

180 Degrees Out: The Change in U.S. Strategic Bombing
Applications, 1935-1955

By

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ABSTRACT

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By John M. Curatola

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This dissertation examines how the U.S. Army/Air Force developed strategic bombing applications during the 1930s and then changed them during World War II and in early Cold War planning. This narrative history analyzes the governmental, military, and social influences that changed U.S. bombing methods. The study addresses how the Air Force diverted from a professed strategy of precision bombardment during the inter-war years only to embrace area, fire, and atomic bombardment during WW II. Furthermore, the treatise continues in this vein by examining how the USAF developed atomic and thermonuclear applications during the post war era and the Cold War.

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LIST OF ACRONYMS

ACTS	Air Corps Tactical School
AEC	Atomic Energy Commission
AUQR	Air University Quarterly Review
AWPD	Air War Planning Document
CEP	Circular Error Probable
CBI	China Burma India
CJCS	Chairman Joint Chiefs of Staff
CNO	Chief of Naval Operations
COA	Committee of Operational Analysis
DoD	Department of Defense
FEAF	Far East Air Forces
FDR	Franklin Delano Roosevelt
FY	Fiscal Year
GAC	General Advisory Committee
GNP	Gross National Product
HE	High Explosive
HUAC	House UnAmerican Activities Committee
ICBM	Intercontinental Ballistic Missile

IRBM	Intermediate Range Ballistic Missile
IP	Initial Point
JCS	Joint Chiefs of Staff
KT	Kiloton
LASL	Los Alamos Scientific Laboratory
MT	Megaton
NSC	National Security Council
OWI	Office of Wartime Information
PGM	Precision Guided Munition
RAF	Royal Air Force
RAND	Research and Development Corporation
SAC	Strategic Air Command
USAAC	United States Army Air Corps
USAAF	United States Army Air Force
USAF	United States Air Force
USSR	Union of Soviet Socialist Republics
USSBS	United States Strategic Bombing Survey
VE Day	Victory Europe Day
VJ Day	Victory Japan Day
VHB	Very Heavy Bomber
VLR	Very Long Range
WSEG	Weapons System Evaluation Group

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CHAPTER 1

ZERO DEGREES *Foundations*

Shortly after August 6, 1945 following the dropping of the first atomic bomb on Hiroshima, the United States attempted to warn the Japanese people about the power of the newly developed atomic bomb. In an effort to encourage the Japanese to sue for peace, Americans dropped leaflets over the home islands. Written on leaflets prior to the Nagasaki detonation was an ominous warning:

To the Japanese People:

America asks that you take immediate heed of what we say on this leaflet. We are in possession of the most destructive explosive ever devised by man. A single one of our newly developed atomic bombs is actually the equivalent in explosive power to what 2000 of our giant B-29s can carry on a single mission. This awful fact is one for you to ponder and we solemnly assure you it is grimly accurate.

We have just begun to use this weapon against your homeland. If you still have any doubt, make inquiry as to what happened to Hiroshima when just one atomic bomb fell on that city. . . . You should take steps now to cease military resistance. Otherwise, we shall resolutely employ this bomb and all our other superior weapons to promptly and forcefully end the war.
EVACUATE YOUR CITIES.¹

Despite this warning and because of Japanese inaction regarding surrender proceedings, early on the morning of August 9, a specially configured B-29 “Superfortress” piloted by Major Charles Sweeney took off from Tinian Island. The plane's mission was to drop a second atomic bomb. Traveling northwest from the island, Major Sweeney’s primary target was the military arsenal located in the center of the city of Kokura on the northern end of the island of Kyushu.² Prior to dropping the bomb, the flight plan called for Sweeney to rendezvous with two aircraft over the

island of Yakushima off the southern coast of Kyushu. During the preflight inspection Sweeney discovered that a 600-gallon auxiliary fuel cell, designed to offset the B-29s center of gravity due to the weight of the bomb, was inoperative and replacing it would take an inordinate amount of time.³ Regardless of the inoperative fuel cell, Sweeney decided to continue with the mission. After take off, and when one of the rendezvous aircraft failed to join up with the bomb-laden plane, Sweeney orbited over Yakushima in hope of eventually joining with the aircraft that was carrying scientific measuring equipment.⁴ While briefed to make only one short orbit over the rendezvous point to join with the other plane, Sweeney orbited for forty-five minutes.⁵ Having delayed his attack and having no success in finding the other the other plane, Sweeney departed for his primary target.

Upon arriving over Kokura, the B-29 made three passes over the town to drop the bomb using visual bombing methods. However, on each pass the bombardier, Captain Raymond “Kermit” Beahan, failed to locate his aiming point due to smoke drifting over from the nearby city of Yawata. The smoke was the result from a conventional bombing raid conducted earlier by 20th Air Force B-29s.⁶ The three passes over the town caused another delay in bombing and cost Sweeney’s aircraft another fifty-five minutes worth of precious fuel.⁷

Because of the smoke and inability to locate the target, Major Sweeney then turned the B-29 toward the designated alternate target – the city of Nagasaki on the southern end of Kyushu. Nagasaki was a military-industrial center for many years.⁸ Located in the center of the Urakami Valley, Nagasaki was home to the Mitsubishi

shipbuilding yard and steel factory, and possessed a robust rail system connected to a large capable seaport.

While falling critically short on fuel because of the earlier decision to orbit for the escort aircraft and the three unsuccessful passes over Kokura, the bomber continued to Nagasaki only to find the view of the city again obscured, but this time by clouds.⁹ Fuel calculations estimated that the bomber had only enough gas to make one bomb run over the city. Despite instructions to drop the bomb using visual bombing techniques, and rather than abort the mission and drop the nuclear device into the sea, Major Sweeney order Beahan to release the weapon using radar bombing methods.¹⁰ However, with the aircraft just 25 seconds from the release point, an opening in the clouds appeared and Beahan yelled: “I’ve got it! I’ve got it!”¹¹ Acknowledging Beahan’s claim, Sweeney replied, “You own it!” At 11:01 the bombardier dropped his ordnance that ironically detonated near the largest Catholic Church in the Far East.¹²



Figure 1. Second Atomic Bomb Crew in front of a B-29 “Superfortress.” *Source: National Museum of the U.S. Air Force, http://www.nationalmuseum.af.mil/photos/media_search.asp?q=nagasaki (accessed November 8, 2006).*

After discharging the weapon, Major Sweeney had the B-29 conduct a steep left turn to avoid the blast effect of the bomb. The bomb exploded at an altitude of approximately 1,500 feet with a blast estimated to be three times as powerful as the previous Hiroshima explosion.¹³ Upon detonation a large white flash ensued with a tremendous roar accompanied with a crushing blast wave and intense heat.¹⁴

Analysis conducted after the war by the U.S. Strategic Bombing Survey (USSBS) estimated:

Within a radius of 1 km from ground zero men and animals died almost instantaneously from the blast and pressure and heat; houses and other structures were smashed, crushed, and scattered; and fires broke out. The strong complex steel members of the structures of the Mitsubishi Steel Works were bent and twisted like jelly and the roofs of reinforced concrete [at the] National Schools were crumpled and collapsed, indicating a force beyond imagination.¹⁵

Heat from the explosion melted the granite off the façades of surrounding buildings and some estimates report the temperature from the ensuing explosion ranged from three thousand to nine thousand degrees centigrade.¹⁶

After observing the detonation and now critically short on fuel, Sweeney and his crew headed for Okinawa and landed their plane with engines sputtering and propellers “windmilling” because of fuel starvation.¹⁷ After landing, ground crews towed the plane to the parking ramp because its fuel tanks were completely dry. Upon returning to Guam following the fuel starved landing at Okinawa, and after risking both the mission and the aircrew because of poor fuel management, General Curtis LeMay, commander of the XXI Bomber Command, chided Sweeney by asking him “You fucked up, didn’t you Chuck?”¹⁸ To this query Sweeney had no reply and

only stood in silence. According to the pilot's group commander, Colonel Paul Tibbets, Sweeney's silence "spoke volumes."¹⁹

After the B-29 departed the target area, smoke and dust engulfed the Urakami Valley and survivors claim that darkness descended upon the city.²⁰ Those not killed in the immediate blast suffered from extreme heat and radiation burns. Victims were burnt so badly that their skin was peeling and hung from their extremities like loose clothing, with those facing the explosion had the appearance of having the skin from their faces melted.²¹ Blackened, burnt bodies were everywhere and thousands had their skin turned as "red as cooked lobsters."²² Many victims jumped into the Urakami River or nearby ponds of water to escape the intense heat and many of these bodies were found hanging onto shorelines, with some left half floating, or completely immersed.²³ An estimated one-third of the casualties in Nagasaki died from flash burns and expired within a few minutes to a few hours.²⁴ In the conflagration that ensued between fifty thousand to one hundred thousand people were estimated to have been injured, and the number of dead was placed at over thirty-five thousand.²⁵

However, the lingering effects of radiation caused up to 20 percent of the deaths with many unaware of their affliction for four weeks.²⁶ Radiation exposure was largely based upon one's proximity to the blast itself and usually caused the victim to have bloody diarrhea and/or vomiting, lethargy, lesions, a complete loss of white blood cells, deterioration of bone marrow, loss of feeling in the legs, hair loss, and acute inflammation of the mucus membranes of the throat, lungs, and stomach.²⁷

These same victims also suffered from fevers that went as high as 106 degrees for extended periods and endured swelling of the gums, mouth, and pharynx.²⁸

Unfortunately for the survivors, 80 percent of Nagasaki's hospital beds were located within a few thousand feet of the detonation and were obliterated.²⁹ Because of the damage from the initial blast and the subsequent fire, the city lacked adequate medical supplies and facilities to treat the thousands of victims. Even if adequate medical services had been available, scientist estimated that the radiation casualty rate would have dropped only 5 to 8 percent.³⁰

Because of the bombing, subsequent flights of aircraft over the city sent survivors scurrying for shelter.³¹ Fear of additional atomic bombings led to a constant sense of uneasiness and nervousness among the remaining population.³² The state of shock the inhabitants of Nagasaki experienced hampered recovery efforts as residents displayed either aimlessness, hysteria, or decided to leave the city altogether for areas containing shelter and food.³³

Thesis

This stark scene witnessed at Nagasaki, and the mushroom cloud over Hiroshima three days earlier, not only marked the dawn of the atomic warfare age, but also highlighted the departure from professed U.S. Army Air Force (USAAF) doctrine and a divergence from forms of warfare previously deemed acceptable by Americans. The threat implied in the aforementioned leaflet and the horrific scenes created at Nagasaki, Hiroshima, Tokyo, and other cities in the final days of the war

are representative of the changing nature of American strategic bombardment.

Bombing operations in World War II conducted over Axis cities saw the U.S. initially attempt to conduct precision bombing against designated factories and infrastructure only then to then transition to wholesale bombardment against entire urban areas and cities.

As World War II progressed and the Allied bombing campaign intensified, enemy cities were attacked not only their industrial capacities, transportation nodes, and command and control facilities, but these same urban centers were firebombed and attacked en mass for morale purposes. Additionally, on August 6 and 9, 1945, the U.S. escalated the use of destructive power by utilizing atomic weapons as a means to prosecute war and affect the Japanese leadership and psyche. Furthermore, after World War II ended the newly created U.S. Air Force embraced atomic, and eventually thermonuclear, bombardment as a viable and acceptable offensive application.

Understanding the culture of a country is paramount to understanding the manner in which the state conducts war and how it prosecutes its national aims.³⁴ In this regard, the conduct of war is partly an expression national ideas regarding morality and is telling of the collective values a population embraces. War reflects the social values and norms of a society and is indicative of ideas and principles considered important by the majority of a given population. While the idea of a uniquely “American culture” is hard to define, if it exists at all, the way in which the United States conducts war is a result of various geographic, historical, political,

economic, and ethnic factors unique to the American experience.³⁵ The various factors and influences that shaped the U.S. resulted in Americans priding themselves on a sense of “fair play,” an adherence to Judeo-Christian ethical standards, and belief in largely western values and principles. In light of these values and standards, prior to World War II Americans generally believed that avoidance of civilian casualties and wanton destruction should be avoided during the conduct of war.

Reflecting ideas from dynastic wars in Europe, and for most of the nation’s first few decades, Americans viewed war as an event between two armies on a battlefield and not necessarily a national event requiring the mobilization of the entire country. Up until the French Revolution, the armies of kings and emperors largely fought wars and campaigns without calling upon all the elements of power of a state or kingdom. However, starting in the mid 19th century and continuing into the 20th century, the concept of “total war” emerged along with the industrial revolution and conflict increasingly grew larger, mechanized, and dependent upon logistical lines of communication.³⁶

The American Civil War is arguably the first major conflict in U.S. history indicative of this new trend in warfare as developments in rail transportation, rifled guns, and the telegraph set important precedents for future battles. Along with the industrial revolution of the 19th century, machined weapons and materials became increasingly important to armies engaged in war. With the advent of the industrial age, warfare had become an increasingly larger endeavor with armies becoming bigger in both size and capability. In conjunction with mechanization, armies called

for more of a nation's manpower through “levees en mass” and national drafts. The relatively small armies of kings and sovereigns gave way to larger national armies that employed new, more lethal, and technologically advanced weapons.³⁷ With the larger size of war and the increasing use of machines in battle, countries developed the requirement to have more of the national population, both civilian and military, involved in the war-making effort.

Along with increased manpower requirements to field an army, nations needed workers to mine raw materials, harvest food, and then move these items to urban centers where factories built war materials necessary to equip these larger armies. Armies depended upon expansive factories staffed with hundreds of workers to design, develop, and produce munitions and armaments with these products again needing transportation to the battlefield for employment. Because of these advancements in weaponry, military operations took place over expanded distances, involving more men and material on the battlefield with ever-increasing efficiency and lethality.³⁸

World War I provided the earliest example of this new relationship between modern armies and the nations they defend. The pouring of men and material into battle during the trench warfare on the western front illustrates the increasing size, mechanization, and lethality of modern war. In this regard, warfare became a function of the whole state and was not just limited to those in uniforms or in close proximity to the battlefield. In the 20th century, war became a function of the entire nation, its people, infrastructure, production capability, and natural resources. In

addition to the armies on the battlefield, the raw materials needed to supply a military, the people who produced weapons of war, and the factories in which they worked now became valid targets for military planners. As production centers and urban areas became targets, the discerning of combatant and noncombatant became increasingly vague and harder to define. The concept of total war began to blur the distinction between soldier and civilian.

Despite these trends in warfare, Americans, like many other western countries during the 1930s, believed that non-combatant casualties should be minimized regardless of the increasing lethality inherent in modern weapons and the greater inclusion of national assets in the war making effort. Civilian deaths were to be avoided and many nations embraced the idea of sparing non-combatants by accepting the idea as, what historian Sahr Conway-Lanz described, an “international normative value.”³⁹ Regarding the killing of civilians in the advent of mechanized war, in 1923 delegations from six countries met at The Hague to discuss international arms limitations in light of the experience from World War I.

Called the “Commission of Jurists,” the body consisting of representatives from the U.S., Great Britain, France, Italy, Japan, and the Netherlands drafted articles specifying limitations on warfare including the use of the new dimension of aerial bombardment.⁴⁰ During the war the nascent air arms of Germany, Great Britain, and Italy developed airframes to support troops engaged in battle, but also build strategic bombing aircraft designed to attack national infrastructure and populations far behind the lines. Because of these developments in air warfare and the ability to strike urban

centers, the Commission discussed the issue of urban bombing and the killing of non-combatants. In the end, the Commission determined that, “bombing to terrorize civilian populations, damage private property, or injure non-combatants was forbidden.”⁴¹ This mandate originated from a 1907 land warfare regulation that also specified that bombing historical, religious, cultural, and medical structures was also prohibited.⁴² Furthermore, the Commission drafted articles that banned, “indiscriminate attacks on civilian populations.”⁴³ Although the Committee developed other regulations limiting the use of airpower during conflict, none of these articles was ratified by the attending nations nor were they ever implemented as international standards, but they were loosely accepted as authoritative directives.⁴⁴

The hapless and ineffective League of Nations echoed the same sentiment as the Commission. In 1938 the League specified that bombing civilians ran counter to international law and specified that, “intentional bombing of civilians was illegal, [that] targets must be legitimate, identifiable objects, [and] must be bombed in a manner which would avoid negligent bombardment of civilian populations.”⁴⁵ In addition to the League of Nations, during the inter-war period many other international and national organizations expressed this same sentiment in an attempt to limit indiscriminate bombing attacks.

Despite the debate regarding America’s adherence to ethical virtues and moral standards, and avoiding arguments regarding the validity of such a claim, this professed allegiance to a sense of fair play and morality is a perception most Americans hold about their nation and the way in which it prosecutes war.

Nevertheless, it would appear that the strategic bombing campaign in World War II and the use of nuclear weapons increasingly violated perceived moral underpinnings of American society. Many Americans still advocated a devotion to these ideals as one senior government leader wrote as late as 1945:

The reputation of the United States for fair play and humanitarianism is the world's biggest asset for peace in the coming decades. I believe the same rule of sparing the civilian population should be applied, as far as possible, to the use of any new weapons.⁴⁶

Exacerbating this moral dichotomy was the use of nuclear weapons that appeared to violate all laws or precepts regarding morality or ethics in war. Comparatively, nuclear warfare posed this same dilemma to the U.S. and the world as a whole. With the advent of nuclear technology, old patterns of warfare were seen as obsolete as more destruction could be effected in a relatively short period.⁴⁷ The widespread killing of thousands of innocents by massive aerial bombardments or even by one powerful device does not appear to square with America's perceived moral virtue or its subscription to a sense of fair play.

In the 19th Century, Americans struggled with the issue of civilian casualties. From the Civil War when Sherman burned his way through the south, to the American west where the Army used indiscriminate force in many instances to clear Indians from the western plains, the issue of civilian casualties created a moral dilemma.⁴⁸ However, during the 20th Century, Americans had to deal with not only the deaths of noncombatants, but with the changing nature of warfare. World Wars I and II significantly revolutionized warfare, not only from a standpoint of larger armies and mechanization, but from increased lethality and destructive capability. As

a result, war in the 20th Century added new dimensions of danger. Not only did the war effort now include the worker and craftsman in the factory, but the rise in technology and mechanization enabled warring parties to range and target the production and population centers of an enemy nation.⁴⁹ Factories, war-making infrastructure, and the civilian workforce became legitimate military targets despite their remote location from the battlefield. War was now becoming total and encompassing all elements of national power.

Prior to World War II the USAAF professed an adherence to a doctrine that was uniquely American - precision daylight bombing. This doctrine, which emerged from the U.S. Army's Air Corps Tactical School (ACTS) in the 1930s, envisioned that bombers would fly to the industrial and administrative centers of an enemy nation and then destroy the means of production and capability required to generate and deploy an effective military force.⁵⁰ Furthermore, and more importantly, in the execution of this mission, American air fleets would use precision methods to pinpoint designated enemy targets and avoid the generation of wholesale casualties and widespread destruction. This concept of precision bombing focused only on vital enemy infrastructure and expressly attempted to avoid the targeting and killing of enemy civilians. In this effort, the placement of bombs was designed to affect an entire war making effort without having to create massive casualties. Even in the midst of World War II, U.S. Secretary of War Henry Stimson believed that American morality precluded the bombing of civilians and thought that war needed to "be restrained within the bounds of humanity."⁵¹ Ironically, despite the widespread

destruction of Germany through the air campaign and the firebombing of Japan, Stimson believed that precision bombing would help ameliorate civilian suffering and reduce casualties.⁵²

The questions this dissertation seeks to answer are: How did the U.S. change from a professed theory of precision bombing to eventually conduct area/wholesale destructive bombing that eventually included atomic and thermonuclear warfare? How and why did the United States military transform its strategic bombing applications and apparently divorce itself from the principles and tenets proffered by planners at the ACTS? What were the factors and influences that led to this departure from Pre-World War II doctrinal strategies that eventually resembled those portrayed in the 1964 Peter Sellers movie *Dr Strangelove*? Specifically, why did the Army Air Force, and its successor organization the U.S. Air Force (USAF), eventually conduct indiscriminate area bombing during World War II and subsequently begin to target urban population centers with nuclear weapons and embrace the idea of “nation killing?”⁵³ Why did the U.S. conduct a “180 degree turn” with regard to strategic precision bombing doctrine and embrace nuclear applications as an acceptable means of warfare? This departure from precision bombing doctrine seems even more intriguing when one considers that as late as 1944 even Lieutenant General Laurence S. Kuter, Chief of the Air War Plans Division, stated that it was “contrary to our national ideals to wage war against civilians.”⁵⁴

The answers to these questions are not necessarily military ones, but speak to American cultural mores, values, and ethics. Through a study of American bombing

theory development, the execution of bombing efforts in both the European and Pacific theaters during World War II, and a review of the development of American nuclear strategies, one can gain an appreciation of how American strategic applications are reflective of the larger society as a whole and are indicative of American virtues and its collective values. The bombing applications embraced by the U.S. military were not created in a vacuum nor were they isolated from the culture that created them. Rather, these applications are reflective of the collective synergy created by, not only the Army Air Force, but the government and the American population. Representative of this synergy is a quote from U.S. airpower advocate Bill Mitchell who argued, “Concepts of warfare are changed only through public opinion or by defeat in war.”⁵⁵

As the U.S. military is largely a cross section of the nation as a whole, the characteristics of the country are reflected in those who serve in uniform. In this regard, American bombing methodologies were not just the product of American military men, but also a creation of the American population and the values it embraces. All three elements the Army Air Force, the U.S. government, and its constituent population have contributed to the change in American bombing applications. A study of this transition provides insight into not only the military applications of the U.S., but also reveals something about American cultural mores and its associated values and beliefs.

Foundations

Army War College professor, Conrad Crane wrote, “Military doctrine is simply a condensed expression of an accepted approach to campaigns, major operations, and battles.”⁵⁶ In this regard, doctrine provides both a framework and sets guidelines that organizations use to establish methodologies and standard practices. Armed forces develop doctrine to establish modes of operation and organizational frames that provide a foundation for subsequent military operations. Established doctrine often provides the intellectual paradigm for a given organization. While doctrine outlines generally how an organization will operate routinely, frequently doctrine also serves as a departure point for more effective methodologies. In order to understand how and why Americans changed bombing methods, it is important to understand bombings conceptual and doctrinal roots. This morphing and modification of doctrine serves to provide an understanding of American bombing applications and the changes they incurred.

World War I and the weapons utilized during this conflict seemed to tip the tactical and operational advantage to the defender and thus subdued the offensive spirit so prevalent among military theorists at the turn of the 20th century. The casualty rates from World War I were estimated at ten million and this staggering figure posed difficult questions for military strategists.⁵⁷ This increase in the scale of war and the new levels of lethality forced many military strategists to ponder the very future of warfare and its viability as a means to pursue national will. The experience of World War I left a lasting impression and served as a catalyst for new ideas

regarding warfare and military applications. How could nations in the future pursue national aims through the use of arms if the static trench warfare of World War I was to be the norm? With the increasing efficiency of new weapons and technology, how could a nation effectively defeat an enemy and potentially avoid a repeat of the World War I experience?⁵⁸ Aerial bombardment was seen as a solution to avoid the type of stalemate experienced on the Western Front and the excessive casualty rates that it generated.

After World War I, some military theorists posited that in the next war the airplane could provide an answer to the stagnant, immobile warfare that had defined “The Great War.” In this regard, the airplane and the capabilities it brought could once again make war serve the political aims of the state and reinstall warfare as an instrument of national power.⁵⁹ Theorists believed that the airplane, perceived as inherently offensive in nature, could tip the balance of power in future conflict and thereby secure victory that was becoming so elusive in ground combat. At the time, the leading theorist and most prolific proponent of air strategy at the time was General Giulio Douhet. Douhet is largely recognized and credited with developing the first articulate and comprehensive doctrine for airpower. His ideas eventually served as the initial blueprint for many subsequent air strategies.⁶⁰

Born in 1869, Douhet, an Italian artillery officer, saw great promise in the airplane and even before World War I broke out, he developed ideas and concepts regarding the effective use of an air force.⁶¹ Douhet believed that war was total and inclusive and encompassed all of a nation’s elements of power. Douhet observed

how mechanization and technology was changing the very nature of war. The development of new technologies and weapons was increasingly dependent upon a nation's industrial might, productive capability, infrastructure, and natural resources. While Douhet did not see significant combat during World War I, and was jailed for insubordination in 1916, he scrutinized events and experiences of the war and concluded that the horrors of static defensive in modern warfare could be avoided through use of an independent air arm.

Based upon the World War I experience, Douhet believed that modern conflict increasingly involved the whole of a nation's populace and that all of a country's resources would be required to support the war effort. Toward this end, Douhet saw that modern war no longer allowed for the distinction between combatant and noncombatant.⁶² In an article entitled "Air Warfare," Douhet stated, "The battlefield can no longer be limited; it will be circumscribed only by the frontiers of the nations at war. Everyone becomes a combatant, for all are directly menaced. The classification into belligerents and non-belligerents can no longer exist."⁶³ In this vein, he envisioned that the effect of war would not stay merely within the parameters of the battlefield itself, but that the effects would reverberate to all corners of the countries involved.⁶⁴

The Italian also argued that the "aerial field is the decisive field" and that a nation must have command of the air in order to successfully prosecute a war.⁶⁵ Douhet saw the airplane as a uniquely offensive weapon because of its speed and ability to avoid effective ground obstacles and defenses.⁶⁶ With these characteristics,

and keeping in mind the widened scope of the battlefield and the technological nature of modern war, the airplane would become especially useful in the destruction of enemy industrial capabilities and infrastructure. As future war would be all-encompassing, Douhet advocated that aircraft should be used to attack “peacetime industrial and commercial establishments; important buildings, both public and private; transportation arteries and centers and certain designated areas of civilian populations.”⁶⁷ In support of this assertion he even spelled out how such attacks could be effectively conducted:

In general areas of large dimensions on which are found the usual buildings and a dense population. To destroy them, it is necessary to employ three types of bombs: explosive, incendiary, and toxic in suitable proportion. The explosive bombs produce the first ruins; the incendiaries produce fires that the toxic bombs prevent from being extinguished. In addition, the complete destruction of the objective produces, besides the material effect, a moral effect that may have tremendous reactions. It is sufficient to imagine what would happen among civilian populations of the other cities when the news had spread that the center attacked by the enemy had been completely destroyed and that no one could have been saved.⁶⁸

In addition to targeting capabilities and infrastructure, Douhet proposed attacking the enemy’s morale as a legitimate end. He advocated the bombing and killing of people in order to destroy a population’s willingness to fight. He was not seeking to attack just the military’s morale, but the entire nation’s morale, its ability to resist, and support the country’s war efforts. He was explicit in this conviction and stated that one of the primary purposes of an independent air force was the “crushing of the material and moral resistance of the enemy.”⁶⁹ Throughout his salient work, *The Command of the Air*, Douhet made clear that the targeting of an enemy’s morale was of primary importance and that victory will go to side that “succeeds in breaking

down the material and moral resistance of the other.”⁷⁰ In this regard, Douhet thought that the psychological effects of bombing were just as important, if not more, as the physical and material effects.⁷¹

Douhet was a realist with regard to modern war and did not express remorse about the bombing of civilian populations and their homes. According to historian Ronald Schaffer, Douhet believed, “that nations must resign themselves to air attacks on their populated places in the same way an army commander resigns himself to the loss of troops when he knows that it is a way to secure victory.”⁷² Within a Douhetian context, civilians were just as relevant a target as the factories and centers of production that were being bombed because the purpose of war was to harm the enemy as much as possible.⁷³ In this vein, the Italian urged his readers to confront the brutal facts of war and to view them “without false delicacy and sentimentalism.”⁷⁴

The stark, draconian picture that Douhet depicts does however have a humane dimension. While aiming weapons at civilians, Douhet envisioned that the pain and suffering would be so immense that wars might become shorter in duration, thereby creating fewer casualties over all. Because morale bombing was aimed “at civilians, that element of the countries at war least able to sustain them” that death would come quickly to those victims without prolonged agony and pain.⁷⁵ In the end, a more humane approach could be the result if the deaths occurred quickly and the overall conflict was shorter in duration. The casualties experienced as a result of World War I would thus be avoided. Despite his advocacy of morale bombing and the use of both gas and incendiaries, it could be inferred that Douhet felt that an overall

amelioration would take place with the use of airpower and that itself was more humane in the end.

American airpower theorists during the inter-war years espoused ideas that resembled those concepts proffered by Douhet. Almost uniformly, American aviation theorists embraced the use of bombers against enemy cities and saw the importance of the air arm in future conflict. However, an important difference was that American strategists did not see civilian populations as legitimate targets and made explicit distinction between combatants and noncombatants. Thus, U.S. airpower strategists held to the belief that infrastructure and enemy forces constituted justifiable targets, not the civilian populations of the enemy nation. As a result, the idea of targeting civilian populations was an anathema to U.S. military operations.

The most influential of these early American proponents of air power was General William “Billy” Mitchell. A World War I veteran with a strong personality and streak of individuality, Mitchell saw great promise in aviation and was a tireless advocate of airpower and an independent air force. He demonstrated the promise of airpower by sinking the captured German battleship *Ostfriesland* in 1921 and signaled the eventual demise of the naval dreadnaught. He saw an air force as a powerful tool in national defense and proposed that airplanes had many efficiencies and capabilities that made other platforms obsolete, particularly battleships. His outspoken views regarding the role of aviation in national defense were so virulent that in 1925 he was court-martialed for insubordination.

After his departure from the military Mitchell continued his fight for airpower, this time in the public arena, published works, and made appearances in support of aviation. One of his most influential writings, published in 1925, was entitled *Winged Defense*. In this work he addresses the promise of airpower not only as a military weapon but as an economic tool and an integral part to the growth of the nation. While the book itself covered a number of issues relating to aviation, it touched upon the topic of aerial bombardment. In the book he specifically avoided the advocacy of bombing civilians by stating:

In the future the mere threat of bombing a town by an air force will cause it to be evacuated, and all work in munitions and supply factories to be stopped. . . Air forces will attack centers of production of all kinds, means of transportation, agricultural areas, ports and shipping; not so much the people themselves.⁷⁶

Furthermore, Mitchell saw a deterrent effect provided through aerial bombardment. In this regard, Mitchell believed bombing would slow or stop enemy rates of production and not necessarily require the actual destruction of industrial centers. He proffered that “an attack from an air force using explosive bombs and gas may cause the complete evacuation of and cessation of industry in these places.”⁷⁷ As a result, workers afraid of bombing would leave centers of production for safety in rural areas elsewhere. The overall effect would be a reduction of enemy war material with an accompanying loss of front-line combat power but without inflicting substantial civilian casualties.

While many visionaries proffered concepts regarding the use of airpower in future conflicts, the aforementioned Air Corps Tactical School (ACTS) served as an

important center for the development of airpower theory and distilled and analyzed many of these nascent ideas. Providing advanced professional education to Air Corps officers, the U.S. Army established the school at Langley Field, Virginia in 1926.⁷⁸ The new school's mission was to "train air officers in the strategy, tactics, and techniques of airpower."⁷⁹ In 1931 the school moved to Maxwell Field in Alabama, and in addition to its teaching mission, it became an important center for the development of U.S. Army Air Corps (USAAC) doctrine and theory.⁸⁰ The Tactical School, during the 1930s, served as the cradle for Air Corps concepts and the ideas articulated from ACTS served as the blueprint for American air efforts during the war. Of the 320 Air Corps generals serving during World War II, over 80 percent were Tactical School graduates.⁸¹ From this location the doctrinal foundations were laid for Air Corps operations in all theaters of operation during World War II, and its influence was felt world wide.

Debate continues as to the direct influence of Douhet on American air leaders of World War II. General Larry Kuter, an ACTS honor graduate who served on the faculty of the school as a strategic bombing instructor downplays the influence of Douhet at the school stating that the Italian's works were not included in the school curriculum.⁸² However, many of the more prominent USAAF generals at least professed to being cognizant of Douhet's ideas regarding the potential of airpower, but most would subscribe to Mitchell's influence and their own individual beliefs regarding the airplane and its capabilities in future conflict.⁸³ ACTS lesson plans in 1939 clearly admit that Douhet be credited with the idea of the strategic air offensive

and the first to recognize the potential of an air force against an enemy's national infrastructure.⁸⁴ Regardless of the Douhet influence debate, Mitchell's ideas and influence manifested themselves largely at the Tactical School during the inter war years and served as a foundation for much of the school's curriculum.⁸⁵ His ideas and tenets were pervasive throughout the school texts, and the school reflected Mitchell's attitudes toward the role of aviation in the modern battlefield. Additionally, several of Mitchell's former aides were on staff at the Tactical School and were destined to become general officers and play significant roles in development of American airpower.⁸⁶ When the faculty developed the concept of precision bombing and its associated methodologies, it is obvious that they constructed their ideas based upon precepts espoused by Mitchell.⁸⁷

By 1935 ACTS subscribed to ideas regarding the use of airpower against enemy war making capability. In January the school responded to an Army War Plans Division document regarding employment of the air by arguing, "the principal and all important missions of air power when its equipment permits is the attack of those vital objectives in a nation's economic structure which tend to paralyze the nation's ability to wage war and thus contribute to the attainment of the ultimate objective of war, namely the disintegration of the will to resist."⁸⁸ In this regard, targeting equipment and production facilities were the aim, not necessarily indiscriminate killing of civilians.

The school faculty made a concerted effort to study the bombing practices conducted against civilians in China, Ethiopia, and Spain and drew important

conclusions regarding these engagements.⁸⁹ While visionaries offered ideas and concepts, the ACTS considered the intellectual merit of airpower ideas and balanced them against real-world applications and results. From their position, the officers at the school had the advantage of hindsight concerning the most effective and efficient use of airpower, and from this position they developed their own ideas regarding bombing applications.⁹⁰ Concurrently, ACTS saw the development of the B-17, with its extended range, powerful engines, and accurate bombsight, as an important step in airpower development.⁹¹ As aviation technology advanced, so to did USAAF bombing doctrine. Based upon their observations on foreign wars, and with the rapid growth of aviation technology, by 1935 the ACTS had fully developed the concept of daylight precision bombing.⁹²

Through an analysis of world events, the Tactical School rejected the idea of deliberately targeting civilians. As a result of their studies, the ACTS Director of Air Tactics and Strategy, Major Muir S. Fairchild remarked:

The Japanese bombing of Chinese cities had actually increased the morale of the Chinese nation, and was more responsible for unifying the populace than any other factor . . . the school preferred a strategy of delivering selective precision attacks against the enemy's national economic structure.⁹³

In an ACTS lesson plan entitled "National Economic Structure," Fairchild taught that attacking civilian populations was ineffective because such raids produced "temporary effects only and these [kinds of attacks] are not necessarily cumulative."⁹⁴ The lesson plan stated that outside of the psychological effect, killing people did not hurt the war making capacity of a nation in the end. Fairchild wanted to produce effects that would build over time and have a lasting effect upon a nation's ability to

prosecute war. Killing people did not yield such effects but he did believe that by destroying national infrastructure over time, intense suffering by the enemy population would eventually destroy national resolve and morale.⁹⁵

The application that the school advocated was the destruction of the enemy's national economy through attacks only on vital installations. In the above text and lesson plan content, it is obvious that the Tactical School rejected the idea of "Douhetian-type" bombing. The faculty argued that strategic airpower could contribute to victory or secure it by attacks on the enemy state if properly focused upon "national economic institutions." In support of this idea, ACTS lesson plans argued, "direct attack of civilian populations is most repugnant to our humanitarian principles and certainly it is a method of warfare that we would adopt only with great reluctance and regret."⁹⁶ Aerial attacks did not need to be wholesale or widespread, but aimed at key components of an enemy's national infrastructure. By targeting these important components, the entire functioning of the enemy state would be disrupted. As a result, ACTS assumed that the enemy's national motivation for war and ability to resist would then wane and eventually disintegrate.⁹⁷

This same approach was discussed by General H. H. "Hap" Arnold, Deputy Chief of Staff for Air in the U.S. Army, and Colonel Ira C. Eaker, who in 1942 would serve as the first commander of the U.S. 8th Air Force spearheading the American bombing campaign in Europe. In a 1941 text, these men wrote:

It is generally accepted that bombing attacks on civilian populaces are uneconomical and unwise. . . . The most economical way of reducing a large city to the point of surrender, breaking the will of resistance, is not to drop bombs in its streets, but to destroy the power plants that supply light, the water

supply, the sewer lines. Never, to date, and perhaps in no time, will any nation have a sufficient air force to be able to use it on other than priority targets. Human beings are not priority targets except in certain special situations.⁹⁸

Hap Arnold's position as the Chief of Staff of the Air Corps gave him great influence over the development and approval of bombing doctrine. Born in 1886 and a graduate from West Point in 1907, Arnold was one of the Army's first aviators and even undertook some of his ground instruction from the Wright brothers.⁹⁹ Despite not serving in combat during World War I, Arnold developed an appreciation of American production and technological capabilities and saw great promise in both of these endeavors. During the interwar years he became well versed on the myriad of requirements needed to administer, supply, train, and equip a large military force. Arnold's organizational and managerial skills were instrumental in the development of the Air Corps and his appointment as Chief in 1938 provided him considerable power and influence over his command up until his retirement in 1946.

Arnold's aforementioned advocacy of targeting only supply centers and his views regarding precision bombing were key to the American bombing doctrine. His sponsorship of strategic bombardment coincided with his advocacy of air power and the idea of an independent U.S. Air Force. Arnold's promotion of aviation was incessant and he was constantly looking for ways to publicize and announce the capabilities of air power to any who would listen. Ironically, his zeal for the validation of airpower as an important tool in war would eventually conflict with the ideals of precision bombardment. As the Chief of the Air Corps, and subsequently the Army Air Forces, his willingness to stray from this same doctrine later in the war

was a significant factor in the radical departure from the strategy he once helped to frame.

Furthermore, Major General Haywood Hansell, a former Tactical School instructor and a proponent and framer of the precision-bombing theory argued that, “the idea of killing thousands of men, women, and children was basically repugnant to American mores. And from a pragmatic view, people did not make good targets for the high explosive bomb, [which was] the principal weapon of the offense.”¹⁰⁰ While recognizing the importance of cities as targets, Hansell believed that targeting factories was a better use of airpower than “scattering bombs in urban areas.”¹⁰¹ Hansell would go on to play a part in the development of the overall American airpower strategy for World War II and serve in both the European and Pacific Theaters of war. However, in 1944, his allegiance to the idea of precision bombardment would cost him his command in the Pacific.

This line of reasoning regarding precision also coexisted with the development of new bombing technologies and the advent of accurate bombsights and bombardment practices. During this period, bombing accuracy was under constant development and the probabilities of hitting a given target were increasing. In exercises held during the 1920s and 1930s, the probability of hitting a target the size of a small factory was 64 percent from three thousand feet, and 19 percent from ten thousand feet.¹⁰² By the time World War II began, Air Corps leadership thought that it had the capacity to hit targets regardless of weather conditions.¹⁰³

Avoidance of civilian casualties from aerial bombardment assault was also a concern for the U.S. federal government as President Franklin Roosevelt, who in response to the Soviet bombing of Helsinki, in 1939 stated, “The American Government and the American people have for some time pursued a policy of wholeheartedly condemning unprovoked bombing and machine gunning of civilian populations from the air.”¹⁰⁴ This statement by the Commander-in-Chief is certainly explicit in its allegiance to the premise that civilian casualties were to be avoided and was in line with contemporary American mores. Later that year, he announced, “if bombing proceeded unchecked hundreds of thousands of innocent human beings who had no responsibility for, and who were not remotely participating in the hostilities will lose their lives.”¹⁰⁵ In 1938, the U.S. Senate, in response to the bombing of civilians by the Japanese in China and by warring parties during the Spanish Civil War, articulated this same sentiment by considering a resolution condemning “inhuman bombing of civilian populations.”¹⁰⁶ Furthermore, on June 3, 1938 Secretary of State, Sumner Welles, published a statement on behalf of the American populace condemning the killing of civilians in China and Spain through aerial bombardments and days later announced that a “moral embargo” be imposed on the sale of airplanes to countries that practiced such bombing.¹⁰⁷

On the eve of World War II on September 1, 1939, FDR pleaded to Great Britain, France, Germany, and Poland to refrain from bombing non-combatants. In this speech he proclaimed an “urgent appeal to every government which may engage in hostilities [to] publically affirm its determination that its armed forces shall in no

event, and under no circumstances, undertake the bombardment from the air of civilian populations or of unfortified cities.”¹⁰⁸ He reiterated this same sentiment three months later in an appeal to the Finns and Russian in their conflict in northern Europe to desist from the practice of bombing civilians.¹⁰⁹ The next day, on December 2, 1939, FDR reiterated the effort announced by Secretary of State Welles in June and called upon American manufacturers and exporters to keep in mind the issue of bombing civilians when they negotiated contracts for the exportation of aircraft and aircraft technology to belligerent countries.¹¹⁰

Precision bombing doctrine also served to set the stage for the validation of an independent air arm that could provide significant contributions in a future war. American theorists believed that a few bombers with selective targeting could neutralize an enemy's war-making capabilities, both cheaply and quickly. This type of application obviously avoided the moral quagmire that Douhetian type attacks insinuated, and given the size and budget of America's 1930 era Air Corps, this idea had an attraction to a fiscally constrained nation whose air force was rather limited in both size and capability.

The targeting of vital areas was also pragmatic from the standpoint that it maximized the limited resources of the Army Air Corps during the 1930s. Increasingly, airpower was seen as an attractive and comparatively cheap deterrent to the political situation that was developing throughout the globe. Given the nature of America's economic downturn during the depression, budgets for all types of military weapons were limited.¹¹¹

In order to maximize the effect upon a potential enemy, and despite America's isolationist leanings, bombers provided a relatively attractive and inexpensive means of delivering a potentially lethal blow to a future adversary.¹¹² The unveiling of the B-17 "Flying Fortress" bomber and other aircraft equipped with newly designed and advanced precision bombsights promised to fulfill the type of bombing envisioned by the Tactical School.¹¹³ Despite the paucity of money to build aircraft and weapons during the 1930s, by the end of the decade the Air Corps was to expand rapidly and began to build more aircraft that supported the tenets of precision bombing doctrine.¹¹⁴



Figure 2. A YB-17 in Flight. Pictured is an early prototype model. *Source: National Museum of the U.S. Air Force*, <http://www.nationalmuseum.af.mil/photos/mediasearch.asp?q=B-17&page=8> (accessed November 17, 2006).

In addition to, or as a result of, the moral and objective arguments, Americans embraced the idea of precision bombing. This pro-Air Corps idea promised victory independent of other branches of the armed services with minimal demands on, and risks for American people. Furthermore, historian Michael Sherry wrote, "this doctrine provided a more attractive alternative by employing the bomber as an instrument of precision rather than indiscriminate horror, laying its high explosives on

its targets with pinpoint accuracy, incapacitating the enemy without slaughter.”¹¹⁵

Even as late as 1942 the idea of precision bombardment was still widely publicized as a lauded attribute of American military aviation. Aviation pioneer and engineer Alexander de Seversky published a best selling book *Victory Through Air Power* shortly after the U.S. entry into the war. In this work he argued that obliterating enemy morale can only be done through the use of precision bombing.¹¹⁶ Seversky argued that in a modern industrialized state, the will of a people can only be destroyed by attacking the necessities of life, largely food, shelter, water, and sanitation facilities.¹¹⁷ However, in order to destroy these required facilities from the air, precise bombardment is a requirement as area bombardment would waste aviation assets and in the end would be more costly. While Seversky does not include any discussion regarding the morality of morale bombing, he at least limits air attacks to a few select target sets.

Lastly, the use of bombers coincided with the U.S. growing fascination with technology and mechanization. The idea of precision bombardment was developed at a time when the American populace was becoming increasingly fascinated and attracted to technology and the promise it had for the future. Most Americans during the inter war period were excited about progress and the scientific breakthroughs being developed. Fascination with the airplane, automobile, and radio provided fertile ground for the development of a doctrine that was dependent upon industrial might and engineering acumen. Just as the U.S. embraced the industrial revolution in the 19th Century, it again welcomed mechanization but this time in the military

realm. The advanced technology of the bomber combined with innovations in economic and industrial capabilities would supplant the brutality experienced during World War I and limit warfare to specific areas of an enemy's infrastructure.¹¹⁸ This belief in scientific application held the promise that bombs would not kill people, but would destroy only things.¹¹⁹ The growth of technological skill and knowledge held the promise of avoiding the kind of terror that modern war was becoming.

While the theory behind strategic bombing was susceptible to a number of interpretations, most American air planners viewed it as an application that would minimize civilian casualties and avoid the horror of World War I trench warfare, while yielding a significant military advantage over a modern enemy army. The use of bombers not only seemed fiscally prudent, but the precision capabilities of these new platforms had the potential to avoid the moral dilemma surrounding the bombing of cities or densely populated areas. During the interwar years, American airpower theorists and government officials rejected the idea of wholesale bombing proposed by Douhet and believed that bombing people was not only inefficient, but also morally reprehensible. While differing from their European and Asian counterparts regarding civilian casualties, American air theorists saw great potential in strategic bombing and began to include this application into future war plans.

A Doctrinal Wedge

For all the emphasis that American airpower theorists put on bombing an enemy's state infrastructure and centers of production, ACTS planners created an

important exception and doctrinal wedge. Air Corps planners left a placeholder for the kind of widespread moral/terror bombing that Douhet advocated. In this vein, the Air Corps did not dismiss entirely terror bombing outright, nor did they remove it from the doctrine they constructed. American precision bombing advocates left an important doctrinal loophole that eventually became the norm as World War II unfolded, and embraced, following VJ day and for the next few decades.

While the Tactical School texts were widely accepted as Air Corps doctrine, the school put forth five optional categories for consideration when engaging in strategic air warfare:

1. Direct attack on enemy armed forces.
2. Indirect air attack of enemy armed forces by destroying the industrial elements which supplied and supported enemy armed forces.
3. Direct air attack on economic and social systems and structure of the enemy state, including destruction or neutralization of major supporting systems.
4. Direct air attack on enemy social centers, including cities and factory worker dwelling areas.
5. Strategic air defense of one's own urban, industrial, economic, and base areas.¹²⁰

In the above options, the intent behind number four is striking. This option insinuates that a direct attack upon an enemy population is both a feasible and an acceptable course of action. The inclusion and implications of this singular option create a dichotomy within the ACTS doctrine. At a 1939 conference that discounted bombardment of civilians due to humanitarian considerations, participants also discussed the view that this kind of bombing could be used “as a possible means of retaliation.”¹²¹ This exception illustrates a doctrinal loophole in USAAC bombing strategies that left the door open for the application of Douhetian-type bombing.

When putting together the air plan for the upcoming war, a group of USAAC officers met in Washington, DC, during August 1941. In a series of lengthy meetings they laid out the framework for the strategic air campaign should the U.S. enter World War II. The product that came about was Air War Planning Document-1 (AWPD-1). AWPD-1 was based largely upon the existing doctrine and focused on destroying “carefully selected targets in the industrial and service systems on which the enemy people, their industries, and the armed forces were dependent.”¹²² Up to a point, the plan followed ACTS doctrine and the tenets developed during the interwar period. However, the plan did stipulate that enemy civilian populations would be included in the targeting process. Toward this end, it specified that humans could become legitimate targets for U.S. bombers. While AWPD-1 did place civilians as the lowest priority, it clearly specified that American bombers would make civilians their objective when the timing was right. While the document did not specify when this targeting would happen, regarding such attacks AWPD-1 stated, “immediately after some very apparent results of air attacks on the material objectives . . . [and] after some major setback of the German ground forces, it may become highly profitable to deliver a large scale, all out attack on the civilian population of Berlin. In this event, any or all the bombardment forces may be diverted for this mission.”¹²³ The document speculated that such attacks might be useful against the entire German population and cause a reduction of public support in a similar manner during World War I.¹²⁴

Updated as the war unfolded, AWPD-1 continued to include the idea of undermining and destroying the will of the enemy to wage war. Despite precision bombing doctrinal theories, a placeholder in the AWPDs and established doctrine had been created that could be utilized for the application of Douhetian tactics. While the reasoning for this placeholder is apparent, conspicuously absent is an explanation as to why the framers of the AWPDs strayed from their stated doctrine and included Douhetian tactics as a potential means of ending the war quickly. If the theory of precision strategic bombing was correct, why then did the men who wrote AWPD-1 feel the need to include the targeting of morale in their planning? Why did this apparent change from Army Air Corps doctrine appear in the primary planning document for the strategic bombing effort? A review of what transpired over the course of the war might provide an insight to this answer.

As late as 1944, Secretary of War Stimson was not convinced that morale bombing would be an effective tool, especially in Europe. As bombing assaults grew larger, the Secretary considered the idea that morale bombing might not be useful in the capitulation of Germany. He was unconvinced of airpower's ability to affect the mindset of the German soldier. In his diary he wrote, "can this [air bombardment] be counted on to affect German morale sufficiently to compel an otherwise successful German Army to surrender unconditionally? I hardly think this is certain."¹²⁵

Despite the Secretary's lack of faith in morale bombing, by the end of the war the USAAF deliberately attacked populations and urban centers. Wholesale bombing attacks came about not just from the commander's decisions in executing the

American bombing campaign, but also because the U.S. public supported such actions. In addition to the USAAF and the American public, the federal government first gave implicit, and later explicit, approval for such bombing methods. All three of these elements created a synergy that allowed not just Douhetian bombing with conventional weapons, but eventual acceptance of both atomic, and later thermonuclear, applications.

¹U.S. Army Air Force Leaflet, Miscellaneous Historical Documents File, no. 258, Truman Presidential Library, Independence MO.

²Charles Sweeney, *War's End* (New York, NY: Avon Publishing, 1997), 194.

³Paul Tibbets, *Return of the Enola Gay* (New Hope, PA: Enola Gay Remembered Inc., 1998), 247.

⁴*Ibid.*, 249.

⁵*Ibid.*

⁶Sweeney, 213.

⁷*Ibid.*, 213-216.

⁸James Yamazaki, *Children of the Atomic Bomb* (Durham, NC: Duke University Press, 1995),

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⁹Sweeney, 217; Tibbets, 249.

¹⁰Sweeney, 217.

¹¹*Ibid.*

¹²*Ibid.*; Robert Trumball, *Nine Who Survived Hiroshima and Nagasaki* (New York, NY: E. P. Dutton and Co., 1957), 87; Tibbets, 250.

¹³Trumball, 87.

¹⁴United States Strategic Bombing Surveys (USSBS), *The Effects of Atomic Bombs on Hiroshima and Nagasaki* (Washington, DC: U.S. Government Printing Office, 1946), 3.

¹⁵*Ibid.*, 13.

¹⁶*Ibid.*, 25; Trumball, 82.

¹⁷Sweeney, 220, 224-226.

¹⁸Tibbets, 250.

¹⁹*Ibid.*

²⁰Yamazaki, 6.

²¹Trumball, 56.

²²*Ibid.*, 31.

²³*Ibid.*, 61.

²⁴*Ibid.*, 17.

²⁵*Ibid.*, 15.

²⁶USSBS, *Effects of the Atomic Bombs*, 15 and 18.

