded Kokura. Sweeney made three passes over the city, but each time bombardier Kermit Beahan announced "No drop."

Tense moments passed as Sweeney waited for his flight engineer's report on the plane's fuel reserves. Kuharek's calculations revealed that just enough fuel remained to drop the bomb on the secondary target and return to a "friendly air field." Sweeney alerted special air-sea rescue forces that ditching the aircraft was a possibility. He then turned the *Bockscar* toward the secondary target of Nagasaki.

THE SECOND ATOMIC BOMB: NAGASAKI

To their dismay, the *Bockscar* crew found Nagasaki obscured by thick cloud cover. Faced with jettisoning the bomb, weaponeer Ashworth opted to use radar, even though they had been ordered to bomb visually.

While on the Hiroshima flight, bombardier Ferebee had steered the plane to the target with the Norden bombsight, *Bockscar* bombardier Kermit Beahan temporarily gave up control. Although accounts vary, the most popular remembrance of the bomb drop is that, at the last minute, Beahan exclaimed "I have the target, taking control." A hole broke in the clouds and Beahan dropped the bomb. At 11:02 a.m., Japanese time, the "Fat Man" tumbled from the *Bockscar*'s bomb bay and seconds later, exploded, 2,600 m (8,500 ft) from the intended target.

The return trip was equally tense. By the time the *Bockscar* reached Okinawa, fuel reserves had dipped dangerously low.

Sweeney's "Mayday" calls did little to clear the crowded Yontan Airfield runway. Firing signal flares finally roused a response. After refueling and reporting to Tibbets, they took off for Tinian, where they received a subdued welcome.