²⁷USSBS, *Effects of the Atomic Bombs*, 18; Yamazaki, 65.

²⁸USSBS, *Effects of the Atomic Bombs*, 18.

²⁹*Ibid.*, 9.

³⁰*Ibid.*, 20.

³¹*Ibid.*

- ³²Ibid.
- ³³Ibid.
- ³⁴Adrian Lewis, *The American Culture of War* (New York, NY: Routledge, 2007), 1-2.
- ³⁵Ibid., 21.
- ³⁶Sahr Conway-Lanz, *Collateral Damage, Noncombatants and Atrocity after World War II* (New York, NY: Routledge, 2006), 5.
- ³⁷Karl Clausewitz, *On War*, ed. by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 511.
- ³⁸Ibid., 538.
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- ⁴⁰Richard Wyman, "The First Rules of Air Warfare," *Air University Review* (March-April 1984): 97; Hamilton DeSaussure, "International Law and Aerial Bombing," *Air University Quarterly Review* 5, no. 3 (Fall 1952): 25.
- ⁴¹DeSaussure, 26.
- ⁴²Ibid.
- ⁴³Ibid.
- ⁴⁴Wyman, 97-98; DeSaussure, 26.
- ⁴⁵DeSaussure, 26.
- ⁴⁶Henry Stimson and McGeorge Bundy, *On Active Service in Peace and War* (New York, NY: Harpers, 1948), 623; Richard Rhodes, *The Making of the Atomic Bomb* (New York, NY: Simon and Schuster, 1986), 640.
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- ⁴⁹Ibid., 6.
- ⁵⁰John F. Shiner, "The Heyday of the GHQ Air Force, 1935-1939," in *Winged Shield, Winged Sword*, ed. B. C. Nalty (Washington, DC: Air Force History and Museums Program, 1997), 112.
- ⁵¹Rhodes, *The Making of the Atomic Bomb*, 639.
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- ⁵⁷David Shermer, *Wars of the 20th Century* (Seacucus, NJ: Derbibooks, 1975), 239.
- ⁵⁸Azar Gat, *A History of Military Thought* (Oxford: Oxford University Press, 2001), 577.
- ⁵⁹Ronald Schaffer, *Wings of Judgment* (New York, NY: Oxford University Press, 1985), 20.
- ⁶⁰Ibid.
- ⁶¹Phillip S. Mellinger, *Airmen and Air Theory* (Montgomery, AL: Air University Press, 2001), 103.
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- ⁶⁴Giulio Douhet, *The Command of the Air*, trans. by Dino Ferrar (New York, NY: Coward-McAnn, 1942), 9-10.

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CHAPTER 2

AT THE ACUTE: *Bombing in the European Theater*

In August 1944, the same General Kuter who wrote that it was “contrary to our national ideals to wage war against civilians,” sent a memorandum to the U.S. Army Air Force (USAAF) Chief of Staff, “Hap” Arnold. The carefully worded memo outlined an Air Staff study addressing the topic of air raids specifically designed to target German civilian morale.¹ The document speculated that a large air attack upon Berlin might create a significant psychological blow to the German populace and affect their support for the war effort. The memo specified that the Air Staff thought that an air assault of this type was to be “concentrated so far as possible on the administrative center of the city; and should continue without respite so long as operational factors permit.”² The document further suggested that these same kinds of raids might be useful on other German cities and even in towns of less than twenty thousand people.³

However, Kuter was not totally convinced that the idea of attacking the German people was a good idea. In response, General Arnold argued that the USAAF should not target the German people per se, but believed that “military objectives of numerous types can be made the targets . . . for example roving flights of bombers and fighters covering all of Germany to give every citizen an opportunity to see positive proof of Allied air power.”⁴ In Arnold’s response, he suggests that the morale of the German people might be affected without specifically targeting them.

Furthermore, Arnold stipulated that he “did not concur in the RAF belief that it will ever be entirely sound to execute an attack strictly against German morale . . . [but] did join in the belief that plans should be available to meet such an eventuality.”⁵

Separately, the Royal Air Force (RAF), who designed an attack plan initiating the Americans discussions, hoped that an attack of this sort would be a culminating blow to the German people and force a quicker Nazi capitulation. The plan called for the dropping five thousand tons of bombs in two hours on the administrative center of Berlin, and postulated that the raid might be “sufficient to devastate completely an area two and one half square miles.”⁶ The plan also speculated that the attack occur “during daylight hours [because] the population of the [targeted] area is high” and a raid of this magnitude offered the possibility of a “100 percent chance of destruction to all personnel and equipment in the area affected” with up to two hundred and seventy thousand killed.⁷ Furthermore, the planners thought that an attack of this sort needed to be directed against an area with the “highest density of population” in order to get the proper psychological impact and effect upon German morale.

Despite USAAF discussions and polemics regarding the raid, the British and the Americans eventually executed the strike in February 1945 and killed an estimated twenty five thousand Germans. After the raid, the *New York Times* reported, “More than 1,000 Flying Fortresses heaped additional ruin on Berlin in which an estimated 3,000,000 refugees from the eastern Reich have been jammed . . . the center of Berlin was left a shambles.”⁸ Regarding the raid one airman stated, “we just poured it in there . . . it [w]as wide open and you could just not miss. It sure

looked good to me.”⁹ So many fires were started by the attack that the last planes in the bomber stream made their attacks in instruments because the smoke obscured their vision.¹⁰ This attack on Berlin, and ostensibly German morale, was a significant departure from the USAAF pre-war doctrine regarding precision bombing and was the result of a steady transformation of American bombing policy and principles.

RAF v USAAF

With the attack on Pearl Harbor serving as the catalyst for America’s entry into World War II, the U.S. participation in the global conflict provided the USAAF the opportunity to prove the efficacy of the precision bombing strategy it developed during the inter-war years. The framers of America’s strategic bombing doctrine now found themselves in a position to execute the strategies they devised at the Air Corps Tactical School. Americans started their strategic bombing operations in Europe within the framework established in the pre-war doctrine. However, as the air war against Germany progressed, the Army Air Force began to stray from the bombing precepts it had once vigorously advocated. The Combined Bombing Offensive in Europe served as the starting point of America’s transition from precision bombing doctrine and the initial step toward wholesale bombing applications.

The first Army Air Force bombers began arriving in England during the spring of 1942. While the buildup of the U.S. Eighth Air Force in Great Britain took some time, the presence of American bombers and crews in England was already controversial. Apart from the cultural differences of the two Allies, with the English

complaining that the Americans were “over-paid, over-sexed, and over here,” a significant doctrinal difference existed between American bombing concepts and British applications. After the British Expeditionary Force’s defeat on the European mainland in spring 1940, England left much of its Army’s equipment in France and on the shores of Dunkirk. As a result, the Royal Air Force (RAF) was the only offensive capability available to the British to strike back at Nazi Germany. Leveraging this single offensive capability, in late 1940 the RAF’s Bomber Command began conducting strategic bombing raids over Hitler’s Third Reich.

The British approach to strategic bombing was markedly different from the Americans. The British believed that they could disrupt German war industry by attacking production centers, national infrastructure, and the normal patterns of civilian life.¹¹ While professing to loathe the bombing of civilians, the British placed great value on the effect bombardment would have on civilian morale and the subsequent result it could have upon armament production.¹² During the early phases of the British air offensive, the RAF attempted daylight raids over Germany. However, for a number of reasons, the biggest being the high loss of aircrew and airplanes from German air defenses, the RAF curtailed daytime bombing operations.¹³ Because of the high loss rate, Bomber Command modified its strategic bomber fleet and switched primarily to nighttime operations.¹⁴ By conducting raids at night, the RAF hoped that the cover of darkness would provide sufficient safety for its bombers flying over hostile territory.

However, switching to night operations had significant consequences on bombing methodology because it precluded the visual sighting of a target through the optical bombsight. It was impossible to locate factories and individual buildings at night from twenty thousand feet, but it was still possible to find cities and major industrial areas.¹⁵ As a result, Bomber Command began conducting saturation bombing against large German cities and production centers.¹⁶ By bombing large areas, the British hoped that the law of averages would work in their favor and destroy German industry as well as the morale of the civilian workforce.¹⁷ This change in British bombing methodology had dire consequences for German civilians and reflected the draconian bombardment ideas initially advocated by Douhet.

Despite the RAF's dismal experience with daytime bombing missions, the U.S. came into the war still subscribing to the idea of daylight precision bombardment. British civilian and military leadership, reeling from their excessive daytime losses, hoped to have the Americans join them in their nocturnal area bombardment raids. However, the USAAF was not equipped to fly night missions nor was it willing to abandon the precision doctrine it had so eagerly developed during the inter-war period. In an October 1942 paper addressing the use of night area bombing, the Commander of the U.S. Eighth Air Force, Brigadier General Ira Eaker defended the American strategy by referencing its economy of mass. In this document, he argued, that day bombardment was superior to night bombardment ten-fold.¹⁸ He believed that it would take one thousand night bombers to create the effects that a force of one hundred day bombers could accurately produce.¹⁹

The issues regarding Allied bombardment methodologies became a significant point of contention during the Allied Casablanca Conference in January 1943. The RAF contingent at the conference proffered that the U.S. support the British in their night bombing campaign and planned to have Winston Churchill press the issue with President Roosevelt. To argue the American position, General Arnold called Eaker to the conference to have him persuade Churchill of the efficacy of daylight bombardment. After a thirty-minute meeting with Eaker and listening to him plead the USAAF case, Churchill replied, “You have not convinced me that you are right, but you have persuaded me that you should have opportunity to prove your contention. When I see your president I shall tell him that I will withdraw my suggestion that the U.S. bombers join the RAF in night bombing.”²⁰ This doctrinal victory by the USAAF enabled it to pursue the daylight applications apart from the RAF and maintain U.S. autonomy in bombing operations.

As a result of this discussion, the Allies drafted the “Casablanca Directive.” This was the blueprint for Allied Bombing efforts in the European Theater and the document specified what types of targets the USAAF and the RAF were to attack. More importantly, the directive was sufficiently vague to allow each air force to pursue bombing operations in its own manner.²¹ According to Hansell:

This directive specified vigorous prosecution by both the British and American air forces toward a common grand strategic objective, optimizing the special strengths and capabilities of each air force toward a common goal. The directive endorsed both the American and British strategies for air power, and recognized both the RAF experience and the American tactical doctrine. The U.S. Eighth Air Force and RAF could cooperate as coordinate members of a team progressing toward a common destination. The RAF was free to

continue its chosen air strategy and the Eighth Air Force was free to pursue its doctrine of destruction of selective targets by daylight.²²

This directive was the seminal document for the “round the clock” bombing operations that characterized the Allied Combined Bombing Offensive.

Beginning with the first flight of American B-17 and B-24 bombers over Nazi territory in January 1943, the Army Air Force initially pursued a precision bombing strategy in accordance with its published doctrine. Simultaneously the British continued their night area attacks upon German urban population centers and production centers. However, the American bombing methodology in the European Theater of Operations was to change significantly over the course the war. As the Combined Bombing Offensive progressed, USAAF bombardment methods came to resemble those of their British counterparts and were eerily similar to raids once espoused by Douhet. The reasons for this change were many.

Practical Considerations

To drop a bomb accurately from a moving aircraft is a complex operation that requires the computation of a number of variables. Among these variables are true airspeed, aircraft pitch and yaw, crosswind drift, altitude, air density, and bombing interval. Despite the complexity of aerial bombardment accuracy, the USAAF was the world’s leader in bombing theory and advanced bombing techniques.²³ For airborne targeting, USAAF strategic bombers were equipped mostly with the Norden Mark (Mk) XV bombsight.²⁴ The Norden computed the many variables of precision bombing quickly and automatically. American airmen were optimistic about the

Norden sight and thought it could provide the accuracy the Air Force doctrine required.

The Mk XV sight (Figure 3) was an ingenious design and an impressive leap in gyroscopic and optical technology.²⁵ The unit was a two-piece assembly held stable by a pair of spinning gyroscopes, regardless of an aircraft's pitch, yaw, or roll. This arrangement allowed the bombardier in a moving airplane to aim his ordinance accurately at a fixed position on the ground. A unique aspect of the Mk XV's design was a remote pilot feature that connected the sight to the aircraft flight controls, thus allowing the bombardier to assume control of the aircraft while on the bomb run.²⁶ This capability allowed the bombardier to make course corrections during the bomb run that would supposedly result in a more accurate bombing pattern on the selected target.

Air Corps personnel expressed praise and admiration for the small, fifty-pound sight and were amazed by its capabilities and potential. Many viewed it as a technological marvel and wonder of engineering. One aircrew member remarked, "The more I found out about the bombsight, the more ingenious and inhuman it seemed."²⁷ Another stated, "It was something bigger . . . I ended up with a conviction . . . that a bombardier can't help feeling inferior to his bombsight."²⁸

The U.S. spent \$1.5 billion developing the bombsight, more than half the amount allocated to the Manhattan Project.²⁹ The Norden's design and intricate internal functions were highly classified, and it had been rumored that the Army Air Force required each bombardier to swear an oath to protect the secret design.³⁰ Due

to the impressive capabilities of the Norden sight, it quickly developed the exaggerated reputation of being capable of putting “bombs in a pickle barrel.”



Figure 3. A Norden Mark XV M-1 bombsight in the nose of a B-17G. *Source:* Author’s collection.

Originally designed for the U.S. Navy to sight both stationary and moving targets, the Norden was adopted by the USAAF in 1932 over its own Sperry developed sight.³¹ By the end of the war, Norden manufactured more than fifty two thousand sights for all branches of the armed services.³² The sight was so precise that bombardiers could drop bombs within fifty feet of a practice target from twenty thousand feet.³³ Based upon these capabilities, the Army Air Force expected 90 percent of bombs dropped to land within one mile of the aiming point with 40 percent landing within five hundred yards.³⁴ The reputation of the Norden was so pervasive that in an issue of *Collier’s* weekly magazine a cartoon had an American bombardier

asking the question while on a bombing run, “Was that address 106 Leipzigerstrasse, or 107?”³⁵

However, for all the accolades attributed to the Norden bombsight and the ideas regarding daylight precision bombing, the reality of the air war in Europe posed significant problems for the USAAF. The idea of targeting and hitting only selected areas of the German military machine and economic infrastructure was harder than airpower enthusiasts envisioned. While the Americans fought so intently to preserve their doctrine of daylight precision, the results of bombing accuracy up to 1944 were similar to that of their RAF counterparts who continued to drop bombs by night without the aid of the Norden.³⁶

After the war, the U.S government initiated a comprehensive and in-depth study of the bombing efforts to determine the effectiveness of the strategic campaign. Called the U.S. Strategic Bombing Survey (USSBS), this effort employed thousands of civilian and military personnel and painstakingly recorded the results of American bombing efforts. The USSBS produced a multi-volume record of bombing effectiveness in both the European and Pacific theaters. These volumes include a myriad of analytical and quantitative analysis regarding execution of the bombing efforts and their effects upon German and Japanese infrastructure. Controversy surrounded the study as it was drafted and then again upon its publishing. Following the war, both strategic bombing advocates and opponents used the results and figures published in the report for their own aims. A recent review of the USSBS argues that the survey’s conclusions are often mistakenly viewed as fact when they should

largely be seen as an interpretation of bombing data.³⁷ Aside from the doctrinal polemics, the survey contains a wealth of information regarding accuracy.

According to the USSBS, the American Eighth and Fifteenth Air Forces were unable to achieve the levels of accuracy expected in the pre-war doctrine. Many factors militated against precision bombardment in the European Theater. Weather was one of the more significant impediments to precision bombing and an important factor determining the success of any mission.³⁸ The study found that in all of 1944, for any area of Germany, on average, only one hundred and four days of clear weather occurred to conduct visual or visual-assist bombing.³⁹ Season weather patterns affected the ability to accurately sight targets and meteorological conditions conducive to visual bombing existed largely only from April to September. From an altitude between twenty to twenty five thousand feet, the occurrence of weather suitable for accurate bombing was roughly 40 percent.⁴⁰ As a result, the study determined that on average only about half of the Eighth Air Forces' aircraft aimed their bombs visually.⁴¹ Regarding precision bombing strategies, the Bombing Survey concluded that:

Many limiting factors intervened; target obscuration by clouds, smoke screens and industrial haze; enemy fighter opposition which necessitated defensive bombing formations, thus restricting freedom of maneuver; anti-aircraft defenses, demanding minimum time exposure of the attacking force in order to keep losses down; and finally time limitations imposed on combat crew training after the war began.⁴²

For all its capabilities, the potential accuracy of the Norden was irrelevant if the bombardier was unable to sight his aiming point from the cloudy, war-torn European skies.

Clouds, overcast, and smoke were only some of the obstacles to precision bombing. German Luftwaffe fighters and flak batteries were among other problems. During the first few years of the bombing campaign, bomber loss rates from German fighters and flak took a heavy toll on the Eighth Air Force. By the end of the war, 9,949 bombers were shot down with 79,265 men lost in action.⁴³ Early loss rates for bombers remained around 8 percent of the bombing force.⁴⁴ With this loss rate, airmen would not, statistically at least, survive their tours of duty consisting of twenty-five missions.⁴⁵

Furthermore, bomber aircrew operated in a dangerous and inhospitable environment. Temperatures at bombing altitudes of 20,000 feet were sub zero and averaged between negative 40 to 70 degrees Fahrenheit. At these extreme temperatures, airmen were subject to frostbite after only a few seconds of exposure to the elements and unprotected skin would freeze to metal components of the aircraft upon contact. Additionally, hypoxia, a lack of oxygen in the bloodstream, was a constant threat at high altitudes. A crewman might easily succumb to hypoxia if an oxygen mask regulator froze from the individuals own breath condensation, as was a frequent occurrence. Aircraft commanders had to continuously conduct voice checks to ensure crewmen remained conscious in the rarified air.

More importantly, these aircrews were subject to the fear and anxiety that goes along with combat. During the conduct of the Eighth Air Forces' effort, almost 2,000 aircrew were removed from flight duties because of fear or refusal to fly.⁴⁶ While this is a statistically small number given the over 100,000 aircrew in the

Eighth, it is indicative of the stress these crews experienced and the fear that accompanied them in their raids.⁴⁷ While the prewar doctrine promised precision, the idea was tested over the peaceful and relatively clear skies of the United States. However, the actual conditions over Europe were much different. One Eighth Air Force officer stated, “There is a lot of difference between bombing an undefended target and running a barrage of six-inch shellfire while a swarm of pursuit [fighters] are working on you.”⁴⁸

Furthermore, early bombing operations and accuracy suffered from poorly trained crews who were unfamiliar with bombers and the realities of air combat. New pilots and crews often came straight from a training command right to a combat unit without sufficient competency in a four-engine bomber and were unfamiliar with flying in bomber formations.⁴⁹ When queried after the war about when during the war did new, well-trained crews arrive in England, future Air Force Chief of Staff, General Curtis LeMay replied dryly “That never happened.”⁵⁰ Furthermore, aircrew and gunners were often untrained in aerial marksmanship and had poor gunnery skills.⁵¹ As a result, the defensive armament of the bombers was ineffective if gunners could not effectively employ their weapons and fend off Luftwaffe attacks. While the Eighth Air Force did develop in-theater training for new crews, the experience of aerial combat was a phenomenon that could hardly be replicated in a training environment.

Because of these factors, the bombing survey concluded that, on average for the entire bombing effort, “only twenty percent of the bombs aimed at precision

targets fell within the target area.”⁵² Accuracy rates of the Eighth Air Force alone show that in 1943 approximately 20 percent of bombs fell within 1,000 feet of their designated targets with that statistic changing to 60 percent by April of 1945.⁵³ As aircrews become more proficient as Luftwaffe fighter and flak effectiveness dwindled and by the last few months of the war, the Circular Error for heavy bombers went from 3,400 feet in early 1943 to approximately 1,000 feet in April 1945.⁵⁴ While accuracy rates rose throughout the course of the war, and spiked near the end, the overall results were still not what the framers of precision bombardment had originally envisioned.

In response to the poor visibility and weather, the Army Air Force began to investigate blind-bombing techniques. In one of these initiatives the Americans turned to their British counterparts for a possible solution. In March 1943, the USAAF obtained RAF-developed radar bombing equipment called “H2S.” H2S was a device that emitted a radar beam that reflected off the ground surface below and provided a graphic depiction of the terrain on a small cathode-ray tube located in the aircraft.⁵⁵ After studying the system, the USAAF subsequently developed an Americanized version called H2X (named “Mickey Radar” by aircrew). By November, the USAAF had conducted sufficient crew training and airframe modifications to execute its first radar bombing missions.

The initial missions using H2X were promising, but the new technology had its limitations. While 80 percent of Eighth Air Force missions in late 1944 used some kind of electronic device for bombing or navigation, many of these missions were

considered failures.⁵⁶ The bombing survey found that these poor results came from “cloud static, increased crew fatigue caused by adverse weather conditions, a high possibility of operator error, and the difficulty in briefing radar missions.”⁵⁷ When bombing a target that was completely overcast and obscured by clouds and when using H2X or other electronic bombing aids, the Bombing Survey determined that the Eighth Air Force placed only a paltry .02 percent of the bombs within one thousand feet of the aiming point.⁵⁸ The survey determined that H2X was effective as an aid to visual bombing, but bombing by radar alone was the least effective method.⁵⁹



Figure 4. First radar bombing mission over Bremen, November 13, 1943. Note the complete overcast under the bombing formation. *Source: National Museum of the U.S. Air Force*, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/060517-F-1234S-004.jpg> (accessed March 4, 2007).

Reporting the inaccuracy of H2X and other aids, the Bombing Survey also reported, “Bombs dropped by instruments [radar] in precision raids directed against specific targets fell over a wide area comparable to that covered normally in an area raid.”⁶⁰ In this case American bombing methodology yielded results similar to the RAF. Furthermore, the survey determined that “precision” was a relative term when

applied to radar bombing. A review of USAAF accounting methods found that the word had a liberal interpretation. The Survey reported, “If the specific target was, for example, a marshalling yard located in a German city, as so often happened, such a raid has the practical affect of an area raid against the city, but on the basis of the declared intention of the attackers it would go into the air force records as a precision attack on the transportation system.”⁶¹ In this vein, the missions counted as precision raids regardless of where the bombs fell. This liberal use of the word “precision” with regard to radar bombardment allowed the Army Air Force to portray the perception that it was adhering to the doctrine of precision strike.

The inaccuracy of bombing through normal visual methods combined with the limitations of early radar systems show that precision bombing was a theory that was not yet feasible. Despite the low accuracy rates and radar bombing results in July 1945, the Army Air Force’s monthly periodical entitled *Impact* still referred to pinpoint bombing and highlighted the difference between U.S. bombing practices and that of their British counterparts. In the end, there was little difference between British and American bombing results, and any differentiation between the two efforts is largely semantics.⁶² While the USAAF openly adhered to its doctrine of precision based upon prewar aiming expectations, the realities of the war precluded the full realization of this strategy. Americans clung to the tenets of precision bombing, but in the final analysis, the USAAF demonstrated at least an implicit acceptance of area bombardment and the collateral damage that was associated with the inability to bomb accurately.

Strategic Pragmatism

Changes to U.S. strategic bombing practices also came about from pragmatic rationales. As the war progressed, key persons in the American military and the federal government allowed and approved bombing operations that were a departure from established doctrine. Many of these individuals had an agenda and rationale for facilitating this change in bombing practices and saw that the application of Douhetian tactics as merely a means to an end. The attitudes of these individuals and their willingness to depart from precision bombing doctrine set a precedent that was to reverberate far into the future.

Through the feats of Charles Lindbergh, Amelia Earhart, Wiley Post, and Roscoe Turner, civil aviation enjoyed great popularity during the interwar years. Air races, new speed and distance records, and the pilots who accomplished these feats were front-page news during this “golden age of aviation.” While civilian aviation experienced a renaissance, the Army Air Corps found it difficult to establish itself in light of interservice rivalries of the era. With the nation reeling from the effects of the Depression, both the Army and the Navy were constantly clamoring for a share of the meager national defense budget. One officer who was to become a key figure in the strategic bombing effort likened the inter-war Air Corps to a “flying club” and a “public relations outfit” as opposed to an efficient military force.⁶³ This American paucity of defense spending and appropriation was based upon the premise that the U.S. could continue to count upon the relative safety that two vast oceans afforded.

In addition to this lack of military concern, the political temperament of the time favored isolationism as Americans sought to avoid foreign conflicts and international commitments. The reminder of American experiences in World War I combined with internal economic and social concerns facilitated the nation's focus on the domestic over the foreign.

However, the men who developed the Air War Planning Documents and filled the ranks of the Air Corps Tactical School understood the merit of military aviation at a time when the federal government and the general population saw aviation as a mere adjunct to an entire war effort. When the U.S. found itself involved in World War II, Army Air Force leadership realized that it had an opportunity to prove the value of aviation. As a result, General Arnold wanted to ensure that his service play a significant role in the conflict.

However, during this same period, much of the American military establishment was still skeptical of an independent air arm and thought aviation should remain subordinate to ground or sea operations. In support of this ideation, in 1939 and 1940 new USAAC aircraft purchases, apart from a few early B-17s, were mostly limited to airframes designed to conduct close air support to ground forces and not for strategic bombers or planes with significant range and payload.⁶⁴ Through a review of conflicts elsewhere in the world during the 1930s, most foreign air forces were merely supporting elements to a land campaign and did not act independently from ground commanders.⁶⁵ This prevailing view of airpower was also evident by the lack of strategic bomber development in all other countries except Great Britain.

All the Axis powers, as well as the USSR, built air forces with large air fleets that directly supported the ground campaign and paid little attention to four-engine bombers with long-range capabilities.

Arnold hoped to prove the value of military aviation while demonstrating the importance of an independent U.S. air force. Arnold was not alone in this thought as many officers in the USAAF saw merit in this endeavor. For Arnold, creating an independent air force became an over riding-priority. In the upcoming conflict, Arnold hoped to validate his contention. If the Combined Bombing Offensive in Europe proved to be an important tool in winning the war, it would not only help the cause of military aviation, but would also validate the premise of an independent air force.

Arnold openly called terror bombing “abhorrent to our humanity, and our sense of decency.”⁶⁶ In public, his views reflected the accepted values that Americans had professed before the war had begun. However, in private he had no such misgivings about the effect bombardment had on enemy civilians.⁶⁷ Regarding World War II he explained, “This is a brutal war and . . . the way to stop the killing of civilians is to cause so much damage that their government ceases fighting.”⁶⁸ However, in line with precision doctrine, he quipped, “This doesn’t mean that we are making civilians or civilian institutions a war objective, but we cannot pull our punches because someone may get killed.”⁶⁹ These same views were evident when Arnold responded to Secretary of War Stimson regarding the firebombing of Dresden

in February 1945. Arnold's retort to the Secretary was simply, "We must not get soft. War must be destructive and to a certain extent inhumane and ruthless."⁷⁰

To avoid a possible public relations backlash when killing lots of civilians while simultaneously cultivating popular support at home for an independent air arm, Arnold continuously walked a fine line between advocating Douhetian-type tactics and a strict adherence to the doctrine of precision bombing. To avoid public ire while still prosecuting his objective of validating airpower, Arnold followed the advice given to him by General Carl Spaatz during Congressional appropriation hearings during the 1930s: "Tell the truth, but don't blurt it out."⁷¹

Despite a huge surge in the size and capability of the USAAF, the beginning efforts of the bombing offensive were not living up to promise of precision strategic bombardment. While the B-17 and B-24s were putting theory into practice, the initial results of the bombing campaign were disappointing. As the U.S. attacked targets in Germany, American aircrews in terms of tactics, techniques and procedures experienced a steep learning curve. As a result, Arnold continually pressed Eaker and the Eighth Air Force for more substantial effects to prove the worth of air power and the expenditure of funds for the USAAF bomber fleet.⁷²

Arnold's office was located in Washington, DC, but his power and influence reached globally. Arnold wielded considerable power in all theaters of the war, and his authority in the USAAF was absolute. According to official USAAF history, Arnold personally selected air commanders and in this role, he held great sway and influence regarding their respective professional futures and subsequent

assignments.⁷³ Additionally, he communicated with them frequently and through his force of personality, and the power he held over their careers, his influence was immense. This influence over these commanders often affected theater applications.⁷⁴ Though not involved in running the day-to-day combat operations, Arnold's authority to relieve commanders gave him great leverage over their actions. He often strongly expressed his concerns to field commanders when they did not deliver the results he expected.⁷⁵



Figure 5. General H. H. Arnold. *Source: National Museum of the US Air Force, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/060913-F-1234S-007.jpg> (accessed March 9, 2007).*

Arnold's influence and agenda was an important factor in the change in bombing applications. According to historian Michael Sherry, "It was not necessarily Arnold's intention to make the war more costly or brutal--but efficiency; the clean kill, promised large rewards for the man [Arnold] and the air force. But intentions

and their results did not often correlate.”⁷⁶ Arnold’s professional agenda and visions for the future of his service were the priority. His motivation for a high number of combat sorties and the proof of the strategic bombing concept lay with his main goal, which was to make the largest possible contribution to winning the war and to ensure that the USAAF receive credit for it through publicity.⁷⁷

Evidence of Arnold’s views is present a 1943 letter to Eaker, where the chief referred to the Eighth Air Force raids over Bremen and Vegesack. In this correspondence, he congratulated Eaker by saying, “When the German news agencies refer to these missions as ‘terror raids,’ we know that the effect is all that we could wish.”⁷⁸ He concludes the letters by writing, “I want to extend to you and to all those who took part in these missions my congratulations on a job well done and my anticipation of bigger and better ones in the future.”⁷⁹ The mention in the German press calling these operations “terror raids,” combined with Arnold’s hope for “*bigger and better ones in the future*” indicate his willingness to change U.S. bombing applications and implicit acceptance of applications outside of precision. While Arnold’s public position on bombing was in line with published USAAF doctrine, his personal views, combined with his absolute rule of a global organization, encouraged bombing results that strayed from precision applications.

Still yet, another example of Arnold’s desire for results and media coverage was evident in a letter to Lieutenant General Carl “Tooe” Spaatz, head of U.S. Strategic Air Forces in Europe. In this letter, Arnold wrote:

The public reaction to our strategic bombing activities indicates that they are getting the impression that we are only partially destroying our targets and

that the British are finishing the work which we have only started . . . Can't we, someday, not in the too far distant, send out a big number--and I mean a big number--of bombers to hit something in the nature of an aircraft factory and lay it flat.⁸⁰

Given the personal views of Arnold and the emphasis he added, the tone of this letter infers that Arnold was looking to completely annihilate a target for media and public relation purposes rather than for practical military necessity.

Arnold was not alone in embracing Douhetian applications. Eisenhower, was a proponent of such actions as long as they would hasten the end of the conflict. In his role as the supreme allied commander, Eisenhower saw strategic bombing promising a way to accelerate Nazi Germany's capitulation and shorten the war. Eisenhower's primary concern over the defeat of the Nazi state made him a pragmatist regarding the use of force. While Ike did not necessarily embrace wholesale Douhetian applications for the sake of creating destruction, he was willing to accept them in order to meet his strategic aim.

In addition to redirecting the strategic bombing effort to support the tactical fight during the D-Day operations in Northern France, Eisenhower's pragmatism is evident in August 1944 when Lieutenant General Spaatz wrote to the Supreme Commander regarding the aforementioned RAF plan to bomb Berlin. The raid specifically targeted German morale and its stated goal was to achieve "in a single blow the complete devastation of the administrative and governmental centre of Berlin."⁸¹ The plan envisioned that this raid could kill or seriously injure two hundred and seventy five thousand people.⁸² Called THUNDERCLAP, the plan included a particularly Douhetian intent as it specified, "whole populations of Berlin

would be spectators of the catastrophe, and, in the state of the war which has been postulated, the effect might be decisive.”⁸³

Spaatz disliked the premise behind THUNDERCLAP and expressed his opinions to Eisenhower. On August 24, 1944, Spaatz reminded the Supreme Commander, “The U.S. bombing policy, as you know, has been directed against precision military objectives, and not morale. I am opposed to this operation as now planned. We are prepared to participate in an operation against Berlin, but in so doing will select targets for attack of military importance.”⁸⁴ In response to Spaatz’s letter, on August 28, Eisenhower replied, “While I have always insisted that the U.S. Strategic Air Forces be directed against precision targets, I am always prepared to take part in anything that gives real promise to ending the war quickly. The policies under which you are now operating will be unchanged unless an opportunity arises where a sudden and devastating blow may have an incalculable result.”⁸⁵

On September 9, Eisenhower directed Spaatz to conduct the raid when given the order. However, the approval of the operation was to coincide with another Allied operation and Eisenhower was hoping that the bombing raid could exacerbate the effects of the airborne assault of Operation MARKET GARDEN.⁸⁶ MARKET GARDEN was a British plan that utilized airborne forces to try isolating German forces in the Netherlands and Belgium by securing bridges and associated road networks. If successful, allied forces would then have a shorter route into Germany and establish a base of operations for subsequent offensives. Since the MARKET GARDEN operation was a failure, the THUNDERCLAP raid, with its promising

effects, was postponed. When finally conducted, on February 3, 1945, the raid coincided with a Soviet ground offensive in the Eastern Front in hopes of heightening the effects of the Russian attack.

Spaatz directed the Eighth Air Force to bomb Berlin in the hope that the THUNDERCLAP mission would succeed despite his initial misgivings.⁸⁷ When the Army Air Force bombers raided Berlin, bombardiers aimed their bombs both visually and by radar at specific targets.⁸⁸ Included in the target set were not only the rail yards at Tempelhof, but also public and political structures such as the Schlesischer rail station, the Air Ministry, Reich Chancellery, the Foreign office, and the Gestapo headquarters.⁸⁹

Although the raid disrupted daily life in Berlin, Operation THUNDERCLAP did not prove to be the decisive blow that the RAF had envisioned and the infamous Dresden raid conducted ten days later quickly overshadowed it. While the Dresden raid captured the press's attention, mostly because of the inflation of casualty figures by Nazi propaganda, the THUNDERCLAP episode not only provided insight into the attitude of the Supreme Allied Commander, but also tells of the willingness of the U.S. Strategic Air Force Commander to order such a raid. Despite Spaatz's reservations regarding this type of bombing, his actions indicate the fine line the USAAF was walking with regard to precision bombardment and the requirements of the Allied war effort. Furthermore, under the auspices of Eisenhower's desire to end the war quickly, bombing German cities daily became a common practice and served as the rationale for subsequent raids.⁹⁰

After the Dresden firestorm and the negative press it received, the USAAF reiterated its policy regarding bombing doctrine and attempted to distance itself from the RAF methodology. In dealing with a possible public backlash, Supreme Allied Headquarters decided to reply to any inquiries by stating, “There had been no change in bombing policy, the U.S. Strategic Air Forces (USSTAF) had always directed their attacks against military objectives and would continue to do so.”⁹¹ The discussions over the Dresden raid, and to a smaller degree, the Berlin raids raised the issue about the kind of bombing the USAAF was conducting. However, these discussions produced no large-scale inquiries that addressed bombing practices falling outside established USAAF doctrine.⁹² Throughout the bombing campaign in Europe, Air Force leadership continued to extol the virtues of precision and denied deliberate “terror bombing” or area bombardment practices. While the original USAAF intent avoided the moral dilemma of Douhetian bombing, the reality of the Combined Bombing Offensive did not match the doctrine publicly advertised.

European Theater commanders were not the only individuals who approved attacks on civilians. General George C. Marshall, Army chief of staff, who was an early advocate for an independent U.S. air force, also saw value in Douhetian applications and gave his implicit approval to another Douhetian effort, Operation CLARION. CLARION was a combined U.S.-British effort to use Allied airpower and scour all of Germany and attack transportation assets, infrastructure, and equipment. Most of the targets included road and rail networks located in small towns that had remained relatively untouched by the strategic bombing offensive.⁹³

When briefed about the CLARION plan and the wide-ranging nature of the operation, Marshall, who was at the Yalta Conference, suggested that in addition to the recent raids on Berlin, “[targeting] Munich would probably be of great benefit because it would show the people that are being evacuated to Munich that there is no hope.”⁹⁴

Marshall’s statement regarding the CLARION plan and his implied approval of this operation hints at a willingness to support attacks upon civilian populations and morale at the highest levels of the U.S. military.⁹⁵ His acceptance of Douhetian type operations was evident earlier in the war when discussing the potential of bombing Japan cities. In a 1941 meeting, he argued, “There won’t be any hesitation about bombing civilians-it will be all out.”⁹⁶ While Marshall himself did not pick target sets nor did he have a hand in daily bombing operations, he left these decisions to commanders who were willing to embrace Douhetian practices and had no objection to such operations.⁹⁷

The rationale for launching CLARION was also tied to the apparent loss of Allied offensive momentum in late 1944. Just as Eisenhower had approved THUNDERCLAP in concert with MARKET GARDEN, CLARION was approved in reaction to a late German offensive in the west. On December 16, the Germans launched their last-ditch effort in the Ardennes Forest near Luxemburg. Designed to thwart Ike’s ground offensive and split the Allied forces, the “Battle of the Bulge” reminded that Allies that the war was not yet won.

By January 1945, the German advance was thoroughly defeated; however, the repercussions of this Wehrmacht assault reverberated throughout the Allied High

Command. The December attack gave the Allies the impression that the final victory over the Nazi state was still beyond reach. As a result, in February Eisenhower approved CLARION in hopes of accelerating Nazi Germany's defeat, despite its Douhetian character.⁹⁸ During the high point in the Ardennes fighting, at a USSTAF staff meeting on December 23, General Spaatz told RAF Air Chief Marshall Arthur Tedder that the forces under U.S. command were prepared to execute CLARION when required.⁹⁹ In this vein, U.S. commanders willingly conducted operations that fell outside of existing doctrine in order to attain their strategic objective. Concerns over a prolonged ground offensive provided the Allied Commander sufficient cause for operations like CLARION and THUNDERCLAP.

THUNDERCLAP and CLARION did not prove to be the culminating blow, but the raids certainly subscribed to a Douhetian methodology. Given the situation at the time, and both Eisenhower's and Marshall's concern over a potential loss of Allied momentum, the execution of CLARION was viewed as a military necessity. The operation, in retrospect, could appear simply as an attempt by the Allies to kill and harm German civilians indiscriminately. However, given the tactical situation in late 1944/early 1945 and the state of the Western European offensive, the approval of such raids by Allied leaders was both prudent and practical. The apparent loss of momentum in the western front and the desire to conclude the war as quickly as possible provided another impetus for the change in bombing operations.

In conjunction with the approval from Allied military leaders, the American national leadership also sanctioned the change in bombing methods. While not

overtly approving Douhetian practices, President Roosevelt implicitly approved the transition of USAAF bombing applications. At the same 1943 Casablanca Conference that outlined the objectives of the Combined Bombing Offensive, the president broached the topic of the Axis' "unconditional surrender" with Churchill. The term helped set the stage for both European and Pacific bombing operations. Many argue that the declaration of the unconditional surrender mandate was more an extemporaneous quip than an attempt to establish a deliberate goal and end state.¹⁰⁰ Some accounts claim that Churchill was surprised at FDR's utterance of the term and was unaware that the President was going to voice such a statement. Adding to the spontaneity argument is the fact that the final press release for the conference failed to include the term unconditional surrender, although it was included in a draft release.¹⁰¹

Regardless of its possible spontaneity, unconditional surrender represented American war aims and was indicative of U.S. attitudes toward the enemy, international relations, national politics, and served as the rallying cry for the war effort.¹⁰² The term implied not just the defeat of the Axis powers militarily but called for the enemy's complete political acquiescence to Allied will and power. The condition, some argue, prolonged the conflict and caused needless deaths while precluding a potential political compromise. However, given the nature of Hitler's war aims and the ruthlessness of Japanese occupations, a negotiated compromise would have been hard to fathom. The enmity resident and goals of each side effectively precluded any

chance of a political settlement that could have spanned ideological, political, and sociological gaps.

Prior to World War II, European wars during recent history ended with some kind of negotiated peace between the combatants.¹⁰³ World War I and the Treaty of Versailles was the latest example of a negotiated peace. However, fresh with the memory of World War I and its consequences, unconditional surrender implied assurances that no deals would be made that could potentially sow the seeds for another war or leave any outstanding issues unresolved. The use of this term established a precedent for modern war and allowed for no compromise of the goals and objectives of the Allied forces.¹⁰⁴ As a result, the Americans and their Allies were fully committed to the destruction of the Axis states, their armies, and their political entities.

Furthermore, the term served as an uncomplicated and clear message for public address, provided assurance to a suspicious Soviet state that the western Allies were in for the long haul, and provided the ideological foundation for the Allied effort.¹⁰⁵ The term's primary importance lay in its galvanizing the Allies and their purpose at a time when they had no specific terms for the end of hostilities.¹⁰⁶ The term helped frame Allied goals and objectives and turned the war into a moral crusade against fascism and expansionist tyranny.

FDR believed that "peace can come to the world only by the total elimination of German and Japanese war power. . . . This means the unconditional surrender of Germany, Italy, and Japan."¹⁰⁷ This particular condition for the end of hostilities had broad implications for Allied military action as it meant the complete defeat and

annihilation of Hitler and the Nazi regime with no possibility of co-existence or compromise.¹⁰⁸

These terms equated to the total crushing of the Nazi state, leaving no room for another revival of the German *Dolchtoess* (stab in the back) excuse used so effectively after World War I.¹⁰⁹ Many in the U.S. government believed that the failure to achieve a complete surrender of Germany in World War I had sewn the seeds for the next one. The demand for an unconditional surrender of the Nazi state in World War II would prevent another conflict with Germany in the future. However, the unconditional surrender requirement carried an implied tasking. This term created an environment that enabled Douhetian applications during the combined bombing offensive. The term unconditional surrender not only implied the destruction of Nazi political and military organizations, but also insinuated the physical destruction of Germany.

Prior to the war, FDR was an early advocate of airpower. As Commander-in-Chief, he established the precedent for the growth of the Army Air Force and especially its bomber fleet in the late 1930s. Even before the war had begun, Roosevelt pressed Congress and American industry to increase aircraft production. In May 1940, he suggested that the US needed to produce “At least fifty thousand planes a year.”¹¹⁰ Having great faith in American production and economic capability, FDR saw that the best way of ensuring an Allied victory was to produce as much war material as possible.¹¹¹ In support of this effort during the early 1940s, he established aircraft production goals with an emphasis on bomber aircraft. In April 1942, he

promised, “soon American Flying Fortresses would be fighting for the liberation of the darkened continent of Europe.”¹¹² This claim is indicative of his initial support of strategic bombing and the importance of the bomber fleet.

FDR also saw efficiency in aerial bombardment because as he saw it, “This kind of war would cost less money, would mean comparatively few casualties, and would be more likely to succeed than a traditional war by land and sea.”¹¹³ In this light, FDR subscribed to certain aspects of Douhetian thought and hoped for a relatively quick war that would avoid the misery and endless violence experienced during World War I. Despite his advocacy for the production of aircraft and belief in a quicker war by use of airpower, Roosevelt never specifically commented about the efficacy of strategic bombing and avoided queries regarding the damage the bombing offensive was creating.¹¹⁴ While never overt, his comments regarding bombing were always indirectly supportive. However, his push for more bombers, increased aircraft production, the expansion of the Army Air Force, and unconditional surrender were key steps in the development of U.S. strategic bombing development and its subsequent transition.

FDR harbored no guilt over the damage inflicted upon the Germans and the Nazi state. Despite his earlier condemnation of the Soviet Union’s use of bombers against Finland, the president believed that Germany and its population needed to be punished for its aggression. The president thought that most people in the U.S. and England erroneously believed that only a few Nazi leaders were responsible for the war, not the entire German nation.¹¹⁵ In August 1944 when discussing post conflict

Germany with his Secretary of the Treasury Henry Morgenthau, the president remarked, “The German people as a whole must have it driven home to them that a whole nation has been engaged in a lawless conspiracy against the decencies of modern civilization.”¹¹⁶ He wanted to the “tough with Germany” and have them understand “the fact that they are a defeated nation, collectively and individually, must be so impressed upon them they will hesitate to start any new war.”¹¹⁷

By harboring such animosity toward Germans and holding them collectively responsible, FDR showed he had little or no remorse for the destruction the U.S. bombing effort was creating. He believed that Germany must be taught a lesson and that they could not continue in this pattern of military action. In his mind, the defeat of the Germans must be thorough, complete, and transcend generations. FDR’s successor Harry Truman shared this sentiment and upon the new president’s return from Potsdam declared, “The German people are beginning to atone for the crimes of the gangsters whom they placed in power and whom they wholeheartedly approved and obediently followed.”¹¹⁸

Other evidence of FDR’s approval of bombing methodologies came in his establishment of the U.S. Strategic Bombing Survey effort. On September 9, 1944, FDR wrote to Secretary of War Henry Stimson suggesting, “It would be valuable in connection with air attacks on Japan and for post war planning to obtain an impartial and expert study of the effects on Germany which was authorized in enlarged scale as the Combined Bombing Offensive at the Casablanca Conference.”¹¹⁹ In this study, the president directed elements of the U.S. government to capture information on

enemy rates of production and the problems associated with shattered infrastructures. He also hoped to obtain “Some indication of the psychological and morale effect on an interior community.”¹²⁰ By signing a letter to study the results of “psychological and morale effect” FDR was at least acknowledging raids targeted these areas and objectives.¹²¹ This singular act proves that FDR was at least cognizant of Douhetian bombing and had at least an awareness of its consequences.

As the war in Europe unfolded, commanders in the theater and at home accepted pragmatic solutions to operational and strategic challenges. Historian Ronald Schaffer correctly identified this idea by arguing, “the most important factor moving the [US]AAF toward Douhetian war the attitude of the country’s top civilian and military leaders.”¹²² This pragmatism was evident in the attitude of Arnold who pushed for bombing results and sought to make a name for the USAAF.¹²³ Likewise, Spaatz willingly ordered area type attacks and oversaw bombing operations that fell outside USAAF doctrine. Eisenhower and Marshall, who both wanted to conclude the war as quickly as possible, saw merit in Douhetian practices.¹²⁴ FDR, who saw bombing as new dimension of warfare, gave his implicit approval of USAAF bombing practices to punish the Germans for their aggressiveness.¹²⁵ All of these men had a role to play and contributed to this transition. While their pragmatic rationales were understandable given the situation, there is no doubt that their individual and collective influences facilitated the movement from precision bombardment to wholesale attack. Either directly or indirectly, these men had a hand

in the development of Douhetian bombing practices over Germany. However, these men alone were not solely responsible for transition of bombing applications.

Public Perceptions

The transition of Air Force practices to Douhetian application in the European Theater occurred also because of other factors and influences. The framers of the Air War Planning Documents envisioned the possibility of targeting populations and bombing large-scale areas. This placeholder in the planning documents that foresaw targeting civilian populations became a reality not only because of the reasons already discussed, but also from the approbation of the American public. American citizens provided support for such methodologies despite the moral dichotomy. While public approval for the bombing campaign did not in itself create the transition, it facilitated the changeover toward Douhetian methodologies.

Despite America's relatively small casualty figures during World War II when compared to other nations, another motivation for the transition of bombing practices was the desire to mitigate U.S. deaths.¹²⁶ Since bombers and their payloads contained more firepower than traditional ground units did, they could theoretically inflict more damage upon an enemy. As a result, bombers were seen by some as a catalyst for the resolution process. Much like Douhet had imagined airpower's ability to shorten wars, Americans believed that strategic bombing could reduce overall casualty rates by creating sufficient enemy fatalities, thus resulting in a shorter war. Even in such Douhetian raids as Operation THUNDERCLAP, the sparing of Allied forces was one

of the intentions and motivations for the bombing campaign. This premise is evident in the opening paragraph of the THUNDERCLAP operations order as it speculated, “If the operation should succeed in curtailing the duration of the war by even a few weeks it would save many thousands of Allied casualties and would justify itself many times over.”¹²⁷

Furthermore, technological fascination was widespread in the U.S. during the interwar years and served as an impetus for many aviation advances. Most Americans were excited about the technological breakthroughs of the time and saw these advancements as an indication of American progress, society, and civilization.¹²⁸ These technological developments, combined with the mass production of consumer products, changed the very nature of American life and the way they viewed the future.¹²⁹ General Arnold too was an advocate of technological development and attempted to leverage scientific and engineering advances as much as possible. He thought, as did many Americans, that the U.S. should leverage technology to the greatest extent possible. With the increase of technological prowess, airpower by the beginning of the war too had matured and grown more powerful and could be employed more selectively than ground or naval forces.¹³⁰

Throughout the inter-war years, advances in aeronautical engineering, radar, navigation, and weapons development held promise for a quicker and more decisive victory. The National Advisory Committee for Aeronautics and the Naval Research Laboratory provided a yeoman service during this period and provided the U.S. with a significant lead in innovation and engineering.¹³¹ Both of these organizations laid

the foundations and set the stage for a military that was quick to access new technologies and apply them on the battlefield.¹³² As a result, most in the U.S. believed that new technology could, and should, spare American lives and bring closure to the war as soon as possible.¹³³

In addition to the growing infatuation with technology and aviation, developing public support for the war and ensuring that Americans understood the reasons why the U.S. was involved in the conflict was of paramount importance to the federal government and to FDR. Many Americans in both the federal government and in the private sector believed that the U.S. needed its own information campaign to counter the Nazi propaganda machine and mobilize public opinion for the war.¹³⁴ So important was public support that in June 1942 FDR established the Office of War Information (OWI) under the direction of Elmer Davis. The OWI's main function was to coordinate government information activities, liaison with the press, radio, and motion picture industries, and communicate American war aims to the general population and to the world.¹³⁵ In this endeavor, the OWI conducted an American version of a propaganda campaign designed to stir emotions and cultivate American domestic support for the war effort. While the American effort based its message on truths wrapped in patriotic tones, the OWI produced movies, radio broadcasts, and published articles and pamphlets declaring the superiority of democracy over fascist totalitarianism.¹³⁶ All of the OWI's messages portrayed the image of a powerful American nation that was fighting against nefarious and evil powers that threatened democratic states.

Most of the messages publicized by the OWI were simplistic and trite but extolled the virtue of the nation's industrial might and military efforts through a multi-media effort.¹³⁷ A significant endeavor for the OWI was to coordinate the message sent to the public through motion pictures. In this effort, the OWI sought to influence the studios and executives in Hollywood so they would produce films supportive of the war. While Hollywood maintained its independence and artistic license, studios harmonized their efforts with government messages that largely supported OWI approved themes.

In order to help Hollywood produce films that supported these governmental themes, the OWI consistently produced guidance on how studios could help in the war effort, participated in executive meetings regarding story lines, and reviewed scripts and screenplays.¹³⁸ In this endeavor, the OWI outlined five prevailing messages that it believed need to be publicized to the American population: Why we fight; the enemy; the united nations (meaning the Allied effort); the home front; and the fighting forces.¹³⁹

For the European Theater, the OWI preferred to focus upon anti-fascist themes rather than racial stereotypes. In this regard, the Germans were given some respect and differentiations were made between "good Germans" and "bad Germans."¹⁴⁰ OWI generally approved of films that addressed the brutality of the Nazis in occupied territories and contrasted it with prewar peace.¹⁴¹ Movies such as *This Land is Mine* (RKO, 1943), *The Cross of Lorraine* (MGM, 1943), *Hangmen Also Die* (United Artists, 1943), and the classic Bogart film *Casablanca* (Warner

Brothers, 1942) all portrayed the draconian nature of Nazi occupation and its murderous ways. Even Tarzan got into the act as Johnny Weissmuller once again played the king of the apes in *Tarzan Triumphs* (RKO, 1942). In this film Tarzan rallies the local population near his jungle, to include the animals who evidently were able to differentiate between Germans and the Allies, to “Kill Nazis” who were trying to exploit natural resources for the German war effort.¹⁴² While Germans could be considered good or bad, the idea that Nazism was such a malevolent phenomenon would no doubt influenced Americans to accept the bombing of German cities. While it could be argued that “good Germans” were being killed in these raids, the lack of public outcry over the bombing effort in Europe indicates an acceptance of the realities of war and the bombing campaign.

Radio too became an effective medium as quick one-minute transcriptions plugged the war effort and leveraged popular radio personalities of the day who reminded Americans of the seriousness of the war effort.¹⁴³ Furthermore, the OWI published pamphlets and small booklets that conveyed patriotic temperament and praised Allied war efforts. The office also aimed its efforts at overseas readers and published a periodical entitled *Victory* that informed other nationalities as to American war progress.¹⁴⁴

Over time, the ideals and themes disseminated by the OWI and other federal agencies became the accepted view most Americans had regarding the war.¹⁴⁵ Through a mixture of both patriotism and profit, Hollywood became complicit in the war effort by helping to generate sufficient public enmity and animosity toward the

Axis enemy.¹⁴⁶ Despite the over-inflated tones and the images published by the OWI and other governmental entities, Americans began to embrace these idealized messages and saw them as a reflection of the larger American society.¹⁴⁷ Because of these propaganda efforts, the American public became conditioned to support the war effort and its military commanders. This in turn generated overwhelming public approval of Allied action and resulted in very little dissent from the wider-held opinions. However, these patriotic messages were not the sole realm of the federal government, but echoed by commercial enterprise, independent news agencies, and popular magazines.

This predisposition of the U.S. citizen to support the military served to enable the transition of USAAF bombing practices. Throughout the bombing campaign the American public raised no large protest or objections to the effects of the bombing offensive and largely supported its actions. However, the execution of the bombing campaign and the doctrine advertised by the Army Air Force created a dichotomy in the public realm that largely went unnoticed. While the Army Air Force publicized its raids as “precision,” popular periodicals of the time often praised the widespread damage seen in Germany. As early as December 1943, one popular magazine ran an article entitled “Germany’s Choice - Quit or Be Destroyed!”¹⁴⁸ The article made repeated references to the amount of destruction dealt upon the Nazis, while still touting the Air Force precision bombing methods. Interestingly, this article belies precision applications as it also reported that “the death and destruction of vast sections of enemy cities [was] unavoidable.”¹⁴⁹ A November 1943 *Saturday Evening*

Post article quoted one Air Force officer who boldly stated, “The German people must make their choice, surrender or total ruin.”¹⁵⁰ The printing of the “total ruin” quip at least hints at a bombing methodology that was less than precise, widespread in effect, and with an expectation that this was a lauded attribute of the bombing efforts.

A review of *Time* magazine from early 1943 to June 1945 found no articles that called into question the amount of devastation the bombing offensive was creating. Rather, the articles published usually lauded the air raids and their effects while raising no moral objections to the Air Force’s efforts. Repeatedly, these stories provided an embedded approval of bombing efforts and praised the heroism of the aircrews conducting these raids. Even after the infamous Dresden raid in February 1945, the March 5, issue of *Time* magazine reported that the city was “a main feeder point for the Silesian front” and made no mention of civilian casualties.¹⁵¹

Furthermore, in the March report the periodical attempted to validate the purpose behind the raid. *Time* address the controversy regarding the Dresden firestorm, but did not question the bombing methodology. At the end of the war, the VE Day supplement to the *Pittsburgh Sun-Telegraph* newspaper included a cartoon that depicted a formation of bomber aircraft in the shape of a large finger pointed at the Japanese rising sun as they flew over a smoldering Germany. Accompanying the formation was the word “DOOM.”¹⁵²

During the European bombing offensive, USAAF Generals Eaker and Spaatz were on the covers of the magazine with accompanying stories portraying them in a hagiographic manner. Both articles were largely human-interest pieces providing

insight into these men and their characters, and having decidedly optimistic tones. In the Spaatz piece, *Time* portrayed the general as a card-playing gambler who was paving the way for a new form of warfare while harboring a disdain for Germans. Equally positive, the Eaker story reported that he was a soft-spoken man with a core of hardness and tenacity. The background artwork on the covers of the respective magazine itself hints at a Douhetian methodology by displaying bombs raining down in the background behind portraits of the generals.

However, after the Berlin and Dresden raid the Germans were vociferous in their claims against the Allies regarding “terror bombing.”¹⁵³ In response, the AP new service ran an article that specifically stated, “Allied air commanders have made the long awaited decision to adopt deliberate terror bombing of the great German populations centers as a ruthless expedient to hasten Hitler’s doom.”¹⁵⁴ This story led to a flurry of internal USAAF discussion and messages addressing the bombing of German cities.¹⁵⁵ This story initiated a doctrinal crisis within the organization, but in the end changed little regarding bombing methodologies. While the story certainly ran counter to what the USAAF public statements, it did not result in any significant repudiation of bombing applications by the public nor did it change popular sentiment regarding the strategic effort.

When Spaatz returned to the continental U.S. following VE Day he, along with General Omar Bradley, other Army generals and returning veterans, were treated to a parade and a heroes’ welcome. The front page of the *Philadelphia Daily News* headline for June 4, 1945 read “500,000 OUT TO HAIL GENERALS” and

prominently featured pictures of him and Bradley.¹⁵⁶ Accompanying the parade was a flyover with the newspaper reporting, “Roaring overhead . . . will be . . . 100 giant B-29s and B-17s, the great planes which are laying waste to the once ambitious Japanese empire.”¹⁵⁷

Like *Time* magazine, the *New York Times* echoed similar sentiment of the bomber offensive. During the same period, articles consistently reported, in a positive manner, the progress of the bombing campaign. Columns in the *New York Times* were full of descriptions praising the Air Force and the damage it had inflicted upon German cities. When Dresden was bombed, the paper published a skeptical view of German casualty and damage reports and said, “The Germans pulled out all the stops on the sympathy propaganda, reporting that Dresden has been turned into a heap of ruins.”¹⁵⁸ In this same article, the author defensively speculates that the city’s cultural artifacts were safe and that pointed out that as in France and Britain, these irreplaceable items and artwork had probably “Long since [been] removed to safety vaults.”¹⁵⁹

This pro-bombardment sentiment of the *New York Times* was clearly resident in an op-ed piece published on March 8, 1944. The newspaper printed rebuttal to prominent pacifist and anti war advocate, Vera Brittain who, along with twenty-eight members of the clergy, protested the war and called the strategic offensive “massacre by bombing.”¹⁶⁰ The editors of the paper met this lone voice of dissent with indignation. In response to Ms. Brittain, the editors replied rather curtly “We should leave tactics and strategies to the generals hoping they can be as merciful as they can.

. . . But let us not deceive ourselves into thinking that war can be made humane.”¹⁶¹ Furthermore, another printed response to Ms. Brittan’s protest asked, “Just how in Earth they [Ms. Brittan and her fellow protestors] expect to achieve their highly valued justice, tolerance, humanity, brotherhood, and tenderness without socking the rapacious German nation with every pound of explosives available they do not say.”¹⁶² While the paper provided a forum for discussion, the responses to Ms. Brittain were telling. Both the responses argued in support of the ongoing bombardment and an acceptance for USAAF efforts. These counter arguments to Ms. Brittain reflected contemporary American thought regarding bombing.

Concurrently the USAAF created its own publication entitled *Impact* that looked very similar to the more popular *Life* magazine. *Impact* routinely printed pictures and published positive stories regarding the bombing effort and the effect it was having on the Axis. In addition to reporting the developments of the air war in all theaters of the war, the periodical published pictures that were telling of the devastation in Germany because of the air assault. Moreover, like its civilian counterparts, *Impact* still referenced precision applications when addressing the strategic effort. While *Impact*’s distribution was limited and was not intended for distribution to the general public, it was widely circulated among Air Force personnel without concern for moral indignation over its content.

In addition to the features and articles, civilian magazines regularly printed advertisements for businesses supportive of Army Air Force efforts and the bombing campaign. Many small manufacturers linked their companies to the air offensive as a

way to promote their products. Companies such as Nicholson Files, Yale Locks, and South Wind Heaters, and a host of others advertised their connection to the USAAF to bolster their sales and reputations. In addition, many larger manufacturers that produced components and parts used in airframes for the bombing effort also advertised their association with the Air Force. General Electric, AC Delco, Studebaker, Texaco, and General Motors all publicized how their products supported the bombing campaign and aircraft designs. Since these companies willingly tied their products to the bombing effort for increased sales, these ads are indicative of a widespread approval of USAAF operations in the eye of the American public.

The USAAF itself made deliberate public relations efforts by printing a book in late 1943 called *Target: Germany* that covered the exploits of the Eighth Air Force during its first year. Copies of this book also included advertisements from local vendors who helped to sponsor the printing of the manuscript. Additionally famous literary author John Steinbeck wrote in support the USAAF cause. In 1942 he published *Bombs Away: The Story of a Bomber Team*. The work outlined how the USAAF trained bomber crews and the responsibilities of each crewmember based upon their assignment in the airplane. In the preface of the book Steinbeck wrote, “The Air Force proves the stupidity of the bewildered Europeans, who seeing this nation at peace, imagined that it was degenerate, who seeing that we fought and quarreled in our politics, took this indication of our energy as a sign of our decadence. The fortresses and B-24s, the Airacobras, and P-47s have by now disillusioned them.”¹⁶³

From the highways of peace...to the skyways of war...



The highest honor that could be paid
any motor car manufacturer...

Studebaker
MAKING
CROSSING THE GREAT DIVIDE
EASIER

Working together the steady-beating wings of the Flying Fortress...
The most reliable, the most comfortable, the most spacious...
The most powerful, the most efficient, the most economical...
The most beautiful, the most dignified, the most inspiring...
The most complete, the most perfect, the most perfect.

For every, beautiful, thoughtful of the day, Studebaker is proud to be a companion in the service of our United States. The most reliable, the most comfortable, the most spacious...
The most powerful, the most efficient, the most economical...
The most beautiful, the most dignified, the most inspiring...
The most complete, the most perfect, the most perfect.

EVENING POST

We Stayed at Home to Drop a Bomb on Berlin



Live at home and like it—it's important to eat down travel. Here's how, with your hardware dealer's help, you can have fun being a stay-at-home.

"Single, married, home this winter will help keep the home fresh strong," says the maker of YALE & TOWNE Locks, urging you to stop at your local hardware store for the many things you'll use any for better winter living.

For some YALE & TOWNE Locks...
...the most reliable, the most comfortable, the most spacious...
...the most powerful, the most efficient, the most economical...
...the most beautiful, the most dignified, the most inspiring...
...the most complete, the most perfect, the most perfect.

TRAD
YALE LOCK
...THE LOCK RECOMMENDED BY THE
WORLD'S LEADING LOCK EXPERTS

THE YALE & TOWNE MFG. CO.
HARTFORD, CONNECTICUT, U.S.A.

Stores at 100 South 10th & 10th Ave. LaSalle, Ill.,
Chicago, Ill., and 10th and 10th St. New York, N.Y.

SHOP AT YOUR LOCAL HARDWARE STORE

Today—Riding High in Icy Battle-Skies

—Is a Heating Miracle for Your Car



"I've seen why by the handle...
...the most reliable, the most comfortable, the most spacious...
...the most powerful, the most efficient, the most economical...
...the most beautiful, the most dignified, the most inspiring...
...the most complete, the most perfect, the most perfect.

This is the magic "sealed flame" principle of heating, developed by Stewart Warner, that made possible the South Wind Heater for your car which has been named "the best in 30 years." In your car's heater, the South Wind Heater will bring you even warmth in even the coldest weather, in even the coldest weather.

What's more, you'll be able to have a South Wind Heater will even start itself! On bitter cold mornings, while you and breakfast, your car will be heated with warmth... the engine wrapped in a warm blanket to make happy, making more a thing of the past.

The proof is riding the line of the world today! In South Wind's line and light enough to hold away to make but please—yet giving more heat than the furnace for an eight-room house! In South Wind's line and light enough to hold away to make but please—yet giving more heat than the furnace for an eight-room house!

SOOK...This Heating Magic Can Serve You in Many Ways!

• Not that it can be used in any other way, South Wind heating magic provides your winter for your car, for your home, for your office, for your shop, for your garage, for your boat, for your camp, for your cabin, for your tent, for your trailer, for your truck, for your motor home, for your boat, for your camp, for your cabin, for your tent, for your trailer, for your truck, for your motor home.

• Not that it can be used in any other way, South Wind heating magic provides your winter for your car, for your home, for your office, for your shop, for your garage, for your boat, for your camp, for your cabin, for your tent, for your trailer, for your truck, for your motor home.

South Wind Heaters

Figure 6, 7, 8. Advertisement excerpts from the *Saturday Evening Post* and *Colliers*. Left: Studebaker Ad, July 11, 1942, *Collier's*. Center: Yale Lock Co. Ad, November 6, 1943, *Saturday Evening Post*. Right: South Wind Heater Ad, February 17, 1945, *Saturday Evening Post*.

Even Hollywood got into the act as Oscar winning director Bill Wyler produced a documentary called *Memphis Bell*, named for the nose art of the bomber, extolling the accomplishments of the first B-17 crew to complete its full compliment of twenty-five missions with no crew losses. This forty-five minute documentary was deftly crafted to depict the bombing effort in the best light possible and highlight the sacrifice of the many aircrews. Additionally, Walt Disney made an animated feature of de Seversky's best selling book on airpower that was equally popular on the big screen.¹⁶⁴ Furthermore, big box office stars such as Jimmy Stewart and Clark Gable also participated by joining the USAAF. In fact, Stewart became a skilled combat commander and eventually rose to the rank of general in the Air Force Reserves. In

all, American popular culture willingly embraced and praised the accomplishments of the strategic air offensive and largely felt no remorse for its consequences.

American approval of the strategic bombing campaign and the damage it created is also evident in Gallup polls taken during the war. In a March 1944 survey, Gallup asked the question: “If military leaders believe it will be necessary to bomb historic religious buildings and shrines in Europe, would you approve or disapprove of their bombing them?”¹⁶⁵ 74 percent of Americans answered in the affirmative while only 19 percent disapproved.¹⁶⁶ Along this same line of thinking, when queried in January 1943: “If Hitler offered peace now to all countries on the basis of not going farther, but of leaving matters as they are now, would you favor or oppose such a peace?”¹⁶⁷ An overwhelming 92 percent of Americans opposed such an offer.¹⁶⁸ These figures not only illustrate the American sentiment regarding bombing applications but also show the clear disdain Americans had for the Axis.

As a result, during the Combined Bombing Offensive military leaders did not have to consider public scrutiny or concern themselves with moral indignation when planning bombing raids and their effects. The bombing of German cities was not a contentious issue among Americans and posed no moral difficulties. When reviewing public opinion polls of the period, the specific question about the bombing of Axis cities and populations is conspicuously absent. Apart from the aforementioned 1944 query regarding historic religious buildings, polls were largely silent on the matter of bombing.¹⁶⁹ The issue regarding the morality of bombing German cities, even after the Dresden raid, was not addressed. The only questions that were evident regarding

bombing, save for the aforementioned query, during the war centered on the dropping of the atomic bombs on Hiroshima and Nagasaki, and the answer to that question was overwhelmingly in favor of their use. The absence of questions and polls relating to the morality of the bombing effort is in itself indicative of the lack of American concern regarding Douhetian applications.¹⁷⁰

While the Dresden raid made some headlines and forced the Air Force to reiterate its established, pre-war bombing doctrine, the American population largely condoned the widespread damage and embraced the potential that airpower had for the defeat of Nazi Germany. The issues regarding the morality of the bombing effort in Europe was largely an individual concern, if it was a concern at all. Even Dr. Norman Vincent Peale, leader of the Reformed Church in America and author of the popular book *The Power of Positive Thinking*, in February 1944 declared that the bombing of Germany was “retributive justice” and that “Berlin and other German cities should be bombed.”¹⁷¹ Additionally, and in response to Vera Brittan’s protestations over the bombing effort, the Bishop of New York, William T. Manning responded, “If war is to be shortened and the world freed from this assault of brutality and terror, what substitute can the signers of this protest suggest for the bombing of cities which are military objectives, terrible and grievous as we all feel this to be.”¹⁷² In these instances, even prominent members of the clergy provided approbation of the bombing campaign and its effects. Furthermore, these comments also insinuate that the bombing effort posed no significant dilemma to contemporary Americans regarding civilian casualties.

The issue regarding the morality of bombing, for both civilian and military alike, was a matter of perception that required each individual to determine its ethics. However, for the vast amount of the American population, they harbored no ill will or indignation toward their government or the Army Air Force. The prevailing sentiment of the American people favored bombing efforts and lauded the strategic campaign. By reviewing print, media, and other elements of popular culture of both the government and private sector, it is obvious that the moral dilemma surrounding bombing posed no significant problems for the USAAF. Through explicit or implicit means, Americans gave their approval for the transition to Douhetian applications and supported this new dimension and application of warfare.

Legacy of the European Theater

The results of the Combined Bombing Offensive were impressive if not stark. In the end, Allied airpower dropped approximately 2,700,000 tons of bombs and flew 1,440,000 bomber sorties.¹⁷³ While the numbers of Allied aircrew killed or missing was comparatively high to other theaters of war, this air armada alone accounted for the destruction of 3,600,000 houses, killed 300,000 civilians, wounded 7,800,000, and made approximated 7,500,000 homeless.¹⁷⁴ Additionally, the infrastructure of the German state was razed, its buildings devastated, and its production capabilities destroyed or at least severely curtailed. Given the ratio of the size of bomber force compared to the destruction it created, Douhetian applications had become a reality.

The widespread destruction wrought by the bombing offensive was a reminder that despite American moral and ethical proclivities, the pragmatism and the exigencies of war over ruled doctrine, theory, and principle. Realities of war won out over peacetime theory and ideation. Regardless of the destruction wrought upon Germany, the numbers generated by the European bombing effort pale in comparison to what followed in Pacific Theater and what was planned in the event of nuclear war.

The Combined Bombing Offensive in the European Theater of Operations provided invaluable experience for the USAAF and had an impact upon the conduct of strategic bombing operations in the Pacific. According to Hansell, the strategy underlying the bombing of Japan was similar to that applied against Germany. The Pacific strategy was “to defeat the enemy air force and to weaken the Japanese capability and will to fight as to cause capitulation or permit occupation against disorganized resistance, failing this, to make an invasion feasible at a minimum cost.”¹⁷⁵ In conjunction with this strategy, a number of personal legacies from the European Combined Bombing Offensive had an impact upon the Pacific Theater bombing campaign. These legacies are not so much from tactics, techniques and procedures regarding bombing application; rather these influences are largely from a strategic standpoint as the experiences of the European effort provided context and perspectives regarding bombing.

While the stated objectives for the Pacific bombing campaign were reflective of those of the Combined Bombing Offensive in Europe, the leadership for the 20th Air Force was composed of individuals who had gained their experience from the

European Theater of Operations. General Curtis LeMay, who became the Commander of the XX Bomber Command in China and subsequently XXI Bomber Command in the Marianas, was largely responsible for the firebombing of Japanese cities in the spring and summer of 1945 gained this operational experience in the European Theater. LeMay became a key figure in the American strategic bombing efforts and developed many of the concepts utilized by the USAAF in World War II, and subsequently by the newly formed USAF. LeMay's impact and influence upon American strategic bombing methodology is incalculable. Not only did LeMay establish operational precedents during the war, but his ideas and temperament were key in the shaping and creation of the strategic bomber fleet during the early years of the Cold War.

Trained as both a navigator and a pilot, and well versed in the skills of a bombardier, LeMay was a talented airman who developed the "box formation" for the Eighth Air Force in Europe that maximized B-17 defensive fires in order to increase bomber protection. He was also responsible for the establishment of new bomb run procedures when the aircraft passed over their initial point (IP) and were enroute to the target. As commander of the 305th Bomb Group in England, he gave standing orders that the group was to remain on a straight flight path during the final bomb run and avoid any evasive defensive maneuvering. This tactic was at the potential expense of higher aircraft and aircrew loss rates, but promised higher bombing accuracy. LeMay was keenly aware of the destructive potential of mass bombing and

he brought his talent skills and experience from Europe to the Pacific, and eventually to the U.S. Air Force Strategic Air Command.



Figure 9. General Curtis E. LeMay with his characteristic cigar. A bout with Bell's Palsy as a young officer damaged the muscles in his face which gave him his ever-present frown. *Source: National Museum of the US Air Force*, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/050811-F-1234P-006.jpg> (accessed July 11, 2007).

Furthermore, Hap Arnold remained in charge of the USAAF throughout the war and his influence over the global air effort remained considerable. Arnold's priorities regarding the role of airpower and the hope for an independent U.S. air force encouraged larger raids that yielded more destruction and death for both theaters of the war. Keen to prove the efficacy of airpower, Arnold continually pushed his commanders to make the biggest effects possible with the bombing

efforts. He was not shy about advertising the USAAF's efforts and hoped to publicize the potential of airplanes and airpower. While cognizant over the potential backlash of civilian deaths, Arnold gauged that Americans were more interested in the winning the war than they were in conducting it morally. Furthermore, an impatient man, Arnold was not afraid to remove commanders when they failed to deliver the results required and chastised them when they fell short of his expectations. Regardless of their locations and own ideas and agendas, both of these men understood the capabilities and limitations of strategic bombing and brought their insights to the Pacific bombing effort. Their personal authority and ability to shape bombing applications in both theaters cannot be dismissed nor can they be addressed without discussing their influence.

Secondly, the American participation in operations such as CLARION and THUNDERCLAP set a precedent for raids falling outside the purview of precision bombing. Wartime expediency over-ruled doctrinal affiliations as bombing methodologies became reflective of wartime realities rather than peacetime theories and intellectual frameworks. Once the USAAF had begun a transition to a Douhetian-type strategy, subsequent operations that utilized non-precision methods became more palatable to Army Air Force leadership. The targeting of civilian populations and urban area bombing was not seen as repugnant as it had been prior to 1943 and the U.S. Eighth Air Force found itself regularly deviating from USAAF doctrinal precepts. This initial acceptance of non-precision methods over Europe, and the establishment of it in the AWPDs, created a placeholder for the eventual use of

such applications. The attacking of German populations in hope of creating a psychological effect deviated from established doctrine, but executed for good military reasons and tactical necessities. Eisenhower's willingness to accept these methodologies in the hope of shortening the war gave impetus to a change in European bombing methodology. Adoption of these practices in Europe and their doctrinal consideration facilitated the transition to area bombing in the Pacific theater.

Thirdly, the desire to avoid American casualties continued to have relevance. In the European bombing effort, Arnold saw that the American population wished to leverage technical advantages in order to reduce U.S. and allied casualties.¹⁷⁶ In this regard, German deaths were much more palatable than American ones, especially if the former facilitated less of the latter. Consequently, just like in Europe, as the war in the Pacific raged, more and more Americans were losing their lives. Perceived fanaticism of the Japanese escalated American fears that an invasion of the home islands would be a bloody affair. Since the utilization of airpower in Europe was seen as a potential way to help offset potential Allied casualties, this same line of reasoning would be applied to the Pacific campaign. Just as Eisenhower approved of the CLARION raid to hopefully shorten the war, strategic bombing in the Pacific was also looked upon as a panacea to American casualties. Victory for the American population not only meant the defeat of the Axis, but also included the requirement for a minimum of suffering and casualties on the part of the Allies.¹⁷⁷

The change in USAAF strategic bombing practices in the Pacific war had its origins in Europe. USAAF leadership experiences, precedent from USAAF European

area practices, and the overall desire to spare American casualties all had an affect upon the Pacific bombing campaign. These influences combined with the unique nature of the Pacific environment provided fertile ground for further changes in bombing methods. With the European bombing experience fresh in mind, the 20th Air Force operating out of the Marianas had a departure point for the development of more lethal and destructive methods of bombing. Those experiences in Europe, which were paid for at a high price by Allied aircrews, facilitated the devastation that was to be experienced by the Japanese nation in 1945. However, in addition to the legacies from the European Campaign, the bombing effort in the Pacific was to have its own unique considerations that exacerbated the departure from USAAF doctrinal constructs.

¹L. Kuter correspondence to Fred Anderson, August 15, 1944, Box 153, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.

²Ibid.

³Ibid.

⁴Memorandum for F. Anderson, September 12, 1944, Box 153, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.

⁵Ibid.

⁶Annex I, Operation THUNDERCLAP Folder, Box 153, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.

⁷Ibid.

⁸Sydney Gruson, "3,000 ton Blow Hits Berlin In Steady Bombing of Reich," *New York Times*, February 4, 1945.

⁹Ibid.

¹⁰Ibid.

¹¹Wesley Craven and James Cate, *The Army Air Forces in World War II, Volume 1 Plans And Early Operations January 1939 to August 1942* (Chicago, IL: University of Chicago Press, 1948), 596.

¹²Ibid.

¹³"A Broken Reich States the Case for Strategic Bombing," *Impact* 3, no. 7 (July 1945), (Washington, DC: Office of the Assistant Chief of Air Staff, Intelligence; Reprint Harrisburg, PA: National Historical Society, 1989), 4.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Ibid.

¹⁷John Nichol and Tony Rennell, *Tail End Charlies* (New York, NY: Thomas Dunn Books, 2006), 39.

- ¹⁸Ira C. Eaker, correspondence dated October 8, 1943, Box 10, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ¹⁹Ibid.
- ²⁰Herman Wolk, "Decision at Casablanca," *Air Force Magazine* (January 2003): 81.
- ²¹Ibid., 82.
- ²²Haywood Hansell, *The Strategic Air War against Germany and Japan* (Washington, DC: Office of Air Force History, 1986), 72-73.
- ²³US Strategic Bombing Survey (USSBS), *Overall Report (European War)* (Washington, DC: U.S. Government Printing Office, September 30, 1945), 4.
- ²⁴Albert Pardini, *The Legendary Norden Bombsight* (Atglen, PA: Schiffer Military Press, 1999), 43.
- ²⁵Ibid., 73. The Sperry "S" series was also used but did not have the accuracy of the Norden M series.
- ²⁶Martin Bowman, *USAAF Handbook 1939-1945* (Mechanicsburg, PA: Stackpole Books, 1997), 195.
- ²⁷Stephan Budiansky, *Airpower* (New York, NY: Penguin, 2004), 174.
- ²⁸Ibid.
- ²⁹Ibid., 176.
- ³⁰Ibid., 175. There is not proof that this was a requirement and may be attributed to a scene in the movie "Bombardier," which showed Air Corps personnel swearing this oath.
- ³¹Pardini, 43, 250.
- ³²Ibid., 342.
- ³³Roger Freeman, *The Mighty Eighth* (New York, NY: Orion, 1970), 1.
- ³⁴Crane, 64.
- ³⁵*Colliers Magazine*, September 26, 1942, 79.
- ³⁶Budiansky, 318.
- ³⁷Gian Gentile, *How Effective is Strategic Bombing? Lessons Learned from World War II to Kosovo* (New York, NY: New York University Press, 2000), 166.
- ³⁸United States Strategic Bombing Survey (USSBS), *Bombing Accuracy, USAAF Heavy and Medium Bombers in the ETO* (Washington, DC: U.S. Government Printing Office, January 1947), 5.
- ³⁹United States Strategic Bombing Survey (USSBS), *Weather Factors in Combat Bombardment Operations in the European Theater* (Washington, DC: U.S. Government Printing Office, January 1947), 29.
- ⁴⁰Ibid., Chart II.
- ⁴¹Ibid., 3.
- ⁴²United States Strategic Bombing Survey (USSBS), *Summary Report (European War)* (Washington, DC: U.S. Government Printing Office, 1945), 4.
- ⁴³United States Strategic Bombing Survey (USSBS), *Statistical Appendix to Overall Report (European War)* (Washington, DC: U.S. Government Printing Office, 1947), viii.
- ⁴⁴Gerald Astor, *The Mighty Eighth* (New York, NY: Penguin, 1997), 98.
- ⁴⁵The number of required missions for a complete tour was initially set at 25. The number of required missions was raised as the war unfolded.
- ⁴⁶Nichol and Rennell, 144. In order to address this issue both the RAF and the USAAF established locations in England away from bomber bases in order to allow crews to relax for a period before resuming flight duties.
- ⁴⁷Ibid.
- ⁴⁸Astor, 76.
- ⁴⁹Kohn and Harahan, 26-27.
- ⁵⁰LeMay in Kohn and Harahan, 35.
- ⁵¹LeMay in Kohn and Harahan, 26; Astor, 76.
- ⁵²USSBS, *Summary Report (European War)*, 5.
- ⁵³USSBS, *Bombing Accuracy*, Exhibit H.

- ⁵⁴Ibid., Exhibit I. The definition of Circular Error in the USSBS is defined as the distance from the target to the center of the bomb pattern.
- ⁵⁵Craven and Cate, vol., 1, 691.
- ⁵⁶Crane, 72.
- ⁵⁷USSBS, *Bombing Accuracy*, 12-13.
- ⁵⁸Ibid.
- ⁵⁹Ibid., 1.
- ⁶⁰USSBS, *Overall Report (European War)*, 72.
- ⁶¹Ibid.
- ⁶²Nichol and Rennell, 42.
- ⁶³LeMay in Kohn and Harahan, 21.
- ⁶⁴Daso, 155.
- ⁶⁵Ibid.
- ⁶⁶Crane, 33.
- ⁶⁷Ibid.
- ⁶⁸Ibid.
- ⁶⁹Sherry, 151.
- ⁷⁰Laurence Giles to H. Arnold, correspondence, March 7, 1945, January-March 1945 Folder, Box 223, General Harley H. Arnold Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ⁷¹Dewitt S. Coop, *Forged In Fire* (Garden City, NY: Doubleday, 1982), 5.
- ⁷²Sherry, 150.
- ⁷³Craven and Cate, *The Army Air Force in World War II, Volume V, The Pacific-Matterhorn to Nagasaki* (Chicago, IL: University of Chicago Press, 1953), 683-684; Craven and Cate, *The Army Air Force in World War II, Volume VI, Men and Planes* (Chicago, IL: University of Chicago Press, 1955), 28-29; Daso, 175-176.
- ⁷⁴Sherry, 150-151; Daso, 229, 175; Richard G. Davis, *Carl A. Spaatz and the Air War in Europe* (Washington, DC: Center for Air Force History, 1993), 32.
- ⁷⁵Sherry, 150-151; Davis, 103-104; Daso, 175-176.
- ⁷⁶Ibid.
- ⁷⁷Crane, 34, 38, 59; Davis, 198.
- ⁷⁸H. Arnold to I. Eaker, correspondence, October 9, 1943, Box 17, General Ira Eaker Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ⁷⁹Ibid.
- ⁸⁰H. Arnold to C. Spaatz, correspondence, January 24, 1944, Box 14, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ⁸¹Annex I, Operation THUNDERCLAP Folder, Box 153, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ⁸²Ibid.
- ⁸³Ibid.
- ⁸⁴C. Spaatz to D. Eisenhower, correspondence, August 24, 1944, Box 18, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ⁸⁵Ibid.
- ⁸⁶Davis, 439.
- ⁸⁷Ibid., 552.
- ⁸⁸Schaffer, 97.
- ⁸⁹Davis, 552.
- ⁹⁰Forrest Pogue, *George C. Marshall: Organizer of Victory* (New York, NY: Viking Press, 1973), 547.
- ⁹¹Schaffer, 99.
- ⁹²Ibid., 100.

- ⁹³Craven and Cate, *The Army Air Forces in World War II, Volume. III, Europe: Argument to VE Day, January 1944 to May 1945* (Chicago, IL: University of Chicago Press, 1952), 732.
- ⁹⁴Pogue, 544; Schaffer, 94.
- ⁹⁵Davis, 549; Schaffer, 106.
- ⁹⁶Sherry, 109.
- ⁹⁷Pogue, 547.
- ⁹⁸David Eisenhower, *Eisenhower: At War 1943-1945* (New York, NY: Vintage Books, 1986), 692.
- ⁹⁹Staff meeting notes, December 23, 1944, Box 16, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.
- ¹⁰⁰Dallek, 375.
- ¹⁰¹*Ibid.*, 374. The fact that it was mention in the draft release is at least indicative of discussions between the two leaders regarding this condition for the termination of hostilities.
- ¹⁰²Anne Armstrong, *Unconditional Surrender, The Impact of the Casablanca Policy upon World War II* (New Brunswick, NJ: Rutgers University Press, 1961), ix.
- ¹⁰³*Ibid.*, 15.
- ¹⁰⁴*Ibid.*
- ¹⁰⁵James Robert Maddox, *Weapons for Victory* (Columbia, MO: University of Missouri Press, 1995), 8.
- ¹⁰⁶“Attention Tokyo,” *Time*, August 6, 1946.
- ¹⁰⁷Dallek, 374.
- ¹⁰⁸Bernard Brodie, *War and Politics* (New York, NY: MacMillan Publishing, 1973), 37-38.
- ¹⁰⁹*Ibid.*, 38.
- ¹¹⁰Sherry, 91.
- ¹¹¹*Ibid.*, 121.
- ¹¹²*Ibid.*, 122.
- ¹¹³*Ibid.*, 79.
- ¹¹⁴*Ibid.*, 122.
- ¹¹⁵Dallek, 472.
- ¹¹⁶*Ibid.*, 472-73.
- ¹¹⁷*Ibid.*
- ¹¹⁸“Radio Report to the American People on the Potsdam Conference,” August 9, 1945, *Public Papers of Harry S. Truman 1945* (Washington, DC: U.S. Government Printing Office, 1961), 203.
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- ¹²⁰Schaffer, 89; correspondence Roosevelt to Stimson, September 9, 1944, Box 277, General Harley H. Arnold Papers, Manuscripts Division, Library of Congress, Washington, DC.
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- ¹²⁴*Ibid.*
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CHAPTER 3

45 DEGREES: *Bombing in the Pacific Theater*

While American forces in late 1944 and early 1945 were penetrating Germany and Nazi occupied territory in Europe, the USAAF's 20th Air Force, flying the new B-29 "Superfortress" bomber, was fully engaged in the bombardment of the Japanese homeland. Initially operating from bases in China and subsequently from the Marianas Island Chain, American air attacks against the Japanese became remarkably effective in destroying large parts of Japan's urban areas and national infrastructure. The strategic effort against the Japanese home islands created horrific scenes of carnage that came to resemble the vision proffered by Giulio Douhet years earlier. The starkest example of the American air offensive's effectiveness and the embracement of Douhetian tactics was evident in the firebombing of Tokyo on 9-10 March 1945. Following the night-time raid over the Japanese capital, accounts of the conflagration reported that:

Most [victims] died horribly as intense heat from the firestorm consumed oxygen, boiled water in canals, and sent liquid glass rolling down the streets. Thousands suffocated in shelters and parks; panicked crowds crushed victims who had fallen in the streets as they surged toward waterways to escape the flames. Perhaps the most terrible incident came when one B-29 dropped seven tons of incendiaries on and around the Kokotoi Bridge. Hundreds of people were turned into fiery torches and "splashed in the river below in sizzling hisses." One writer described the falling bodies as resembling "tent caterpillars that had been burned out of a tree." Tail gunners were sickened by the sight of hundreds of people burning to death in flaming napalm floating on the surface of the Sumida River . . . B-29 aircrews fought the superheated updrafts that destroyed at least ten aircraft and had to wear oxygen masks to avoid vomiting from the stench of burning flesh.¹

Ironically, *Time* magazine reported that the raid was “precision area bombing,” meaning that the target area was outlined with bombs aimed at just that specific district.² Scenes similar to this one occurred in many Japanese cities as waves of B-29s dropped napalm based incendiary bombs upon the wooden frame houses of Japan’s metropolitan areas. In the days following the Tokyo raid, attacks against Osaka, Kobe, and Nagoya were equally destructive. Raids against smaller Japanese urban areas followed the bombing of the major cities. Repeated attacks hit Tokyo, and destroying more than half of the city’s urban neighborhoods by May 1945.³ The effectiveness of the Pacific bombing campaign led to the destruction of over 180 square miles of Japanese urban territory, destroyed over 600 factories and 2.3 million homes, injured between one-half to one million, and killed 330,000 to 990,000 civilians.⁴

The harshness of the Pacific bombing effort and the number of deaths incurred led General LeMay, Commander of the XXI Bomber Command on Guam, to quip “if we lost the war we would be prosecuted as war criminals.”⁵ This observation by LeMay, who was directly responsible for ordering firebombing practices, speaks volumes about the conduct of the Pacific effort and represents a personal acknowledgment of the significant departure from USAAF doctrine. Future Secretary of Defense, Robert S. McNamara, who served as a member of LeMay’s staff in the Pacific, characterized the firebombing campaign years later by stating that “he [LeMay] was right, we were acting as war criminals.”⁶

Regardless of the moral interpretations of U.S. efforts in the Pacific campaign, and much like its European counterpart, the changes in bombing methodologies resulted from a number of reasons and rationales. The influence of various considerations unique to the Pacific effort encouraged the continued departure from established bombing doctrine, a shift that was to manifest itself in the conflagrations experienced by the Japanese population in the spring and summer of 1945. While building upon the experiences of the bombing effort over Germany, the USAAF developed more lethal bombing applications and targeting methods. The changes that occurred in the Pacific bombing campaign came about from a mix of geographical, technical, economic, social, and political circumstances. The engine of war that drove these changes and the synergy of these circumstances drove the transformation in American strategic bombing methods.

Geography

The geographic location of Japan and the unique meteorological conditions over the island chain had a direct impact upon the manner in which the 20th Air Force executed its strategic bombing effort. While the technology for high-altitude bombing was coming of age before World War II, weather still had significant implications for the execution of the strategic campaign. Meteorological considerations affected not only bomb flight dynamics and targeting, but were also a factor regarding aircraft formation, performance, flight routes, and bombing run procedures.

Much as had been the situation in Europe, weather considerations over Japan, especially cloud cover, precluded the accurate sighting of targets through an optical bombsight. While weather over Germany allowed for approximately one hundred days a year for optical sighting, the Japanese weather patterns were not much better. Before launching a bombing force from the Marianas, a daily reconnaissance strike mission conducted a one thousand three hundred mile trek just to obtain weather data.⁷ Furthermore, lack of weather data reported from Siberia, northwestern Japan, or China made weather forecasting for the USAAF even more problematic and made these reconnaissance flights even more important.⁸

The Japanese home islands experience two seasonal weather patterns--winter and summer. Both of these patterns adversely affected high-altitude precision bombing and precluded the application of existing USAAF doctrine. The winter weather pattern (figure 10) is characterized by cold air from Siberia sweeping across to the Japanese islands of Hokkaido and Honshu and picking up substantial amounts of heat and moisture as it passes over the Sea of Japan.⁹ When this cold air mass reaches the Japanese coast, it creates clouds and precipitation on the windy northwestern slopes of the island.¹⁰ As a result, meteorological conditions along this coast are not conducive to precision bombing.

However, the Siberian air, dries out as it rises over the island chain's western mountains and then warms when it descends on the other side of the island. After descending, the air arrives clear and dry over the Japanese plains that face the Pacific.¹¹ This weather pattern creates conditions favorable to bombing the eastern

Japanese plains and the cities that occupy these regions.¹² Despite this promising weather pattern, this same air mass continues south eastwardly toward the Pacific where it descends under warm, tropical air over the open ocean, which then produces a turbulent frontal area with towering cumulus clouds.¹³ Off the eastern Japanese coast, towering fronts sometimes produced solid walls of clouds from one thousand five hundred feet to thirty thousand feet between the Marianas and the mainland.¹⁴ This eastern frontal area served as a significant obstacle to B-29s flying north to the Japanese islands.

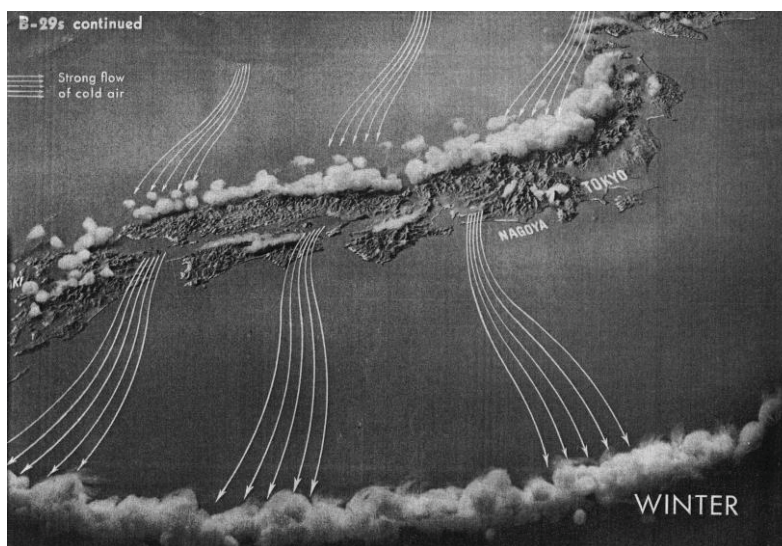


Figure 10. Japanese Winter Weather Pattern. *Source*: “The Weather Problem in Attacking Japan,” *Impact* 3, no. 2 (February 1945): 48.

Additionally, while the winter weather pattern is characterized by clear weather over the eastern Japanese plains, the weather over this low-lying area was not always conducive to precision bombardment.¹⁵ Despite the described winter weather patterns and the potential for clear air over the Japanese plains, actual meteorological

conditions over the eastern mainland of Japan, at best, presented marginal weather for daylight precision bombing. Weather conditions during the first bombing raids over Tokyo and Nagoya, conducted in the early winter of 1944, reported weather problems with cloud cover that obscured targets even during this most favorable season.¹⁶

24 Nov., Tokyo. No Clouds 9/10 undercast.
27 Nov., Tokyo. Jap mainland completely cloud covered.
29 Nov., Tokyo. Solid undercast at target.
13 Dec., Nagoya. 1/10 cloud.
18 Dec., Nagoya. 3 Sqns report CAVU (Ceiling And Visibility Unlimited) . . . over target, 6 report 8/10- 10/10 cloud.
22 Dec., Nagoya. 6/10 to 10/10 cloud.
3 Jan., Nagoya Primary target CAVU to 2/10 cloud
14 Jan., Nagoya Primary Target 8/10 to 10/10 cloud.¹⁷

However, the summer weather pattern did not mitigate the weather problem for the XXI Bomber Command operating from Guam/Saipan. During the summer months (figure 11) the cloud cover over Japan shifted over to the Pacific side of the island chain as a weak flow of cool air, circulating over the Sea of Japan, converged with a strong flow of warm air coming westerly from the Pacific.¹⁸ Where the warm air climbed over the cold air on the western mountain chain of the islands, clouds built up to high altitudes and provided a dense overcast for targets on the eastern Japanese plains.¹⁹ As a result, a blanket of overcast covered much of the lowland plains and the major Japanese cities. Thus, the summer weather pattern too, often precluded effective precision bombing.

Despite general awareness of the existing weather patterns, preliminary planning considerations assumed that visual bombing conditions existed over the Japanese home islands.²⁰ Fresh from his experiences in the European theater,

General Hansell, the first Commander of the XXI Bomber Command, conducted operations in accordance with existing USAAF doctrine. The first strike over Tokyo on October 30, 1944, called for a daylight visual bombing from 30,000 feet with mostly high explosive (HE) bombs.²¹ This raid set the pattern for bombing operations for the next three months.²² However, high altitude precision raids failed to produce the results expected by Arnold and the visual bombing weather assumption proved incorrect.²³ Hansell understood the implications of Japanese weather on the strategic bombing effort and concluded that the preferred strategy of precision optical bombing could not be sustained in the face of continuous cloud cover.²⁴

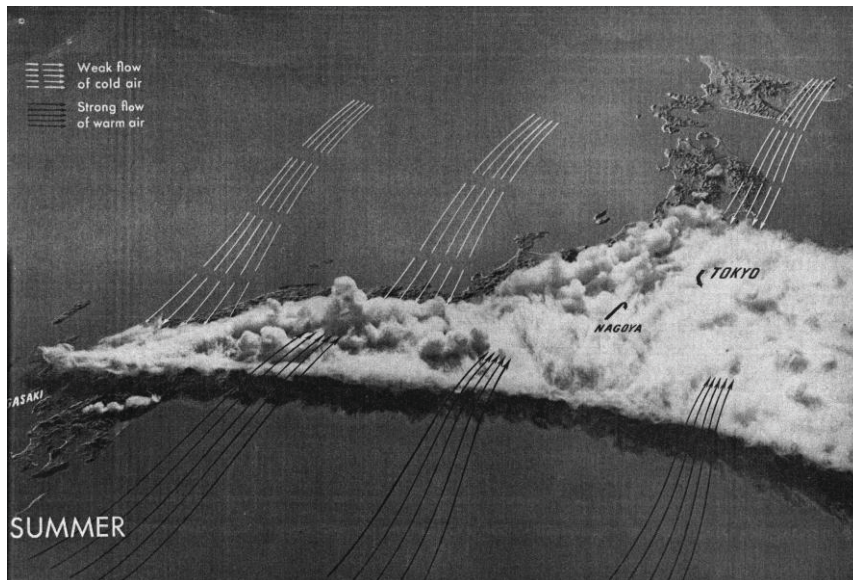


Figure 11. Japanese Summer Weather Patterns. *Source*: “The Weather Problem in Attacking Japan,” *Impact Magazine*, 3, no 2 (February 1945): 49.

Regarding the weather over Japan, LeMay stated, “The weather at high altitude [over Japan] was unquestionably the worst bomber weather in the world.”²⁵

From high altitudes cloud ceilings averaging six thousand feet often obscured Japanese targets. During these early raids, B-29 aircrews placed less than 10 percent of their bombs within the designated target areas.²⁶ As a result, the damage produced by early B-29 raids was hardly worth the expense of the new airplane or the risk to the aircrew's lives.²⁷ In fact, the weather situation during these early B-29 operations proved to be more of an obstacle than Japanese fighters or anti-aircraft fire.²⁸ The weather phenomenon had significant implications upon U.S. bombing methodology in the Pacific.

Because of meteorological considerations, and after the March 9-10 raid, LeMay on April 5, 1945 wrote Arnold: "Weather continues to be our worst operational enemy. During my first six weeks here we had one visual shot at a target. This was primarily the reason I lowered the altitude for our incendiary attacks."²⁹ He went on to state: "I am going to try lowering the altitude of our daylight attacks to get under the weather. If necessary, we will go clear down to the deck."³⁰ The USSBS substantiated LeMay's comment and noted the meteorological problem by stating, "weather constituted the most serious obstacle confronting our combat units."³¹

As mentioned earlier, radar-bombing methods developed throughout the war allowed bombardiers to "see" through clouds and overcast. However, as discussed previously, these early radars were less than accurate for precision bombing and even if a crew had trained with this new equipment, bombing results were usually unsatisfactory. The USAAF continued to develop radar technology and the early versions of the B-29 had the APQ-13 radar system installed. However, much like its

European predecessor, this early radar could not provide the definition required to accurately sight bombing targets from high altitudes.³²

LeMay, too, concluded that the APQ-13 radar, was inadequate for high altitude precision bombing. However, the APQ-13 was effective against coastal targets with proper training of navigators and radar operators. He found that low-level incendiary attacks presented an operation well within the capabilities of B-29 crews and radar equipment.³³ In the last few months of the war, the USAAF began fielding the APQ-7 *Eagle* radar that had ten times the power of resolution of the APQ-13.³⁴ However, when the weather allowed, high explosive strikes were conducted from medium altitudes, but when clouds obscured the target, as was usually the case, area tactics using incendiaries with radar targeting methods became a common practice.³⁵

In addition to cloud coverage, 20th Air Force crews had their first experience with the phenomena known as the jet stream. The jet stream, a current of racing air that circles the globe, was discovered B-29 aircrews operating at altitudes around 30,000ft. These jet stream winds could even reach speeds as high as two hundred to two hundred and fifty miles per hour, and created significant problems for the American bomber formations over the Japanese mainland. A first casualty of B-29 encounters with the jet stream was the doctrine of high altitude precision bombardment. The excessive wind velocities made impossible accurate high altitude precision bombing and thus, as LeMay later admitted, proved to be “a stumbling block to bombing accuracy.”³⁶ LeMay noted, “wind velocities at 30,000 feet were as

high as 230 miles per hour or about three times hurricane intensity.”³⁷ These winds posed a number of problems for bombardiers. When bombing downwind, these winds resulted in aircraft ground speeds that climbed as high as five hundred and fifty miles per hour, far beyond the parameters in existing USAAF bombing tables.³⁸ By flying with the wind, a B-29 would pass over the target at a rate much too fast for World War II precision bombing techniques. Conversely, if a B-29 turned into the wind during its bombing run, the excessive headwind would slow the plane’s ground speed and result in making the bomber an easy target for Japanese interceptors.³⁹

If the bombers attempted to bomb crosswind, the high winds forced the B-29s to drift in their flight paths up to 45 degrees.⁴⁰ The Norden Mk XV optical bombsight could correct for a 35-degree drift, but the additional 10-degree drift experienced by the B-29s decreased the 20th Air Force’s bombing accuracy appreciably.⁴¹ As a result, aircrews were faced with a choice of bombing inaccurately at a high rate of speed, or by crabbing in a crosswind, and exceeding the Norden bombsight’s normal operating parameters. Otherwise, they could fly at an unacceptably low speed and place themselves in a situation that compromised the safety of the aircraft and crew.

These headwinds experienced by USAAF pilots flying in jet stream seriously affected fuel usage rates of the B-29. Fighting the jet stream increased B-29 flight times and fuel consumption rates. By flying in these headwinds, many B-29s ran out of fuel on the return trip to their home bases because they consumed the bulk of their fuel supply on the outbound trek.⁴² Additionally, combating these headwinds also placed higher stress upon the B-29’s four newly-designed, Wright Cyclone-R-3350

air-cooled engines. These engines, which were initially fraught with mechanical anomalies, had a difficult time producing the power required to overcome the headwinds experienced at high altitudes.⁴³

Cloud coverage, the jet stream, and high winds, precluded the USAAF from conducting the high altitude strategic bombing that it had attempted to do in the European theater. Meteorological and geographical variables prevented the type of bombing the USAAF had proffered in its prewar doctrine.⁴⁴ However, meteorological and geographical conditions were not in themselves the sole reason for shift away from prescribed doctrine.

Japanese Manufacturing Dispersal

By 1945, the USAAF had gained most of its strategic bombing operational experience through its efforts in the European Theater. German industrial infrastructure was organized into manufacturing centers largely concentrated in a few areas. Centers of production in locations, such as the Ruhr Valley and the oil refineries and storage facilities in the Caucasus, provided excellent targets for strategic bombardment. Once identified, the Eighth and Fifteenth Air Forces focused their assaults upon these manufacturing clusters. However, USAAF intelligence reported that the Japanese dispersed much of their industry throughout the population centers of the nation. Additionally, this Japanese system, for a time, included the use of home labor or cottage type industry directly supporting the national war effort. In this program the Japanese distributed drill presses and other machinery to citizens for

home industries. While the Germans, too, had begun to disperse some of their industrial capacity, they did not carry through to the same degree of their Japanese counterparts.⁴⁵

While at one time believing that they were immune to large scale bombing attacks, Japanese manufacturers began to see the merit in the dispersal of factories and production centers.⁴⁶ By dispersing their factories and the means of production, the Japanese thought a single raid would not produce a catastrophic effect upon their industrial base. The dispersal of factories would dilute the bombing effort and mitigate risk to Japanese production. USAAF planners were cognizant of this decentralization of Japanese production and assumed that this method of production was a mainstay of Japanese industry. As a result, the USAAF began to target entire urban areas.

According to LeMay, the Japanese model of production was intricate and complex and described the process in a postwar memoir as:

In Japan they would be set up like this: they'd have a factory; and then the families, in their homes throughout the area, would manufacture small parts. You might call it a home-folks assembly line deal. The Suzuki clan would manufacture bolt 64; the Harunobo family next door might be making nut 64, 65, or 63, or all the gaskets in between. These would be manufactured right in the same neighborhood. Then Mr. Kitagawa from the factory would scoot around with his cart and pick up the parts in proper order.⁴⁷

After the victory over Germany, Spaatz was reassigned as the commander for Strategic Air Forces in the Pacific. In this effort the primary objective was to, “Complete the present program against industrial concentrations and stores located in urban areas.”⁴⁸ Arnold was aware of this Japanese method of production and

explained to the civilian leadership in Washington that, “it was practically impossible to destroy the war output of Japan without doing more damage to civilians connected with the output than in Europe.”⁴⁹

To the USAAF, this integration of the civilian population and their homes into the war-making effort expanded the definition of what planners considered a target. To military planner, targeting the Japanese civilian population and their homes made perfect sense. Much like Douhet had envisioned in his theories, the separation between combatant and noncombatant began to again disappear. While areas of industrial concentration remained primary targets, the concept of workers as belligerents had once again resurfaced.⁵⁰ Both the factory and the home were now legitimate targets. In an interview conducted after the war, Ira Eaker, who eventually became Arnold’s deputy during the Pacific bombing campaign, underscored this reasoning when he stated that, “it made a lot of sense to kill skilled workers by burning whole areas.”⁵¹

Secretary of War Stimson expressed concern over a lack of adherence to precision bombardment during discussion regarding the use of the atomic bomb and queried Arnold over the issue of precision. The Chief of Staff responded by explaining the nature of Japanese industrial dispersal. Arnold argued that area bombardment was the only way to destroy all those drill presses and that the USAAF was trying to keep it “down as far as possible.”⁵² Stimson passed this same information to Truman and told him that he was trying to keep the Air Force honest with regard to the precision doctrine. The Secretary was afraid that area

bombardment could portray the perception that the U.S. was “outdoing Hitler in atrocities.”⁵³ Despite Stimson’s concerns and Arnold’s assurances of limitations, the execution of the bombing campaign laid waste to huge swaths of the Japanese urban landscape.

LeMay understood the moral implications of bombing the urban areas and workers homes. He knew that there was going to be the perception that the USAAF was conducting terror raids upon the Japanese. However, after the war, he responded to his critics by stating as follows:

These operations were not conceived as terror raids against the civilian population of Japan. But we had to be realistic. The Japanese economy depended heavily on home industries, which were carried on in cities close to major factory areas. By destroying these feeder industries the flow of vital parts could be curtailed and production disorganized. By starting conflagrations in a city like Tokyo or Nagoya we would have a good chance of destroying some of the priority targets in those areas, and therefore make it unnecessary to knock them out by separate pinpoint attacks.⁵⁴

LeMay felt justified in the application of firebombing upon the Japanese nation. He believed that the whole of the Japanese population, men, women, and children were involved in the production and manufacturing process. “We knew we were going to kill a lot of women and kids when we burned a town. [It] had to be done,” LeMay observed.⁵⁵

While visiting Yokohama after the war, LeMay noted the remnants of Japanese civilian home-based manufacturing. He was impressed with the number of drill presses and machinery he saw in the city. They looked to him like “a forest of scorched trees and stumps, growing up through the residential area. Flimsy construction all gone . . . everything burned down, or up, and drill presses standing

like skeletons.”⁵⁶ This integration of home industry into the Japanese production system enabled a pragmatic LeMay to validate his ideas regarding the firebombing of Japan and espouse a policy that deviated from established doctrine.

However, USSBS analysts found after the war that these Japanese home industries were not as important as LeMay and the USAAF leadership had originally thought. While the Pacific bombing campaign focused part of its efforts upon Japanese home industries, these industries were not as prevalent by the time the Americans began the large-scale firebombing of Japan. According to the USSBS:

The urban area incendiary attacks eliminated completely the residential and smaller commercial and industrial structures in the affected areas and a significant number of important plants, but a portion of the more substantially constructed office buildings and factories in those areas and the underground utilities survived. By 1944 the Japanese had almost eliminated home industry in their war economy. They still relied, however, on plants employing less than 250 workers for subcontracted parts and equipment. Many of these smaller plants were concentrated in Tokyo and accounted for 50 percent of the total industrial output of the city. Such plants suffered severe damage in the urban incendiary attacks.⁵⁷

While the USSBS minimized the use of home industries into the Japanese war effort and addressed the elimination of this effort by 1944, this does not negate the notion that USAAF planners classified Japanese residential neighborhoods as legitimate targets. While the Japanese may have eliminated home production by 1944, USAAF planners assumed that this practice of making components in homes was still very much a part of the enemy’s war making effort. In this regard, logical targeting rationales were at the forefront of American planning efforts, although the killing of Japanese civilians was viewed at the time as a lauded consequence of the

strategic campaign. Terror raids for the sake of retribution or revenge were not a part of the Pacific bombing methodology.

The location of smaller plants concentrated in urban areas served to validate the USAAF targeting rationale. Because, according to the USSBS, the Tokyo area feeder type plants produced 50 percent of Tokyo's industrial output, these smaller factories were still, therefore, considered legitimate targets regardless of their location.⁵⁸ As a result, the location of the targets was largely immaterial to 20th Air Force planners. From their perspective, only military necessity and effect mattered.

Despite USSBS findings, USAAF planners were aware that the Japanese had, at least for a time, used cottage industries and homes in the manufacturing process. These cottage industries and homes, combined with smaller factories located in urban areas, gave USAAF planners sufficient cause to recommend the deliberate targeting of areas occupied largely by civilian populations. This assumption, erroneous as it may have been by 1945, provided a logical and sound military rationale for the firebombing efforts. The known dispersal of Japanese production capability, whether in a house or in a small factory located in a residential area, contributed to the change in USAAF bombing practices.

Japanese Urban Construction and the M69

In 1942, a group of military and civilian experts was put together to conduct special studies and analysis for Arnold. This group included individuals from the Office of Strategic Services, Harvard and Princeton Universities, Massachusetts

Institute of Technology, as well as a number of persons from the War Department. Called the Committee of Operational Analysis (COA), the group consisted of individuals with keen analytical skills, knowledge of industrial processes, and was well versed in problem solving methodologies.⁵⁹ These men helped to develop targeting lists for the European Theater, and in spring of 1943, began studying Japan to determine potential targets located on the home islands. In their analysis, this group utilized existing open-source periodicals, monitored Japanese radio transmissions, and conducted interviews with people who had lived in Japan and had a part in the development of Japanese infrastructure.⁶⁰ After collecting and analyzing the information, in November 1943 the committee reported that the most vital targets in Japan were merchant shipping, aircraft plants, steel, and urban industrial areas.⁶¹

Furthermore, the COA reported that firebomb attacks on urban areas would have a significant effect upon Japanese industry.⁶² In this effort, the COA believed that urban firebombing would adversely affect feeder industries, small subcontractors, destroy living spaces, public services, and other elements vital to Japanese production.⁶³ This vulnerability to firebombing was not necessarily new to officers of the USAAF. In 1939 an ACTS lesson taught that “large sections of the great Japanese cities are built of flimsy and highly flammable materials. The earthquake disaster of 1924 bears witness to the fearful destruction that may be inflicted by incendiary bombs”⁶⁴ Throughout its history Tokyo has suffered a number of large fires, despite these conflagrations, building materials and construction had changed little before 1945.

In June 1944, the COA established the Joint Incendiary Committee. The purpose behind this committee was to determine the force required to burn down major Japanese urban areas and to estimate the consequence of their destruction.⁶⁵ To determine what was needed to destroy these Japanese urban areas, the USAAF constructed small villages representative of Japanese urban architecture at Eglin Field, Florida, and at Dugway Proving Grounds, Utah.⁶⁶ At the Dugway site the USAAF employed an American architect, who had lived in Japan for years, to design houses embodying exact specifications of the kind of residences found in Japan.⁶⁷ The USAAF constructed the houses in clustered units and sought to represent urban neighborhoods. Called “little Tokyos,” these test villages enabled experts to evaluate incendiary bombing techniques and their destructive potential.⁶⁸ As a part of these tests, Army fire departments located at nearby posts tried to extinguish the fires set in these targeted villages. In many of the tests, the USAAF used local fire departments with equipment similar to their Japanese counterparts. In most of these cases, these American crews were unable to extinguish the fires set in these representative towns.⁶⁹

In September 1944, the Joint Incendiary Committee submitted its findings to the COA. The committee reported that fire raids in Japan would do far more damage than the incendiary raids conducted over Germany because European workers were less concentrated in urban areas and their cities were constructed of largely of stone, brick, and mortar.⁷⁰ The findings showed that incendiary attacks on the major cities of Japan could destroy up to 70 percent of the housing and kill more than one-half

million civilians. The COA also estimated that the raids would cost Japan 15 percent of its total manufacturing output.⁷¹ Additionally, the committee concluded that fire attacks would disrupt transportation networks, wreck storage and marshalling yards, injure one out of ten workers, break civilian will and morale to support the war, cause a breakdown in social order, and achieve the cumulative effect of a “major disaster.”⁷²

In concert with the study of damage inflicted upon Japanese cities, American industry also began to design more effective and efficient incendiary bombs. Research efforts by DuPont, Standard Oil, and the National Research Defense Council resulted in the new M69 incendiary bomb.⁷³ The M69 incendiary bomb was an assembly composed of 38 smaller 6.2 pound bomblettes that were 3 inches in diameter and 20 inches long. Weighing a total of 500 pounds, the M69’s smaller clusters were strapped together inside a metal container, which was fused to break open at a specified altitude and scatter the individual bomblettes.⁷⁴ Three to five seconds after the bomblettes would hit, an explosive charge ejected and ignited a sack of jellied gasoline.⁷⁵ The jellied gasoline was a combination of aluminum salts of naphthenic and palmitic acids specially combined and became known as *napalm*. The sack held the napalm in one spot thereby producing a hotter fire and one that was more difficult to extinguish.

In Europe, high explosive (HE) bombs were the mainstay of bomber loads. Because European cities consisted largely of stone and masonry, many believed that incendiaries were not as effective as the HE bomb. Airmen in the European theater

disliked the incendiary bombs and believed that incendiaries were harder to aim, were more easily damaged in shipment, and argued that HE bombs offered greater destructive potential.⁷⁶ However, by 1944, the Army's Chemical Warfare Service solved these and other problems associated with incendiaries.⁷⁷ Because of the European Theater's preference for HE bombs, the full effect of these technological developments in incendiaries would not become evident until used in mass by the 20th Air Force. By the end of the war, the incendiary had become the bomb of choice for the USAAF in the Pacific Theater. In the later stages of the strategic bombing effort in the Pacific, 70 percent of bombing was devoted to incendiary bombing.⁷⁸ Only 22 percent of bomb loads comprised HE, while the remainder was committed to the aerial mining campaign.⁷⁹

In late 1944, the 20th Air Force conducted a number of experimental raids against Japanese targets to test the effectiveness of incendiary bombing. On December 18, XX Bomber Command located in the China-Burma-India (CBI) Theater launched a raid sending eighty-four B-29s in at medium altitude with five hundred tons of incendiary bombs. The attack left Hankow, China burning for three days, proving the effectiveness of incendiary weapons against the predominately wooden architecture of Asian cities.⁸⁰ These early missions did much to develop the incendiary campaign, and in March 1945, the results of these experimental raids yielded the most horrific air attacks of the war.

Between March 9 and June 15, a total of 6,960 B-29 sorties delivered 41,592 tons of incendiary bombs on Tokyo and other targets razing 102 square miles of

urban construction.⁸¹ During the spring of 1945, LeMay's command dropped so many incendiaries that his bomb dump became devoid of the ordnance.



Figure 12. A B-29 over Tokyo. *Source: US Air Force Museum Bomber Aircraft Virtual Gallery, <http://www.wpafb.af.mil/museum/research/bombers/b29-4.jpg> (accessed March 14, 2006).*

Further supplies of the bombs went right to the flight line straight from the seaport.⁸² From all B-29 missions, up to 180 square miles of urban industrial area was burned in 66 major cities, with 600 factories destroyed including 25 aircraft factories, 18 oil production centers, and six major arsenals.⁸³ Table 1 indicates the damage to the five largest cities:

Table 1. Area Destroyed by the 20th Air Force.

City	Total Urban Area (square miles)	Planned Target Area (square miles)	Area Destroyed (square miles)
Tokyo	110	55	56.3
Nagoya	39.7	16	12.4
Kobe	15.7	7	8.8
Osaka	59.8	20	15.6
Yokohama	20.2	8	8.9
Total	246.2	106	102

Source: United States Strategic Bombing Survey (USSBS), *The Strategic Air Operation of the Very Heavy Bombardment in the War Against Japan: Final Report (Twentieth Air Force)* (Washington, DC: U.S. Government Printing Office, 1946).

Through an analysis of the table above, one can easily see that the COA, the Incendiary Committee, governmental and private corporations, as well as academia had all contributed to developing the equipment and technology priorities for incendiary bombing. The employment of incendiary weapons in light of Asian construction and city planning methods worked to produce the type of bombing originally envisioned by Douhet. As a result, the Japanese cityscape also provided impetus for a change in strategic bombing application.

Mechanical Limitations

The strategic bombing of Japan was conducted almost exclusively by a single weapon system, the Boeing B-29 Superfortress. Given the unique circumstances (and distances) governing military operations in the Pacific War, the Superfortress was the only weapon system capable of striking the Japanese home islands.⁸⁴ Possessing the

range to reach Japan from bases in China and the Mariana Island Chain, the B-29 came to symbolize American military might and its technological prowess. Known as the “3-Billion Dollar Gamble,” because it was ordered into production while still just a design on paper, the aircraft could carry ten tons of bombs and had a range of over three thousand miles.⁸⁵ The B-29 became one of the war’s greatest military weapons and its image as the first nuclear bomber is permanently fixed in military history.

However, for all the accolades and praise attributed to the B-29, the aircraft’s initial operations suffered from numerous design problems and engine malfunctions. These early difficulties precluded the airframe from achieving designed performance parameters. An old Air Force axiom states “never fly the ‘A model’ (first production series) of anything,” and certainly in the case of the B-29 this statement rang true. As with most new airframes, the first model of the B-29 required the modification, redesign, and reengineering of many systems, subsystems, and components. However, the technical problems of the first production models of B-29s had consequences that went far beyond the engineer’s T-square and the drafting table.

At the time, the B-29 was the most sophisticated and complex airplane ever designed. Built in the wake of the B-17 and B-24, the Superfortress included many technological innovations that substantially improved the bomber’s capabilities and flying qualities. While pursuit aviation claimed priority of effort in the 1930s, the outbreak of World War II renewed interest in large bomber design. As a result of the war, in February 1940 the U.S. Army Air Corps announced a requirement for a

“Hemispheric Defense Weapon.”⁸⁶ Boeing Aircraft Company answered the call and its first prototype, the XB-29, made its maiden flight in September 1942. The airframe was powered by four R-3350, turbo charged engines designed to produce 2,200 horsepower each at take-off. The aircraft featured self-sealing fuel tanks, considerable armor protection, heavy defensive armament, and the ability to carry eight tons of bombs.⁸⁷ The bomber also included a pressurization system for crew comfort, remote fire control defensive systems, specially designed four-bladed Hamilton propellers, and hundreds of other impressive engineering advances.⁸⁸

The idea behind the B-29 came from a requirement for a “Very Heavy Bomber”(VHB) (also referred to as the Very Long Ranger (VLR) bomber) in the Air War Planning Document (AWPDs). The concept of the VHB built upon existing bomber designs and engineering advances to produce a bomber that was considerably heavier, faster, and more capable.⁸⁹ According to the Aircraft Commander’s Manual for the B-29: “It [the B-29] was built to do one particular job well, fly a long way with a big load of bombs.”⁹⁰

AWPD-1 originally specified the production for over two thousand VHBs.⁹¹ This requirement included the use of the VHB not only for the Pacific theater, but first in the European Theater, which had the priority of effort for the Allies.⁹² Toward this end, planners envisioned that B-29s would strike at the heart of Germany while operating out of bases in Asia Minor and the Middle East.⁹³ While B-29s did not operate in the European Theater, the desire to have VHBs operate against Nazi Germany considerably reduced the time allotted to design, develop, and test this

aircraft. Because of this pressure, development and design modifications were conducted concurrently with aircraft production and fielding. The time constraint regarding B-29 development had serious implications for the airplane's operational use. The VHB concept was so important that the USAAF placed orders for the B-29 and production lines prepared even before the new design was flight tested. Highlighting its importance was the decision to build B-29s at a full rate production a year before the first aircraft was airborne.⁹⁴

General Arnold supported the tenets of AWPD-1 and enthusiastically supported the VHB program. As a proponent for the VHB he meticulously tracked its development.⁹⁵ Arnold, more than anyone else in the Air Force, took the chances on the enormously expensive and unproven B-29 project.⁹⁶ During the early phases of B-29 development, Arnold countered critics in the War Department who objected to the huge allocation of funds and resources dedicated to the project.⁹⁷ Given that the B-29 was an unproven design and rushed into production to meet wartime requirements, Arnold's gamble had serious implications for the USAAF.⁹⁸ Only one other aircraft had ever been ordered 'off the drawing board' without prototypes built, the Martin B-26 Marauder. However, a major difference with the B-29 was that only a single manufacturer built the B-26. While the B-29 was still just a design on paper, it was ordered into production on an industry-wide scale.⁹⁹

For Arnold, the commitment to an unproven aircraft design was a pivotal decision. If the B-29 program failed, it could well destroy his life's work and jeopardize the future of an independent U.S. air force.¹⁰⁰ The risk to build and

employ, what was at the time a paper design, was taken at the potential expense of Arnold's personal and professional reputation. This calculated risk by Arnold not only had a direct effect upon the B-29 design process, but exerted an impact upon Arnold's air commanders to produce quick results with the new weapon. Arnold was anxious to obtain bombing results in Japan that again proved the efficacy of strategic bombing, but he also demanded results that validated the expense of the B-29's production.

The B-29's complexity and incorporation of so many new design features inevitably, as noted, caused technical problems to multiply and threatened the employment of the bomber.¹⁰¹ The challenges inherent in producing an airplane as complex as the B-29 would have been difficult under the best of conditions, but the B-29 was built at a pace to meet the war requirements in Europe.¹⁰²



Figure 13. B-29 front cockpit. *Source: US Air Force Museum Bomber Aircraft Virtual Gallery, <http://www.wpafb.af.mil/museum/research/bombers/b29-1.jpg> (accessed March 14, 2006).*

B-29s rolled off the production lines in late 1943 and early 1944. However, these early airframes were built before a number of technical problems with the B-29

became apparent. This led to the fielding of aircraft before important engineering changes were incorporated.¹⁰³ In 1944 fifty-four major modifications had to be made to every B-29 that came off the assembly line.¹⁰⁴ Areas requiring modification included the electrical system, tires, the fire control system, and the propeller feathering system.¹⁰⁵ According to LeMay:

[The] B-29 had as many bugs as the entomological department of the Smithsonian Institution. Fast as they got the bugs licked, new ones crawled out from underneath the cowling.¹⁰⁶ If you ever saw a buggy airplane, this was it.¹⁰⁷

In Wichita, Kansas, where the bombers were produced, efforts to mitigate and correct these design problems resulted in what become known as the “Battle of Kansas.” This “battle” was a concerted and collective effort to design, apply, and field modifications to the B-29 and address existing engineering problems. Despite efforts during this “battle,” early B-29 operations were continually plagued with mechanical maladies. As a result, flight line modifications and expedient fixes were still required in order to make the aircraft ready for combat and airworthy.¹⁰⁸

The biggest problem affecting the performance of the B-29 was her newly designed R-3350 engines made by the Curtiss-Wright Corporation. These powerful engines often overheated, had cylinder heads blow out during start up, were equipped with faulty ignition systems, leaked oil excessively, and were plagued with fuel system problems.¹⁰⁹ Because of these, and many other issues, LeMay thought that the R-3350 was not worthy of mounting on an operational aircraft until it had gone through a long period of trial and testing.¹¹⁰

The marriage of an engine into an airframe is one of the most challenging engineering problems in the air age.¹¹¹ To adapt an engine into a functioning power plant on an airframe requires the integration of a number of subsystems and components.¹¹² This integration adds multiple layers of complexity and can be the source of major problems. The complexity of the B-29 and the R-3350 is a prime example. In reviewing the development of the B-29 and the R-3350, it became obvious that both Boeing and Curtiss-Wright were not on the same design page.¹¹³ Regardless, wartime expedience forced the installation of the R-3350 on the B-29.

When a number of B-29s crashed in the CBI Theater in summer 1944, engineers at Wright Field in Dayton Ohio investigated. After conducting trial runs and test flights, Wright engineers found several reasons for these failures. Engineers discovered that the R-3350's thermo-couplers were often out of calibration, cowl flaps were improperly set for take off and taxi, cylinders in the rear rows were susceptible to exhaust valve seat erosion, and a leak in the exhaust port in the front cylinders would allow white-hot exhaust to blow over adjacent cylinder heads.¹¹⁴

To correct these and other deficiencies, engineers designed cuffs on the root of the Hamilton propellers to improve ground cooling and installed new engine baffles and seals.¹¹⁵ In addition cowl flaps were added to each engine nacelle that were made operable from the cockpit along with crossover tubes from the intake to the exhaust port on the top five cylinders on both the front and rear rows.¹¹⁶ Engineers also included an inter-rocker box lubrication line that addressed the

exhaust valve problem. These changes provided for a better flow of both cooling oil and air around the engine and resulted in improved engine life and reliability.¹¹⁷



Figure 14. B-29 ditched in the Pacific. *Source: US Air Force Museum Bomber Aircraft Virtual Gallery, <http://www.wpafb.af.mil/museum/research/bombers/b29-28.jpg> (accessed March 14, 2006).*

In addition to the cooling problem, the R-3350 also had a tendency to ingest engine valves into the cylinders. As mentioned above the top three cylinders on the back row of the engine were often susceptible to exhaust valve seat erosion with a subsequent failure of the valve guide boss.¹¹⁸ This “swallowing” of a valve into the cylinder was the most common cause of engine fire in the B-29.¹¹⁹ In this instance a valve would burn lose from its mount and then being ingested into the cylinder. This in turn would lead to the entire cylinder coming off and destroying the rest of the engine.¹²⁰

However, the most dreaded engine problem was an induction fire. This phenomenon was feared because once the magnesium alloy parts in the engine induction system started to burn, the fires could not be put out.¹²¹ Since magnesium burns at a relatively high temperature, the existing fire extinguishing systems in the

B-29 were unable to deal with the elevated temperatures and procedures designed to counter the flames were ineffective. Therefore, when the magnesium parts caught fire, the fire burned through the engine's firewall and spread into the wing structure, thus causing the entire wing to depart the aircraft with very little time for the crew to bail out.¹²²

The R-3350 also had a habit of losing hydraulic pressure which then precluded the ability to “feather” the propeller (“Feathering” is the rotating of the propeller blade ninety degrees, parallel to the air stream, thus reducing drag and preventing the heat produced by crankshaft friction generated by a wind milling propeller.) This inability to feather a propeller had dire consequences for B-29 aircrews. If a B-29 lost hydraulic fluid, the inability to feather the engine could lead to the departure of the propeller from the engine. LeMay noted that a crew would be fortunate if just the propeller flew off “because sometimes the whole damned engine would seize and would twist right out of the wing.”¹²³

Because of these and other mechanical difficulties, the R-3350 engine required over two thousand engineering changes.¹²⁴ After the war in November 1945, in an address to the Ohio Society of New York and the Alumni of Ohio State University, LeMay explained:

You do not draw a complicated, precision airplane like the B-29 out of a silk hat. The Air Forces had blueprints for [t]he B-29--but no blueprint ever dropped a bomb. So the B-29 was tested in combat. It is a tribute to the men who planned and built it that this great airplane lived up to what was expected of it after a few modifications.¹²⁵

The number of problems that the B-29 experienced took years to correct and the Air Force was still modifying the plane when withdrawn from service in the late 1950s.¹²⁶ As for the R-3350 itself, it eventually became a reliable design and was eventually utilized on the Douglas AD-1 Skyraider attack aircraft and Lockheed Constellation airliner.¹²⁷

The first operational B-29 raid occurred against the Makasan Rail yard in Bangkok, Thailand in June 1944.¹²⁸ Despite the promise of the design, this raid yielded disappointing results. Out of the one hundred B-29s launched for the mission, only seventy-six returned to their home station having dropped their bombs.¹²⁹ Eighteen had to turn back due to mechanical failures and six others had to ditch or land at alternate airfields.¹³⁰ During the first XXI Bomber Command mission against Japan on November 24, 1944, twenty-six out of the one hundred and eleven aircraft launched were forced to turn back or abort enroute due to mechanical difficulties.¹³¹ Natural phenomenon accounted for many aborts as the temperature differential between the tropical conditions on the ground coupled with the freezing temperatures at altitude caused considerable problems for both the airframe and aircrew.¹³² During these early operations the number of B-29s bombing the primary targets declined as crews either bombed secondary targets or salvoed their bombs harmlessly.¹³³

Most of the aircraft losses during the first B-29 missions were due to mechanical failures as the long climb to thirty thousand feet stressed the R-3350 engine.¹³⁴ After studying B-29 performance, LeMay decided that he needed to bring

the bombing formations down to lower altitudes where the engines and other equipment would not be under such constant strain.¹³⁵ By lowering B-29 cruising and bombing altitudes, the stress on engines was significantly reduced. This reduction in stress on the engine lowered operating temperatures of the cylinders that increased aircraft operational availability. The long strenuous climb to high bombing altitudes and the fuel weight associated the climb was reduced when B-29 aircrew lowered their operating altitudes from thirty thousand to ten thousand feet.

Through his observation of operational missions LeMay concluded that:

With the overheating engines, it began to seem that this high altitude stuff was strictly for the birds. The airplanes had been breaking down. There are something like 55,000 different parts in a B-29; and frequently it seemed that maybe 50,000 of them were all going wrong at once. I felt that the majority of our losses were due more to our own mechanical problems than they were to the Japanese defensive system. [The] Main thing to do, it seemed, was to get them [the B-29s] down in altitude. Then we'd get a lot more hours service out of each engine.¹³⁶

After making mission profile changes, LeMay found that 91 percent of all B-29s bombed their primary targets instead of the abysmal 36 percent from previous missions.¹³⁷ Because of the reduction in altitude, maintenance “down time” dropped and more bombers became available to conduct bombing raids. Since the engines avoided the stress of climbing to thirty thousand feet, the number of mechanical failures dropped and aircraft availability rose. During the March raids, aircraft availability climbed appreciably from 59 to 83 percent.¹³⁸ Additionally, the decision to lower bombing altitudes also went hand-in-glove with the desire to avoid bombing through the difficult Japanese weather while also evading the excessive winds of the

jet stream. As well, this drop in operating altitudes was to yield a third and more deadly benefit for LeMay and the 20th Air Force.

In addition to the heat, fire, and valve problems, the R-3350 also did not produce the power necessary to fly the new bomber and its advertised payloads. Since aircraft performance is dependent upon density altitude (the amount of air molecules in a given body of air), the hot weather combined with the weight of the B-29 had severe consequences for B-29 aircrew. During CBI operations in October 1944, LeMay wrote to Arnold, and stated:

To a large extent our bomb load is limited by gross take-off load. This is in turn influenced by operating technique, runways, high free air temperature and power available. The take-off is a very serious problem with the B-29, and is the high point of any flight. All crews, in discussing a mission, invariably talk about their take-off and not about flak, fighters or other enemy opposition. Even partial power loss from one engine almost invariably results in a crash from which there are very few survivors.¹³⁹

Later in the letter LeMay further stated:

The B-29 airplane is capable of considerable higher performance than the R-3350 engine now installed will permit, as the maximum gross weight is limited by power available for take-off and climb. Until more power is available, we cannot fully capitalize on the capabilities of the airplane.¹⁴⁰

By lowering bombing altitudes, LeMay allowed for increased bomber payloads. Because LeMay was anxious to increase aircraft sortie rates and try to work around the uncooperative Japanese weather, the lowering of cruise and bombing altitudes allowed the B-29 to carry a larger bomb load. According to LeMay:

One of the main advantages in going down to less than 10,000 feet over the target was the increased bomb load. We could increase the bomb load of each plane from about two and one-half tons to 10 tons. This was possible because each individual attack required no assembly into formation over the base at the start of the mission, and because aircraft would go directly from base to

target and return, saving tremendous amounts of gasoline. Better weather would be encountered at lower altitudes and the heavy gas-consuming winds of high altitudes would be avoided. The weight of extra crew members, armament, and ammunition would go into bombs.¹⁴¹

The amount of fuel a B-29 used to climb to bombing altitude, given a specified weight, could use as much as twelve hundred gallons (weighing seven thousand two hundred pounds) when climbing at a gross weight of one hundred and thirty thousand pounds. In order to compensate for this fuel weight, power settings had to be increased for the long climb to altitude, creating an additional strain on an engine.¹⁴² When bombing by prescribed USAAF methods, the weight of bombs carried in the B-29 had to be reduced from ten to three tons because of the fuel needed to climb to and fly at higher altitudes.¹⁴³ An average B-29 used seven thousand gallons of gasoline on a mission. The pragmatic LeMay surmised that using over twenty-one tons of fuel to drop three tons of bombs did not make sense.¹⁴⁴ He determined that by lowering altitudes, and negating the requirement to carry the fuel used for climbing to high altitude, bomb loads increased significantly.¹⁴⁵

The B-29's poor high altitude performance necessitated the lowering of bombing altitudes and this in turn facilitated higher aircraft reliability figures while simultaneously allowing larger payloads. In this regard mass became an important aspect of the American bombing effort. Increased number of B-29s equated to more destructive and deadly raids. American industry built bombers and fighters at a rate with which the Axis powers could not cope. This massive air armada overwhelmed axis air defenses. Toward the end of the war in both the Pacific theater as well in European, mass itself became an important aspect of the strategic campaign. As more

planes and aircrew became available, more bombs were dropped. This same application of mass became ever more important in American strategic methodologies in the nuclear atomic age.

The technical problems of the R-3350 engine and the B-29 mandated that mission profiles be adjusted to utilize lower altitudes. This change in profiles in turn facilitated the hauling of larger and more destructive bomb loads of M69 incendiaries. By summer 1945 much of the Japanese homeland became a vast wasteland. Certainly, one of the primary reasons for this was the substantial rise in the number of B-29s over the islands and the greatly increased bomb tonnage dropped on each mission. With lower altitudes, LeMay was able to raise the 2.6-ton load of each aircraft to 7.4 and keep more aircraft in the air.¹⁴⁶ The ability to carry more bomb tonnage meant greater destructiveness.

Despite the fact that the B-29 was designed for high altitude precision bombing, the state of the 20th Air Force and the imperfect design of the airframe required a modification to bombing operations. The USSBS noted that:

The preceding 9 months had seen the B-29 committed in general to the doctrine of very high altitude precision bombing. Designed specifically for this type of operation, it was logical and mandatory that the doctrine be thoroughly tried before it was modified. Many factors militated against the achievement of this objective, among the foremost of which were insurmountable weather obstacles, strain imposed on equipment by high altitude operation, insufficient force, low sortie rate, and low bomb loads.¹⁴⁷

The Survey further noted:

By lowering the bombing altitude, the effectiveness of each B-29 was increased tremendously. Bomb loads more than doubled; using radar bombing methods the weather ceased to be a serious factor; the number of aircraft dropping on the primary target soared from 58 to 92 per cent . . .

decreasing bombing altitude meant less operating strain which added up to more sorties per air craft.¹⁴⁸

However, LeMay's decision to drop bombing altitudes held deadly implications for his own aircrews. Since the USAAF's bombing experiences were based upon the European Theater, the concerns over enemy fighters and flak while bombing at low altitude were a major concern. Furthermore, to save on weight, LeMay ordered removal much of the defensive armament on the B-29s. Not only did crews worried about their chances of survival by flying so low over enemy territory, but now they faced an inability to defend themselves from Japanese fighters. Based upon what had happened to B-17s and B-24s by Luftwaffe fighter and flak during the early missions over Germany, B-29 aircrew were concerned about a repeat experience over the Japanese home islands at the hands of the Imperial Army Air Forces.

That did occur, but as fire raids continued the USAAF found little opposition from Japanese air defenses. In a November 1945 speech, LeMay commented that: "We decided to take advantage of what we thought was the Japs' unpreparedness for low altitude attack and exploited it."¹⁴⁹ Japanese anti aircraft fire was usually ineffective and the home islands had few low altitude gun concentrations. Furthermore, Japan's homeland defensive fighter force was too meager and technologically incapable of thwarting the American onslaught.¹⁵⁰ The inability of the Japanese to defeat a threat at low altitude only encouraged the USAAF to continue its newly found bombing methodology.

The early performance of the B-29, the unique nature of the Japanese weather patterns, perceived manufacturing organization, city architecture, and the

development of effective incendiary weapons contributed to the synergy that led to the transition of strategic bombing practices. The combination of these factors collectively facilitated the change in applications that laid waste to the Japanese home islands. For the USAAF, LeMay's change in doctrine from high altitude precision to low-level area bombing, while drastic, was mandated in part due to the aforementioned conditions. The decision for LeMay was a tough one and he recalled later, "feeling a level of anxiety I'd not wish to experience again."¹⁵¹ He was well aware that his newly developed tactic for the Pacific bombing campaign ran counter to existing doctrine and he accepted the risks in order to prosecute the war against Japan.¹⁵² However, these conditions and the effect they had upon the operational commander were only partly responsible for the change in bombing methodology.

Human Factors

Despite all the military, technological, and scientific rationales for the change in USAAF strategic bombing practices, several of the most compelling reasons for the shift from high- altitude, precision bombing are less pronounced and harder to define. While weather, city design and layout, flight characteristics, and operating parameters all had a hand to play in the transition, human fear, frailties, and desires were also in play. The willingness and fervor it took to create the conflagrations throughout the Japanese home islands were an overriding imperative towards the realization of Douhetian bombing. This motivation came from not only the military

and civilian officials overseeing the conduct of the war, but was to be found in the American populace and deeply imbedded in popular culture.

Before World War II, anthropologist Ruth Benedict conducted and published an in-depth study of Japanese culture and social organization. In this work, she found that the Japanese culture and social values were vastly dissimilar to those of the west and were largely alien to traditional American mores. While her work remained classified during the war, in 1946 it was finally published. In the preface to her work, she stated:

The Japanese were the most alien enemy the United States had ever fought in an all-out struggle. In no other war with a major foe had it been necessary to take into account such exceedingly different habits of acting and thinking . . . Conventions of war which Western nations had come to accept as facts of human nature obviously did not exist for the Japanese.¹⁵³

The cultural unfamiliarity illustrated by Benedict between the U.S. and the Japanese is telling and is related to how the USAAF conducted the bombing campaign. In this vein, throughout the war most Americans held the perception that the Japanese were a less-than-human race, worthy of annihilation, and the events at Pearl Harbor needed to be avenged. These ideas were so pervasive in American culture that they again gave the military establishment tacit approval to conduct bombing operations in any manner necessary. As a result, Americans were largely unconcerned about the morality of the firebombing effort as applied to Japan and, like the European bombing offensive, largely lauded its results. This cultural phenomenon not only facilitated the transition of bombing practices, but as the war progressed, served as an impetus to

inflict as much damage as possible upon a nation unlike itself and altogether alien to contemporary American values.

The national collective will, along with a number of individual agendas, had a significant role to play in the transition to low-level area firebombing. These human, and albeit, less tangible rationales for the change in USAAF bombing practices are not quantifiable, nor can they be measured with a level of certitude. However, emotional and ultimately human factors are certainly alluded to, and evident in, official documents of the USAAF and the War Department as they suffuse the texts, pictures, and other manifestations of American popular culture of the time.

In 1944, Hollywood released a motion picture depicting the trial of the captured “Doolittle Raiders” after their B-25s attacked Tokyo in April 1942. The film entitled *The Purple Heart* (20th Century-Fox, 1944) ended with this statement made by one of the doomed fliers:

It is true we Americans don't know very much about you Japanese, and never did, and now I realize you know even less about us. You can kill us-all of us, or part of us. But if you think that's going to put the fear of God into the United States of America and stop them from sending other fliers to bomb you, you're wrong, dead wrong. They'll blacken your skies and burn your cities to the ground and make you get down on your knees and beg for mercy. This is your war. You wanted it. You asked for it. And now you're going to get it, and it won't be finished until your dirty little empire is wiped off the face of the earth!¹⁵⁴

This statement illustrates and represents the American hostility toward the Japanese throughout the war in the Pacific and its placement in a feature film is indicative of the popularity of such proclivities. This widespread hostility and animosity Americans felt toward the Japanese provided approval, and some impetus for, the

realization of Douhetian bombing in the Pacific theater. Despite U.S. claims that it did not deliberately target civilians, the bombing efforts over Japan exposed a dichotomy within the U.S. defense establishment and the American population.

Even before Pearl Harbor the Japanese were often vilified in the press for bombing Chinese cities during their 1937 invasion.¹⁵⁵ Similar sentiment was expressed during the Spanish Civil War and when the Germans initiated offensives in the early phases of the war in Europe. In 1940, Roosevelt went so far as to recall, “with great pride that the United States consistently has taken the lead in urging that this inhuman practice [of bombing civilians] be prohibited.”¹⁵⁶ However, after Pearl Harbor there was no public outcry against the firebombing of Japanese cities. Like the bombing of Germany, there was no large-scale public objection. Popular apathy about this issue led USAAF leaders to believe that they had approval by the American populace to continue the fire raids without fear of a popular backlash.¹⁵⁷ While the public’s approval might not have been overt, it was at least implied.

The lack of revulsion and public outcry over the nature of the bombing campaign in the Pacific is generally attributed to racial motivations and overt hatred of the Japanese. Loathing of the Japanese had been growing in America since the turn of the century and was exacerbated by the Japanese invasion of China and the criminal activity of the Imperial Army.¹⁵⁸ Pearl Harbor crystallized this hatred and it grew over time as the Japanese continued to publicize and perversely revel in their atrocities on the world stage.¹⁵⁹ FDR was disturbed by Japanese brutality and used the words “uncivilized,” “inhuman,” “depraved,” and “barbarous,” when describing

Japanese actions.¹⁶⁰ A Gallup poll taken in May 1945 asked: “Which people do you think are more cruel at heart—the Germans or the Japanese?” Overwhelmingly 82 percent picked the Japanese.¹⁶¹ The mistreatment of Allied prisoners; the widespread execution, rape, and random killing of Chinese men and women; forced labor and institutionalized murder; combined with a host of other Japanese victories all help to create fervent anti-Japanese sentiment. This sentiment led to unquestioning support for the firebombing of Japan.

Anti-Japanese sentiment was resident in official speeches, publications, and government documents. In much of the official correspondence of the USAAF at the time, the term “Jap” is widely used and accepted while congratulatory verbiage is used prolifically in applauding LeMay’s firebombing efforts. All the military services shared this same sentiment. Admiral William Halsey, Commander of the South Pacific Fleet, established slogans such as “Kill Japs, Kill Japs, Kill more Japs” while the Marines furthered Halsey’s motto by adding “keep ‘em dying!”¹⁶² The Marine Corps monthly magazine *Leatherneck* ran a headline reminiscent of the nineteenth century American Indian Wars stating that the only “Good Japs are Dead Japs.”¹⁶³

Indicative, too, of widespread American sentiment was the large amount of fan mail LeMay received congratulating him and his command’s efforts. People requested autographed photos of the General, 20th Air Force patches, and in some cases offered him expensive presents and gifts of appreciation. Many of the letters were similar to one submitted by Mr Julius Kelly of Ardmore, Oklahoma who wrote

to “congratulate you General on the fine way you are conducting the present air offensive . . . it is through your excellent planning that our air offensive is being so successful.”¹⁶⁴ Additionally, in a V-mail from Army Chaplain Randolph Gregory, this member of the clergy wrote, “from all the reports you are really giving the Japs HELL . . . after seeing what you did to Germany I can well visualize what the tinder cities of Japan look like . . . we have a deep admiration for your splendid work.”¹⁶⁵ LeMay received many similar letters, including, ironically, at least one note from a Japanese-American named Tom Kamikido. Mr. Kamikido’s congratulatory letter ended by bidding “goodbye to a great guy who we the Amerasians look to as a great guy [sic].”¹⁶⁶ In fact, LeMay had so many requests for signed photos that his supply of them at one point ran out.¹⁶⁷

Historian John Dower, in his landmark work addressing the issue of race during the Pacific war, surmised that this popular sentiment among Americans was also fostered by the federal government’s embarking upon an “annihilationist policy” toward the Japanese.¹⁶⁸ This anti-Japanese rhetoric and sentiment was due in large part to overt racism, the surprise nature of the Pearl Harbor attack, and by the continued reports of Japanese atrocities.¹⁶⁹ On February 19, 1942, Executive Order 9066 authorized the forced removal of Japanese-Americans to internment camps in the western U.S. This domestic policy is indicative of the large American sentiment regarding the hate and loathing for the Japanese and their culture. In regard to the use of airpower, Dower noted that fire raids were widely accepted as retribution and as sound strategic policy, and raised few arguments.¹⁷⁰ To many, the burning of cities,

such as Tokyo, Osaka, Nagoya, and Yokohama was “just desserts” for the Japanese people who started the war and expanded their empire under the auspices of the East Asian Co-Prosperity Sphere. For the Americans, Japan was now “reaping what it had sowed.”¹⁷¹

In July 1945, Major General Claire Chennault, commander of the famed “Flying Tigers” and subsequently the 14th Air Force, sent a letter to LeMay in which he suggested that the strategic bombing effort include the deliberate poisoning of the Japanese rice crop with fuel oil. Chennault estimated that this effort could kill 20 percent of Japan’s rice crop and “millions of Japanese [would] face starvation.”¹⁷² While LeMay ignored the suggestion, its malevolent overtones cannot be ignored and are indicative of the hatred harbored by American leaders. For Arnold, Japanese military brutality proved to him that they had crossed a moral line that in turn justified the firebombing methodology.¹⁷³ General Spaatz remarked that he did not hear any complaints from the American public concerning the mass fire bombing of Japan.¹⁷⁴ Thus, the USAAF leadership assumed correctly that the vast majority of their countrymen approved of a revenge-fueled strategy.¹⁷⁵ California State University Professor Ronald Schaffer notes that in the minds of the USAAF leadership, the moral attitudes were weighed against American public opinion favoring harsh treatment of the Japanese, and in this comparison public opinion was the victor.¹⁷⁶ After the March 10 raid over Tokyo, Arnold sent congratulations to LeMay and stated “this mission proves your crews have the guts for anything.”¹⁷⁷

In concert with official disdain for the Japanese, a significant portion of American public opinion approved of the extermination of the Japanese people or at least the country's "thoroughgoing defeat."¹⁷⁸ Public opinion polls reflected that 10 to 13 percent of Americans supported the "annihilation" or "extermination" of the Japanese as a people.¹⁷⁹ In a 1944 poll asking "What do you think we should do with Japan as a country after the war?" 13 percent of Americans surveyed wanted to "kill all Japanese," and 33 percent were in favor of destroying Japan as a political state.¹⁸⁰

Comparable sentiments were reflected in the American popular media and press. *Time*, *Life*, *Colliers*, and *The Saturday Evening Post* magazines freely used the term "Jap."¹⁸¹ When *Time* magazine reported on the March 1945 fire bombings, the magazine lauded these raids, called the results "miraculous," and admired LeMay's ingenuity.¹⁸² (Interestingly the same article referred to these raids as "precision-area bombing" in order to differentiate the U.S. effort from that practiced by the RAF.¹⁸³) *Colliers* magazine ran an article regarding the unique development of the M69 and entitled the piece "Tokyo Calling Cards."¹⁸⁴ Furthermore, a 1943 best seller *Singapore is Silent* also insinuated that a war with Japan would continue, "until not only the body but the soul . . . is annihilated, until the land . . . is plowed with salt, its men dead, women and children divided and lost among other people."¹⁸⁵

Just as Eaker and Spaatz had been on the cover of *Time* magazine during the European bombing effort, on August 13, 1945, after the dropping of the atomic bomb, LeMay was given a cover story on the periodical with the a sub heading that read, "Can Japan stand twice the bombing that Germany got?" The accompanying article

addressed the many challenges LeMay faced as the commander of the XXI Bomber Command. Like the pieces on Eaker and Spaatz, the story again painted a very positive and upbeat portrait of LeMay as a man who was “a crack pilot with an exceptional feel for mechanics work” and is “already the youngest major general in the Army who could probably look forward to getting his third star.”¹⁸⁶ When addressing the firebombing effort, the article even went as far as calling the decision “one of the great military decisions of the war.”¹⁸⁷ The story concluded by calling the General a “level headed, devoted airman.”¹⁸⁸

Popular culture also reflected this overt hatred of Japan and the Japanese people and the governments’ annihilationist stance. A few of the songs during this period included titles such as “You’re a Sap, Mr. Jap,” “Take a Rap at the Jap,” and “We’re Gonna Have to Slap the Dirty Little Jap,” along with many others, were popular with the American public and indicative of the national sentiment.¹⁸⁹ All this official and popular anti-Japanese rhetoric further fuel the common depiction of the Japanese as less than human or subhuman.¹⁹⁰ Racial stereotypes and animosities were key psychological tenets to the American war effort as the Japanese were normally depicted as monkeys, reptiles, insects, and vermin.¹⁹¹ Racially charged comments, such as “yellow rats,” “yellow monkeys,” and “yellow bastards,” further demonstrated American popular sentiment.¹⁹²

In motion pictures, whereas the portrayal of Germans had some leeway between good and evil, Japanese were given no such latitude. Their characters were represented as a largely barbarous, evil, and sub-human species.¹⁹³ While American

still struggled with issues regarding race and racial stereotypes at home, the existing virulent anti-Japanese prejudice was easy to capitalize upon by movie studios.¹⁹⁴ A spate of movies reinforced anti-Japanese racial depictions with derisive images. Frank Capra's film *Know your Enemy-Japan* (U.S. War Department, 1945) repeated this theme and reinforced the negative image Americans had developed regarding the Japanese.¹⁹⁵ While OWI preferred to focus upon the anti-fascist theme rather than racism, Hollywood continued to push racial related messages when addressing the Pacific war. Hollywood readily depicted the popular sentiment regarding the Japanese as a lesser people. Reflective of the rest of America, studios capitalized on the racial issues and used many of the same derogatory terms in the movies.¹⁹⁶ By 1944 racially laced, anti-Japanese, themes were a mainstay in Hollywood-produced movies and added to the popular anti-Japanese sentiment. While this anti-Japanese racial attitude went as far back as the Philippine Insurrection, racial overtones helped to make the war in the Pacific more violent and tragic.¹⁹⁷

According to Dower:

At the simplest level, they (the animal depictions) dehumanized the Japanese and enlarged the chasm between "us" and "them" to the point where it was perceived to be virtually unbridgeable. . . . The enemy in Europe "were still people." The Japanese were not, and in good part they were not because they were denied even the ordinary vocabularies of being human.¹⁹⁸

Both the official anti-Japanese sentiment and the popular American cultural tones provided the "engine of war" for the Pacific theater. While motivated by both anger and outrage over Japanese actions in the Pacific, racial overtones exacerbated the existing condition. All of these factors created an environment that allowed for

the transition to incendiary bombing and provided the USAAF carte blanche to conduct whatever practices it deemed necessary. This authority provided LeMay and the USAAF unprecedented license to destroy an enemy that was viewed as less than human and unworthy of existence in the civilized world.

As addressed earlier, the desire to reduce American casualties was an implicit and over-riding concern on the part of U.S. leadership. By March 1945, the U.S. had been engaged in World War II for just over three years. While the U.S. served as an economic and industrial base for the Allied cause, it had not suffered, statistically, the number of casualties other nations involved in the war faced. Relatively speaking, in comparison to Soviet experience on the Eastern Front and British losses in Western Europe and North Africa, American casualties were considerably less.¹⁹⁹ Despite this fact, Americans were keenly aware of the casualties generated in both the European Theater and in the Pacific and took notice with the number of gold stars hanging in the front windows of some U.S. homes.

By 1944, the U.S. had scored a number of victories over the Japanese. Indeed since the Guadalcanal and Midway battles in 1942, the Japanese were on the strategic defensive with the myth of their invincibility effectively destroyed. On the other hand, these defeats did not mean that Japan was ready to capitulate. The American people were aware of the potential of Japanese resistance and in July of 1945, 86 percent of Americans believed that the war would continue until 1946 and beyond.²⁰⁰ Despite their defensive military predicament, the Japanese continued to fight in anticipation that continued resistance would undermine American public support for

the war. Through dogged resistance, the Japanese hoped to secure for themselves favorable terms for the termination of hostilities.²⁰¹ This desire to secure better terms had a direct impact upon the Japanese measures for the defense of the home island. To assist in this goal, at the behest of the Emperor, the Japanese planned to mobilize the entire civilian population and turn it into an army.²⁰²

This desperate last gasp effort can be viewed as a fanatical and unrealistic request. However, given Japan's cultural heritage and values, it is likely that the Japanese populace would have continued to fight and resist as mandated by Hirohito.²⁰³ Benedict validated this belief in Japanese fanaticism by writing that:

Honor was bound up with fighting to the death. In a hopeless situation a Japanese soldier should kill himself with this last grenade or charge weaponless against the enemy in a mass suicide attack. But he should not surrender. Even if taken prisoner when he was wounded or unconscious, he "could not hold up his head in Japan" again; he was disgraced; he was dead to his former life.²⁰⁴

This devotion to the emperor was also inextricably linked to the Japanese belief in the spirit and its power over materialism. By 1945 the industrial capacities of Japan were shrinking, not just because of the incessant firebombing, but also from American sea interdiction efforts and the decimation of the Japanese merchant fleet by the U.S. Navy. During the Pacific war, the U.S. Navy sunk or seriously damaged 8,900,000 tons of Japanese shipping.²⁰⁵ Most of this effort is attributed to the American submarine forces that accounted for over 54 percent of Japanese merchant vessel losses.²⁰⁶ Lack of military goods and materials was a constant for the Japanese armed forces by this time, but this lack of material was not necessarily seen as an impediment to Japanese victory. The Japanese had a strong belief in the spiritual

over the material and thought that combat was merely an issue of mind over matter.

For the Japanese, according to Benedict:

The spirit was all and was everlasting; material things were necessary, of course, but they were subordinate and fell by the way. . . . This reliance on spirit was taken literally in the routine of war; their war catechisms used the slogan--and it was a traditional one, not made for this war--"To match our training against their numbers and our flesh against their steel." Their war manuals began with the bold typeline, "Read this and the war is won."²⁰⁷

Based upon the Japanese devotion to the emperor and the belief in the spirit over material superiority, the defense of the Japanese home islands could be accomplished with the proper mind set. With this concept accepted by the Japanese civilian population, the results from an amphibious invasion would have yielded massive casualties for both sides.

For the Americans the concern was the casualty estimate of an invasion of the home islands. However, while confronted with the idea of assaulting the home island through a ground invasion, American planners hoped to achieve victory with the fewest casualties as possible.²⁰⁸ Because Japan had never surrendered to a foreign power, Americans had no way of knowing how the Japanese would react to surrender or a home invasion.²⁰⁹ American planners feared that fanatical Japanese resistance might cause the Japanese people to die in mass for their Emperor. This concern over Japanese fanaticism and the mobilization of the Japanese populace for home island defense led one 5th Air Force intelligence officer to declare: "There are no civilians in Japan."²¹⁰ In the same statement, this officer went further to state: "We are making war and in making it in the all out fashion which saves American lives, shortens the agony which war is and seeks to bring about enduring peace. We intend to seek and

destroy the enemy wherever he or she is in the greatest possible number, in the shortest possible time.”²¹¹ While a single individual officer made this Douhetian statement, the fact that it is published in official USAAF history validates the notion that this idea was a prevalent thought resident throughout the USAAF and much of its leadership.

As Americans conducted their offensives, battle casualties increased as the Pacific war progressed. The average monthly rate of losses quadrupled to nearly thirteen thousand, and the casualty rates from the assaults on Iwo Jima and Okinawa during the spring of 1945 foretold the potential consequences of a homeland invasion.²¹² Casualty estimates for the invasion of the home islands of Japan for the first month alone were predicted at thirty one thousand.²¹³ While debate continues regarding potential casualty rates, American planners at the time no doubt believed that an invasion would have been a bloody affair regardless. As a result, the avoidance of generating American casualties was at the forefront of American military concerns.

At a June 18, 1945 meeting along with the Secretaries of the War and the Navy, Admirals Leahy and King, as well as Generals Marshall and Eaker, President Truman authorized the invasion of Kyushu. At the meeting, discussion ensued regarding the efficacy of the aerial bombardment campaign over the amphibious invasion. Marshall briefed that “we are bring to bear against the Japanese every weapon and all the force we can employ and there is no reduction in our maximum possible application of bombardment and blockade.”²¹⁴ Marshall went on further to

point out he did not believe that airpower alone could put the Japanese out of the war. Eaker, who was attending at the behest of Arnold, agreed with Marshall's statement. Despite Eaker's agreement with Marshall regarding the inability of airpower to knock Japan out of the war, the blockade combined with a strategic air assault was seen by many in USAAF as the best way to force a Japanese surrender without the need for an amphibious assault. LeMay was a proponent of such a strategy and he fully believed that airpower alone could force the capitulation of Japan.²¹⁵ In order to make his point LeMay traveled to Washington and briefed the Joint Chiefs of Staff, to include General Marshall. While LeMay flew from the Pacific to Washington DC, the briefing was poorly received and according to LeMay, General Marshall had slept through most of the brief.²¹⁶ In defense of this idea LeMay stated:

Most of us in the Army Air Force had been convinced for a long time that it would be possible to defeat Japan without invading their home islands. We needed to establish bases within reasonable range; then we could bomb and burn them until they quit. That was our theory, and history had proven that we were right. The ground gripping Army, and the Navy, didn't agree. They discounted the whole idea.²¹⁷

LeMay went on further to state that:

The number of American casualties which would be incurred by an actual invasion of the islands of Kyushu and Honshu was well up in the imaginative brackets and then some . . . I think we would have won the war anyway, merely by sticking to our incendiary tactics. But we were given the [atomic] bombs and told to go ahead and drop them.²¹⁸

The USSBS later observed, "General LeMay believed that all out air attacks could force Japan to surrender prior to the planned invasion and, at the calculated risk of exhausting all available crews, he committed the command accordingly."²¹⁹ Based upon his own statements and sentiment, history can conclude that LeMay felt no

remorse over the bombing of Japanese civilians because he saw it as a way to avoid American casualties. The avoidance of a ground invasion was worth the expense of American lives and was paid for by Japanese civilians. He expressed similar views regarding the use of atomic weapons on the Japanese and viewed it as a question of military expediency and not so much as a moral issue.²²⁰ In the end LeMay could argue that his tactic saved many thousands of Japanese lives, who would have been killed in an invasion, in addition to the American soldiers who would have died facing Hirohito's mobilized civilians.

Arnold, while a believer in the potential of the strategic air effort, favored a land invasion of at least one home island. Despite LeMay's ideas, Arnold saw the potential of capturing the southern home island of Kyushu (Operation OLYMPIC) and using it as base for B-17s and B-24s to attack the main island of Honshu. In this regard, the seizure of Kyushu would allow the Eighth Air Force to transfer from Europe to the Pacific, thereby increasing offensive airpower. This power would then be used against the main island of Honshu and make the invasion of the larger island (Operation CORONET) unnecessary.²²¹

However, Arnold's official concurrence, via Eaker, had pivotal implications for the future of an independent air force. His submitted recommendation was placed in order to avoid the potential alienation of Marshall, who advocated the use of ground forces for an invasion, but who was also warming to the idea of an autonomous U.S. air force as previously mentioned. However, in his quest for an independent air arm, Arnold did not want to risk the alienation of Marshall.²²²

Regardless of LeMay's failure to change the minds of the Washington leadership, the conduct of the strategic campaign prior to the dropping of the atomic bomb was no doubt influenced by the idea of defeating Japan in an expedient manner that precluded the generation of massive American casualties through a ground invasion. While not necessarily directed by Washington or by the Joint Chiefs, LeMay was given wide latitude to conduct bombing operations as he saw fit. LeMay's superiors never questioned the issue of his burning large swatches of Japanese cities and killing thousands of civilians. Even Marshall's previously mentioned statement regarding the use of "every weapon and the force we can employ" hints that at the national level, the bombing effort had Washington's full endorsement. Despite Stimson's concerns over area bombardment, the civilian leadership's silence regarding firebombing equated to an approval.

Much as he had in Europe, Arnold again played a significant role in the bombing campaign. However, this significant achievement did come at a price, and part of that price was to be paid by the citizens of Imperial Japan in 1945. As noted previously, for Arnold the desire to validate the strategic bombing concept and airpower as a viable tool for the subjugation of an enemy was an overriding imperative for the USAAF. There was no doubt that Arnold's main goal was to have the USAAF contribute to winning the war to the largest extent possible while ensuring that the Air Force received full due credit.²²³

Much like in the European effort, Arnold's desire to secure the future of the Air Force was tied directly to the success of the bombing campaigns and especially

the B-29. As discussed previously, it was Arnold who took the chances, cut the corners, and ordered an airplane into production before the prototype was even built.²²⁴ Because of the risks he took with the B-29 project and the concerns he had regarding its success, Arnold personally selected the commanders for each B-29 bomb group.²²⁵

In late 1944, when the XXIst Bomber Command was not producing the results he expected with the B-29, Arnold sent his Chief of Staff, Lauris Norstad, to Guam in January to remove the commanding officer, Major General Hansell (who had been a key figure in the development of AWPD-1) and replaced him with LeMay. This replacement came on the heels of the relief of another commander, Brigadier General K. B. Wolfe from the XXth Bomber Command in the CBI theater. This ability to replace commanders who were not producing up to the standards Arnold required sent reverberations throughout the USAAF.²²⁶ However, condemnation of Hansell was subdued. The only disparaging words said about Hansell was that he was too inflexible regarding high altitude bombing doctrine and not pragmatic enough to adjust the environment over Japan while compensating for the shortfalls of the B-29 design.²²⁷

This desire to ensure the success of the B-29 went even further as it resulted in his personal oversight of B-29 operations. The 20th Air Force was created in April 1944 and functioned directly under the JCS. The headquarters was established in Washington, DC, with Arnold in command. However, when the B-29s were sent to the Pacific and CBI theaters, they remained under his direct control.²²⁸ Arnold

retained control believing that placing the B-29 under a theater commander was a mistake. After the war he declared “while everybody wondered why I kept personal command of the B-29s there was nothing else I could do, with no unity of command in the Pacific. I could find no one there who wanted unity of command.”²²⁹

Furthermore, his retention of the Twentieth Air Force precluded some commander to be tempted to divert the strategic bomber from its intended purpose and use it for tactical missions.²³⁰ Neither Nimitz, MacArthur, nor Stilwell were strong advocates of strategic airpower, and the lack of unity of command in the Pacific theater concerned Arnold as he retained control in order to ensure the strategic use of the B-29.²³¹ This fear over the misuse of the Superfortress was further validated when the Navy requested B-29s to conduct antisubmarine duties.²³² Thus, Arnold’s retention of B-29 operations was intended to ensure that the weapon system was used to conduct the types of missions for which it was designed.

Arnold saw the B-29 and its mission as its own theater of war. Toward this end, even the name of the 20th Air Force reflected this significance. With fifteen numbered air forces already in place, the next number for the new air force should have been sixteen. However, Arnold himself decided to call the new air force the Twentieth because he saw the strategic bombing of Japan as a separate endeavor in the war, and the obtuse numerical designation helped to illustrate this fact.²³³

In a March 1945 letter from Arnold to his subordinate, the Air Force Chief of Staff wrote; “Under reasonably favorable conditions you should then have the ability to destroy whole industrial cities should that be required.”²³⁴ This ability to destroy

whole cities, combined with Arnold's desire for results and LeMay's initiative, helped set the stage for the widespread destruction of Japanese infrastructure. For LeMay, the B-29 and the capabilities it possessed created a unique opportunity in the annals of war. LeMay summed up his attitude in a message to Brigadier General Lauris Norstad, Chief of Staff for the 20th Air Force:

I am influenced by the convictions that the present stage of development of the air war against Japan presents the AAF for the first time with the opportunity of proving the power of the strategic air arm. I consider that for the first time strategic air bombardment faces a situation in which its strength is proportionate to the magnitude of its task. I feel that the destruction 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. Though naturally reluctant to drive my force at an exorbitant rate, I believe that the opportunity now at hand warrants extraordinary measures on the part of all sharing it.²³⁵

LeMay himself best describes his relationship with Arnold in light of the B-29:

General Arnold, fully committed to the B-29 program all along, had crawled out on a dozen limbs about a thousand times, in order to achieve the physical resources and sufficient funds to build those airplanes and get them into combat. . . So he finds that they're not doing well. He has to keep juggling missions and plans and people until the B-29's do well. General Arnold was absolutely determined to get results out of this weapon system. The turkey is around my neck. I've got to deliver.²³⁶

Despite the fact that LeMay had initially used the same tactics that were employed by Hansell, the desire to achieve significant results with the B-29 created yet another impetus for a change in strategic bombing practices. LeMay once replied, "I never felt that they [the USAAF leadership] were looking over my shoulder. I knew what was expected of me and why I was there. I had to produce some results."²³⁷ While Arnold did not directly order the firebombing, especially since he

was unaware of LeMay's initial change in mission profiles for the March raids, his influence and desire for the proof of bombing's effectiveness and the validation of funds for the B-29 had considerable influence. In the final analysis, LeMay's ability to turn from established procedures, once they proved to be ineffective, and try a new approach was a key aspect to his success.²³⁸ This ability of LeMay not only served Arnold well in his desires, but also got the most effective use out of the B-29 while creating favorable conditions for the surrender of Japan.

The moral reservations about Douhetian bombing as conducted by the 20th Air Force during the war remained muted for many reasons. In the minds of American policy makers, the desire to end the war quickly with the lowest possible casualty figures took precedence over moral considerations about the indiscriminate bombing of civilian populations.²³⁹ Furthermore, animosity, revenge, and racial prejudice toward the Japanese provided additional rationales to the firebombing effort. While LeMay, Arnold, and the rest of the USAAF did not necessarily justify their bombing operations with these reasons, the American public gave its implicit approval based upon these largely human emotions.

To the typical American citizen today, the hatred and loathing Americans held toward the Japanese during the war is largely forgotten and is an antithetical to contemporary values. While Japan is now one of the U.S.'s largest trading partners and a keystone in America's nation defense posture in Asia, the truth is that Americans in World War II were united by their visceral hate of the Japanese during the Pacific War. This abhorrence of Japan seems as alien to present day Americans

as Benedict saw Imperial Japanese empire values to American ones. Historical relativism distorts the past as today's historians often overlay 21st century values and mores and superimpose them on top of past events. The error of imposing current mores upon historical events provides a false picture of past events and distorts the contemporary zeitgeist of the World War II period. In this regard, it is important to remember that at the time of the Pacific bombing campaign, the detestation Americans felt toward Japan was of paramount importance to the generation that worked to defeat the Axis powers. Furthermore, the passage of time ought neither diminish nor to trivialize the importance of these concerns and the role that they played in the prosecution of the war.

Summary

The Japanese home island presented unique challenges and opportunities for the proponents of airpower and strategic bombing. Faced with unique weather patterns that thwarted the use of high altitude precision-bombing methods, the officers of the USAAF had to develop other methods of dropping bombs on the Japanese home island. Further complicating the matter was the fact that Japanese industry was a widespread affair that was not neatly clustered like its Nazi counterpart. Because the Japanese had included, for a time, home industry, USAAF planners felt that targeting entire urban areas was required. Included with this was the fact that smaller "feeder" factories were located in urban areas and this too contributed to the area bombing practices of the 20th Air Force. Also, because large

areas had to be bombed instead of centralized locations, use of fire was seen as an effective and efficient weapon. East Asian architectural practices were conducive to incendiary bombing and the fires they produced became the primary weapon for the USAAF.

In addition to the natural barriers, technological issues also drove changes in bombing practices. Design flaws and mechanical failures of the B-29 and its many components and subsystems further exacerbated existing problems with precision bombing practices. Problems with the engines provided significant challenges to the 20th Air Force and resulted in the loss of both aircraft and aircrews. Pragmatic fixes to these engineering problems combined with the natural environment mandated a change in bombing methodologies.

In the political realm, the use of firebombing held the promise for a potential victory without need for a large-scale amphibious assault of the home islands. In regards to the political objective of “unconditional surrender,” strategic bombing in the Pacific served political ends much the same way it had in Europe. LeMay and select officers of the USAAF thought that airpower alone might bring about capitulation despite Marshall’s and others belief in the requirement for an invasion. In this consideration, widespread fear over large U.S. casualty counts resulted in the inflicting as much damage upon the Japanese and the use of firebombing fit that requirement.

Lastly, war is a human endeavor and conducted through the passions, hatred, and irrationality that are a part of human emotion. These fallible human

characteristics, combined with analytical and systemic reasoning, facilitated and probably expedited the transition to low-level area bombing. The desire to end the war quickly without a land invasion, racism toward and hatred of the Japanese people, combined with various individual agendas were all variables that affected USAAF operations. These emotions and feelings were resident in the national political leadership, the military officers, and in the American population as a whole. Sufficient enmity existed throughout the U.S. that gave both explicit and implicit approval of area firebombing of Japanese cities. While the 20th Air Force did not necessarily have to seek approval for its newly found methodology, the tacit concurrence from the U.S. government and the American people allowed USAAF to develop applications that would have been seen as inhumane and repugnant just a few years earlier.

While these human variables were conventional, advances in science and technology now made it possible to employ “exterminationist practices” that were wholly unconventional.²⁴⁰ Toward this end, racism, dehumanization, and hatred combined with technological advances became inextricably linked to cause the kind of widespread carnage experienced by the Japanese Empire in the spring of 1945. This marriage of technology and human nature made it possible for the first time in history to conceive of deliberate annihilation of an entire race of people in a relatively short period. This recipe for conflagration and disaster moved to another level when atomic and thermonuclear weapons made their appearance on the world stage.

¹D. Haulman, *Hitting Home* (Washington, DC: Air Force History and Museum Program, 1990), 18; and Wilbur Morrison, *Point of No Return* (New York, NY: Times Books, 1979), 224; and Thomas Havens, *Valley of Darkness* (New York, NY: W. W. Norton, 1978) 178-181 as referenced in Crane, 132.

²“Ten-Day Wonder,” *Time*, March 26, 1945, <http://www.time.com/time/printout/0,8816,803479,00html> (accessed March 16, 2007)..

³Alvin Croox, “Strategic Bombing in the Pacific 1942-1945” in *Case Studies in Strategic Bombardment*, 335.

⁴U.S. Strategic Bombing Survey (USSBS), *The Strategic Air Operation of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force) Final Report* (Washington, DC: U.S. Government Printing Office, 1946), 6 and Schaffer, 148.

⁵Errol Morris, *Fog of War: Eleven Lessons from the Life of Robert S. McNamara* (Culver City, CA: Sony Pictures, 2003), video.

⁶*Ibid.*

⁷“The Weather Problem in Attacking Japan,” *Impact* 3, no. 2 (February 1945): 49; Box 41, General Curtis E. LeMay Papers, Manuscripts Division, Library of Congress, Washington, DC.

⁸USSBS, *The Strategic Air Operation of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force)*, 27.

⁹*Ibid.*

¹⁰*Ibid.*

¹¹*Ibid.*

¹²*Ibid.*

¹³“The Weather Problem in Attacking Japan,” *Impact* 3, no. 2 (February 1945): 49; Box 41, General Curtis E. LeMay Papers, Manuscripts Division, Library of Congress, Washington, DC.

¹⁴Schaffer, 124.

¹⁵USSBS *The Strategic Air Operation of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force)*, 27; “The Weather Problem in Attacking Japan,” *Impact* 3, no. 2 (February 1945): 49.

¹⁶*Ibid.*

¹⁷*Ibid.* The ration figures correspond to the cloud cover over a given target area. Example, 9/10 means that only 90 percent of a city was visible from a given altitude.

¹⁸*Ibid.*

¹⁹*Ibid.*

²⁰Craven and Cate, vol., 5, 612.

²¹*Ibid.*, 556.

²²*Ibid.*, 560.

²³*Ibid.*, 568, 612; “Air Blitz Against Japan,” *Air Force Magazine* 28, no.6 (June 1945): 32.

²⁴Hansell, *The Strategic Air War Against Germany and Japan*, 228.

²⁵LeMay, speech to Ohio Society of New York, November 19, 1945, Box 41, General Curtis E. LeMay Papers, Manuscripts Division, Library of Congress, Washington, DC.

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CHAPTER 4

RIGHT ANGLE: *Nuclear Warfare*

At 0230, July 16, 1945, a storm hit New Mexican desert in a downpour delaying the test of the world's first nuclear explosion. Located adjacent to the Oscura Mountains in a plain called the "Jornada del Muerto" and sitting atop a 103-foot steel tower was a nuclear device weighing 10,000 pounds with a cast aluminum external shell.¹ Inside the shell was a core of gunmetal black plutonium surrounded by two layers of yellowish, precisely shaped and placed blocks of Composition B and Baratol high explosives.² On the exterior of the device lay a morass of wires and conduits connected to a precise and exacting triggering mechanism that would initiate a force causing an implosion and start a nuclear chain reaction.³

The weather was so severe that the two B-29 bombers scheduled to observe the explosion from the air were unable to fly over the test site, code named Trinity. As the early morning hours passed, it seemed that the test might be scrubbed for the day, much to the chagrin of the chief scientist of the Manhattan Project, J. Robert Oppenheimer and the officer in charge, Major General Leslie Groves. Working six days a week, for the past few months both men and their subordinates experienced a spartan-like existence in the austere desert environment and were under tremendous pressure to produce results with the \$2 billion of taxpayer's money they spent. Overcoming scientific and mathematical problems posed numerous hurdles, but the physicists at the Los Alamos Scientific Lab (LASL) were also saddled with the

additional challenge of successfully detonating “the gadget” during the conduct of the Potsdam Conference being held in occupied Germany from July 17 to August 2, 1945.⁴

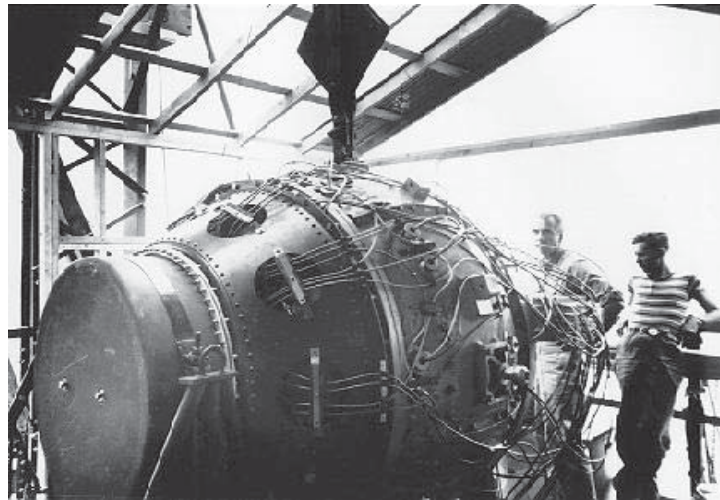


Figure 15. “The Gadget,” The Trinity bomb fully assembled atop the test tower. *Source: White Sands Missile Range*, <http://www.wsmr.army.mil/pao/TrinitySite/tpixind.htm#> (accessed October 16, 2007).

By 0400 the rain began to dissipate and hopes revived that the test could be conducted in the early morning darkness. A nighttime detonation was specifically planned so that the ensuing explosion would attract less attention and the resulting fireball, observed against a dark background, would provide a better contrast for photographs.⁵ Waiting out the storm at the base camp were Oppenheimer and Groves. Oppenheimer, who chained smoked his own hand-rolled cigarettes and drank prodigious amounts of coffee, was clad in his usual khaki trousers and grey “pork-pie” hat.⁶ The meteorological department determined that a two-hour window of clear weather approached and gave the favorable forecast to Oppenheimer. Based on this promising report, the chief scientist gave the order to conduct the test by 0530.

After Oppenheimer made the decision and its subsequent announcement, the arming party closed various circuit switches and departed the tower area for the control center some ten thousand yards south of the shot tower. At 0510, the public address system announced the initiation of the countdown.⁷ As the countdown passed the one-minute mark, classical music seeped in the background noise of the loudspeaker. Because a Voice of America radio transmission operated on the same frequency as the Trinity public addresses system, the sound of Tchaikovsky's *Serenade in Strings* provided an ironic setting to the event.⁸ Forty-five seconds from the explosion, the automatic timing switch energized and triggered electrical circuits. Fifteen seconds later the voltmeter indicted that the firing unit was fully charged.⁹ After charging, an automated timing sequence took over leaving the scientists nothing to do but wait.

The bomb went off at exactly 0529.45 when the firing circuits engaged simultaneously at thirty-two separate points on the sphere.¹⁰ The detonators set off the first layer of composition B and then triggered a second set of explosives creating a shock wave compressing the gadget's plutonium core.¹¹ When the shock wave reached an initiator in the core, free neutrons released from a polonium and beryllium mixture at the center of the sphere starting a nuclear chain reaction.¹² The free neutrons collided with the plutonium atoms and began splitting the atomic structure. The chain reaction began to multiply itself through eighty generations in a millionth of second, creating phenomenal amounts of pressure along with a corresponding rise in temperature.¹³ Light filled the skies.

Regarding the explosion, General Groves reported:

For a brief period there was a lightning effect within a radius of 20 miles equal to several suns in midday; a huge ball of fire was formed which lasted for several seconds. This ball mushroomed and rose to a height of over ten thousand feet before it dimmed. The light of the explosion was clearly seen at Albuquerque, Santa Fe, Silver City, El Paso, and other points generally to about 180 miles away. The sound was heard to the same distance in a few instances but generally 100 miles away. . . . A massive cloud was formed which surged and billowed upward with tremendous power, reaching the sub stratosphere at an elevation of 41,000 feet . . . in about five minutes, breaking without interruption through a temperature inversion at 17,000 feet which most of the scientists thought would stop it.¹⁴

Even with welders' goggles on, eyewitness accounts report that the bright flash from the explosion was several times brighter than the sun.¹⁵ All of southern New Mexico felt the explosion, as did parts of Arizona and Texas. Many people in this large geographical area wondered if an earthquake had taken place.¹⁶

After the explosion, Groves and other members of LASL staff conducted an inspection of the test site. Vaporizing the entire tower, the only remnants of the structure left were parts of the concrete footings and thick metal rebar that at one time helped hold the tower in place. According to Groves:

A crater from which all vegetation had vanished, with a diameter of 1200 feet and a slight slope toward the center was formed. In the center was a shallow bowl 130 feet in diameter and 6 feet in depth. The material within the crater was completely pulverized dirt. The material within the outer circle is greenish [from the formation of Trinitite. A glassy residue made from silica and feldspar melted together during the blast] and can be distinctively seen from as much as 5 miles away. The steel from the tower was evaporated. 1500 feet away [from the center] there was a four-inch iron pipe 16 feet high set in concrete and strongly guyed. It disappeared completely . . . One half mile from the explosion there was a massive steel test cylinder weighing 220 tons. The base of the cylinder was solidly encased in concrete. Surrounding the cylinder was a strong steel tower 70 feet high, firmly anchored to concrete foundations . . . Forty tons of steel were used to fabricate the tower. . . The blast tore the tower from its foundations, twisted it, ripped it apart, and left it

flat on the ground. The effects on the tower indicate that, at a distance, unshielded permanent steel and masonry buildings would have been destroyed.¹⁷

The most interesting comment regarding the result of the explosion made by Groves referenced his most recently completed engineering project, the building of the Pentagon. This massive concrete building was a marvel for the time because of its solid construction and massive size. However, upon witnessing the force of the Trinity explosion and the potential power of nuclear blasts, Groves admitted, “I no longer consider the Pentagon a safe shelter from such a bomb.”¹⁸

Aside from the technical innovation and scientific achievement made possible by the Manhattan scientists, the moral and ethical dilemmas created by their work continue to trouble man. The development of nuclear weapons and the effects they produce only exacerbated the dichotomies regarding precision bombardment, American values, and the goal of total victory. Existing doctrine at the time still advocated precision application of bombing. The introduction of nuclear weapons drastically changed American bombing strategies. The use of mass had begun to replace precision and with it, an acceptance of large numbers of civilian casualties. Despite the pre-war goal of avoiding the targeting of civilian populations, the generation of massive casualties became implicit in bombing operations. While the USAAF killed thousands of civilians during World War II based upon operational practices and necessities, the introduction of the atomic bomb represented a deliberate change in bombing applications. Notably, the decision to use atomic weapons was not made by operational commanders dealing with the limitations of their planes and

crews or in light of a determined air defense. Rather the adoption of nuclear warfare and the generation of massive casualties was a deliberate and conscious choice made by the civilian political leadership in conjunction with leaders in the War Department. With the introduction of nuclear weapons, the tenets behind precision bombardment appeared to be archaic and obsolete.

The dichotomies between the advancement of scientific knowledge, the generation of massive casualties, and the moral implications of harnessing nuclear technology for military purposes was best captured in a quote expressed by Trinity Test Director Kenneth Bainbridge to Oppenheimer following the July explosion. After the successful detonation and initial celebrations, Oppenheimer was leaving the control center and returning to base camp. Still basking in the hubris of the moment, Oppenheimer went to shake hands with Bainbridge, who softly told the chief scientist, “Now we’re all sons of bitches.”¹⁹

The Strategic Imperative

The ability to harness atomic energy and then to use it against an enemy came to fruition on August 6 and 9, 1945 over the cities of Hiroshima and Nagasaki. While USAAF aircrew and personnel delivered atomic bombs, the choice to use weapons of mass destruction was not necessarily a military decision based upon operational needs or tactical consideration. Rather, the decision to use these weapons derived from strategic political deliberations made at echelons largely above the USAAF. It was not the USAAF’s decision to employ these weapons, but the use of such power was in

contrast to existing doctrine. Despite American claims of abhorring the killing of innocent civilians, the political leadership at the federal level, along with members of the War Department, saw that the best way to achieve the aims of the U.S. in the Pacific War was to employ strategic bombers with nuclear weapons and destroy large parts of an entire city.

Regardless of the USAAF's concepts concerning precision bombardment, political necessity and the exigencies of war overrode moral imperatives and existing doctrinal constructs. Since the Casablanca Conference and the Cairo Declaration in 1943, the political ends of the U.S. mandated the "unconditional surrender" of the Axis powers. Not willing to back off this requirement for the termination of the war, the use of nuclear weapons provided a promising way to force the Japanese to capitulate, with the USAAF providing the means to deliver and employ them.

The use of atomic weapons brought about a new dimension in warfare. A single aircraft with a small bomb load, now accomplished what once required a fleet of heavy bombers. Some envisioned that nuclear weapons meant an end to large bombing raids comprised of several hundred planes.²⁰ American technological prowess significantly changed the calculus of war, akin to a revolution in military affairs. The effects generated by the development of nuclear weapons were two-fold. Not only did they physically destroy structures and kill adversaries, but they also had an important psychological effect that was just as potent. The mere threat of their use provided a non-kinetic weapon aimed at an enemy psyche, which proved to be just as, if not more effective. However, the harnessing of atomic energy and its

indiscriminant destructive power posed potential moral and ethical issues for the U.S. threatening to make the idea of precision bombardment irrelevant.

By the spring of 1945, the U.S. was on the march in the Pacific. Japanese forces were strategically on the defensive since their crushing defeat at Midway in June 1942. The loss of her carrier fleet and most of its aircraft and pilots at the battle prevented the Japanese from conducting further large-scale offensive action. Since Midway U.S. forces had the strategic initiative and taken a number of islands throughout the Pacific slowly shrinking the Japanese Empire. American assaults during the “Island Hopping” campaign combined with MacArthur’s Philippine strategy forced the Empire of the Rising Sun to wane. Furthermore, through the U.S. Navy’s efficient destruction of the Japanese merchant fleet, the home islands suffered from a lack of vital war materials and the natural resources from the East Indies. This effort, combined with LeMay’s firebombing raids, created a desperate situation for the Empire’s armed forces.

By late 1944, the Imperial Japanese forces were falling short of everything but manpower. By western standards, the Japanese military was unable to conduct large-scale offensive battle and could only undertake delaying actions against the Allied onslaught. Estimates made during 1945 placed the Japanese Army at roughly five million men.²¹ With no hope of defeating the Americans, the Japanese established a defensive approach aimed at postponing or at least frustrating the American offensive march. Entitled “Sho Go” (Victory Operations) the Imperial Japanese Headquarters in 1944 developed this defensive strategy with two thoughts in mind.²² The first

intent, specifically designed to frustrate the American advance, planned to create as many American casualties as possible. The Japanese ordered “Sho Go” attrition style of warfare in hopes that the Americans would sue for some kind of negotiated peace to avoid the continuous blood letting of its Pacific offensive. Secondly, these delaying actions on the fringes of the Empire could buy time for the establishment of effective defensive positions on the home islands.²³

The American experiences on Iwo Jima and Okinawa were glaring examples of the tenacity of Japanese defenders. The battle of Iwo Jima resulted in over 25,000 American casualties (dead and wounded) and over 20,000 Japanese deaths. Figures from Iwo Jima paled in comparison to casualty figures on Okinawa a few months later when some 60,000 Allied troops were casualties, with Japanese deaths estimated around 100,000.²⁴ Tragically, over 150,000 Okinawan civilians, one-third of the civilian population, caught in the middle of the fight also perished. Both of these battles indicated to American planners that an even bloodier experience would occur on the Japanese home islands once the Allies invaded Kyushu and Honshu.

Despite the casualty figures, and what they foretold for an assault of the Japanese home islands, the Allied goal of “unconditional surrender” mandated the thoroughgoing defeat of the Japanese Empire. When FDR died on April 12, 1945, Harry Truman ascended to the presidency. In his first address before a joint session of Congress on April 16, 1945, Truman reiterated his predecessors policy by announcing “our demand had been, and it remains-Unconditional Surrender! We will not traffic with the breakers of peace on the terms of peace.”²⁵ He repeated his

adherence to FDR's policy weeks later during his VE-Day speech by stating, "Our blows will not cease until the Japanese military and naval forces lay down their arms in unconditional surrender."²⁶ Truman was committed to more than just the unconditional surrender mandate and sought to continue all efforts established by FDR. Shortly after taking office, the new president hung a picture of FDR in the Oval Office and stated, "I'm trying to follow FDR's policies as much as possible."²⁷

The unconditional surrender stipulation, experts acknowledged, carried with it the potential for a very bloody price tag regarding the Pacific War. Just as it had been a worry in the European Theater against Germany, casualty rates were a great concern in the Pacific War. With the Iwo Jima and Okinawa experience fresh in mind, an amphibious assault of the Japanese home islands would be a blood bath for both sides. At the same June 18 meeting at the White House that addressed the ability of airpower to single handedly knock the Japanese out of the war, the President, the Joint Chiefs, and the service secretaries discussed the unconditional surrender mandate. During this meeting Admiral Leahy, Chief of Staff to the President for the Army and the Navy, expressed the concern that insistence on unconditional surrender "would result only in making the Japanese desperate and thereby increase our casualty lists."²⁸

The attendees discussed recent casualty figures from Pacific battles and ratios between American dead to enemy dead. During the meeting General Marshall stated that American casualty numbers on Pacific battlefields was so diverse that he "considered it wrong to give any estimate in [casualty] numbers" regarding the

invasion of the Japanese home islands.²⁹ Despite this vague answer, the magnitude of expected casualties was a topic of discussion at the meeting and Truman heard figures that would at least give him an idea of how many would die. Admiral Leahy drew the conclusion that the casualty figures for the invasion of Japan would be comparable to the 35 percent experienced during the battle of Okinawa.³⁰ Marshall pointed out that the total assault troops planned for the Kyushu campaign was 766,700 while the Japanese forces numbered some 350,000 with more troops coming.³¹ Based upon the 35 percent figure and the numbers provided by Marshall, American casualties could have been around 270,000. Admiral King, Chief of Naval Operations, added to the discourse and estimated that casualties would be between the numbers experienced in Luzon and Okinawa.³²

After the war, discussion ensued regarding Japanese efforts to end the war prior to the atomic bombings and of their attempts to reach some sort of negotiated peace. Messages between Japanese Minister of Foreign Affairs Shigenori Togo and Ambassador Naotake Sato in Moscow address the potential use of Soviet help to negotiate and end to the war. In this effort, they attempted to arrange a meeting between Japanese Prince Konoye and Soviet officials to mediate some kind of resolution. While certain elements of the government saw the futility of continuing the war, other segments adhered to traditional Japanese values and wished to fight to the bitter end. Even after the dropping of the Nagasaki bomb, military elements of the Japanese government were still opposed to the idea of surrender and attempted to subvert the capitulation effort.³³ On the eve of defeat, elements of the Japanese

military attempted to confiscate the Emperor's surrender recording and prevent its broadcast. While much debate occurred regarding the pro-surrender Japanese officials and efforts to stave off an invasion, the public pronouncements of the government, legislative actions, and the preparations underway on Kyushu reinforced the perception that Japanese intended to resist and would not capitulate without a fight on the home islands. Based upon these Japanese public declarations and martial actions, the U.S. had no choice but to continue making decisions based upon a determined Japanese defense.

In order to avoid the large number of casualties, but still reach American objectives in the Pacific, there were efforts made to curtail the unconditional surrender requirement and be less stringent in its application.³⁴ In early June, former President Herbert Hoover sent a memorandum to Truman that outlined the requirements for a Japanese surrender that was less than unconditional. The document specified conditions Japan could meet that would still satisfy overall American war aims.³⁵

From the War Department, Marshall advised Stimson that the U.S. needed to be more subtle and nuanced in its requirements and that unconditional surrender be looked upon as a slogan and not necessarily a policy.³⁶ Despite these efforts to tone down the unconditional surrender mandate or ameliorate its harsh terms, at the June 18 meeting Truman finally replied that it was up to Congress to change the unconditional surrender requirement and that "he did not feel that he could take any

action at this time to change public opinion on the matter.”³⁷ This retort effectively ended further discussion on the matter.

During the same meeting, Stimson voiced concern over the potential ferocity of Japanese resistance. He expressed an opinion that there were Japanese who were not in favor of the war, but if attacked on their own ground, they would “fight tenaciously.”³⁸ Given the Japanese ideas of honor and the samurai tradition, the very idea of surrender was abhorrent to the Imperial Army and the national population.³⁹ Bushido and the warrior code required an individual to fight until death with unswerving loyalty to the Emperor. Furthermore, to the Japanese the idea of surrender was even more repugnant in light of their ideas regarding racial superiority compounded with the fact that no invader or foreign power ever occupied the Japanese home islands.⁴⁰

Following Samurai tradition and social structures, every Japanese family fell under the authority of a patriarch and under his rule; everyone else had a role to play. For the Japanese, they saw themselves as the patriarch to the people of Asia and the imposition of their will on other nations and races was both correct and proper.⁴¹ The Greater East Asia Co-Prosperity Sphere established by the Japanese purported equality in this area of the world, but in reality the organization merely reflected the self-aggrandizing attitude of the Japanese. Indicative of the Japanese idea of racial superiority is a 1943 publication outlining the demographic impact of the war in light of Asian history. This multivolume work of over three thousand pages was entitled “An Investigation of Global Policy with the Yamato Race as Nucleus.”⁴² Based upon

this egocentric view of the world, the Japanese looked upon Americans with the same contempt as other nations. Even in the face of LeMay's relentless firebombing efforts, Japanese ideas regarding racial superiority still existed. In an August 1945 radio response to the American aerial assault, the Japanese announcer stated, "Japan simply will not submit" and despite the heavy bombing Germany was subject to, "the severe pounding it received was no criterion as far as Japan is concerned. Orientals are made of sterner stuff."⁴³

On July 26, the Potsdam Declaration reiterated Allied resolve regarding unconditional surrender and gave the Japanese government full warning regarding use of military force against the home islands. Although two of the "Big Three" players had changed, Clement Atlee for Churchill and Truman for FDR, the Allies were still in agreement regarding the conditions for the conclusion of hostilities. Addressing their terms for surrender the Allies specified, "We will not deviate from them. There are no alternatives. We shall brook no delay."⁴⁴ Even the concluding lines of the Potsdam Declaration hinted at an assault similar to what Douhet envisioned as the Allies promised the "prompt and utter destruction" of Japan.⁴⁵

In response to the Potsdam Declaration, *Time* magazine reported that the Japanese Premier Kanto Suzuki renounced the declaration by stating, "So far as the Imperial Government of Japan is concerned, it will take no notice of this proclamation."⁴⁶ Suzuki went on to further state that he would treat the declaration with "mokusatsu," which was interpreted by many to mean silent contempt.⁴⁷ However, the term mokusatsu has other translations to include to "take no notice of"

or to “remain in a wise and masterly inactivity.”⁴⁸ Debate exists regarding context of the Premier’s comments. Some believe that he used the *mokusatsu* term in the latter context and actually meant “no comment” while waiting to see if some of Japan’s peace efforts with the Soviet Union would be successful.

Taking the more negative interpretation of *mokusatsu*, the *New York Times* reported, “Suzuki called the Potsdam ultimatum a mere repetition of the Cairo Declaration and said Japan would ignore it as unimportant.”⁴⁹ While U.S. papers decried the rejection of the declaration, Japanese papers reiterated stubborn resolve and the refusal to surrender. The Japanese *Mainichi* daily newspaper called the Potsdam declaration a “laughable matter.”⁵⁰ Adding to the more negative interpretation regarding the use of the word *mokusatsu* was the *Ashai Shimbun* newspaper. As Tokyo’s largest news daily, it called the Potsdam Declaration “a thing of no great value” and at a press conference held on July 28, Premier Suzuki declared that the Potsdam declaration was only a “rehash” of the Cairo Declaration and reiterated the *Ashai Shimbun*’s statement while repeating the government’s determination to sustain the war effort.⁵¹

Regardless of interpretations and perspectives regarding the Potsdam Declaration, as far as the Allies were concerned, Japanese inaction regarding unconditional surrender or the Potsdam declaration set the stage for the continuation of hostilities and the invasion of Japan. Historian Robert Maddox points out that even in light of the Sato-Togo discourse there is no evidence that supports the contention that the Japanese Government as an entity would surrender to the Allies

unconditionally or in any manner that resembled these terms.⁵² An official Japanese edict announced in June 8, 1945, stated that they would “prosecute the war to the bitter end in order to accomplish the objectives of which we went to war.”⁵³ In light of this edict, the fact that the Togo-Sato messages were secret and not in the public domain, and since the Premier made his intent clearly regarding the Potsdam declaration, Truman had every reason to think that the Japanese meant to continue the war regardless of their military disadvantage or national condition.⁵⁴

The first objective for the attack on the Japanese homeland was the southern home island of Kyushu. The OLYMPIC plan, called for multiple amphibious assaults of the island beginning November 1, 1945. OLYMPIC was a precursor to a second amphibious assault on the larger island of Honshu.⁵⁵ The Kyushu assault would be part of the existing blockade effort against the home islands and would serve as an important staging point for Operation CORONET, the planned assault upon Tokyo and the Kanto plain on Honshu.⁵⁶ According to an account published after the war, General Marshall believed that the Japanese would have 2.5 million people fighting to the death to protect their home and Emperor. Regardless of LeMay’s firebombing efforts and the effect it had on the populace, Marshall believed that the Japanese refused to accept defeat and would fanatically defend their homeland during an invasion.⁵⁷

At the June 18 meeting, General Marshall argued that the invasion of Kyushu should be conducted before the Japanese had sufficient time to prepare defenses and before the winter weather became a factor.⁵⁸ Additionally, Marshall expressed

concern that if the invasion was not conducted by this date that the war could extend up to another six months. Despite LeMay's ideas regarding bombing the Japanese into surrender, all of the service chiefs, to include Arnold, represented by Eaker at the meeting, concurred with the decision to invade Kyushu. Before the meeting adjourned, and despite wanting to avoid a repeat of the Okinawa experience on the home islands, Truman gave his consent for the invasion.⁵⁹

Unbeknown to the Allies, the Japanese Army had already established extensive defensive positions on the island of Kyushu and were increasing the force's fighting capability. The loss of Okinawa led the Imperial General Headquarters to believe that an assault upon Kyushu was in the offing and that the tentative invasion date was in June.⁶⁰ After the fall of Okinawa, the Imperial Japanese Headquarters published the directive for "Ketsi Go" (Decisive Operation) which outlined the strategy for mobilization, command and control, and general guidance for the defense of the home islands.⁶¹ Despite Japan's shortage of war material and the loss of thousands of soldiers, the national psyche had yet to accept defeat. In preparation of the American assault, the Japanese staged supplies, material, and men to conduct yet another delaying action. Some estimates place up to nine hundred thousand men on Kyushu staged in caves and on terrain favorable to the defense. Additionally, the Japanese marshaled a civilian militia throughout the country estimated to include some 28 million men and women.⁶² The legislation establishing this militia passed unanimously in the Japanese Diet.⁶³ While armed with bamboo spears, muzzle loaded rifles, and other simple weapons, these forces would no doubt create

thousands of American casualties on the home islands. Given the terrain, the influx of Japanese men and material, and the mobilization of the civilian masses, an American assault faced a difficult challenge.⁶⁴

The mobilization of the Japanese nation produced a significant land force that would have caused further problems for the Americans. MacArthur, who would have been the invasion force commander, received reports from his G-2 Intelligence staff that the Japanese sent troops to Kyushu and built a sizeable defensive force. After reading Japanese radio intercepts, in August 1945 MacArthur was under the impression that the Japanese Army in Kyushu was 560,000 strong, some 400,000 less than the aforementioned 900,000 estimate.⁶⁵ Conversely, the planned American invasion force for OLYMPIC was roughly 750,000 men, some 150,000 less than high-end defensive force estimate. Given the widely accepted force generation ratio of 3:1 for successful offensive action (meaning it takes a force three times larger to defeat and enemy force in the defense), the American landings would have been decimated.⁶⁶ Using this conventional planning ratio, even if MacArthur's lower estimate was correct, the American force would still not have had sufficient forces to dislodge the defenders. After the war, one Japanese General reported, "we would have succeeded in driving you off the beaches."⁶⁷

In addition to the military situation facing the Allies and the invasion of Japan, a domestic concern was also resident. After the fall of Germany in May, America could now fight a one-front war. While Germany had the priority of effort for the Allies, the defeat of the perceivably more formidable Nazi foe held promise for the

beginning of demobilization of the American military. While American war sentiment and support was strong, with the victory over the Nazis, many in the U.S. began to push for the start of demobilization and a return to a peacetime economy. Support for the war effort was a commodity that was consumable, and with Germany defeated and the Japanese on the defensive, this commodity was fast becoming scarce. Shortly before the fall of Germany, Marshall asked the American people for patience regarding demobilization and a future invasion of Japan by stating, “The attitude of the American people at home would be of the utmost importance to the Army’s morale and efficiency. They must be brought to understand the urgent requirement of the situation. They must be persuaded to support us in a last great effort to hasten the end of this war.”⁶⁸

In 1945, American manpower resources were increasingly stretched thin. What the military said it required to maintain the ranks ran in contrast with the desire for demobilization and civilian production requirements. Victory over one foe raised hope for a return of men, however, military necessities precluded the partial demobilization of the Army. Domestic economic and social forces were no doubt a concern for the national leadership as well as a way to expedite the end of the war. These domestic concerns of the American constituency had a direct influence upon the nation’s political and military leadership and this influence was to manifest itself in ways unforeseen.

Fred Vinson, head of the Office of War Mobilization and Reconversion told the Joint Chiefs that “there was overwhelming public pressure to increase the

production of consumer goods.”⁶⁹ He expressed fears about “unrest in the country” as a result of “end-of-the-war psychology” that was beginning to permeate throughout American society.⁷⁰ Indicative of this sentiment, Secretary of the Interior, Harold Ickes warned, “unless the Army released men for work in coal mines, civilians would be short of fuel this winter.”⁷¹ Also reflective of this demobilization sentiment, Congressman Edwin Johnson called the Army’s measured demobilization plan “blind, stupid, and criminal” and charged that the Army was unnecessarily holding men.⁷² Adding to the demobilization argument, the *New York Times* reported in May 1945 that steel, textile, lumber, and aluminum plants had an immediate need of 189,000 workers.⁷³

Conversely, Secretary Stimson worried about manpower shortages for the military at the same time. Understanding the requirement for men in the upcoming invasion of Japan and faced with pressures for demobilization, he directed a study to determine Army manpower accession requirements. The results of the study reported that the Army needed to maintain its current accession rate to support the war in the Pacific. The study published its findings in June 1945, and stated that the Army policy of producing replacements be based “against maximum requirements rather than against continually revised estimates of minimum needs.”⁷⁴ With the invasion of Japan looming for the latter part of 1945 and continuing on into 1946, the requirement for a large Army still existed despite the victory over Nazi Germany.

Up until July 1945, the strategic plans for the Pacific did not include the use of the atomic bomb, as it was a highly classified project and still only a theoretical

application.⁷⁵ The political, social, and military objective of the U.S. during this time was the destruction of Japanese military power and her complete surrender in a rapid manner.⁷⁶ Given the ultimate Allied objective of unconditional surrender that required the assault of the Japanese home islands, Truman faced a Hobson's choice. He could either settle for something less than unconditional surrender, which was politically, socially, and militarily unacceptable to the Allies and the American population, or continue with the planned amphibious assaults and subsequent, drawn out, costly ground campaigns. By conducting the OLYMPIC and CORONET operations, America would suffer large numbers of casualties, as well as their Japanese adversaries, in a struggle that would go well into 1946 and have reverberating effects upon the American domestic and economic horizon. However, the events in New Mexico and the efforts of the Manhattan Project scientists were to provide a third option for the president.

Manhattan

The genesis of the U.S. government's interest in nuclear technology began with Albert Einstein's letter to FDR on August 2, 1939. Written in the eve of World War II and less than a month before Hitler's assault into Poland, Einstein worried that Nazi Germany's advances in nuclear technology could provide them with a weapon the Third Reich might be willing to use. With developments in this new technology during the 1930s, Einstein theorized, "it may be possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large

quantities of new radium like elements would be generated.”⁷⁷ He wrote further that “this new phenomenon would also lead to the construction of bombs . . . a single bomb of this type, carried by boat or exploded in a port, might very well destroy the whole port altogether with some of the surrounding territory.”⁷⁸ Ironically, the scientist also postulated, “such bombs might very well prove too heavy for transportation by air.” He ended the letter by warning the president that the Germans had already begun hoarding Czech stores of uranium and that the Kaiser-Wilhelm Institut was repeating American scientific advances in nuclear physics.

Two months passed before FDR acted upon Einstein’s letter. However, on October 11, the President met with Wall Street economist, and personal friend Alexander Sachs, and discussed the famous physicist’s letter. From this meeting FDR directed that Sachs create a group, to include representatives from the Army and Navy, to begin studying uranium and its possibilities for the release of the energy that Einstein described.⁷⁹ The group, which became entitled the “Advisory Committee on Uranium,” headed by Lyman J. Briggs, the Director of the National Bureau of Standards, met for the first time on October 21, and submitted their first report twelve days later.

The committee’s report recommended that the U.S. government procure four tons of graphite and fifty tons of uranium oxide to support experiments conducted by Columbia University.⁸⁰ While the ideas behind nuclear fission were speculative at best in 1939, the committee believed that it was well worth the expenditure of funds to finance such research. With no promise of any kind of return, the U.S. government

began supporting these experiments. The theoretical ideas regarding nuclear fission were a long way from actual application or even the development of a useable atomic weapon, but the threat of an Axis monopoly of nuclear technology required action. Even one of the leading physicists working the issue of nuclear fission in the 1930s, Enrico Fermi, stated, “there was little likelihood of an atomic bomb, little proof that we were not pursuing a chimera.”⁸¹

In 1941 the Uranium Committee was renamed the Office of Scientific Research and Development Section on Uranium with the codename “S-1.”⁸² A study published in May from the National Academy of Sciences reported uranium research was worthwhile, but that current efforts would not produce a bomb prior to 1945. The study clearly stated that much more research was required before any weapons could be detonated and considered practicable.⁸³ However, in July the U.S. National Defense Research Committee received a report from British scientists, entitled the “MAUD Report.” This report specified British advances in nuclear technology and announced that U 235 might be useful through use of a gun-type assembly that “could bring together two pieces of the active material each less than the critical size but which when in contact form a mass exceeding it.”⁸⁴ The report further speculated that the gun assembly held promise and “would certainly be within the carrying capacity of a modern bomber.”⁸⁵ The British, who were already engaged in a war with the Axis powers, recommended, “a uranium bomb was both practicable and likely to lead to a decisive result in the war . . . that the work be continued on the

highest priority . . . [and] that the present collaboration with America should be continued and extended especially in the region of experimental work.”⁸⁶

The MAUD Report encouraged the American efforts as it outlined plans for a uranium-based bomb.⁸⁷ Emboldened by the British report, on October 9, former Massachusetts Institute of Technology professor Vannevar Bush, now head of the National Defense Research Committee, went to FDR and briefed him on the MAUD findings. During the meeting Bush, who was an early advocate of civilian-military partnerships for defensive purposes, was directed to contact the Army for support. Furthermore, FDR directed Bush to move as quickly as possible in the atomic effort in terms of research and study, but not to proceed in the production of a bomb.⁸⁸ Eleven days before the attack on Pearl Harbor, Bush forwarded a report to FDR that provided American confirmation of the British findings in the MAUD Report. FDR did not reply to Bush’s November submission until January 1942, after Pearl Harbor and the American declaration of war against the Axis powers, only then did the president give him full approval to move forward with the atomic project.⁸⁹

When FDR approved of Army involvement with the S-1 project, it set the direction for the atomic effort. After FDR gave his guidance to Bush, the project eventually fell under the purview of the Army Corps of Engineers. The American declaration of war served as a catalyst for a military lead in the atomic project. Before FDR gave his guidance to Bush, on December 16, 1941, the Top Policy Group, lead by Vice President Henry A. Wallace, determined that certain scientific efforts might be leveraged and that the Army would take the lead when, or if, the

production stage might be reached.⁹⁰ This arrangement changed the nature of the S-1 project as the Army became the leading advocate for atomic research and would employ academics and scientists as part of the supporting effort. This arrangement put the military in charge instead of the previous arrangement that had civilians leading the way.⁹¹ During the summer of 1942, the S-1 project was established in New York City initially commanded by Colonel James Marshall. Marshall's office was located in New York City under auspices of the Manhattan Engineering District. As time passed, the New York genesis of the effort served as the impetus behind the bomb's more recognized and popular name the "Manhattan Project."⁹²

While not the first director of the Manhattan Project, in September newly promoted Brigadier General Leslie Groves became the head of the effort and quickly began a number of initiatives to get the project moving.⁹³ Groves was a competent and efficient administrator with an excellent engineering background and possessed an impressive professional resume. A West Point graduate, 4th in his class, Groves was abrasive, abrupt, demanding, and possessed an ego to match his ever-growing waistline.⁹⁴ One military subordinate referred to Groves as the "biggest SOB I ever worked for," but went on further to quantify that the General was the right man for the job.⁹⁵ Groves had no reservations or moral qualms over the project, justified it based upon the potential of a German atomic threat, and saw an American atomic bomb as the best insurance against a nuclear attack upon the U.S. Furthermore, he believed that this new weapon would be an important tool in ending the war as quickly as possible.⁹⁶ For Groves, the use of the weapon was not just a theoretical

engineering effort, but also the development of a weapon that would ensure the safety of the nation and held the promise of a shorter war and advancing U.S. Security.⁹⁷

Furthermore, a group of visionary scientists known as “the luminaries” joined the S-1 effort. Chief among “the luminaries” was J. Robert Oppenheimer a physicist from the University of California.⁹⁸ Oppenheimer possessed a superior intellect with vast array of interests in the arts and the humanities. Comfortable with many languages and with a penchant for oriental philosophies, Oppenheimer was a fast and prolific reader and provided effective leadership for the “long hair” civilian scientists.⁹⁹ He had completed his undergraduate studies at Harvard in only three years, graduated summa cum laude, and Phi Beta Kappa. After graduation, he worked in physics labs at universities in Cambridge, Gottingen, and Leiden and established a highly respected reputation within the physics intellectual community.¹⁰⁰ By the time the war broke out, many considered him one of the top theoretical physicists in the world.¹⁰¹ With Oppenheimer eventually becoming the chief scientist, the Manhattan Project was gaining momentum. Equally important, the relationship between Oppenheimer and Groves provided a unique synergy for the Project. The relationship between these two men served as the glue in this Army led, civilian intensive project, and both men’s roles were paramount to the success of the endeavor.

In the summer of 1942 scientist determined that the Manhattan project needed better coordination and required a central location for atomic research.¹⁰² Oppenheimer was the chief advocate of such a facility and sought to build a lab

staffed and equipped according to modern scientific protocols.¹⁰³ Oppenheimer received Grove's approval to establish such a lab but security requirements mandated that the facility be located in a remote location. Familiar with northern New Mexico, Oppenheimer convinced the Army to obtain the location that became the home of the Los Alamos Scientific Laboratory (LASL).¹⁰⁴ While the conditions at LASL were austere, the intellectual and theoretical work done there was world class and cutting edge.

On December 2, 1942, Enrico Fermi successfully achieved a self-sustaining chain reaction under the west football stands at the University of Chicago. Combined with Fermi's success and the many other positive steps in 1942, on December 28, FDR gave the approval for full-scale development of atomic weapons that eventually cost over \$2 billion dollars.¹⁰⁵ At the beginning of 1943, the Manhattan Project was fully funded, had the complete support of the national leadership, the military, the federal government, attracted the nation's most distinguished civilian scientist and engineers, was building a first rate and research facility, and had effectively leveraged segments of American industry.¹⁰⁶ By the time the war had concluded, the Manhattan Project employed approximately six hundred thousand Americans.¹⁰⁷ Driven by wartime exigency and fully supported by American resources and leadership, the development of atomic weapons accelerated at a rate unimaginable just a few years earlier.¹⁰⁸

Much like the British had speculated in the MAUD Report, scientists in the Manhattan Project saw uranium as the best source for creating a nuclear chain

reaction and development of a bomb. Physicists at the University of Minnesota confirmed that when correctly concentrated, Uranium 235 (U 235) had all the properties required for fission and for use in a nuclear weapon. An obstacle to the development of uranium bombs was that U 235 was in short supply. While it was difficult to make U 235 at the time, finding suitable uranium for even starting the process was difficult as less than 1 percent of uranium mined out of the ground was seen as suitable for weapons.¹⁰⁹ Once suitable ores were found, Manhattan scientists had to extract U 235 from its heavier parent element U 238. However, the separation process was a slow and tedious one.¹¹⁰ In order to conduct this difficult refinement process, the Manhattan Project built the huge K-25 Gaseous Diffusion Plant at Oak Ridge Tennessee that took two years to construct and employed up to 12,000 workers.¹¹¹

Regardless of the difficulty in creating U 235, by 1943 the uranium gun type assembly was seen as the most practical approach toward a making an atomic bomb.¹¹² While this design had the best chance for success, it still had limitations. One of the chief concerns with the gun type assembly was how to fit this design into a bomb casing for delivery. Another issue was how to fire the nuclear projectile in the gun at the accompanying nuclear target element with sufficient precision to cause a chain reaction.¹¹³ Eventually Manhattan scientists were able to overcome such challenges and the “Little Boy” bomb design became finalized in February 1945 with the actual developed that summer. The bomb was some 9,000 pounds, 10 feet long, and 28 inches wide and consisted of a naval gun barrel with the uranium target placed

in the nose and accompanying projectile and other components near the tail assembly.¹¹⁴ After the bomb's release from the aircraft and upon it reaching a predetermined altitude, the firing mechanism would engage and send the uranium slug down the barrel toward the nose target.¹¹⁵ When joined, the two U 235 bodies created a nuclear detonation occurring as an air burst over the target area.

Through 1944 and early 1945, Manhattan scientist continued with their gun assembly plans and encountered few problems.¹¹⁶ Experiments validated the criticality of U 235 and the correctness of their scientific hypotheses. At an April 1945 conference, scientists concluded that the uranium gun assembly would work if the engineering plans were fully followed.¹¹⁷ No full-scale test on the "Little Boy" design occurred, as Manhattan scientists were confident of the gun's design and the bomb's chances of success.¹¹⁸ Furthermore, this absence of full testing was also related to the difficulty in making U 235 from the refinement of U 238. The amount of U 235 produced from the refinement process was barely enough to create a fissionable event. In fact, the making of "Little Boy" depleted the American stockpile of U 235 so much that there was little of the material left for a second bomb. According to Hans Bethe, Head of the Theoretical Division at LASL, it would have taken another six months to produce enough U 235 for a second "Little Boy" type bomb.¹¹⁹

While developing one bomb was hard enough, planners came up with the requirement for additional bombs. According to Groves, the idea of dropping two atomic bombs came from Navy Rear Admiral William Purnell, who in 1944 was part

of the Military Policy Committee that served as an advisory panel to the Secretary of War.¹²⁰ After discussions, these men concluded that the first bomb be a warning to the Japanese regarding the power of the new weapon, while the second bomb was to prove that the U.S. had the capacity to build more, thus keeping the Japanese off balance.¹²¹ Knowing the Japanese disposition regarding surrender, bushido, and the samurai tradition, the dropping of a single bomb may not have been enough to convince the Japanese to capitulate. The second bomb would provide the “one-two” punch to convince the Japanese to quit. Furthermore, assuming production could keep up with demand, there was no limit on the number of bombs that Groves could provide to the USAAF for subsequent delivery.¹²² In this thought, the U.S. government was tacitly subscribing to a Douhetian philosophy of morale bombing that leveraged the psychological aspects of atomic warfare.

In conjunction with the experimentation and development of the uranium based gun assembly, scientists in the Manhattan project were also developing a second method of nuclear fission. Instead of slamming two sub critical masses together and creating a supercritical state and explosion, this second method focused upon implosion. The idea behind implosion was that a sub critical mass might become critical if symmetrical shockwaves compressed the mass while free neutrons became available. Furthermore, this method of fission would yield a potentially more powerful blast and with a different type of material.

For the implosion design, LASL used plutonium as the base element. Plutonium (Pu 239) is a man made element that also comes from Uranium. However,

the method for making Pu 239 is easier than the method for extracting U 235. While there were risks involved, Pu 239 did not require the three step refinement process needed for U 235.¹²³ Irradiating U 238 in a reactor could create the plutonium needed for fission and produce it in faster quantities. In order to produce Pu 239 another facility was required as space was limited at the Oak Ridge site. As a result, DuPont and the Manhattan Project built another large and expansive refinement plant in Hanford, Washington.¹²⁴

Furthermore, in addition to the simpler process of creating Pu 239, implosion required smaller amount of fissionable material. Adding to the attractiveness of the plutonium implosion design was the fact that lesser quantities of Pu 239 can create a nuclear chain reaction when compared to a larger amount U 235.¹²⁵ For U 235 to become critical 110 pounds of the material is required.¹²⁶ However, for a plutonium based bomb, 35.2 pounds of Pu 239 is required, and that figure can be reduced further to 22 pounds.¹²⁷

The efficiency of Pu 239 over U 235 was obvious to Manhattan scientists and added to the attractiveness of the implosion theory. Not only did it require smaller amounts of fissionable material, the supply of the relatively easier made plutonium coming from Hanford also held promised for a growing supply of atomic bombs. While scientists were reasonably sure that the U 235 gun assembly would work, the scarcity of fissionable uranium precluded the stockpiling of this type of bomb design. While two bombs may have been the minimum requirement, the viability of the

plutonium/implosion design held the promise an ever-growing stockpile of nuclear weapons for the current conflict and any wars following.

One of the most challenging aspects to a plutonium-based design is the implosion upon the core and the symmetry of the shock wave. Implosion work comprised ninety percent of the work conducted at LASL and the Trinity detonation was the validation of this effort.¹²⁸ This type of explosion is what occurred in the New Mexican desert on July 16, and served as the base design for the “Fat Man” bomb dropped by “Bockscar’s” and Major Sweeney’s crew on August 9, 1945. Furthermore, the implosion design is the same type of bomb that became the mainstay of America’s nuclear force in the years immediately following World War II. From 1945 to 1955, America’s nuclear arsenal grew from the paltry two weapons in the spring/summer 1945 to over 2,000.¹²⁹

The development of these weapons posed no appreciable ethical problem for the scientist at LASL during the war. Despite efforts and letters written by Leo Szilard and Albert Einstein during 1945, most of the men working at LASL saw their effort as a contribution to the over all war effort and did not suffer moral pangs of guilt. Most were too busy with the work at LASL to think about the morality of their work and did not concern themselves with the discussions going on elsewhere.¹³⁰ Emilio Segre, who measured gamma rays for the Trinity project, was still unmoved by the moral question years after the war and stated “as far as having helped to make it [the atomic bomb], if I go to hell, it will be for something other than that.”¹³¹ Stafford Warren, who was part of the security detachment at LASL stated “Friends

were dying in the war . . . with so much killing going on, we didn't worry about the ethics of killing anymore.”¹³² Harvard Physicist, Percy Brigman, articulated the quote most indicative of the scientist's sentiment regarding development of the atomic bomb. This mentor of Oppenheimer opined, “Scientists aren't responsible for the facts that are in nature. It's their job to find the facts. There is no sin connected with it-no morals. If anyone should have a sense of sin, it's God. He put the facts there.”¹³³

Oppenheimer also harbored no moral dilemma regarding the atomic effort, he saw the bomb as a useful tool and other scientist involved with the project at LASL justified their actions upon empirical arguments.¹³⁴ For these men, the bomb was merely a means to an end and was a technological solution that exploited laws and principles existing since the beginning of time.¹³⁵ Even after the Nazi surrender, LASL scientist believed that the Pacific War would have a bloody ending and their work might be able to mitigate such an occurrence.¹³⁶ Furthermore, Oppenheimer proffered that “even had the Japanese surrendered, we would have continued testing and would have developed the bomb. . . . The assumption was that this weapon would be used in war.”¹³⁷ When interviewed twenty years later, Oppenheimer had no remorse over the Manhattan Project and when queried if he would do it again, even knowing about the effects upon Hiroshima and Nagasaki, he replied in the affirmative.¹³⁸ His response to the question went on further “It wasn't a pretty world. After the Tokyo fire raids, what possible moral reason should we have for not using

the bomb?¹³⁹ This justification was present in other elements of the government as well.

Both the “Little Boy” and “Fat Man” bombs were the result of a concerted national effort from the federal government, the military leadership, corporate America, combining with the civilian scientific community. No one single element created the American nuclear monopoly of 1945 nor the change in American bombing methodology. Through the synergistic effect of various sectors of American public and private entities, atomic warfare became a reality. Strategic nuclear bombing was not the brainchild of the USAAF, nor by its successor the U.S. Air Force, rather the idea of destroying whole cities came out of wartime exigency and political aims combined with significant advances in technology and science. As war by the mid-20th century became an increasingly larger affair, so too did the lethality of the weapons used by the belligerents and the planned effects of their use.

The Interim and Targeting Committees

The development of the nuclear bombs and growth of atomic technology posed a number of questions for U.S. policy makers during the 1940s. Not only did questions arise regarding the use of atomic weapons in the current conflict, but what would be America’s policy regarding nuclear technology after the war? What was to happen to the atomic production facilities built under the aegis of the Manhattan Project built? Should American share its newfound technology with the rest of the world? What did future strategy look like now that atomic energy was possible, and

what controls were needed? To begin deliberations regarding these questions Secretary Stimson chaired a group at the behest of the President and entitled the “Interim Committee.” The title of “interim” was used because it was expected that when the atomic program became public information, a permanent organization would be needed to deal with the issues surrounding nuclear policies.¹⁴⁰ However, in the spring of 1945 this committee served as the primary advisory body to the President regarding wartime control, public announcements, legislation, and post-war organization of the American nuclear effort. The committee’s mandate included “making recommendations to the president on this project [Manhattan] with particular reference to its military aspects.”¹⁴¹ The committee thus served as the president’s primary advisory committee regarding the dropping of the atomic bomb.

Meeting for the first time in May 1945, the committee eventually included such scientists as Vannevar Bush, James Conant (Chairman of the National Defense Research Committee), Karl Compton, (Chief of the Office of Field Service, Office of Scientific Research and Development), Oppenheimer, and Fermi. Other members were military representatives Generals Marshall and Groves, Undersecretary of the Navy Ralph Bard, and Special Consultant to the Secretary of War, George Harrison. Representing the State Department was Assistant Secretary of State William Clayton, and soon to be Secretary of State James Byrnes (who at this time served as a presidential advisor). Also included in at least one meeting of the committee were representatives from DuPont, Westinghouse, Union Carbide, and Tennessee Eastman Chemical Company who had all assisted in the development of the bomb and worked

in support of the Manhattan Project. The committee met eight times during between May and July and formulated the American policy and actions regarding the initial use of the atomic bomb.

During a committee meeting held on Thursday May 31, discussion ensued over the use of the atomic bomb and its possible effect upon the Japanese national morale and their will to fight. During this discussion, members pointed out that the potential effects of the bomb “would not be much different from the effect caused by any Air Corps strike of present dimension . . . but that the visual effect of an atomic bombing would be tremendous.”¹⁴² The atomic bomb promised devastation along the same order of magnitude, but now a single plane and a single bomb could achieve the same amount of destruction. This was the comparison used by Oppenheimer to justify the atomic bombs as he saw little differentiation between the firebombing efforts of LeMay and the atomic bomb.

During this same meeting, discussion ensued regarding giving the Japanese a warning of the destructive potential of atomic weapons. Stimson, who saw the atomic bomb as more than just a kinetic weapon of destruction, proffered the notion that “we could not give the Japanese any warning; that we could not concentrate on a civilian area; but that we should make a profound psychological impression on as many of the inhabitants as possible.”¹⁴³ To Stimson, the primary target of the bomb was not necessarily the Japanese cities and infrastructure, but the attitudes of the Japanese bureaucrats, military leaders, and the civilian populace. The use of the atomic weapons was largely psychological with focus on the Japanese will to fight.

To Stimson, providing any advance warning or notification of the atomic weapon would lessen its psychological effect and thus reduce the effectiveness of the bombs. In conjunction with Stimson's suggestion, Dr. Conant argued, "the most desirable target would be a vital war plant employing a large number of workers and closely surrounded by workers' houses."¹⁴⁴ Other members of the committee agreed that this was the best way to employ the weapon and then proposed that multiple strikes occurring simultaneously might provide a better affect.

General Groves objected to the proposal for simultaneous multiple strikes. He argued the U.S. would lose "knowledge concerning the weapon at each successive trip [and that] such a program would require a rush job on the part of those assembling the bomb."¹⁴⁵ His arguments carried the day. Whether they realized it or not, by suggesting the targeting of "workers' houses" and seeking to make "a profound psychological impression," the members of the committee had just advocated terror bombing with nuclear weapons. The targeting of a "vital war plant . . . closely surrounded by worker's house's" was eerily similar to ideas expressed by Douhet decades earlier. Despite USAAF doctrine of the time, leadership in Washington was no longer merely giving tacit approval to morale bombing, as had been done during the European bombing campaign, but was now advocating bombing strategies that departed from published doctrine.

The next day the committee met again, in this session the Secretary of War praised the efforts of the industrialist present and thanked them in advance for suggestions they might have regarding the continued development of the new

technology and its implications in international relations. After initial discussions the topic eventually returned to the use of the bombs upon the Japanese. To this Jimmy Byrnes, the future Secretary of State, argued that the atomic bomb “should be used against Japan as soon as possible,” but that the target “was essentially a military decision.”¹⁴⁶ In the same discussion Byrnes reiterated that the weapon “be used upon a war plant surrounded by workers homes.”¹⁴⁷ The same sentiment concerning terror bombing was advocated by other members of the committee. No dissenting voices were recorded in the meeting notes.

During June, Stimson tasked the scientists of the committee to consider the use of the weapon against the Japanese and the potential effects such an attack would have upon the international community. Called the Scientific Panel, this group included Oppenheimer, Fermi, and included Nobel Prize winning physicists Ernest Lawrence and Arthur Compton. On June 16, a month before Trinity, the Scientific Panel submitted its report and repeated earlier sentiments regarding the use of the atomic weapons. In addition, these scientists reported that it was “our obligation to our nation to use the weapons to help save American lives in the Japanese war.”¹⁴⁸ To these learned men of science, sparing American lives overrode any moral arguments against the bomb’s use and the U.S. aversion of generating civilian casualties.

In the same report, the Panel discussed the execution of a “purely technical demonstration” to encourage the Japanese to surrender.¹⁴⁹ During this time, other members of the American scientific community, mostly from Chicago, submitted the

Franck Report that renounced the potential use of the atomic bomb and suggested that the U.S. invite the world community to see the explosive power of the technology. This effort hoped to lay a framework for international agreements regarding the control of the weapons.¹⁵⁰ This demonstration was seen as a way to educate the world about the long-term danger of nuclear war despite its possible effectiveness in the current war with Japan. Those scientists who suggested the demonstration held the belief that if the U.S. were to use nuclear weapons, it would be acting immorally and would be “sacrificing public support throughout the world.”¹⁵¹

In support of this same contention, Einstein again wrote to FDR. This time Einstein penned a letter of introduction for Dr Leo Szilard, a well-respected physicist who made significant contribution to the development of nuclear technology. Szilard would argue against the use of the bomb and the proliferation of nuclear technology. However, FDR never saw the letter as he died eighteen days later.¹⁵² Despite the suggestion of a demonstration and the concerns over the use of nuclear weapons, the panel rejected the idea of a nuclear display and felt a staged explosion would not compel the Japanese to surrender. Furthermore, the panel did not feel that the U.S. was lowering itself to the level of the Axis and their crimes against humanity. These men felt that military expedience and necessity trumped other moral considerations at the time. To the idea of scheduling a nuclear event for the Japanese to observe the committee wrote, “We can propose no technical demonstration likely to bring an end to the war; we see no acceptable alternative to direct military use.”¹⁵³

In an interview after the war, Groves commented that any demonstration to the Japanese of the bomb's power would have only impressed their scientists and would have no impact on the military and government leaders of the Empire.¹⁵⁴ Additionally, the scheduling of a demonstration would also include the risk of a misfire or failure. Given the experimental nature of the technology, if the demonstration bomb proved to be a dud, it would not only embarrass the U.S., but might have emboldened the Japanese to resist even more.¹⁵⁵ While these deliberations were going on during June and July of 1945, the gun assembly was the only design that theoretically had a good chance of working. The gun type bomb was based upon uranium and that fissionable material was still in very short supply with only enough of it for "Little Boy". Expending this cache of uranium for a demonstration would leave nothing left to use as a weapon.¹⁵⁶

As well, during this same period, the implosion device still needed validation as a viable design. Even when the Trinity explosion occurred, the event did not fully test all the bomb's mechanisms. The Trinity test, conducted from a tower, did not test the triggering mechanism of an air dropped bomb because those components were still in the design phase.¹⁵⁷

The decision to forgo a demonstration surfaced again during the June 21 Interim Committee meeting. Members again recommended that the atomic attack be conducted "without warning" and that it "be used on a dual target . . . a military installation or a war plant surrounded by or adjacent to homes or other buildings most susceptible to damage."¹⁵⁸ The committee members, which included no one from the

USAAF, specified that the attack commence without any advance notice and the idea of nuclear demonstration was discounted. While the committee deemed it a military decision as to what target to hit, for the committee members dropping the bombs was fait accompli. The issue was not if the bombs should be dropped on the Japanese, but the outstanding questions were; would it work, and if so when and where should we drop it?¹⁵⁹

To address the question of targets, Marshall tasked Groves to create a committee of officers to determine suitable Japanese cities for atomic attack. Known as the Targeting Committee, the group initially met at the Pentagon but did most of its work at LASL and consisted of hand picked men by both Arnold and USAAF General Lauris Norstad.¹⁶⁰ The committee began meeting on April 27, and in the opening remarks, Groves tasked the committee to pick four targets vital the Japanese war effort.¹⁶¹ In addition to choosing cities, the committee also determined the best means of employing the weapons and outlined specific conditions for their use. In a second meeting conducted on May 10 and 11, the Committee determined that the weapon be dropped visually, and if weather precluded visual sighting, then the mission was to be aborted.¹⁶² However, if the bomber was damaged, unable to return to base, and could not locate the target visually, the committee determined that the bomb be dropped using the “Eagle” radar installed on the latest version of the B-29 as it had the best resolution of any available radar at the time.¹⁶³ Furthermore, the committee specified that the bomber avoid blind bombing techniques that might result in a less-than-accurate drop.¹⁶⁴

The 20th Air Forces' firebombing efforts were so effective that the USAAF expected that most, if not all, of Japan's major industrial cities would be burned by January 1946.¹⁶⁵ As a result, the number of Japanese cities deemed suitable for nuclear attack was rapidly dwindling. Members of the committee considered five Japanese cities as excellent candidates for a nuclear attack. In a May 10 report, the committee suggested that targeting criteria for an attack include, "a large urban area of more than three miles in diameter, [the capability] of being damaged by a blast, and [were] unlikely to be attacked by [LeMay's bombers] by next August."¹⁶⁶ Each of the cities discussed had a large urban and industrial area with two that included an army depot and one having significant psychological and cultural significance. The criterion used by the Targeting Committee was similar to that specified by the Interim Committee even though the targeting sessions occurred before the President's advisory body had even convened.

The first of the proposed cities was Kyoto and had a population of 1 million. Not only was this city the cultural and intellectual center of Japan, but was considered big enough that the power of the bomb would remain contained within the city itself, thus lending to a better understanding of the weapons destructive capability.¹⁶⁷ Next was Hiroshima as it housed an army depot and headquarters in an industrialized area with a large population surrounded by hills that "are likely to produce a focusing effect which would considerably increase blast damage."¹⁶⁸ Located by the sea it provided an excellent return on the B-29s radar screens if bombing occurred non-visually. Yokohama housed important production facilities and oil refineries, and as

Tokyo burned from attacks, many industries relocated to this city.¹⁶⁹ Kokura included one of the largest arsenals in Japan and was adjacent to various industry and metal works. Kokura's factories made anti-aircraft guns and beachhead obstacles that would no doubt assist in the defense of the home islands. The city also housed a railway and various machine shops and power plants.¹⁷⁰ Lastly, Niigata was an important seaport on the northwest coast of Honshu and contained oil refineries and machine tool industries. Discussion also ensued regarding the bombing of the Emperor's Palace, but postponed a decision on that target pending further guidance.

The committee met again on May 28, and during the meeting Colonel Paul Tibbets, Commander of the unit designated to drop the bomb, conferred with the members. During the meeting, participants addressed delivery methodology and various mission-planning considerations. The committee acknowledged the necessity of selecting targets that would produce the most damage and would have the biggest effect upon Japanese morale.¹⁷¹ Additionally, densely populated areas not targeted previously, or having experienced little damage from conventional firebombing efforts, figured to be the best targets.¹⁷² This targeting rationale stemmed from the idea that cities not damaged from other raids provided a better chance to measure the full effects of the atomic bombs.¹⁷³ Following these discussions, the committee omitted Yokohama and determined that the first four choices for atomic bombing were: (1) Kyoto, (2) Hiroshima, (3) Niigata, and (4) Kokura. Groves approved the list and planned to submit it to Marshall. However, before briefing the Army Chief of Staff, the Manhattan Chief stopped to brief Stimson on an unrelated matter on May 30.

According to Groves, this meeting resulted in Stimson inquiring about the targeting list.¹⁷⁴ Despite Grove's efforts to avoid giving the list to the Secretary without Marshall having yet viewing it, Stimson replied, "This is a question I am settling myself. Marshall is not making that decision."¹⁷⁵

Upon seeing the listing of Kyoto, Stimson objected to its targeting based upon the city's significance to Japanese culture, heritage, and the Shinto religion.¹⁷⁶ Despite the morale value of targeting Kyoto, Stimson who had visited the city as Governor General of the Philippines, directed that Groves remove the city from the list with a replacement target added. Despite Stimson's rejection of Kyoto as a target, Groves continued to press for its inclusion into the target set. Eventually Stimson took the matter to Truman who sided with his Secretary of War. In response to the targeting of Kyoto, Truman reportedly quipped that, "even if the Japs are savages, ruthless, merciless, and fanatics, we as the lead of the world for the common welfare cannot drop this terrible bomb on the old capital or the new. He [Stimson] and I are in accord. The target will be a purely military one."¹⁷⁷ In a July 24 letter from a Colonel John Stone to Arnold, the final targeting list included the city of Nagasaki in place of Kyoto.¹⁷⁸ While Kyoto was eventually removed from the list, Arnold directed that the 20th Air Force cease bombing operations against this city and the other identified targets in possible preparation for atomic attack.¹⁷⁹

After the success of the Trinity explosion and while at Potsdam, Truman conferred with Stimson, Marshall, and Arnold regarding the decision to employ the new weapon. While the decision whether to use the weapon belonged solely to the

President, Arnold requested that local air commanders receive wide latitude for employment of the weapon based upon tactical considerations.¹⁸⁰ On July 25 , Marshall submitted a draft message directing the USAAF to conduct the atomic mission. One also should note that the directive to Spaatz to drop the weapon was drafted by Groves on July 23, and published on the 25th, days before the Potsdam Declaration and the subsequent Japanese rebuffing of the document.¹⁸¹ According the U.S. Air Force historians, once the Trinity test succeeded, Groves immediately sent technicians to Tinian to help assemble “Little Boy” for delivery without actual orders to drop the bomb.¹⁸² Air Force historians after the war asked the president to define the time line for the decision. To this request, Truman responded, “it was necessary to set the military wheels in motion, as these orders did, but the final decision was in my hands, and was not made until we were returning from Potsdam.”¹⁸³

Historian James Maddox has captured the essence of the decision to drop the bomb given the organizational inertia the program had by 1945. In a 1995 work regarding the use of the bomb Maddox stated, “It may be fairly concluded that the only decision made at Potsdam was not to stop the machinery that went into motion immediately after the Alamogordo test.”¹⁸⁴ In a post war *Harpers Magazine* article, Stimson reported that as one of the principal war advisors, for both FDR and Truman, he never heard arguments against the use of the atomic bomb.¹⁸⁵ According the Groves, Truman’s choice was a one of “noninterference-basically a decision not to upset the existing plans.”¹⁸⁶ With large amounts of manpower and resources committee to the Manhattan Project, the use of the bomb was always presumed. Both

FDR and Truman had a responsibility to the American populace to use whatever weapons available to reduce American casualty lists. In the Truman White House, there are no records yet found of any moral arguments against the bombs use and given Truman's inclination to continue FDR's policies and goals, the use of the atomic bomb, once it proved practicable, fits that pattern.¹⁸⁷

While Truman may have set the "wheels in motion" prior to the Japanese response to the Potsdam Declaration, many other factors facilitated the use of atomic weapons and the continued departure from established doctrine. Given Japanese tenacity and resolve to continue fighting in the face of defeat, an invasion would have created unimaginable casualties at a time when war-weariness was beginning to permeate. Furthermore, domestic concerns regarding manpower and the economy were an issue on the home front and were well known to the national leadership. Additionally, the advice given to the president and the effort and expense required to build such a weapon, combined with the desire to continue the organizational momentum of FDR's policies provided further impetus for the bombs use. A total lack of condemnation from other advisors regarding the moral implications of the bomb added to the mix. As a result, the president's decision to use the bomb had been in the making for years prior to July 1945, and was not a decision based solely upon recent events. The synergy between policy goals and organizational momentum made the use of the bomb not merely a feasible but, arguably, the only possible course of action.

Hiroshima and Beyond

Despite Einstein's assertion in his 1939 letter to FDR that an atomic weapon may "prove too heavy for transportation by air," the USAAF, and subsequently the USAF, came to have the primary role in the delivery of nuclear weapons. Until 1944, few outside of the Manhattan Project knew about the program with Hap Arnold only scantily aware. This situation changed in spring 1944 when Groves approached the Air Chief and informed him of the potential requirements for delivery of the weapon.¹⁸⁸ Once Arnold was briefed upon the latest developments regarding the project and the role the USAAF would play, he became a strong supporter of the program.¹⁸⁹

Having the USAAF deliver the bomb fit perfectly with Arnold's overarching vision of validating airpower and proving the value of an independent air force. The delivery of the atomic bomb would serve as the crescendo to the USAAF's bombing of Hitler's Germany and the firebombing of Japan and would add to the importance of airpower. Arnold promised to provide Groves' with what he needed, specifically aircraft to carry the weapon and crews that could satisfactorily deliver it.¹⁹⁰ Arnold realized the importance and significance of the atomic bomb and was determined to support the effort as much as possible despite its doctrinal deviation. Based upon Arnold's support, the USAAF designated one unit with specially modified B-29s to carry the newly developed ordnance.¹⁹¹ This use of the B-29 also played into Arnold's desire to validate the "3 Billion Dollar" gamble he took with the development of the superfortress years earlier in 1942.

Based upon mission parameters and lift requirements, the B-29 was the only U.S. airplane that met the mission specification. However, stock B-29s coming out of Boeing factories required modification to carry and deliver atomic weapons. The USAAF initiated a program to produce specially modified B-29 to conduct atomic missions. These atomic capable B-29s, known as “Silverplate” bombers, had fuel injected engines, pneumatic bomb bay doors (instead of electrically operated ones) that opened and closed faster, had all the defensive turrets removed, were 7,200 pounds lighter than other superfortresses, could easily fly over 30,000 feet, had a range of 2,000 miles, and redesigned bomb bays to accommodate the new bombs.¹⁹² These aircraft became the mainstay of America’s nuclear delivery capability for years following the war until phased out of service in 1950 by the larger more capable B-36 and B-47 bombers.

To operate the Silverplate bombers the USAAF created a special unit whose sole function was nuclear delivery. In September 1944, the 393th Bomb Squadron located in Fairmont, Nebraska was detached from its parent organization, the 504th Bomb Group, and served as the core organization for the newly created 509th Composite Group. The 509th was specifically designated as America’s nuclear delivery organization. For security reasons Wendover Airfield, in a remote section of Utah, became the first home for the unit. The base had the added feature of being adjacent to a practice bombing range and was a short flight from the LASL. The 509th was a mix of both bombers and troop carrier aircraft and had a full compliment of support personnel making it a self-sustaining unit.¹⁹³ Commanded by Colonel Paul

Tibbets, an experienced and respected bomber pilot, he told few in his command of the unit's specific mission and strictly enforced security regulations.¹⁹⁴ Upon receiving their modified B-29s in October 1944, for the next ten months, the unit developed and practiced targeting and egress procedures for dropping the atomic bomb.

The 509th deployed overseas in April 1945 and chose Tinian as their base of operation. While their mission was still secret, the unit was placed under command of Curtis LeMay's XXI Bomber Command for operational employment while the decision for nuclear weapons still rested in Washington. According to Groves, it was LeMay's idea to have the atomic bomb delivered by a single ship flying at high altitude. LeMay's rationale stemmed from his operational experience and figured that the Japanese would pay little attention to a single ship at high altitude and think it only a reconnaissance or weather plane.¹⁹⁵ Groves acquiesced to LeMay's suggestion, but pointed out that the mission required observation planes to record the event and collect scientific data.

Once in theater, the 509th continued to practice long-range navigation and bomb dropping procedures. The Group practiced atomic mission profiles against actual Japanese targets, but used special orange-colored bombs similar in shape to "Fat Man" that contained various amounts of conventional explosives.¹⁹⁶ The orange bombs, called "Pumpkins," served as a training tool for the aircrews preparing for atomic deliveries. Despite the large blast effect that atomic weapons have, the dropping of the bomb required careful aiming. In order to develop a high level of

targeting proficiency, the 509th dropped pumpkin bombs from 30,000 feet using the Norden sight and targeted increasingly smaller areas.¹⁹⁷

Regardless of the large-scale demolition and mass destruction inherent with the application of atomic weapons, bomb placement and aiming was still important in order to achieve the effects planners envisioned. Despite the USAAF's area fire bombardments over Japan, accuracy was still a lauded attribute. Being able to place the bombs on target was still a goal, but as the war progressed, and as discussed, accuracy was less important. Concurrently, what became more acceptable is the widespread damage created by the bombing and not necessarily the pinpoint targeting of a single building or rail yard. The emphasis on bomb placement and accuracy was to continue once LeMay commanded Strategic Air Command after the war regardless of the widespread effects created by atomic and thermonuclear weapons.

“Little Boy” was ready for employment on July 31 and the 509th was awaiting favorable weather before it conducted the mission. Written guidance to Spaatz on July 25 directed that, “The 509th Composite Group, 20th Air Force will deliver its first special bomb as weather will permit visual bombing after 3 August 1945 on one of the targets: Hiroshima, Kokura, Niigata, and Nagasaki.”¹⁹⁸ Despite the authority to launch after August 3, favorable weather conditions did not occur for several days. As the days passed, the components for “Fat Man” arrived and the bomb assembled.

At 0245 on August 6, Colonel Paul Tibbets rolled his B-29 down the runway with “Little Boy” secured in the bomb bay of the bomber entitled *Enola Gay*.

Heavily loaded with the 9,000-pound bomb and 7,000 gallons of gas, the pilot held the plane on the runway as long as possible to ensure his airspeed was sufficient to become airborne.¹⁹⁹ Once safely airborne, the onboard weaponeers, Lieutenant Morris Jeppson and Navy Captain William Parsons, completed the assembly of the bomb by placing a slug of U 235 in the gun mechanism of “Little Boy” and a conventional explosive charge that would trigger the weapon’s detonation.²⁰⁰ While the primary target of the attack was Hiroshima, weather observation planes, launched three hours earlier were to confirm visual bombing conditions over the city. If clouds precluded visual bombing over Hiroshima, the cities of Kokura or Nagasaki were on the secondary target list.²⁰¹



Figure 16. The *Enola Gay* on Tinian. *Source:* U.S. Air Force Museum web site, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/060712-F-1234S-021.jpg> (accessed December 8, 2007).

Around 0830 the weather plane over Hiroshima sent a coded message reporting visual weather conditions over the city.²⁰² As a result, the *Enola Gay* continued to its primary target. When the plane reached its initial point (IP) for

commencement of the bomb run, the pilot made a heading correction as bombardier Major Thomas Ferebee began looking for his aim point, the distinctive “T” shaped Aioi Bridge crossing the Ota River in the center of the city.²⁰³ Flying at 285 knots with 8 knots crosswind, Ferebee made the proper adjustments to the Norden sight and engaged the autopilot for the bomb run.²⁰⁴ At 0915 (Tinian Time, 0815 Hiroshima Time), the automatic sequence opened the pneumatic bomb bay doors and the weapon dropped from the plane.²⁰⁵

To avoid the blast effects of the bomb, Tibbets placed the *Enola Gay* in a preplanned 155-degree diving turn with a 60-degree angle of bank and lost 1,700 feet of altitude.²⁰⁶ The evasive maneuver, practiced many times by pilots of the 509th, was designed to put the crew and plane approximately ten miles away from the impact point when detonation occurred. Scientists with the Ballistics Group at LASL determined that the ten miles distance would provide an adequate level of protection for the airplane and crew from the ensuing shock wave by a factor of two.²⁰⁷

The bomb exploded at 1,890 feet and the detonation produced a blinding flash, 53 seconds after it dropped from the plane.²⁰⁸ Luis Alvarez, a scientist aboard the bomber described the resulting flash as the most spectacular part of the event and estimated the light to be seven times brighter than the sun even after the plane was several miles away.²⁰⁹ At the same time, Tibbets experienced the distinct taste of lead on his tongue because of electrolysis from the bomb releasing radioactivity and interacting with the fillings in his teeth.²¹⁰ Two shock waves hit the plane, the first from the detonation itself and the second from a reflection wave that bounced off the

ground.²¹¹ Tibbets had to grip the yoke tightly in order to maintain control. As the *Enola Gay* left the target area, tail gunner, Staff Sergeant George Caron, saw a giant purple cloud rising up to 45,000 feet, approximately 15,000 feet above the bomber's altitude, and on the ground below, fires began to emerge and grow.²¹² The resulting fire and dust cloud was so expansive and thick that four hours later observation planes found the view of the city still obscured by smoke.²¹³

Tibbets later described his feelings of one of shock and horror, but as the crew headed home, they felt relieved that their mission had been successful.²¹⁴ While various accounts of the event have put words in the commander's mouth, Tibbets dismissed many of these assertions. According to the mission commander, once the tension ebbed, he calmly tamped some tobacco in his pipe, lit it up and told his copilot, Captain Bob Lewis, "I think this is the end of the war."²¹⁵ Tibbets then gave the radio operator, eighteen-year-old Private Dick Nelson, a message to transmit in code back to Tinian that reported the success of the mission and that the plane was returning to base.²¹⁶ The *Enola Gay* landed at 1458 after a mission time of 12 hours and 13 minutes.²¹⁷

While enroute home from Potsdam aboard the *U.S.S. Augusta*, President Truman received a message from Stimson reporting: "Big bomb dropped on Hiroshima 5 August at 7:15 P.M. Washington Time. First reports indicate complete success which was even more conspicuous than earlier test."²¹⁸ Upon hearing the news, Truman claimed the Hiroshima bombing as "the greatest thing in history."

Weeks earlier, the Interim Committee determined that a public statement regarding the event needed to be prepared if the weapon proved to be a success. In support of this effort, the Manhattan Project hired William Laurence, science editor of the *New York Times*, to assist in drafting the White House press release. Following the attack the White House released a prepared announcement. The statement publicized that a bomb “more powerful than 20,000 tons of T.N.T” destroyed Hiroshima’s “usefulness to the enemy.”²¹⁹ The statement went on to affirm that the weapon was an atomic bomb and that the U.S. was producing new ones in “more powerful forms.”²²⁰ Regarding future use, the release stressed, “Let there be no mistake, we shall completely destroy Japan’s power to make war,” and followed up by telling the Japanese that if they did not accept the Potsdam terms, “they may expect a rain of ruin from the air, the likes of which has never been seen on this earth.”²²¹

Following the Soviet entry into the war and after the Nagasaki bombing of August 9, a second “Fat Man” bomb was prepared for a drop upon Japan. The only missing component on Tinian was the bomb’s plutonium core.²²² While Washington waited for a response from the Japanese, Groves held up shipment of the fissionable components until August 13.²²³ If the Japanese did not respond by that date, the plutonium core would be flown to Tinian for a third atomic mission. Additionally, LASL continued bomb production in the event that more atomic weapons were required.²²⁴ Spaatz contact Norstad on August 10 proposing to drop the third bomb on Tokyo, but the same day the Japanese, communicating through the Swiss,

accepted the Potsdam Declaration.²²⁵ There can be no question that the U.S. was fully prepared to wreak more nuclear induced havoc upon the Japanese had they not capitulated after the second atomic attack.

The public statement from the White House regarding the bomb is telling. The promise to conduct “a rain of ruin” and the development of “more powerful bombs” certainly harkens to a change in bombing methodology and application and an acceptance of mass casualties aimed at enemy morale. This statement is far removed from approved USAAF policies and widely accepted views regarding bombing prior to the war’s beginning. However, given the frame of mind of most Americans during this time, there was comparatively little outcry over the atomic attack. Apart from Szilard’s group in Chicago and objections by pacifist, American’s were overwhelmingly supportive of the action. Leveraging the enmity developed by the attack on Pearl Harbor and other Japanese atrocities, American political and military leaders were free to execute nuclear bombing without large-scale dissention from the national populace. In late August 1945, 85 percent of Americans polled approved of the use of the atomic bomb on Japanese cities, with only 10 percent dissenting, and another 5 percent having no opinion.²²⁶ In September, 69 percent of polled Americans thought that it was a “good thing” that the bomb was developed with only 17 percent dissenting.²²⁷ Even four months after the attacks and well after the war had ended, 22.7 percent of Americans polled wished that the U.S. had the opportunity to drop many more atomic bombs before the Japanese had surrendered.²²⁸

While popular sentiment supported the bombing, a duality of sentiment existed within the national leadership. A message sent to Truman from U.S. Senator Richard Russell lauded the bombing and advocated more atomic missions. In an August 7 telegram, the Senator told the President that “we should continue to strike the Japanese until they are brought groveling to their knees. We should cease our appeals to Japan to sue for peace. The next plea for peace should come from an utterly destroyed Tokyo.”²²⁹ However, in response to this message, the President demurred and stated that he did not believe in “wiping out a whole population” and that he had “humane feelings for the women and children of Japan.”²³⁰ Similarly, when Groves and Arnold met with Marshall after the Hiroshima bombing, the Army Chief of Staff cautioned against being too elated by the attack because it had caused so much death and destruction.²³¹ After Marshall’s comment, Groves responded that he was not too concerned about the Japanese deaths considering the suffering of Americans at the hands of the Japanese.²³² Once outside of Marshall’s office, Arnold reportedly turned to Groves and stated, “I am glad you said that, it’s just the way I feel.”²³³

Based upon the poll data and other evidence, most Americans at the time would have agreed with the President in a response he sent to Sam Cavert, General Secretary of the Federal Council of the Churches of Christ in American, regarding the attack on Hiroshima. The President wrote on August 11, 1945, “the only language they [Japanese] seem to understand is the one we have been using to bombard them. When you have to deal with a beast, you have to treat him as a beast. It is most

regrettable but nevertheless true.”²³⁴ Evidence of Truman’s duality regarding the bombing is also evident in a memo sent to Dean Acheson on May 7, 1946. In the memo, Truman tells Acheson about a visit by Oppenheimer to the White House that occurred months earlier. In the opening passages of the memo Truman begins by calling Oppenheimer a “cry baby” and goes on further to write, “He came into my office some five or six months ago and spent most of his time ringing his hands and telling me they had blood on them because of the discovery of atomic energy.”²³⁵ While accounts of Truman’s response to Oppenheimer may be apocryphal, he supposedly offered the scientist his handkerchief from his pocket and replied, “Well here, would you like to wipe your hands?”²³⁶

Summary

As a result of both atomic bombings, the USSBS estimated that up to 120,000 people were killed or missing, over 110,000 were injured, and 6.5 square miles of urban landscape destroyed.²³⁷ The collective numbers of these raids are slightly higher than what occurred on the single March 9-10 fire raid over Tokyo that killed over 83,000, injured 102,000, and razed 15.8 square miles of the city.²³⁸ Ironically, the individual atomic attacks accounted for less death and destruction than the earlier conventional Tokyo firebombing raid. In light of these statistics, Oppenheimer’s aforementioned argument regarding the morality of the atomic bomb is particularly relevant. The only appreciable difference between the atomic raids and the March firebombing mission was the source of the conflagration.

Regardless of the statistical comparisons between atomic attack and conventional firebombing, the Hiroshima and Nagasaki missions were largely morale bombings aimed at the psychological rather than the physical dimension of Japan's war effort. The psychological and political effect of atomic attack was a catalyst that forced the Japanese government to capitulate. The entry of the Soviet Union into the Pacific war cannot be dismissed as another motivation for the Japanese surrender. The sheer size and power of the Red Army in the Pacific no doubt was a factor in Japan's final acceptance for capitulation. Apart from which event carried more weight in the Japanese decision, the end of the war came in only a few days of the atomic attacks because of Japan's psychological defeat. Even though she was defeated militarily prior to 6 August, the Japanese were far from being defeated mentally. The bombs and the Soviets entry served the purpose of destroying Japanese resolve.

Even Stimson, who largely abhorred the bombing of civilians, agreed that the bomb was a psychological weapon.²³⁹ Not only did the weapon destroy a large part of two individual cities, but also shocked the Japanese government into finally accepting the Potsdam Declaration. While the average Japanese citizen's resolve was not diminished by the atomic attacks, the very threat of nuclear annihilation finally illustrated to the Japanese government the futility of resistance that led to an acceptance of the military situation. While the targeting of the bombs was based upon military considerations, the decision to employ them was primarily politically and psychologically motivated. Discussions of the Interim Committee bear this out.

Stimson's May 31, meeting comment regarding a "profound psychological impression" unmistakably characterize these missions as morale bombings and these discussion clearly show that morale bombing was accepted as a feasible course of action at the national level. In the end, Stimson believed that it was not one atomic bomb that finished the Japanese, but the threat of what more atomic bombs would do to the nation that forced capitulation.²⁴⁰

The USSBS argues that Japan would have surrendered by November or December 1945, even if the atomic bombs were not used.²⁴¹ The Survey bases its conclusions on mostly quantitative analysis, and does include some interviews with Japanese leaders, but failed to measure the resolve resident in all elements of the Empire's leadership. In the end, no analysis could accurately measure the Japanese populace's level of resolve. While morale bombing was not, by itself, effective in breaking the Japanese populace's spirit, it was effective in coercing the Emperor and the government to accept defeat. While a number of measurements of the USSBS prove the untenable position the Japanese were in by 1945, the national will remained unbroken and steadfast. The bomb finally broke it. By affecting the will of the leaders of Japan, the population followed. Had the bomb remained unused, the Japanese would have continued to resist. The bombs served as a means to a political end with the USAAF serving as merely the tool. In this case, the military was clearly expressing national goals and policies "by other means."

Apart from the international strategic political implications, American domestic concerns were also in play. The organizational momentum of Manhattan

and its expense cannot be discounted. The legacy of FDR's policies carried into the next presidential administration that established goals and objectives that Truman felt compelled to continue. In addition, American war-weariness and the domestic anxieties were also a factor as Americans began to look beyond the war and into a post war economy. Lastly, and most important, were the anticipated casualty figures regarding the invasion of the Japanese homeland. Given the Japanese plans of *Ketsi Go*, thousands of American, and Japanese, would be killed. As commander in chief, Truman had the obligation to spare as many American service members' lives as possible and it would have been negligent on his part had he allowed the bloody invasions to occur knowing that he had a powerful alternative.²⁴² As Groves saw it "to any experienced soldier, it was obvious that once an advantage had been gained over an enemy as dangerous as Japan, no respite should be given."²⁴³

Truman repeatedly defended his decision to drop the bomb, and because the invasions never occurred, historians have the luxury to second-guess his choice. One may observe, Truman was facing a lose-lose situation. Had CORONET and OLYMPIC been executed with the atomic bomb in hand, history would chastise Truman for a war possibly drawing out until 1946 and creating thousands more military and civilian casualties. The August missions killed 120,000, probably less than the casualty rate of a full-scale invasion. The destruction of the two cities seemed the lesser of two evils. Regarding Japanese attempts to surrender prior to 1946, actions taken by elements of the military even after the atomic attacks, clearly show that a high level of resolve still existed among Japanese leaders. Strong

evidence argues that the Japanese population would have, no doubt, echoed this level of resolve.

American bombing applications during the war were increasingly more effective and destroyed great swaths of Japan's cities and infrastructure. The effects of the Pacific firebombing raids and the atomic bombs were commensurate with the havoc already experienced globally. Over time, the USAAF gradually moved toward Douhetian practices for a number of tactical, operational, and strategic reasons. Domestic pressures provided impetus, validation, and approval for USAAF bombing applications. Not only did the USAAF eventually embrace this doctrinal revolution, but the American people and the U.S. government gave its approbation, accepting such methods as an inevitable manifestation of modern warfare. In the case of atomic weapons, morale bombing and the threat of nuclear annihilation became part of American bombing strategies and would remain so for decades.

¹Lansing Lamont, *Day of Trinity* (New York, NY: Atheneum Books, 1965), 10; Interview with Norman Ramsey, correspondence RE: Day of Trinity, page 114, Box 1, Research Materials (Rough Notes), Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.

²Papers of Lansing Lamont, 116.

³Lamont, *Day of Trinity*, 117.

⁴Interview with George Kistiakowsky, correspondence RE: Day of Trinity, page 139, Box 1, Research Materials (Rough Notes), Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.

⁵Lamont, 195; Leslie Groves, *Now It Can Be Told* (New York, NY: DaCapo Press, 1962), 293.

⁶Interview with Norman Ramsey, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.

⁷Peter Goodchild, *J. Robert Oppenheimer: Shatterer of Worlds* (Boston, MA: Houghton Mifflin, 1981), 161.

⁸Ibid.

⁹Lamont, *Day of Trinity*, 230.

¹⁰Rhodes, 670.

¹¹Ibid.

¹²Ibid.

¹³Ibid.

- ¹⁴Correspondence, Groves to Stimson, July 18, 1945, Research Materials, Box 1, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁵Miscellaneous Report, A. B. Machen, 30,000 Yards West of Ground Zero Trinity, July 16, 1945, Box 1, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁶Lamont, 241.
- ¹⁷Correspondence, Groves to Stimson, July 18, 1945, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁸Ibid.
- ¹⁹Lamont, *Day of Trinity*, 242.
- ²⁰Letter, L. Alvarez to son, August 6, 1946, Correspondence RE: Day of Trinity Research Materials, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ²¹Henry Stimson, "The Decision to Use the Atomic Bomb," *Harper's Magazine* 194, no. 1161 (February 1947): 102. According to Stimson he states that post war studies validate this 5 million man estimate.
- ²²John Ray Skates, *The Invasion of Japan: Alternative to the Atomic Bomb* (Columbia, SC: University of South Carolina Press), 101.
- ²³Ibid.
- ²⁴Thomas Huber, *Japan's Battle of Okinawa April-June 1945* (Ft. Leavenworth, KS: Leavenworth Papers, Combat Studies Institute, 1990), 119.
- ²⁵"Address Before a Joint Session of Congress," April 16, 1945, *Public Papers of The Presidents of the United States Harry S. Truman Containing the Public Messages, Speeches, and Statements of the President, April 12 to December 31, 1945* (Washington, DC: U.S. Government Printing Office, 1961), 2.
- ²⁶"The Presidents News Conference on VE Day," May 8, 1945, Ibid, 45.
- ²⁷Michael Perlman, *Unconditional Surrender, Demobilization, and the Atomic Bomb* (Ft. Leavenworth, KS: Combat Studies Institute Pamphlet, 1996), 15.
- ²⁸Minutes of Meeting held at the White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ²⁹Ibid.
- ³⁰Ibid.
- ³¹Minutes of Meeting held at the White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO; Richard Frank, *Downfall: The End of the Imperial Japanese Empire* (New York, NY: Penguin Books, 1999), 145.
- ³²Minutes of Meeting held at the White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ³³John Toland, *The Rising Sun: The Decline and Fall of the Japanese Empire 1936-1945 Volume 2* (New York, NY: Random House, 1970), 1026-1053.
- ³⁴Perlman, 7.
- ³⁵Memorandum for the Secretary of State from Harry S. Truman, June 9, 1945, White House Central File, State Department Correspondence, WW II to 1952, Box 1 of 6, Box 43, Harry S. Truman Presidential Library, Independence, MO. Historians speculate on how Truman came up with his 1 million man figure regarding casualty rates for the invasion of Japan. In Hoover's letter he speculated that the invasion may cost "500,000 to 1,000,000 American lives." The Hoover document may be source of Truman's number.
- ³⁶Perlman, 8.
- ³⁷Minutes of Meeting at White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ³⁸Ibid.
- ³⁹Maddox, 146.
- ⁴⁰Ibid.
- ⁴¹Dower, 279.

- ⁴²Ibid., 263.
- ⁴³“Invasion Success Feared By Japan,” *New York Times*, August 5, 1945.
- ⁴⁴Potsdam Declaration, July 26, 1946, <http://www.international.ucla.edu/eas/documents/potsdam.htm> (accessed October 26, 2007).
- ⁴⁵Ibid.
- ⁴⁶“Attention Tokyo,” *Time*, August 6, 1945, <http://www.time.com/time/magazine/article/0,9171,803665,00.html> (accessed October 5, 2007).
- ⁴⁷Rhodes, 693; Pacific War Research Society, *Japan’s Longest Day* (New York, NY: Ballentine, 1968), 10.
- ⁴⁸Pacific War Research Society, 10.
- ⁴⁹“War News Summarized,” *New York Times*, July 30, 1945.
- ⁵⁰Toland, 956.
- ⁵¹Pacific War Research Society, 11.
- ⁵²Maddox, 84.
- ⁵³Ibid., 54.
- ⁵⁴Ibid.
- ⁵⁵Rhodes, 641.
- ⁵⁶Minutes of Meeting at White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO .
- ⁵⁷John P. Sutherland, “*The Story General Marshall Told Me*,” *U.S. News and World Report*, no. 47, (November 2, 1959): 50-56.
- ⁵⁸Minutes of Meeting held at the White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ⁵⁹Minutes of Meeting held at the White House, June 18, 1945, Miscellaneous Papers, Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO; Frank, 142-143.
- ⁶⁰Thomas Huber, *Pastel: Deception in the Invasion of Japan* (Ft. Leavenworth. KS: U.S. Army Command and General Staff College, 1989), 36.
- ⁶¹Skates, 102.
- ⁶²Toland, 934.
- ⁶³Ibid., 935.
- ⁶⁴Frank, 191; Perlman, 9; Huber, 35-39.
- ⁶⁵Maddox, 126.
- ⁶⁶Since the defense is widely recognized as the stronger form of warfare, rough military planning figures require 3 attackers for every 1 defender. In this instance the Americans would not have achieved sufficient combat power to defeat the Japanese defenses.
- ⁶⁷Perlman, 3.
- ⁶⁸“Marshall Appeals to Public Patience,” *New York Times*, April 7, 1945.
- ⁶⁹“Marshall Appeals to Public Patience,” *New York Times*, April 7, 1945; Frank, 124.
- ⁷⁰Perlman, 3.
- ⁷¹“Stimson Refuses Earlier Releases,” *New York Times*, August 3, 1945.
- ⁷²Ibid.
- ⁷³“Army to Discharge 2,000,000 in a Year,” *New York Times*, May 6, 1945.
- ⁷⁴D. M. Giangreco, “Casualty Projection for the US Invasions of Japan, 1945-1946; Planning and Policy Implications,” *Journal of Military History*, 61, (July 1997) 568; Robert R. Palmer, Bell I. Wiley, and William R. Keast, *The Procurement and Training of Ground Combat Troops*, in the series *United States Army in World War II* (Washington, DC: Department of the Army, 1948), 234-237; Frank 128.
- ⁷⁵Stimson, 102.
- ⁷⁶Ibid., 101.
- ⁷⁷Correspondence from A. Einstein to F. D. Roosevelt, August 2, 1939, http://www.mbe.doe.gov/me70/Manhattan/einstein_letter.htm (accessed November 4, 2007).

- ⁷⁸Ibid.
- ⁷⁹F. G. Gosling, *The Manhattan Project* (Oakridge, TN: Department of Energy, Office of Scientific and Technical Information, 1999), vii and 62.
- ⁸⁰Ibid., 6.
- ⁸¹Ibid., as referenced in Laura Fermi, *Atoms in the Family, My Life with Enrico Fermi* (Chicago, IL: University of Chicago Press, 1954), 164.
- ⁸²Gosling, 9.
- ⁸³Ibid., 8-9.
- ⁸⁴MAUD Report, <http://www.atomicarchive.com/Docs/Begin/MAUD.shtml> (accessed November 2, 2007).
- ⁸⁵Ibid.
- ⁸⁶Ibid.
- ⁸⁷Gosling, 9.
- ⁸⁸Ibid.
- ⁸⁹Ibid., 10.
- ⁹⁰Vincent Jones, *Manhattan: The Army and the Atomic Bomb* (Washington, DC: Center of Military History, 1988), 34.
- ⁹¹Gosling, 11.
- ⁹²Gosling, 13; Groves, 17.
- ⁹³Gosling, 13; Groves, 23.
- ⁹⁴Lamont, *Day of Trinity*, 6; Notes on L. Groves, Box 2, Lamont Papers, Truman Library.
- ⁹⁵Gosling, 37.
- ⁹⁶DeGroot, 35.
- ⁹⁷Ibid.
- ⁹⁸Gosling, 15.
- ⁹⁹The term “long hairs” was a derisive term used by active duty army personnel when referring to the civilian scientists working on the Manhattan project.
- ¹⁰⁰Notes on J. Robert Oppenheimer, 287, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁰¹Ibid.
- ¹⁰²Gosling, 35.
- ¹⁰³Ibid.
- ¹⁰⁴Groves, 67.
- ¹⁰⁵Gosling, 16.
- ¹⁰⁶Groves, 415.
- ¹⁰⁷Ibid., 414.
- ¹⁰⁸Gosling 17; Groves 9.
- ¹⁰⁹Groves, 8.
- ¹¹⁰Rhodes, 25-29.
- ¹¹¹Manhattan Project Signature Facilities, K-25 Gaseous Diffusion Process, Oak Ridge TN, Atomic Archive Web Site, http://www.atomicarchive.com/History/sites/K_25.shtml, (accessed November 7, 2007).
- ¹¹²Lamont, *Day of Trinity*, 59-60.
- ¹¹³Ibid., 59-60.
- ¹¹⁴Richard Campbell, *The Silverplate Bombers* (Jefferson, NC: McFarland and Co., Publishers, 2005), 81; 116, Box 1, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹¹⁵Ibid., 82.
- ¹¹⁶Jones, 510.
- ¹¹⁷Ibid., 488-89.
- ¹¹⁸Gosling, 43.

- ¹¹⁹Interview with Hans Bethe, 226, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹²⁰Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO., 334: Groves, 342.
- ¹²¹Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO., 334.
- ¹²²Ibid., 335.
- ¹²³Plutonium Bomb, <http://hyperphysics.phy-astr.gsu.edu/hbase/nucene/bomb.html> (accessed November 8, 2007).
- ¹²⁴Gosling, 28.
- ¹²⁵Lamont, 25-27.
- ¹²⁶Documentation and Diagrams of the Atomic Bomb, <http://www.nuc.berkeley.edu/neutronics/todd/nuc.bomb.html#III.F> (accessed November 8, 2007).
- ¹²⁷Ibid.
- ¹²⁸Interview with Hans Bethe, 226, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹²⁹Ibid., 292.
- ¹³⁰Ibid., 83.
- ¹³¹Interview with Emilio, Segre, 187, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹³²Interview with Stafford Warren, 136, Box 1, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹³³Interview with J. Robert Oppenheimer, 289, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ¹³⁴Ibid.
- ¹³⁵Ibid.
- ¹³⁶Ibid., 291.
- ¹³⁷Ibid., 290.
- ¹³⁸Ibid., 292.
- ¹³⁹Ibid. The March 9-10 firebombing raid killed and wounded 84,000 Japanese while both atomic bombs killed approximately 120,000.
- ¹⁴⁰Notes of the Interim Committee, May 31, 1945, Miscellaneous Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁴¹Ibid.
- ¹⁴²Ibid.
- ¹⁴³Ibid.
- ¹⁴⁴Ibid.
- ¹⁴⁵Ibid.
- ¹⁴⁶Notes of the Interim Committee, June 1, 1945, Miscellaneous Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁴⁷Ibid.
- ¹⁴⁸Recommendation on the Immediate Use of Nuclear Weapons by the Scientific Panel of the Interim Committee, June 16, 1945. Nuclear files.org (accessed November 15, 2007).
- ¹⁴⁹Ibid.
- ¹⁵⁰Franck Report, June 11, 1945, Folder 76, Harrison-Bundy file, Manhattan Engineering District, Record Group 77, National Archives, Washington, DC.
- ¹⁵¹Ibid.
- ¹⁵²Rhodes, 636. Truman never saw the letter either and Szilard mission was obviously unsuccessful in changing the mind of any government official that mattered.
- ¹⁵³Stimson, 101.
- ¹⁵⁴Interview with General. Leslie Groves, 297, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO; Stimson 101.

109. ¹⁵⁵, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.,
- ¹⁵⁶Stimson, 101.
- ¹⁵⁷Ibid.
- ¹⁵⁸Notes of the Interim Committee, June 21, 1945, Miscellaneous Historical Documents Collection, Harry S. Truman Presidential Library, Independence, MO.
- ¹⁵⁹Maddox, 107.
- ¹⁶⁰Jones, 528.
- ¹⁶¹Ibid.
- ¹⁶²Darry Memorandum for General Groves, May 12, 1945, Summary of Targeting Committee Meetings on 10 and 11 May, 1945, Vertical File, Harry S. Truman Presidential Library, Independence, MO..
- ¹⁶³Ibid.
- ¹⁶⁴Ibid.
- ¹⁶⁵Rhodes, 639.
- ¹⁶⁶Targeting Committee Notes May 10 and 11, 1945, Vertical File, Harry S. Truman Presidential Library, Independence, MO.; Leslie Groves, *Now It Can Be Told* (New York, NY: DaCapo Press, 1962), 267.
- ¹⁶⁷Groves, 273.
- ¹⁶⁸Targeting Committee Notes, May 10 and 11, 1945, Vertical File, Harry S. Truman Presidential Library, Independence, MO..
- ¹⁶⁹Ibid.
- ¹⁷⁰Ibid. and Groves, 272.
- ¹⁷¹Jones, 529.
- ¹⁷²Ibid.
- ¹⁷³Ibid.
- ¹⁷⁴Groves, 273.
- ¹⁷⁵Ibid.
- ¹⁷⁶Jones, 529; Groves, 273; Stimson, 105.
- ¹⁷⁷Robert Ferrell, "Truman at Potsdam," *American Heritage*, June-July 1980, as referenced by Rhodes, 691.
- ¹⁷⁸John Stone to Arnold, July 24, 1945, Vertical File, Harry S. Truman Presidential Library, Independence, MO; Craven and Cate Vol. 5: 710; Groves, 275.
- ¹⁷⁹Jones, 530; Craven and Cate, Vol. 5: 710; Groves, 275. Additionally Groves asked Marshall to forward the same message to MacArthur and Nimitz.
- ¹⁸⁰Craven and Cate, Vol. 5: 712.
- ¹⁸¹Groves, 308.
- ¹⁸²Craven and Cate, Vol. 5: 714. According to Groves, the bomb was assembled, save for the breech plugs, and was ready for delivery by July 31.
- ¹⁸³Ibid.
- ¹⁸⁴Maddox, 107.
- ¹⁸⁵Stimson, 98.
- ¹⁸⁶Groves, 265.
- ¹⁸⁷Maddox 124.
- ¹⁸⁸Groves, 253.
- ¹⁸⁹Ibid.
- ¹⁹⁰Ibid., 254.
- ¹⁹¹Ibid., 256.
- ¹⁹²Campell, 1; Rhodes, 680.
- ¹⁹³Ibid., 259.
- ¹⁹⁴Rhodes, 585-586.
- ¹⁹⁵Groves, 284.

- ¹⁹⁶Campell, 19.
- ¹⁹⁷Rhodes, 585.
- ¹⁹⁸War Department Correspondence, Office of the Chief of Staff, July 25, 1945 as referenced in Robert H. Ferrell, ed. *Harry Truman & The Bomb* (Worland, WY: High Plains Publishing, 1996), 35.
- ¹⁹⁹Tibbets, 215- 216.
- ²⁰⁰Ibid.
- ²⁰¹Ibid., 224-225.
- ²⁰²Ibid., 226.
- ²⁰³Ibid., 227.
- ²⁰⁴Ibid., 228.
- ²⁰⁵Ibid.
- ²⁰⁶Ibid., 230.
- ²⁰⁷Groves, 286. Tibbets estimates that they were 9 miles away from the site of the blast when the shock wave hit.
- ²⁰⁸Tibbets, 232; Groves 318.
- ²⁰⁹Letter, L. Alvarez to son, correspondence RE: Day of Trinity Research Materials, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ²¹⁰Tibbets, 231.
- ²¹¹Groves, 318.
- ²¹²Tibbets, 233.
- ²¹³Groves, 318-319.
- ²¹⁴Tibbets, 233 and 234.
- ²¹⁵Ibid., 234.
- ²¹⁶Ibid.
- ²¹⁷Campell, 31.
- ²¹⁸White House Map Room, Correspondence Nr 335, From Secretary of War to The President, August 6, 1945, Personal Secretary File (PSF), Subject File, 1940-1953 NSC A, Harry S. Truman Presidential Library, Independence, MO..
- ²¹⁹Draft White House Statement on Dropping the Bomb, July 30, 1945, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.. The draft statement left the time and target blank based upon what transpired during the actual mission.
- ²²⁰Ibid.
- ²²¹Ibid.
- ²²²Campell, 39.
- ²²³Groves, 352.
- ²²⁴Ibid., 353.
- ²²⁵Rhodes, 742; 744.
- ²²⁶Gallup, 521-522.
- ²²⁷Ibid., 527.
- ²²⁸Dower, 54.
- ²²⁹Misc, Box 197, Official File, White House Central Files, Harry S. Truman Presidential Library, Independence, MO.
- ²³⁰Ibid.
- ²³¹Groves, 324.
- ²³²Ibid.
- ²³³Groves, 324; DeGroot, 91.
- ²³⁴Corr. Between Truman and Cavert, August 11, 1945, Official File, Truman Library, in Ferrell, 71.
- ²³⁵Memorandum For Dean Acheson From The President, General Folder, Atomic Testing, Box 175, National Security Council-Atomic File, Subject File 1940-1953, PSF, Harry S. Truman Presidential Library, Independence, MO.

²³⁶DeGroot, 111, E-mail between author and Erica Flanagan, Student Archivist, Truman Archive, dated December 11, 2007. Ms. Flanagan could only locate documentation regarding Oppenheimer's quote and could not find direct evidence of Truman's answer about the handkerchief and telling Oppenheimer to "wipe your hands." Ms. Flanagan could only locate secondary sources regarding Truman's quote in Martin Sherwin's, *American Prometheus* (New York, NY: A. A. Kopf, 2005), 332. In an Email from Mr. Sherwin on December 12, 2007 to the author, he agrees that Truman's statement may be exaggerated and that the president may have embellished the story.

²³⁷USSBS, *The Effects of the Atomic Bombs on Hiroshima and Nagasaki*, 33.

²³⁸Ibid.

²³⁹Stimson, 105.

²⁴⁰Ibid., 106.

²⁴¹Correspondence from O. Anderson to the Secretary of War, via CG Army Air Force, July 11, 1946, pg 4 USSBS, *Summary Report (Pacific War)*, Garland Series, Volume VII.

²⁴²Maddox, 155.

²⁴³Groves, 264; J. Samuel Walker, *Prompt and Utter Destruction* (Chapel Hill, NC: University of North Carolina Press, 1997), 94.

CHAPTER 5

AT THE OBTUSE: *Nuclear Strategies and the Primacy of Air*

The National Security Act of 1947 significantly changed the landscape of America's military establishment. The Act single-handedly created the National Military Establishment and merged the Department of the Navy with the War Department, while finally realizing Hap Arnold's goal and established an independent U.S. Air Force (USAF). Under the new structure, all the military services were organized under what eventually became known as the Department of Defense (DoD) headed by a single Secretary of Defense. Under the Secretary of Defense were Secretaries of the Navy, Army, and Air Force with each military service chief subordinate to his respective civilian superior. However, bitter arguments ensued between the services over troop strengths, roles, mission, and more importantly, budget allocations.

With the advent of atomic warfare and perceived global threats, members of the newly formed Air Force envisioned an increasingly larger role in national defense. By dropping the atom bombs on Hiroshima and Nagasaki, many believed that Douhet's vision had come to fruition and that the day of the land-based intercontinental bomber had truly arrived. Air Force leaders envisioned the newly designed, six-engine B-36 "Peacemaker," B-50, and the swept wing B-47 "Stratojet" bombers as the standard-bearer of America's military and the most important part of national defense.¹ Furthermore, with the leaps in technology, the arrival of jet power,

advances in electronics, metallurgy, and aerodynamics many believed in the primacy of airpower as the dominant military force.

In the Air Force's opinion, the inherent offensive capability of the airplane and its ability to deliver nuclear weapons made other forms of warfare appear obsolete. For the new service, aviation and atomic technology gave America a "Sunday Punch" capability to knock out a potential adversary with a single massive airborne nuclear strike. In this effort, airmen thought the USAF single-handedly could end any war in a matter of a few days, if not hours. As early as 1945, Spaatz, who soon became the first Air Force Chief of Staff, argued that the nature of war had changed and wrote, "it must be total in every way, designed to destroy an enemy's home base and spare him nothing."² In light of this vision, the USAF viewed the other military services as inconsequential appendages and expected the other military services relegated to secondary/supporting roles. Given this view of potential conflict LeMay surmised, "[that the only thing] conventional forces do is delay the inevitable nuclear confrontation."³

The other services, chiefly the Navy, took a dim view of this Air Force vision for future conflict. While initially afraid of losing their sea-borne air armadas to the Air Force, naval aviators believed that aircraft carriers with their accompanying air wings provided a unique capability that could not be matched by land-based aircraft. The Navy thought that large land-based bombers were vulnerable to enemy air defenses and argued that wholesale nuclear attack had severe moral implications counter to American ideals. As the Air Force pushed for more bombers, the Navy envisioned a new larger aircraft carrier to meet America's future defensive needs.

The new aircraft carrier design had a flush deck, an array of fighters, and included eighteen attack aircraft capable of delivering nuclear ordnance.⁴ To the Air Force, this naval platform offered an inferior and less effective means of striking the enemy. More importantly, the budget and role of the ship posed a threat to the building of an Air Force nuclear bomber fleet in an era of fiscal military frugality.



Figure 17: Air Force vision regarding the relevance of the military services in future conflict. *Source:* “A Decade of Security Thru Airpower,” USAF Pamphlet, Box 96, Papers of General Curtis E. LeMay, Manuscripts Division, Library of Congress, Washington, DC.

The differences between these two visions of the future came to a head in the halls of Congress during the fall of 1949 and eventually known as the “Revolt of the Admirals.” The larger question was not so much a matter of inter-service rivalry over roles and missions, but the direction of America’s grand military strategy in the post war world. Was the U.S. going to base its defensive posture upon a large, land-based strategic bomber fleet capable of delivering nuclear munitions or look to an equal array of naval, air, and land forces for defending itself and the free world? Additionally, the issues discussed during the 1949 “Revolt” tacitly included the official approbation or rejection of nuclear bombing and continued departure from the bombing theory as framed by ACTS. In this forum, members of the U.S. government debated the efficacy and effectiveness of nuclear weapons and associated bombing methodologies. In this discourse, it was obvious that USAF strategic planners sought to target not just factories, but was looking to destroy entire cities, and possibly a whole nation.

Naval officers had their own opinions regarding national defense and the USAF’s vision of future conflict. However, based upon the Truman Administration’s post war policies, the advent of nuclear warfare, the emerging threat of the Soviet Union, and advances in technology, the overall strategy for America’s defense radically changed. These varied agendas and influences facilitated the USAF’s continued departure from ACTS foundations.

The Post War World

Following World War II, America found itself as the preeminent power in the world. With the defeat of the Axis, most of Europe was a smoking ruin from over six years of war; England teetering on financial chaos, and the Soviet Union facing a huge rebuilding and recovery effort, the U.S. was the sole economic and industrial power in the world. After the war, America still had its entire infrastructure intact, possessed easy access to an abundance of natural resources, and could expect an adequate labor pool to operate the nation's industries. While serving as the "arsenal of democracy" for the Allied powers, the war stimulated the American economy with U.S. exports by 1944 exceeding \$14 billion.⁵ Furthermore, the U.S. arguably possessed the most potent war machine on earth. In addition to having cracked the code on nuclear fission and developed atomic weapons, as the war ended in September 1945, the U.S. military had 97 Army and Marine ground divisions, approximately 230 Army Air Force groups, over 85,000 aircraft, 1,166 Navy combat ships, and over 12 million in uniform.⁶ From every measure of national power in 1945, the U.S. stood as the most dominant state on the globe.

However, with the end of the war, most of those in uniform looked forward to returning to civilian life and a job in the post war economy. With loud cries "to bring the boys home," the military services were pressed to demobilize as fast as possible, keeping with the American tradition of maintaining a relatively small peacetime military. While debate ensued regarding the speed, or lack thereof, in the demobilization process, the armed services began releasing men from active duty. The Army alone had approximately 8 million men in uniform at the end of August

1945, and a year later that number dwindled to 2 million.⁷ In a four-month period, from September to December 1945, the demobilization process began in earnest with an average of 1 million men leaving the Army each month for civilian life.⁸ The Army Air Force alone had its strength overseas cut by over half during the same period and dropped from 1 million men to only 385,000.⁹

While some complained of lethargy in the demobilization process, others thought the drawdown too quick and haphazard. According to one Air Force leader, “Demobilization was not demobilization; it was a rout. We just walked away and left everything.”¹⁰ To support this observation, by September 1946, the Air Force consisted of only 55 groups, down from the previous 230, with only two groups listed as operationally effective.¹¹ Less than two years after the war, by April 1947, the U.S. Army (to include the Army Air Force) was but a shell of its former self with approximately 1 million men left in uniform.¹²

As U.S. forces demobilized, Americans starting becoming accustomed to the existence of nuclear technology and the atomic bomb. A December 1945 issue of *Time* magazine named Harry Truman the “Man of the Year” largely because of his decision to use the atom bomb.¹³ American’s became familiar with this new technology despite the initial shock of Hiroshima and Nagasaki. The use of this “wonder weapon” was largely viewed in a positive light by Americans.¹⁴ Indicative of this American sentiment was a December 1945 song “*When the Atomic Bomb Fell*” that included the verse “when it all cleared away, there the cruel Japs did lay, the answer to our fighting boys prayer.”¹⁵ Many Americans in the post war era envisioned atomic energy serving a very useful purpose not only for military

applications but also for civilian uses.¹⁶ This new energy source held the promise for a better future with atomic planes, ships, and for new advances in nuclear medicine.¹⁷ Many American's saw atomic energy ushering in a new hopeful era that would change everyday life.¹⁸

Leveraging this atomic optimism and indicative of popular sentiment, manufacturers jumped on the bandwagon as companies utilized the word "atomic" in many every day products with the mushroom cloud signifying a bold new era.¹⁹ Using "atomic" in the title of any product or service during this time was to imply that it was exciting and exhilarating.²⁰ By 1947 the Manhattan phone book listed forty five companies with the word atomic somewhere in the title, bars offered "atomic cocktails," General Mills offered an atomic ring in *Kix* children's breakfast cereal, a Los Angeles burlesque show featured the "Atomicbomb Dancers," and by 1949 a comic book was published based upon the popular cartoon strip "Blondie" entitled, "Dagwood Splits the Atom."²¹

This same trend continued well into the 1950s and Americans purchased uranium mining kits, read articles published on how to find the element, U-235 lab kits were sold, board games with nuclear war as the theme were produced. Even children comic books characters were created with titles like "Atomic Mouse," "Atomic Rabbit," and "Atomic Bunny." One 1952 comic book title ominously warned "Only a Strong America Can Prevent Atomic War." In the same year, the Atomic Energy Commission (AEC) published a newspaper insert entitled "Today: atoms work for you" and extolled the peaceful used of the atomic technology. The insert stated that "the atomic age is coming to make your life better."²² The AEC also

published another pamphlet that included a listing of “45 ways you can use isotopes” and how they were practical in civilian production methods.²³

Schools also played a role in this endeavor. Educating students in atomic energy was promoted by the National Education Association who in 1948, along with the AEC, published the book *Operation Atomic Vision* that highlighted the peaceful uses of the new technology.²⁴ During the late 1940s, education journals advocated teaching the “positive aspects of atomic energy.”²⁵ In 1949, the *Journal of Education Psychology* referenced General Groves as he stated, “the average American must learn that nuclear energy, like fire and electricity, can be a good and useful servant.”²⁶ Taking this position to an extreme, one farmer from Arkansas wrote Oak Ridge looking for atomic bomb support to blow tree stumps from his property.²⁷

This cultural infatuation with nuclear technology served as sort of a social safety value and did not necessarily mean that Americans were altogether cavalier about the existence of the atomic bomb or its dangerous potential.²⁸ Two years after Hiroshima, in October 1947 when asked if development of the atomic bomb was “a good thing or a bad thing” 55 percent of Americans answered in the affirmative with 38 percent in the negative.²⁹ The number answering in the affirmative was significantly less than the 85 percent who approved of the atomic bombings in August of 1945 and was 14 percent less than a December 1945 survey asking the same question. The promise of this new technology went hand in hand with its destructive potential and the fear of nuclear war remained an underlying theme in American social fabric.³⁰ Regarding atomic weapons, in December 1945 *Time* magazine

reported that when “listening to the people talk, [to street pollsters they] found awe, fear, cynicism, and hope-but mostly confused fear and hopeful confusion.”³¹

When covering American feelings regarding the bomb, the same article reported, “Never before since the pollsters set up shop had one topic evoked such prolonged intense public concern. Nothing-not the homecoming of the heroes, not the strikes nor reconversion, the Pearl Harbor investigation, the housing shortage not this week’s Big Three meeting, not even Santa Claus had been able to drive the bomb from the topmost place in the U.S. mind.”³² However, along with this fear, many in the U.S. anticipated that the nuclear monopoly would lead to a kind of “atomic pax Americana.”³³ The *Time* article concluded, “Americans precariously holding the bombs precarious [sic] secret, were more afraid of it than any have-not nation had reason to be.”³⁴

As the U.S. military downsized and atomic culture began to flourish, the priority of effort for both the nation and the Truman Administration turned to the economy and post war prosperity. Both citizens and corporate American alike saw a bright future ahead and looked to the government to reform many of the essential wartime economic policies. Industry sought an end to price controls and Americans looked forward to the end of rationing with the hope that the peacetime economy did not yield a huge rise in inflation.³⁵ As the basis of the economy shifted from wartime to peacetime, fears over inflation and another depression served as reminders to Truman that a balanced federal budget, and the amelioration of the wartime national debt, was the necessity.³⁶ Truman was so concerned with balancing the federal

budget that whenever Congress forwarded a proposal for a tax cut, he consistently vetoed it.³⁷

Instead of depending upon a large standing army, Truman saw that economic solvency provided the best bet for national security in the post war world. In his annual State of the Union address in January 1946, he stated, “National security does not consist of an army, a navy, and an air force. It rests on a much broader basis. It depends on a sound economy of prices and wages, on prosperous agriculture, on satisfied and productive workers, on a competitive private enterprise free from monopolistic repression.”³⁸ As the military shrank in size, so too did its budget. Because of the nation’s victory in the war, and for the good of the economy, Truman cut defense appropriations from 40 percent of the Gross National Product (GNP) to a mere 4 percent.³⁹ During the same January address, he outlined a plan for a reduction in defense expenditures dropping them from a planned figure of \$70 billion for fiscal year 1946 to \$49 billion. For the following year he planned to reduce the figure again to a mere \$15 billion and sought to keep military spending around this level during his term.⁴⁰

In his effort to secure the economic solvency, Truman also sought to balance the federal budget for the next four years. The planned reductions in military spending were one of Truman’s primary methods of cutting federal expenditures. While holding the opinion that the military always requesting more money than it needed, after the war Truman began applying the “Remainder Method” of fiscal policy with regard to the defense budget.⁴¹ This methodology considered all expected civilian governmental expenses and balanced them off the federal government’s

projected income.⁴² Once the civilian expenses were subtracted from the federal revenue, the “remainder” served as the budgetary limit for the military.⁴³ This system of budgeting obviously placed defense funding as the lowest priority and the immediate post war Army, Navy, and Air Force reflected such frugality. The idea of fiscal conservatism not only affected the military but also served as the foundation for many Truman administrations policies and actions. Ironically, this same frugality led Truman to rely more upon atomic weaponry for defense than large standing conventional armies.⁴⁴

Along with a president concerned largely with fiscal solvency, Americans began to look inward. Following the war, Americans were much more concerned with domestic issues rather than foreign ones and placed the emphasis with the economy over national security. A poll taken in October 1945 asked Americans the following question, “What do you think is the most important problem facing the country during the next year?” The answers of jobs, strikes, and reconversion were by far the three prevailing responses.⁴⁵ A little over a year later in 1946, polls again queried Americans after the November mid-term elections and asked this question, “What is the first problem you would like to see the new Congress take up?” The four most frequent responses were: control of strikes, prices and the high cost of living, tax reform, and the housing shortage.⁴⁶

Despite a spike in inflation in 1946 and a large number of strikes that affected major industries, the nation enjoyed increased economic prosperity and by 1947, many Americans began to experience a rise in discretionary spending with national incomes growing 60 percent.⁴⁷ Consumerism became the norm as Americans spent

their growing incomes on the purchases of household furnishings, luxury items, and appliances.⁴⁸ Sales of items such as cars, stoves, televisions, and refrigerators in America easily numbered into the millions and found their way to U.S. homes.⁴⁹ Unlike generations before, Americans began spending more and saving less. The postwar economy provided a new standard of living for most Americans and a welcome respite from the war and the depression that preceded it. Commensurate with this growth in income and discretionary spending, the number of American families also began to rise with this pattern of economic prosperity continuing well into the 1950s.⁵⁰ By 1960, 75 percent of Americans owned a car, 86 percent a refrigerator, and 75 percent had a dishwasher.⁵¹

However, even with the domestic prosperity enjoyed by most Americans during the post war period, events overseas provided an ominous warning. As Americans started families, bought cars, and began establishing suburbs, Europe lay prostrate from the war with little or no economy and communist parties vying to fill political power vacuums. Soviet forces were loath to withdraw from Iran, and in 1947 communist insurgents in Greece and Turkey threatened democratic governments. Adding to the danger, a coup in Czechoslovakia ensured that country remained under the Soviet sphere of influence and in June 1948, the Soviets established the Berlin blockade by stopping all surface movement from West Germany to the city of 2 million. Exacerbating the concerns of communist incursions and the threat to America, in 1949 Mao and his “Red Army” soundly defeated the Nationalist Chinese on the Asian mainland forcing Chiang Kai Check to withdraw to the island of Formosa. Furthermore, in September an American WB-29

reconnaissance plane taking air samples over the Kamchatka Peninsula found evidence of a Soviet nuclear detonation.

The American relationship with the Soviet Union had always been one of suspicion and mistrust. The U.S. loathed the establishment of communism in Russia beginning with the October Revolution in 1917 and attempted to thwart the effort with the ill-fated Archangel and Vladivostok expeditions of 1918-1919. Following World War I, fervent anti-communist sentiment became part of the national fabric and remained a foundation of American patriotic ideals. As a result, the pattern of the U.S.-Soviet relationship was already well established before World War II and continued after the Allied victory.⁵² Despite U.S.-Soviet cooperation in the war against Hitler, neither side completely trusted the other and the shotgun marriage of convenience quickly deteriorated after V-J Day. While there is no definitive start date to the beginning of the “Cold War” many largely accept the end of World War II as the event precipitating the ideological struggle.⁵³

With Truman succeeding FDR, the anti-Soviet sentiment within the U.S. government would continue in earnest. Truman held deep-seated hatred of both communism and the Soviet Union and reportedly argued that “Russians were as untrustworthy as Hitler and Al Capone.”⁵⁴ Adding to the political dichotomy was Truman’s steadfast belief in American “moral superiority” and the observation that Russians mistook generosity as a sign of weakness.⁵⁵ Furthermore, he believed that the USSR needed to be “taught how to behave in the civilized world” and that the world depended upon American economic, political, and liberal values.⁵⁶ The establishment of the “Truman Doctrine” on March 12, 1947, clearly drew the line

between the two powers as the president stated, “it must be the policy of the United States to support free peoples who are resisting attempted subjugation by armed minorities or by outside pressures.”⁵⁷ When addressing “outside pressures” there was no doubt in anyone’s mind to whom Truman was referring.

Throughout the post-war period and well into the 1950s, the issues regarding the apparent appeasement of Soviet expansion served as rhetorical fodder for domestic discussion and for the political positioning between the Republican and Democratic parties. Charges of being “soft on communism” served largely political ends in domestic arenas as both parties used this accusation to sway voters. In this same vein, political leaders argued that the high standard of the American way of life proved the superiority of capitalism over communism. The contemporary zeitgeist in American wove economic prosperity with patriotic overtones and connected consumerism and the conventional values of the family unit as part of a safeguard against communism.⁵⁸ The ideological and political lines between the superpowers had clearly been drawn. Hanson Baldwin, the military editor for the *New York Times*, argued in 1947, “the United States and Russia are face to face in a struggle for the world, a conflict short of war, but a conflict non-the-less.”⁵⁹

Eager to offset the Republican gains in the 1946-midterm elections, Truman set out to firmly establish his anti-communist stance and bolster the Democratic Party’s public image as champions of democracy. In 1947 to partly offset Republican claims regarding Democrats “being soft on communism,” and in line with traditional American fear over communist infiltration, Truman signed Executive Order 9835 that established the Employee Loyalty Program that held hostage anyone with a

communist connection.⁶⁰ This program allowed federal civilian employees to be dismissed from their jobs if “reasonable grounds” were found.⁶¹ This program facilitated the subsequent communist witch hunts of McCarthy and the House Un-American Activities Committee (HUAC).⁶² In addition to the Truman Doctrine, on April 3, 1948, Truman initiated the Marshall Plan in Europe as another effort to stem growing communist influence. As the Soviets exerted their influence in Poland, Rumania, Hungary, Bulgaria, and Czechoslovakia, America sought to establish capitalist trading partners in Western Europe.⁶³ The Marshall Plan not only provided reconstruction opportunities to a worn-torn Europe for humanitarian purposes, but also served as an economic bulwark against further communist gains. By encouraging capitalism and sewing the seeds for future markets, the Marshall plan was a direct attempt to prevent further communist influence in Western European political arenas. The Marshall Plan served in concert with the Truman Doctrine as the president claimed they were “two halves of the same walnut.”⁶⁴

On the domestic front, Truman’s policies were bearing some political fruit. In his close election with Thomas Dewey in 1948, the challenger stated that he lost because “the [Russian] bear got us.”⁶⁵ Dewey concluded he was not sufficiently critical regarding Truman’s “tough on communism” stance, but historian Arnold Offner argues, “Truman appeared to be doing what the public wanted him to do, namely, sustain a tough policy-short of war in Berlin and elsewhere.”⁶⁶ The domestic political agenda not only shaped American post war foreign policies and agendas, but helped to drive defense policy and practices.

Perhaps the best starting point for the American perspective regarding the post-war international environment is George Kennan's famed "Long Telegram" message from Moscow on February 22, 1946. In this transmission, Kennan, the Deputy Head of the U.S. mission in Moscow, provided the intellectual cornerstone for American military and political policy for the next few decades.⁶⁷ In his message Kennan outlined the mistrustful nature of the Soviet Union and explained, "At the bottom of the Kremlin's neurotic view of world affairs is the traditional and instinctive Russian sense of insecurity."⁶⁸ Further he claimed, "world communism is like a malignant parasite which feeds only on diseased tissue."⁶⁹

The message was popular reading in the Truman Administration and eventually published in the academic journal *Foreign Affairs* in 1946 under the name penname "Mr. X." The most important aspect of the Kennan "Mr. X" article came from one of the last passages as it suggested that the U.S. embark "with reasonable confidence upon a policy of firm containment, designed to confront the Russians with unalterable counter force at every point where they show signs of encroaching upon the interests of a peaceful and stable world."⁷⁰ Kennan's ideas quickly gained traction in post war America and national foreign policy strategy obtained a new name: "containment."

Post Cold War scholars have refuted such nefarious intentions on the part of the Soviet Union and see Stalin much more in a defensive mode. Cold War historian John Lewis Gaddis identified Stalin's post war goals specifically as, "security for himself, his regime, and his country and his ideology precisely in that order."⁷¹ Furthermore, Gaddis believes that Stalin was betting that another capitalist crisis

would occur following the war and that the U.S. would lend money to the USSR for reconstruction in order to keep markets open for American manufacturers.⁷² In keeping with Marxist ideology, Stalin thought capitalism would eventually sow its own seeds of destruction and the countries of Western Europe would ultimately turn to communism as a solution.⁷³ According to Gaddis' interpretation, there was no need for offensive military action on the part of the USSR, as time would provide the eventual victory of communism.

Regardless of Gaddis's opinion of Stalin's intentions, most Americans in the late 1940s saw communism and the USSR as a nefarious agent in world affairs bent upon global expansion. Polls taken at this time overwhelmingly reflected the suspicious mood of Americans toward the Soviets. In August 1946, 60 percent of Americans surveyed thought that Russia "was trying to build itself up to be the ruling power of the world" while only 26 percent thought the USSR was merely trying to protect itself from another war.⁷⁴ A year later, another poll found that 71 percent of Americans believed that one nation was trying to dominate the world. Furthermore, of that 71 percent, a full 78 percent believed that the one country attempting to dominate was Russia.⁷⁵ Six months later in February 1948, 73 percent of those polled believed that that Russia would start a war with the U.S. to "get something she wanted."

On November 23, 1948, the National Security Council (NSC) Memo 20/4 officially reflected the growing concern over Soviet actions and echoed the sentiment expressed by Kennan in his 1946 telegram and "Mr. X" article. NSC 20/4 argued that "communist ideology and Soviet behavior clearly demonstrate that the ultimate

objective of the leaders of the USSR is the domination of the world” and in doing so Russia was “building up as rapidly as possible the war potential of the Soviet orbit in anticipation of war, which in the communist thinking is inevitable.”⁷⁶ Furthermore, the document argued that the Red Army was capable of “over-running in about six months all of continental Europe and the Near East . . . while occupying important continental points in the Far East.”⁷⁷ NSC 20/4 also speculated, “by no later than 1955 the USSR will probably be capable of serious air attacks against the United States with atomic, biological and chemical weapons.”⁷⁸

In response to this threat, NSC 20/4 suggested that the U.S. needed to prepare itself militarily and provide a long-term deterrent stance against possible Soviet Aggression.⁷⁹ Additionally, in the event of war the document stated that the U.S. “should endeavor by successful military and other operations to create conditions which would permit satisfactory accomplishment of U.S. objectives without a predetermined requirement for unconditional surrender.”⁸⁰ NSC 20/4 established American national security policy and the military stance of nation until replaced by the equally assertive policy of NSC 68. However, NSC 20/4 was really designed to help spur defense appropriation under Truman’s budgetary constraints and draw attention to external threats.⁸¹ Unlike its successor NSC 68 in this purpose, NSC 20/4 was a failure.⁸² Nevertheless, as much as it failed to encourage defense spending it also failed to provide definitive guidance to military planners regarding goals and objectives of an atomic offensive. As a result, targeting of Soviet cities and infrastructure was left largely to the devices of men like LeMay.⁸³

Flush from victory, after World War II most of America turned inward for economic and domestic prosperity with the Truman administration looking to balance the federal budget and curb government costs, especially defense spending. A smaller U.S. military reflected the mood of the nation as it maintained only a cadre force despite the possible growing threat of communist incursions. However, as the hubris of victory wore off, world events effected national policies and directives that set in place a more pronounced defensive posture in light of the perceived danger from global monolithic communism. To meet the challenge, America's strategic policies changed and leveraged the most cost effective, yet destructive means to deter aggression: atomic warfare. The adoption of atomic war and the ability to destroy whole cities certainly departed from America's pre-war bombing doctrine and stood in contrast to previously held notions regarding civilian casualties.

Birth of Nuclear Planning and the Rise of the Air Force

On March 31, 1949, at the Mid-Century Convocation at the Massachusetts Institute of Technology, Former British Prime Minister Winston Churchill provided his perspectives regarding the emerging Cold War and the role of technology in recent world conflicts. One sentence in Churchill's speech stood above the others regarding the development of modern warfare and was held in high regard by the future commander of the USAF's Strategic Air Command (SAC). About half way through his speech Churchill quipped, "For good or ill air mastery is today the

supreme expression of military power, and fleets and armies, however necessary, must accept a subordinate rank.”⁸⁴ The quote rang true with Curtis LeMay and he had the words printed, framed, and hung in his office at his SAC Headquarters.⁸⁵ While other military services may have bristled as such an idea, there is little doubt that many members of the newly created Air Force fully subscribed to Churchill’s observations.

Following the war, Army Air Force leadership was convinced of the superiority of the air arm in modern war and firmly believed that their efforts had been the decisive factor in the Allied victory.⁸⁶ The charred remains of German and Japanese cities stood as testaments to the destruction wrought by America’s air armadas and were harbingers to the potential of airpower. However, with the publishing of the Strategic Bombing Survey in 1946, arguments ensued over how much aerial bombardment had actually contributed to winning the war. While many air leaders believed that the Army Air Force’s bombing effort proved the value of airpower, the USSBS was not the definitive validation of air some expected. Overall, the survey’s findings reported mixed results from both theaters. The USSBS described in detail that many German production rates steadily increased up until mid 1944 despite the “round the clock” bombing of the RAF and USAAF.

Changes in German production methods and organization mitigated some of the Allied bombing effects the survey found that certain USAAF target sets had the wrong emphasis. In the Pacific, while the firebombing efforts against the Japanese were certainly destructive, they did not start in earnest until March 1945. By that time, the U.S. Navy had already sunk much of the Japanese merchant fleet and

isolated the home islands from its source of war materials in South East Asia and the East Indies.⁸⁷ As a result, resources on the mainland were already scarce and factories increasingly had smaller amounts of raw materials to produce the equipment required for a modern mechanized military.

In the end, the survey found that air power was a factor in the Allied victory, but not the decisive cause of the Axis defeat. The USSBS went so far as to conclude that, “the role of air power cannot be considered separately . . . from the roles of ground and naval forces nor from the broad plans and strategy from which the war was conducted.”⁸⁸ Analysis conducted by the widely regarded civilian strategist Bernard Brodie during the 1950s echoed the USSBS findings. He argued that the strategic bombing campaign was one element in a combination of forces that defeated the Axis and that airpower alone could not have secured victory.⁸⁹

The USSBS conclusions did not necessarily provide the definitive validation of strategic bombing for which the Air Force had hoped.⁹⁰ But while the contributions and effectiveness of strategic bombing in World War II were equivocal, airmen in the post-war era were steadfast in their defense of strategic bombardment and the belief that it could single-handedly bring victory. Furthermore, with the advent of the atomic bomb and improvements in aviation technology, many believed that airpower was now the decisive force regardless of the USSBS findings. In one of the first highly regarded books about nuclear war, *The Ultimate Weapon*, author Bernard Brodie argued that along with nuclear bombs came a wholesale change in warfare. While Brodie saw some merit in the USAAF conventional wartime bombing efforts, he believed that atomic weaponry significantly changed the mission

of armed forces. The salient message of the book was that “the chief purpose of our military establishment has been to win wars. From now on, the chief purpose must be to avert them. It can have no other useful purpose.”⁹¹ Furthermore, because of the airplane’s destructive potential with atomic weapons, Brodie believed that war in the future would be a short affair lasting only a few days.⁹² These ideas regarding war in the future also permeated throughout the USAF and served as the foundation for American defensive strategies during the Cold War.

The polemics regarding the findings of the USSBS led one Air Force leader to submit an addendum to the Secretary of War. The document provided a pro-Air Force perspective to the survey’s lukewarm results and argued the potential for airpower in future conflict. Major General Orvil A. Anderson, Chief of the Army Analysis Division, argued that in light of the survey’s findings, the leaps in aviation technology and development of long-range air weapons provide an “effective means of striking directly at the enemy’s sustaining resources and his will to wage war.”⁹³ Furthermore, the General proffered the view that, “surface forces need be opposed and neutralized only as required in acquiring and/or defending necessary air bases [and] . . . In the future, the range of air weapons and their ability to penetrate enemy air defenses will be fundamental considerations in the development of a nation’s primary striking force.”⁹⁴ Echoing the primacy of airpower, this same sentiment was expressed by Stuart Symington, future Secretary of the Air Force who told a crowd in Detroit, “our strength in the air will decide the destiny of America.”⁹⁵ Regardless of what the Survey reported about the effectiveness of the strategic air effort in World

War II, it did not shake the Air Force's opinion of its pivotal role in any upcoming conflict.

Concern over the spread of communism, and a return to the pre-war hostility between the U.S. and the USSR, when combined with the large-scale demobilization of the military following the war, caused American planners increasingly to perceive atomic weapons as America's trump card to offset a large Soviet Red Army. In December 1947 the first Secretary of Defense, James Forrestal, acknowledged the primacy of atomic weapons in American strategy in a testimony to the Senate Armed Services committee. Forrestal stated that there were only "four outstanding facts in the world at this time:

1. Predominance of Russian land power in Europe and Asia.
2. Predominance of American Sea power.
3. Our exclusive possession of the atomic bomb.
4. American productive capability.

He asserted further, "As long as we can out produce the world, control the sea, and strike inland with the atomic bomb, we can assume risks otherwise unacceptable in an effort to restore world trade, to restore the balance of power-military power-and to eliminate some the conditions that breed war."⁹⁶ War plans in the immediate post war period called for more and more powerful atomic weapons to target both the Soviet armies in the field and the national infrastructure of the USSR.

However, America's stockpile of atomic weapons was limited to a mere thirteen bombs in 1947 and in late 1946 the nuclear delivery force consisted of only twenty-three of the special "Silverplate" B-29s.⁹⁷ Furthermore, Air Force bomber crews were sadly deficient in both competency and airmanship during the post war

era. The drawdown of the military had significant consequences for the USAF. After LeMay took command of SAC he directed a practice raid upon Dayton Ohio with all the bomb groups in the command. In January 1949, crews were given a pre-World War II photo of the town and directed to attack select targets, using radar, at thirty thousand feet.⁹⁸ Many aircraft aborted due to mechanical difficulties, radar sets did not work at altitude so crews flew bomb runs at fifteen thousand feet, and inexperienced radar operators became confused as to the actual target.⁹⁹ Weather also affected the bombers, but the average bombing score was between five thousand and eleven thousand feet from the target.¹⁰⁰ Not one bomber finished the mission as briefed.¹⁰¹ LeMay called the raid “the darkest night in American aviation history.”¹⁰²

The Air Force asked famed aviator Charles Lindberg to assess the USAF during the post war era. The aviator flew with SAC aircrews during 1948 and submitted a report that foreshadowed the Dayton raid results.¹⁰³ He found deficiencies in SAC training programs created by the command’s leadership and their policies.¹⁰⁴ America’s premier atomic strike unit was not immune to a lack of training as the 509th Bomb Group’s Circular Error Probable (CEP), the radius in which fifty percent of bombs dropped will fall, was over one mile when released from over twenty five thousand feet.¹⁰⁵ This lack of high altitude proficiency led Lindberg to report, “the personnel for atomic squadrons are not carefully selected enough . . . and the average pilots proficiency is unsatisfactory, teamwork is not properly developed. . . . In general, personnel are not sufficiently experienced in their mission.”¹⁰⁶

Regarding nuclear weapons, the U.S. military had no atomic bombs to train with as all fissionable materials fell under the purview of the civilian-run AEC established by the McMahon Act of 1946. While the JCS attempted to gain access to these weapons in 1948, SAC did not have authorization to possess nuclear munitions until 1952. As a result, ground crews had little experience, if any, on how to handle, assemble, or load nuclear ordnance. The early MK III bombs had to be assembled by hand and then closely monitored as battery life and the generation of heat around the nuclear core prevented the stockpiling of fully assembled bombs.¹⁰⁷ Furthermore, it could take up to sixteen hours to fully complete the assembly process.¹⁰⁸ Despite these initial shortfalls in training, material, and organization, the idea of nuclear weapons began to gain popularity as an important tenet in American post war defensive strategy.¹⁰⁹

Regardless of the poor state of the U.S. strategic bombing force, reliance upon atomic weapons served a domestic political agenda. Truman's fiscal conservatism and desire to balance the national budget led to reliance on atomic weapons to mitigate the requirement for a large and expensive conventional standing army. The portion of the GNP allocated to defense reflected Truman's "Remainder Method" of budgeting. During this period the White House continually exerted pressure upon the Pentagon to economize and stretch its meager budget allocations.¹¹⁰ Additionally, as inflation rose in the U.S. during the post war period, the purchasing power of the dollar shrank. This situation not only affected the American consumer, but also the defense establishment. In addition to the lack of purchasing power of the dollar, defensive systems and equipment were becoming increasingly more sophisticated and

therefore more expensive.¹¹¹ The technological boon experienced in the war came with a price. A B-17 bomber during the war cost \$218,000 but the new B-36 the USAF was buying during the post war era cost over \$3.6 million.¹¹² While platforms grew in capability and performance, costs skyrocketed and the military had to conduct its missions with less assets and equipment.

Even after the Berlin blockade of 1948 and rising tensions with the USSR, Truman refused to raise the defense budget and atomic weaponry served as a panacea to the Soviet threat while keeping defense expenditures minimal regardless of the sad shape of the nuclear force.¹¹³ Truman's agenda combined with the thriving post war economy made it difficult to man, train, and equip the USAF.¹¹⁴ All of the services suffered from a lack of personnel and equipment during the post war era and military planners saw nuclear capability as a way to tip the balance of power toward the U.S.¹¹⁵ However, given the size of the budget and the USAF's actual readiness capability for the nuclear mission, it is obvious that America's nuclear trump card was largely a bluff and would remain so until global events forced the presidents hand.

With the advent of atomic bombing, at the later half of 1945 Arnold directed a study to determine the employment, size, organization, and composition of the post-war, atomic, Air Force. The study, headed by Spaatz included future USAF Chief of Staff General Hoyt Vandenberg and the future Supreme Allied Commander-Europe, General Lauris Norstad. One of the assumptions these men made regarding an atomic air force was that time was now at a premium and that the Air Force no longer had the luxury of years to build an air fleet once a war started.¹¹⁶ America's military might in

1941 was only a fraction of what it became by 1945. After Pearl Harbor, U.S. industry had time to build planes while the Army began recruiting and training aircrews. In this effort, the U.S. had over a year to build up forces before the initiation of the CBO in Europe. In Asia, the USAAF had a full two years before it started B-29 operations over Japan.

In future war, however, the board assumed that America would not have the time to “ramp up” aircraft production and aircrew training much as it had in World War II. Just as Brodie had envisioned, and given advances in technology, future wars were expected to be shorter in duration and required the ability to strike with full military might at the very beginning of the conflict. Toward this end, the new USAF needed to exist in sufficient numbers of both men and aircraft at the start of any war. To support this posture American needed “an Air Force in being,” capable of delivering a knock out blow to an adversary during the early phases of a conflict.¹¹⁷ Furthermore, military planners generally accepted that there was no defense against atomic bombing. A nation could ill-afford to be caught unprepared for a war in which airpower and atomic bombs would provide the decisive victory.¹¹⁸ The term “an air force in being” was a common expression used by USAF leaders to sell the idea that America needed an air fleet in existence to counter potential aggression.

A 1946 work written by a veteran of the strategic bombing campaign over Germany specifically addresses the issue of military preparedness for nuclear war in light of a democratic form of government. William Borden’s *There Will be No Time*, argued that democratic governments were at a disadvantage to dictatorships in preparing for war as the focus of effort was different.¹¹⁹ While democratic citizens

focus upon jobs and economic domestic concerns, dictatorships were able to prepare for war because they did not answer to a constituency.¹²⁰ Borden concluded that in the nuclear world a standing military force ready to strike back at an aggressor was an imperative, despite the democratic foundations of the country, and warned that the penalty for not supporting such preparation was not just a longer casualty list but “certain national death.”¹²¹

The Spaatz board also determined that the atomic bomb was primarily an offensive weapon to be utilized against large cities and industrial targets. Despite the bombs destructive power and potential, they concluded it “did not warrant a material change in our present conception of employment, size, organization, and composition of the post-war Air Force.”¹²² Furthermore, they found that the bomb “has not altered our basic concept of the strategic air offensive, but has given us an additional weapon.”¹²³ Given USAAF doctrinal precepts before the war, this statement certainly alludes to a significant change in thought. However, based upon this statement it is obvious, these men were referring to USAAF practices as it pertained to the World War II experience and not the pre-war doctrine of precision bombardment.

As raids during World War II produced large-scale devastation and razed square miles of urban area, American air leaders became anesthetized to the widespread devastation created by aerial bombardment. They became accustomed to the mass destruction produced during the war and carried such ideation into the post war era.¹²⁴ The scale and scope of World War II hinted that the next conflict would include the use of more powerful weapons and leverage the most advanced technology. Toward this end, USAF planners widely believed that future conflict

would be nuclear, air-centric, and fought in a relatively short time. Public addresses, papers, and articles written during this time consistently echoed these sentiments and such ideas served as the foundation for bombardment strategies.

USAF leaders of the era tended to be unsophisticated regarding their ideas of airpower and focused upon execution rather than reflective rationalized thought regarding geopolitics and nuclear conflagration.¹²⁵ While these leaders were not unintelligent or dim-witted men, they did lack an appreciation of international politics and the nuances of diplomacy. This lack of intellectual thought and reflection is evident in the demographics of the entire USAF officer corps. Statistics from 1954 state that that roughly only 43 percent of Air Force officers were college graduates, the lowest of any service, and of that, only 7 percent had come from a service academy.¹²⁶ In *Air Force Magazine*, the Director of Education at the USAF's Air University complained about the lack of emphasis in professional instruction in his service. He made note that the Air Force was stagnant in regarding to education and intellectual development and argued,

We tend to give precedence to the things that we cherish. Thus in today's Air Force we lay great emphasis on the skills necessary to fly and maintain our weapons, and properly so. However, although we clamor for the kinds of people professional education produces, we do not attach commensurate importance to the effort necessary to develop them.¹²⁷

Furthermore, he noted that while the Air Force doubled in personnel strength from 1950-1953, professional education programs did not grow in concert with the increase and that the service did not have an Academy established for the development of its own officer corps.¹²⁸

When LeMay assumed command of SAC on October 19, 1948, he quickly attempted to fill the ranks of his organization with what he referred to as the “right people,” meaning mostly his subordinates and colleagues from his wartime, World War II bombing operations.¹²⁹ The “right people” LeMay surrounded himself with directed raids over Berlin, Tokyo, Hamburg, and Yokohama and had no qualms about executing missions they thought as militarily sound with the most destructive means at their disposal. They were single-minded in their ideas regarding bombing and based their decisions upon wartime conventional experiences.¹³⁰

Paramount to this experience was the war fighting principle of “mass.” This principle has a number of definitions but largely defined as to “concentrate the effects of combat power at the decisive place and time.”¹³¹ Mass allows a commander to “overwhelm enemies” to achieve both destructive and constructive results.¹³² For air commanders during World War II, this application of combat power eventually began to equate to mass more in different terms pertaining to large-scale application of bombing and widespread destruction. The large raids over Germany and Japan and their considerable effects had a significant impact on these commanders at the operational level in World War II. These men carried these experiences to the strategic level of war during the post war period with little or no appreciation for the new dimension of atomic war.

As technology and bomb yield improved, little thought was given in USAF circles to a nuanced military strategy that reflected the larger political aims of the nation or to the development of doctrine in light of the new changes in warfare as Brodie suggested.¹³³ While these leaders did consider the psychological, mental, and

political effects atomic weapons created, air planners looked mainly at the physical destruction and the effect upon enemy infrastructure reminiscent of World War II methods of bombardment. USAF leaders failed to appreciate the implications of atomic war and revise air doctrine.¹³⁴ While advocates of air power at the time saw an end to the bomber streams and large air battles of World War II, they failed to appreciate the larger implications of atomic warfare and its direct correlation to national political objectives. When Brodie was hired by the Research and Development (RAND) Corporation to review SAC planning in the early 1950's, he was chagrined to see that it was operationally focused and failed to consider the larger strategic political aims of the state in light of atomic war.¹³⁵

The legacy of the World War II experience greatly affected post war planning and America's air leaders relied upon their operational level combat experience for planning rather than intellectual, carefully measured thought regarding atomic war. What many USAF planners focused upon was the destruction of factories and infrastructure and the use of massive attacks to destroy an enemy; such operations might not be necessary given the overall requirements in support of national strategic aims.¹³⁶ While targeting strategies changed as did the growth of the American nuclear stockpile, SAC planned to throw much of the atomic force against the Soviets in a single massive attack. In January 1949, the first approved plan specifically including atomic attack, entitled TROJAN, called for the early targeting of vital elements of Soviet war making capacity and assumed that authorization for the use of nuclear weapons had been obtained.¹³⁷ TROJAN was approved by both the Joint Chiefs of Staff (JCS) and the president, and called for the nuclear targeting of 70

Soviet cities and the use of 133 atomic weapons.¹³⁸ Still haunted to a degree regarding the use of the atomic bomb, Truman wanted to reject these plans in favor of a more conventional attack; however, the President was not willing to change his current fiscal policies to build a larger force with comparable potential.¹³⁹

The TROJAN plan was replaced by one entitled OFFTACKLE in 1949 with the later plan called for the destruction of Soviet war making capability as opposed to the mere “targeting of vital elements.”¹⁴⁰ By the mid 1950s war plans envisioned that Russia would be “nothing but a smoking radiated ruin at the end of two hours.”¹⁴¹ This kind of ideation fell in line with the air commanders World War II ideas regarding “mass” but and failed to acknowledge that the idea of restraint was more relevant in the nuclear age.¹⁴² Brodie argued that it was the very threat of nuclear war that was the real weapon and the accompanying psychological effect was of primary importance. In this regard, Brodie believed that throwing all atomic weapons at once reduced the deterrent effect of holding an enemy hostage with future attacks.¹⁴³ Furthermore, Brodie was dismayed that Air Force planners had limited intelligence on Soviet infrastructure and did not really know how much destruction was required for Russia to collapse.¹⁴⁴ Planners believed that by throwing atomic weapons at Soviet targets, the Russians would simply capitulate.¹⁴⁵ Regardless of Brodie’s ideas, USAF planners paid more allegiance to their World War II ideas of mass than to other considerations. As result, these men established targeting rationales that called for large-scale strikes that remained inherent in USAF nuclear planning for years.

In an article written for *Collier’s Magazine*, in December 1945 entitled “Airpower in the Atomic Age,” Spaatz described a vision indicative of the USAF’s

thought regarding future conflict. In the piece, he wrote war in the future “would be aimed at smashing the enemy’s whole organism and would counter his offensive incidentally in the process.”¹⁴⁶ As Spaatz envisioned, an effective air offensive would “pulverize” the adversary’s industrial centers and by conducting “immediate blows against [enemy] means of civilization and military support, his industrial and economic areas would make his continuance of the struggle pointless and bring a quick surrender.”¹⁴⁷

Spaatz suggested a wholesale change in American military thinking. With this vision of a new type of war, Spaatz argued that defense from atomic weapons means that American must be on the offensive from the very start. In the nuclear world, with improvement in aircraft and missiles Spaatz concluded that the “offense has a crushing advantage” and “our habits of strictly defensive thought must be weeded out. We need a national psychology of offense.”¹⁴⁸ He argued further, “For the world’s greatest democracy to remain in its traditional defense minded rut during this time of military revolution would be an historic calamity.”¹⁴⁹ Obviously, this idea represented a radical shift in American military thought.

In speeches conducted by various members of USAAF leadership immediately after the war, the constant theme was that America needed an air force ready to retaliate to any aggressor with large-scale nuclear destruction from the air. In both the tone and intent of their words lie the foundations for what eventually became “massive retaliation” and the deterrence policy adopted by subsequent administrations. Fears over an atomic Pearl Harbor underscored the importance of preparedness and the ability to attack immediately with nuclear weapons if

required.¹⁵⁰ Representative of this thought was an article written in the Air Force Academic journal *Air University Quarterly Review* (AUQR) that argued, “If bombing is required to enforce our will, let it be atomic bombing . . . we can concentrate our energies on the super air blitz which will force an unqualified decision within a month . . . a ready fighting team, a true atomic-bombing-force-in-being, can win the game without every making a substitution.”¹⁵¹ This same sentiment was consistently expressed throughout the post war era as nuclear confrontation was considered almost as inevitable. When asked by a Naval officer visiting SAC headquarters about the command’s capability to conduct strategic bombing if atomic weapons were outlawed, LeMay replied, “foolish question. It is inconceivable to me that this situation will ever arise.”¹⁵²

However, Spaatz was not insensitive to the moral aspect of what he was advocating and understood the ethical implications and consequences of nuclear war. Shortly after relieving Hap Arnold as the Commander of the Army Air Forces, he wrote a note to Stuart Symington similar in context to LeMay’s statement regarding the firebombing of Japan. In the memo Spaatz writes, “Do you realize in accepting our new jobs and in the event of war with Russia we will be hanged as war criminals? There had better be some real hard honest-to-God thinking about what we need to avoid being on the losing side. The U.S. has already set the pace for the atomic bomb, strategic bombing, and hanging war criminals.”¹⁵³

Conversely, an article written by the same General Anderson who responded to the USSBS with the pro USAF letter rebuking the survey’s tepid response, argued the morality of nuclear weapons in light of self-preservation and the defense of

democracy. In the winter of 1949 in AUQR, he argued in modern war the “soldier and the worker are complimentary” and that the idea of strategic bombing as immoral is a “fallacious argument.”¹⁵⁴ He goes on further to argue that “the informed viewpoint” knows that the western civilization is dependent upon nuclear weapons and military leaders would be “derelict in their duty to the people of the U.S. and the western democracies if they did not fully exploit the power of the air offensive.”¹⁵⁵ In closing General Anderson argues that the U.S. has a moral obligation “as the champion of the dignity of man and human rights” to defend itself within the means available.¹⁵⁶ In essence, America had a moral obligation to defend the free world with nuclear weapons.

In addition to the USAF, the Joint Chiefs of Staff also developed similar ideas regarding the requirement for nuclear weapons and a “force in-being.” Shortly after the war, the U.S. initiated Operation CROSSROADS and tested nuclear weapons on ships staged near the Bikini Atoll in early 1947. Two tests conducted under this program, called ABLE and BAKER, targeted 88 ships of different class size and nationality. The evaluation board consisted of Army and Navy personnel with prominent civilians also included. After witnessing the tests and returning to Washington, the board submitted its findings in June. The board came to the same conclusions as the USAF regarding the primacy of offense in the atomic age and that America “must be prepared to employ them [atomic bombs] before a potential enemy can inflict significant damage upon us.”¹⁵⁷ It also suggested that the U.S. manufacture and stockpile sufficient quantities of fissionable materials to give the U.S. “the ability to overwhelm swiftly any potential enemy.”¹⁵⁸ Moreover, the JCS

report emphasized nuclear weapons by stating, “the possible penalty of a failure to retain dominance in the development of the atomic bomb and of the strategy and tactics of its use so great that it must serve as constant incentive to the best thought and effort of our military planners.”¹⁵⁹

As far as precision bombing was concerned, the board also concluded that the explosive yield of atomic bombs was greater than conventional munitions and that bombing accuracy was far less important.¹⁶⁰ In this regard, the board suggested that precision was no longer going to be as significant a factor in bombing operations because of the widespread effects of the weapon. These conclusions might be related to the fact that the ABLE drop was off target some 1500 yards.¹⁶¹ Why the bomb was so far off target is still a matter of conjecture, but the occurrence highlighted potential problems with dropping such a device accurately. Given the nature of nuclear weapons, precision bombardment seemed to be an anachronism and a contradiction in the atomic age.

However, over time the USAF determined that bomb placement was still important to create the desired effects at the target area. While the blast of nuclear weapons destroyed large areas potentially killing thousands, the placement of the bomb at a given target was, and still is, important. Because of topographical, meteorological, and architectural considerations, aircrews still have to place the weapon at a selected point to ensure the destruction of the target. An underground bunker might safely withstand a nuclear airburst or an important factory would remain unaffected if the bomb was placed on the opposite side of an adjacent

mountain range or dropped into a body of water. Regardless of their large-scale effects, precision still had a place in atomic bombing.

Starting with LeMay and continuing into the contemporary era, SAC began to emphasize bombing accuracy holding an annual competition for aircrews. The winning unit won the “Fairchild Trophy,” named after ACTS strategic bombing instructor Muir Fairchild, and winning the award became highly regarded by operational units.¹⁶² While bombing accuracy became less important as World War II unfolded, it initially appeared that this same trend was to continue into the nuclear age. However, with the creation of SAC, the USAF was to renew interest in bombing accuracy, this time ironically with atomic weapons. The departure point in the post war era from the original ACTS doctrine is not in the rejection or dismissal of accuracy in bombing operations, but in the intended massive, large-scale destruction, and collateral damage expected from the nuclear detonation.

While the framers of precision bombing specifically tried to avoid civilian casualties, planned bombing methodologies in the post war Air Force were no longer constrained by such considerations. Indicative of this thought, in 1947 the USAF Directorate of Intelligence forwarded a study of target sets in the USSR and entitled the document “To Kill a Nation.”¹⁶³ While people were not necessarily the target of atomic strategic bombing, acceptance of massive casualties was now taken as a given in Air Force planning. Implicit in war plans of the era was the destruction of entire cities and their populations. Such operations were now an inherent part of modern warfare and attempting to avoid such annihilation was no longer a planning constraint.

Reminiscent of the morale bombing issue from before the war and related to the large-scale effect from atomic weapons, the CROSSROADS board concluded:

In the face of these negative findings, and of the bomb's demonstrated power to deliver death to tens of thousands, of primary military concern will be the bomb's potentiality to break the will of nations and of peoples by the stimulation of man's primordial fears, those of the unknown, the invisible, the mysterious. We may deduce from a wide variety of established facts that the effective exploitation of the bomb's psychological implications will take precedence over the application of its destructive and lethal effects in deciding the issue of war.¹⁶⁴

Morale was again a major target despite the secondary importance placed on it at ACTS.

However, members of the USAF leadership do not bear sole responsibility regarding the draconian application of nuclear bombardment. While these men did rely on their recent experiences for their targeting and planning methods, they received no real guidance from the Truman administration or civilian leadership regarding the ends expected from a bombing strategy.¹⁶⁵ LeMay recalled that "there wasn't anything that came out of Washington. As a matter of fact, I don't think we got anything out of Washington other than maybe a little guidance on targets that should be hit. We did the plan right up till the time I left [SAC] in 1957."¹⁶⁶

Lieutenant General Jack Catton, an operations planner at SAC during LeMay's tenure called SAC the "center of gravity for planning" during this time because only they had the expertise to design a bombing campaign.¹⁶⁷

By 1948, it was clear that international United Nations control over atomic energy, as embodied in the Baruch Plan and related initiatives, was a failure and America was free to incorporate nuclear applications into its war planning.¹⁶⁸ The

Russians rejected international inspection fearing disruption of their own atomic bomb development efforts, and remained opposed to any outside scrutiny. Following the Baruch failure, the Truman Administration published only vague guidelines regarding the use of nuclear weapons and never clearly defined a strategy for nuclear applications. No distinct plans from the national authority outlined when and how atomic weapons might be used. The first guideline for the use of nuclear weapons was not officially established until three years after Hiroshima in September 1948, under NSC 30 entitled “U.S. Policy on Atomic Warfare.” In light of the Czech coup and the beginning of the Berlin blockade, the National Security Council began to outline policies for atomic weapons.¹⁶⁹ NSC 30 merely designated the president as the sole approval authority for their use and mandated that the U.S. be ready to “utilize promptly and effectively all appropriate means available, including atomic weapons, in the interests of national security and must therefore plan accordingly.”¹⁷⁰

Outside of this, NSC 30 provided no further guidance on what to target in support of national goals or towards what end. In this regard, questions remained as to what events might require a nuclear response and if approval was given, what target sets needed to be hit and when?¹⁷¹ Even before NSC 30 was approved, USAF General Vandenberg was already looking to gain guidance regarding the use of nuclear weapons and the goals of an American bombing campaign against Russia:

In a war with the USSR is our purpose to destroy the Russian people, industry, the Communist party, the communist hierarchy, or a combination of these? Will there be a requirement to occupy, possibly reconstruct, Russia after victory, or can we seal off the country, letting it work out its own salvation?¹⁷²

Similarly, W. Walton Butterworth, Director of the Office of Far Eastern Affairs at the State department echoed a similar sentiment. In a memo dated September 15, 1948 Butterworth asked “when and how such weapons should be used? Should we . . . begin bombing major centers of population . . . or start with smaller centers important for transportation or specific industries? This question should be answered not so much on the basis of humanitarian principles as from a practical weighing of the long-run advantage of this country.”¹⁷³

New York Times editor, Hanson Baldwin echoed these same sentiments almost a year earlier in a March 1947 article regarding the new role America played in securing the future of western civilization. In the piece, Baldwin argued that American was now the west’s sole protector from the encroachment of Russia and stood as the most important factor in preventing a “reversion to nihilism and the dark ages.”¹⁷⁴ While American was the bulwark against communist aggression, Hanson was concerned that the U.S. still had “no finished, over-all military policy [and that] our fighting forces are handicapped not only by the demands for economy but by lack of legislation and by piecemeal legislation. There is no rounded and complete policy to guide them in organization or development of post war forces.”¹⁷⁵ While the piece was addressing military applications as a whole, he was obviously addressing both conventional and atomic strategies.

Regardless of Baldwin’s concerns, in November 1948 NSC 20/4 was signed. But the document still provided only a limited amount of guidance for Air Force planners. In the event of war with the USSR, NSC 20/4 directed that the U.S. should “eliminate Soviet Russian domination in areas outside the borders of any Russian

state” and create conditions that would preclude the Russians from having “sufficient military power to wage aggressive war.”¹⁷⁶ Furthermore, after the war NSC 20/4 intended to prevent the Bolshevik regime from having any “military-industrial potential” to wage war with other regimes.¹⁷⁷ Based upon these mandates, the USAF still had hardly any definitive guidance from which to plan and relied upon its previous bombing experiences as the foundation for targeting methodologies.¹⁷⁸ As a result, due to the lack of strategic guidance from the national political leadership, the wartime operational influences of USAF leadership would dominate nuclear post war planning efforts up into the 1950s.

As far as LeMay was concerned, it was not his job to “promulgate national policy” it was his job to provide the resources and capability to execute.¹⁷⁹ He saw that his job was to produce a force that would place the U.S. in a position of power. In developing the force he wrote in his memoirs, “I never discussed the problem with President Truman or with President Eisenhower. I stuck to my job at Offutt [Air Force Base, Nebraska] and in the command. I never discussed what we were going to do with force we had, or what we should do with it, or anything of that sort. Never discussed it with topside brass, military or civilian. All I did was keep them abreast of the development of SAC. I told them what strength we had, as fast as the strength grew.”¹⁸⁰

While USAF planners had little in the way of strategic guidance in light of nuclear applications, technological advances were having a significant impact upon the development of military capabilities. The continued developments in science, engineering, and physics was transforming military hardware. Contemporary thought

at the time was that the rapid advances in aviation technology were shrinking both time and distance as it pertained to warfare. Impressed with technological achievements made during World War II, and continuing in the same vein, the USAF embraced new scientific and engineering efforts in order leverage emerging capabilities.¹⁸¹ During the post war era, government sponsorship of research and development efforts continued to stimulate technological efforts in a number of areas. In order to continue the technological development of these new weapon systems, the USAF recognized the importance of collaborating with civilian scientist and academia. Vannevar Bush, a member of the Interim Committee from 1945, and Director of the Office of Scientific Research at Wright Field in Dayton Ohio was a proponent of a close relationship between industry and the military. He proffered that the relationship forged during World War II should continue for the security of the nation in the post war world. As a result, the combined efforts of both the military and civilian sectors led to quantum leaps in technology.



Figure 18, 19, 20: From left to right: Convair B-36 Peacemaker dwarfing the B-29, Boeing B-47, and YB-52. *Source:* U.S. Air Force Museum on Line Archives <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/061128-F-1234S-027.jpg>; <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/061025-F-1234S-005.jpg>; <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/061026-F-1234S-016.jpg> (accessed February 22, 2008).

In aviation efforts, bomber aircraft development had the priority over fighters.¹⁸² During this period, special emphasis in aviation focused upon speed,

payload, range, and ceiling rather than designs that could generate large sortie rates and were more maneuverable.¹⁸³ The design of the B-36, B-47, B-52, are indicative of this emphasis with marked improvements in performance in each successive design. Eventually these manned, air breathing platforms would, partly, give way to advances in rocket technology and the development of the Intermediate Range Ballistic Missile (IRBM) and subsequently the Intercontinental Ballistic Missile (ICBM). As a result, USAF collaboration with companies such as Boeing, Convair, General Dynamics, and Martin resulted in more efficient and more destructive weapon systems.

The new designs, both manned and unmanned, also focused upon ability to penetrate enemy airspace and avoid anti-air defense systems.¹⁸⁴ The ability to fly over an enemy nation and attack factories, military installations, and population centers in a matter of a few hours, meant future war would only last a few weeks if not days. For the Air Force, in 1946, future Secretary of the Air Force Stuart Symington iterated that if American planes could accomplish these missions, an enemy air force would also eventually develop a similar capability.¹⁸⁵ While American had a marked advantage in aircraft performance and had a monopoly on atomic weaponry up until 1949, most military planners understood that eventually other nations would develop similar capabilities that could threaten America.

In addition to the development of air platforms, the U.S. also made advances in bomb technology. In 1949 AEC scientists produced the MK IV atomic bomb. This bomb was a redesigned FAT MAN, but had a more aerodynamic shape for accuracy purposes and included a new implosion device.¹⁸⁶ The design also included

a levitated, uranium-plutonium, core which increased the bombs explosive yield.¹⁸⁷ The yield of the MK IV was scalable but had a high end capacity of thirty-one KiloTons (KT) (compared with “Little Boy’s” approximate yield of twenty KT).¹⁸⁸ Successfully demonstrated during the SANDSTONE series of tests in 1948, the MK IV bomb improved efficiency of fissionable materials, but more importantly, the design paved the way for the mass production of nuclear weapons and improved the ability to stockpile the weapon.¹⁸⁹ By 1950, both delivery and weapons systems engineers made important technological advances, making the idea of a nuclear offensive a feasible idea.

Planners expected that in the future the continental U.S. would be equally vulnerable from attack as enemy bombers could range North American cities. The advent of long-range jet bombers meant that America could no longer rely on the relative safety of two vast oceans as a defensive buffer. Furthermore, with the increased destructive potential of atomic weapons, the devastation incurred from such an aerial attack would be more widespread and on an unprecedented scale. Conflict in the future would be a ‘total war’ executed by attacking the entire national apparatus and not just selected segments of the society. Much as Douhet had envisioned “all were directly menaced.”

Also, due to the offensive nature of both the airplane and the atomic bomb, many Air Force leaders thought there was no real defense against an atomic attack. Even with developments of surface to air missiles and radar, the speed and altitude of new aircraft designs armed with nuclear ordnance would probably evade parts of an air defense system. While an effective system could engage some of the attacking

aircraft, it in all probability would not be able to shoot down all the bombers. Regardless of how well designed the defense system was, a number of the attacking planes would likely reach their intended targets.

With all the advances in technology and the growing importance and increasing relevance of the airplane in America, Truman decided to appoint a board to help clarify the role of aviation to the future.¹⁹⁰ On July 18, 1947, the president established the Air Policy Commission and told the appointed members “There is an urgent need at this time for an evaluation of the course which the United States should follow in order to obtain, for itself and the world the greatest possible benefits from aviation.”¹⁹¹ In this effort, the Commission was to consider both the civilian and military application of aviation and look broad in scope and beyond the contemporary environment. Philadelphia lawyer Thomas K. Finletter, who became Secretary of the Air Force in 1950, was appointed chairman. He along with four other prominent businessmen, most without aviation experience, were tasked by Truman to report their results by the beginning of 1948.¹⁹²

During the Commission’s six-month deliberations, it conducted both closed and open door meetings, interviewed over 150 officials and executives, and visited 17 civilian and military aircraft establishments.¹⁹³ The Commission also received testimony from the chiefs of the respective military departments and Secretary of Defense Forrestal. While the JCS saw the importance of a well-funded air arm, it argued for an equitable and even-handed approach to military expenditures.¹⁹⁴ Each service stated its relevancy in the modern age, but Forrestal, keeping in mind

Truman's fiscal conservatism, argued against huge sums for defense expenditures that might imperil the president's goal economic solvency.¹⁹⁵

At the end of 1947 the "Finletter Commission," as it was known, completed its investigation and submitted its finding to the president in a report with the ominous title "Survival in the Air Age." The Commission placed great emphasis upon the airplane in national defense and especially the USAF. The board echoed the USAF's arguments that American needed to have a robust deterrent military power so strong that "other nations will hesitate to attack us or our vital national interests because of the violence of the counter attack" and that such a capability required a "force in being."¹⁹⁶ Again this "force in being" needed to be present during phase one of any war. Furthermore, while still envisioning a requirement of an Army and a Navy, the Commission stressed that the nation's military security "must be based upon airpower."¹⁹⁷ Recognizing that the Russians would eventually develop the atomic bomb, the Commission reported that any future attack with weapons of mass destruction may likely come from the air and the only method to counter such a threat was a robust air force.¹⁹⁸ Much like Churchill had argued in his MIT speech, the committee emphasized the primacy of airpower over other forms of warfare. While still recognizing that armies and navies were still important to meet national aims, the air force was now the main effort for the defense of U.S. and western civilization.

The Commission also stipulated that the "force in being" should be built around a fleet of bomber aircraft and that these planes would attack an enemy who would have their "cities destroyed and its war machine crushed."¹⁹⁹ In order to conduct this wartime mission, the Commission suggested that the 1947 USAF

strength of 55 groups be increased to 70 groups, with 700 very heavy bombers, and that this growth needed to be done by January 1950.²⁰⁰ To support this increase in the size of the USAF and build the additional bombers, the Commission recommended an increase in defense expenditures. However, this increase in expenditures focused mainly at the Air Force. According to the report during Fiscal Year (FY) 1947, the Navy was funded at over \$4 billion with the Air Force only budgeted at \$2.8 billion. In order to build the required airpower, the Commission recommended an increased USAF appropriation of over \$4.1 billion in FY 1948 and kept the Navy and Army budgets at approximately \$4 and \$3.2 billion respectively.²⁰¹ This increase in Air Force budget allocations was to continue under the Commission's plan into FY 1949 and in subsequent FYs.

The commission's request for increased budgets flew in the face of Truman's fiscal outlook. However, by 1948 with the Berlin blockade and other events in Eastern Europe the president could no longer avoid the issue America's weak defensive posture. Truman was determined to limit defense expenditures to \$15 billion and in order to counter any potential Soviet threat, nuclear bombs were the most obvious answer.²⁰² American leaders increasingly looked to the ill-equipped and poorly-trained SAC to thwart any potential Soviet invasion. As a result, in the FY 48 appropriations the Air Force received an influx of money to the total of \$4.5 billion with SAC being the priority.²⁰³ Remarks to new Democratic Party members of Congress in April 1949, partly reflected the commission's suggestions, Truman articulated his willingness to use atomic weapons in defense of American security. He told the new congressmen that he hoped we would never have to make the

decision again regarding the use of the bomb but “if it has to be made for the welfare of the United States, and the democracies of the world are at stake, I wouldn’t hesitate to make it again.”²⁰⁴

In addition to the Finletter Commission, Congress established its own investigative body to review airpower requirements. This investigation led to the “Hinshaw-Brewster Report,” and reiterated many of the same conclusions from the Finletter Commission including the need for a seventy group Air Force. However, this recommended increase in the size of the USAF and its budget did not mean the argument of building a larger nuclear bomber fleet was finished. With Truman’s defense spending limitations, all the services were feeling the fiscal restraints and the aforementioned reports only caused increased inter-service rivalries. As Army and Navy budgets were called out to make accommodation for a bigger Air Force, the ability to man, train, and equip naval and ground forces was in jeopardy. The Navy, which opposed the 1947 unification was the loudest critic of the Air Force’s new primacy and argued against the types of missions SAC was planning. Reflecting this new emphasis on the USAF and strategic bombing, in July 1949, the FY 1951 budget proposed downsizing the Navy’s carrier fleet from eight to four and reducing the number of aircraft from 1,554 to a mere 690.²⁰⁵

Adding to the issue of strategic nuclear bombardment was a report published in May by Air Force Lieutenant General H. R. Harmon that evaluated the results of a U.S. nuclear attack on the USSR. A committee headed by the General found that the TROJAN plan for nuclear attack was no guarantee to meet the aims specified in NSC 20/4 and argued that the war making capability of the Soviet Union “would not be

seriously impaired.”²⁰⁶ Despite this lukewarm evaluation of the TROJAN plan, the report estimated however, that some 2.7 million Russians would be killed, the Soviets would experience a 30 to 40 percent reduction in production capability, and that the aerial assault would “vastly complicate” the lives of 28 million people in the seventy targeted cities.²⁰⁷ Obviously, these statistics stand in stark contrast to what ACTS preached.

The report went on further to state the overall effect of the atomic attack would not prevent Soviet offensive actions in Europe, the Middle East, or in the Far East.²⁰⁸ Furthermore, the report concluded that the effects of the planned nuclear strike would not cause the capitulation of the Soviet state or “weaken the power of the Soviet leadership to dominate people.”²⁰⁹ Lastly, the report speculated that the planned American offensive would only serve the propaganda purposes of the USSR by unifying the Soviets and “increasing their will to fight.”²¹⁰ Kennan, author of the “Long Telegram,” concurred with this assessment by arguing that by bombing Moscow and other Soviet cities all the U.S. will accomplish it to convince Russians that we are “barbarians trying to destroy their very society.”²¹¹ The Harmon Report findings lead to a reassessment of the nuclear weapons requirement that eventually resulted in a substantial increase in the atomic stockpile.²¹² The report also suggested that the Air Force include the targeting of communist forces if they attacked in Western Europe.²¹³ This targeting of enemy ground forces was a new wrinkle in strategic bombing as destruction of the enemy army was now an objective in order to “retard” a Soviet offense.²¹⁴ While strategic bombing was designed to attack the war-

making infrastructure behind enemy lines, the U.S. bomber fleet would also be used to attack enemy forces in the field.

Just before the Harmon Report was published, the lightning rod for arguments over roles and missions between the Air Force and the Navy started in April 1949. New Secretary of Defense Louis Johnson, who replaced James Forrestal, cancelled the Navy's planned flush-deck aircraft carrier the *U.S.S. United States*.²¹⁵ Adding fuel to the interservice fire was Secretary Johnson's termination of the program without consulting the Secretary of the Navy John L. Sullivan. Further complicating the situation was the fact that the JCS, including Chief of Naval Operations (CNO) Admiral Luis Denfeld, collectively signed the document killing the *U.S.S. United States* program. This situation quickly festered into a well-publicized political scandal.

In light of the emerging controversy, the Bureau of the Budget sent a memo to Truman the same month regarding atomic warfare and the B-36. While the memo references the Spaatz Report quote about the atomic bomb being "just another military weapon," the Bureau's memo calls into question American nuclear defense posture and presidential authority.²¹⁶ The memo warns that a commitment to B-36 production and atomic re-armament might "put the president in a most awkward position if he desired to alter the strategy in the midst of the intense pressures of the hour."²¹⁷ In conclusion the memo recommends that the B-36 program be evaluated based upon what the program might mean regarding presidential nuclear authority.²¹⁸ The stage was now set for a public debate on the nuclear bombing strategy and the associated moral issues surrounding it.

In addition to the cancellation of the *U.S.S. United States*, dubious claims against Symington and others in the Air Force over the development of the B-36 bombers surfaced. During May 1949 an anonymous letter, written largely by pro Navy interest and sent to Congressman James E. Van Zant, charged that procurement irregularities existed in the B-36 program.²¹⁹ The letter claimed that Air Force Secretary Stuart Symington and Secretary of Defense Johnson had a vested, personal monetary and political interest in the expensive bomber project.²²⁰ These charges not only led to a congressional investigation, but the inquiry provided a venue for a debate regarding the prospect of Naval aviation vis-à-vis the emerging USAF and the larger issue of the U.S. commitment to nuclear bombardment as the first line of defense.

The charges against Symington, Johnson, and Vultee Corporation President Floyd Oldum, maker of the B-36, were summarily dismissed in August when former Navy Commander Cedric R. Worth, a Special Assistant to the Secretary of the Navy, admitted his part in the authorship of the anonymous letter. Furthermore, in his testimony before the Congressional committee, Worth retracted his statements accusing Air Force leadership of wrongdoing and was subsequently suspended from his job at the Department of the Navy.²²¹ Others were also implicated in writing the anonymous letter to include future CNO Admiral Arleigh “31 Knot” Burke’s OP-23 office as well as another naval officer. While the charges against Air Force officials were no longer valid, the battle over nuclear bombing and the primacy of the Air Force still loomed in the halls of Congress as naval officers still argued to present their case regarding the importance of carrier aviation.

Despite shortcomings in the initial design of the B-36, the Air Force proffered that the bomber provided a unique capability to deliver bombs throughout the globe. Naval officers claimed that the “atomic blitz” the Air Force proposed did not provide a deterrent effect and that the B-36 was “a billion dollar blunder.”²²² They also thought the World War II design origins of the B-36 made the plane too slow for the nascent jet age and therefore vulnerable to an effective enemy air defense.²²³ Additionally, these officers believed that fast attack carrier aviation had a role to play in the nuclear mission and that the value of a naval campaign had been proven during the Pacific war. In his testimony during the congressional hearings in October 1949, Navy Admiral Arthur Radford expressed concern that the nation had placed too much emphasis on strategic bombing.²²⁴

Not only did the Navy question the practicality of the B-36 in an upcoming war but called into question the morality of the nuclear offensive. Radford went on further to argue the whole theory of “atomic annihilation” and that this application of power “would be politically and economically useless . . . [and] morally reprehensible.”²²⁵ Additionally Navy Rear Admiral Ralph A. Ofstie, a contributing author to the CROSSROADS Report, questioned the efficacy of strategic bombardment and asked “does the concept of strategic bombing effectively support the policies, objectives and commitment of the United States?”²²⁶ He also claimed “strategic bombing, as now accepted, unavoidably includes mass slaughter” and that “the moral force of the people of this country is in strong opposition to military methods so contrary to our fundamental ideals. It is time that strategic bombing be squarely faced in this light; that it be examined in relation to the decent opinions of

mankind.”²²⁷ Ofstie went on further to classify strategic bombardment as a “ruthless and barbaric policy.”²²⁸

Near the end of the October deliberations, Denfeld finally spoke. Despite owing his job as CNO to Secretary Johnson, the Admiral now defiantly broke with this civilian superior and answered in contradiction to his earlier signature supporting the cancellation of the *U.S.S. United States*. In this testimony Denfeld stated, “As the senior military spokesman for the Navy, I want to state . . . that I fully support the conclusion presented to this committee by the Navy and Marine officers who have preceded me.”²²⁹ Denfeld went on further to argue Navy grievances regarding Department of Defense (DoD) policies and its efforts to down size the Navy. He decried that DoD “limitations are imposed without consultation” and the only guidance the Navy receives is to decommission ships and organizations.²³⁰ As a result of his defense of his Navy brethren, advocacy of carrier aviation, and in defiance of Secretary Johnson’s desires, Denfeld was fired as CNO and replaced by Admiral Forrest P. Sherman on November 2, 1949.

Despite the Navy’s arguments, the results of the B-36 hearings were a boon for the Air Force, its role in national defense, and the strategic bombing effort. While Truman still adhered to his limit on defense spending by allocating only \$4.4 billion for the USAF, Congress voted 305-1 to provide the service with additional funds for FY 1950.²³¹ Furthermore, the public debate on bombing served to highlight American security concerns. During this same period, on October 1, 1949, Mao and the Red Army established a communist China and a few days earlier on September 23, Truman announced the discovery of a Soviet atomic explosion. These two events

in addition to other world events heightened the concern over American national security and military posture. Concurrently with the B-36 hearings in October, the NSC, in coordination with the AEC recommended to Truman the acceleration of the atomic energy program.²³² These two organizations were fully committed to the idea of deterrence and stated in a report to the president, “we should develop a level of military readiness which can be maintained as long as necessary as a deterrent to Soviet aggression, as indispensable support to our political attitude toward the USSR, as a source of encouragement to nation’s resisting Soviet political aggression, and as an adequate basis for immediate military commitments and for rapid mobilization should war prove unavoidable.”²³³ The result was a presidential call for an increase in the production of fissionable materials. These world events combined with the discussion on military strategy provided fertile ground for an increase in America’s atomic strategic bombing capability and embracement of methodologies divergent from ACTS precepts.

As events unfolded, Americans increasingly saw a need for an atomic air force. Even before Mao succeeded in China and the Soviet atomic explosion, in January 1949, 70 percent of polled American thought that the U.S. needed to increase the size of the Air Force.²³⁴ The same poll suggested that the other services also needed to grow in size, but responses to Army and Navy increases were only 56 and 57 percent respectively.²³⁵ In August, American’s were asked if they believed the U.S. should swear off the first use of atomic weapons.²³⁶ Again, an overwhelming 70 percent disagreed with this idea with only 20 percent agreeing to the statement.²³⁷

Regarding the actual use of the bomb, in an August 1950 poll, 77 percent of those asked answered in the affirmative that “we should use it.”²³⁸

Concurrently, American atomic war plans matured and relied upon the use of more nuclear weapons. When in December 1949, the TROJAN plan was superseded by OFFTACKLE, the new plan increased the size of the atomic attack by targeting 104 cities with 220 weapons and included follow-up attacks planned with another 72 nuclear weapons.²³⁹ These totals were significantly higher than TROJAN’s 72 cities with 133 bombs with no follow-on attacks. Furthermore, the plan also targeted Soviet military forces in order to delay and frustrate their offensive thrust into Europe. The “retardation mission”, as it was called, attacked Soviet offensive ground forces in Europe was the second priority to targeting of Soviet factories and infrastructure. However, this retardation targeting was significant as it harkened back the World War II bombing applications when the Eighth Air Force bombed Normandy in preparation of the D-Day assault and the subsequent drive through France. A third target set developed in OFFTACKLE was aimed at destroying Soviet fuel and power industries.²⁴⁰ The JCS endorsed the plan and in approving OFFTACKLE it reiterated support for the strategic atomic air offensive regardless of the discussion that occurred regarding the B-36.²⁴¹

As the 1940s came to an end, SAC was posed to grow in size commensurate to its increasing importance. The strategic bombing mission was now the priority not just for the Air Force, but the entire U.S. defense establishment. The public debate along with various federal commissions only served to reconfirm the growing commitment to atomic bombing strategy while Americans supported efforts to

preserve their nuclear supremacy.²⁴² Furthermore, adherence to World War II methodologies and a failure to recognize the new dimension of atomic war facilitated the departure from ACTs precepts. In addition, a wholesale change in American military thinking came about. The primacy of the offense and the idea that a “force in-being” was now required. The idea of a small American military for defensive means gave way to a relatively large force postured for offensive use. This idea regarding America’s new military posture is illustrated by a quote from LeMay while commanding SAC “We had to be ready to go to war not next week, not tomorrow, but this afternoon.”²⁴³ In taking command of SAC LeMay instituted the idea that “we are at war now.”²⁴⁴ While fiscal frugality initially constrained the growth of America’s nuclear bomber fleet, concerns over communist encroachment and the growing popularity of offensively minded warfare in the atomic age precluded compassionate considerations regarding strategic bombardment.

NSC 68 and Korea

As America entered the 1950s, the Truman Administration’s priority of effort was still the economy and a balanced federal budget. During his 1950 State of the Union address, the president chided Congress over tax cuts, called for the reduction in federal expenditures, and argued that his fiscal policy was “the quickest and safest way of achieving a balanced budget.”²⁴⁵ He boasted that American’s GNP was over \$225 billion a year and that continued economic prosperity needed business men to maintain initiative and enterprise, working men and unions need to be more productive, and that Americans needed to conserve its natural resources.²⁴⁶ Domestic

programs and the development of economic prosperity were still the major themes in his address. While Truman emphasized the economy and internal stability, he expressed concern over foreign relations by stating, “people everywhere . . . [were] being corrupted and betrayed by the false promises of communism.”²⁴⁷ However, as the year unfolded, the president found his priority of effort shift from one of domestic economic prosperity to national defense and fears over global communist threats.

Given the successful Soviet atomic test and fear of losing the lead on nuclear technology, at the end of January 1950, Truman directed that work begin on the development of the “super bomb” or what became known as the Hydrogen Bomb. The same day he directed Secretary of State Dean Acheson and Secretary of Defense Louis Johnson to review national security policy “in the light of probable fission bomb capacity and possible thermonuclear bomb capacity of the Soviet Union.”²⁴⁸ The Director of Policy Planning at the State Department headed this review of policy. The office had been led by George Kennan, originator of the “long telegram,” but Policy Planning was now run by Paul Nitze. While Kennan framed the initial American foreign policy regard the Soviets after World War II, he was less inclined to use military power and emphasized diplomacy over force.²⁴⁹ Acheson, while was no great proponent of atomic weapons, believed that Kennan’s emphasis on diplomacy in light of the nuclear age was impractical and simplistic.²⁵⁰ As a result Acheson sent Kennan on sabbatical to South America in a less influential and significant position.

Kennan’s replacement, Nitze, was a member of the USSBS and a Wall Street investment banker. Acheson saw Nitze as a pragmatist who understood the

contemporary environment and as someone who could formulate effective and practical strategies.²⁵¹ Largely with Nitze's influence and ideas, NSC 68 was drafted and the policy sent to Truman on April 7. NSC 68 continued in much of the same fashion as Kennan's long telegram regarding Soviet intention and stated that the goal of the Kremlin was "domination of the Eurasian land mass" and "to solidify their absolute power."²⁵² The draft offered four courses of action for American foreign policy, "Continuation of Current Policies, Isolationism, War, and A Rapid Build up of Political, Economic and Military Strength in a Free World."²⁵³ In the conclusion of the document, Nitze reiterated the continuation of certain elements of NSC 20/4 and recommended that the president choose option four as the best course of action.

NSC 68 speculated that the Soviets, by 1954 or 1955, would have a "military capability of delivering a surprise atomic attack of such weight that the U.S. must have a substantial increase in general air, ground, and sea strength, atomic capabilities, and air and civilian defenses to deter war and to provide reasonable assurance, in the event of war, that it could survive the initial blow and go on to the eventual attainment of its objectives."²⁵⁴ As a result, 1954 is often referred to as "the year of maximum danger," although, the phrase itself is not resident in the document.²⁵⁵ Nitze's conclusions also recommended a "rapid and sustained build-up of political, economic, and military strength of the free world."²⁵⁶ This suggestion was in stark contrast to the fiscal conservatism of the Truman administration policies and harkened to American defense spending during World War II. However, this theme was consistent with the Finletter, Brewster, and Harmon commissions addressing similar topics.

While the document was submitted in April, the White House forwarded the draft to the JCS for consideration and was still under review when on June 25, the North Korean Army attacked south across the 38th parallel initiating the Korean War. Initially meeting with great success as they drove south, this offensive effort on the part of a communist country had propitious timing for NSC 68's approval. Given the actions in other parts of Asia and on the Korean Peninsula, Truman could not refute much of NSC 68's speculation regarding communist intention and overall goals. Four months after the document was submitted to the president, on September 28, Truman formally approved the document and it became the basis for an explosive growth in the armed services and especially SAC.

NSC 68 was specifically designed to counter Truman's fiscal policies and to make a statement to senior officials that America had to make a change if it was to counter communist aggression throughout the world.²⁵⁷ While the document included no actual cost figures, the tone and intent of the verbiage made it clear that option four would not be cheap and that the restraint on defense spending needed to be removed. The price tag in support of option four was around \$50 billion annually, a far cry from Truman's professed cap of \$14 billion.²⁵⁸ Many claim NSC 68 over-hyped the communist threat, and even Acheson acquiesced that the real purpose of the document was "to so bludgeon the mass mind of 'top government' that not only could the President make a decision, but that the decision could be carried out."²⁵⁹ Regardless of the hyperbole, Acheson hoped that execution of option four would create for America a position of strength if expected to be effective in foreign policy endeavors.²⁶⁰ From FY 1950 to FY 1952 defense spending increased from Truman's

cap of \$14 billion and grew to over \$44 billion along with a significant increase in the size of the armed services.²⁶¹

At the end of 1950 SAC was a force of only 85,000 and had less than 1,000 aircraft. But a year later, by the end of 1951, the small, under funded command had grown to 145,000 airmen with 1,200 aircraft with plans to continue increasing its size. By 1954 SAC had doubled in size with over 2,100 planes of which 835 were bombers (B-36 and B-47), 315 were reconnaissance (RB-36 and RB-47s), 540 tankers, and 325 fighters along with other support air frames.²⁶² Flight personnel in SAC alone by 1954 grew to over 1,000 crew with 490 fighter pilots and weapons operators.²⁶³ Under LeMay's direction aircrews were under constant training and made simulated bomb runs on a number of U.S. cities.²⁶⁴ This training began to pay off as crew accuracy began to rise appreciably from the debacle of the January 1949 Dayton exercise. By 1954 when conducting a training exercise with 150 bombers, 133 aircraft successfully "hit" their targets, with 24 having to abort prior to dropping their ordnance because of the navigation system failed at no fault of the aircrew.²⁶⁵ Eventually LeMay instilled a determined sense of purpose in SAC and insisted that there was little differentiation between peacetime and wartime. One planner quipped, "Training at SAC was harder than war. It might have been a relief to go to war."²⁶⁶

The result of SAC's growth and the approval of NSC 68 went hand in hand with contemporary American concerns of the early 1950s. Not only did NSC 68 see communist threats abroad, but the American public was alarmed by events at home that appeared to threaten American democracy. In February in Wheeling West Virginia, Joseph McCarthy began his infamous run on communist infiltrators in the

federal government. At a speech at a local Republican Club lunch, he made his dubious claim of having a list of 205 State Department employees that were members of the communist party. While the number of names on the list changed frequently and many, if not all, of his charges were specious, debate over communist infiltration was a popular topic. A month earlier, in January, Alger Hiss was convicted of two counts of perjury in a trial from an original charge of espionage. This conviction came after years of proceedings where Hiss testified in 1948 to the HUAC. Similarly, in 1951 Julius and Ethel Rosenberg were convicted of espionage and spying for the Russians by passing nuclear secrets. They were both executed at Sing Sing Prison in New York in June 1953.

The Employee Loyalty Program and events surrounding the Rosenbergs, Hiss, and McCarthy are illustrative of the domestic concerns within U.S. culture during the time. These domestic events combined with events in Berlin, Czechoslovakia, and the most importantly the Soviet atomic explosion created a sense of general fear as the Hearst press advocated the U.S. stockpiling four atomic weapons for every Soviet bomb.²⁶⁷ Further, indicative of this concern, the threat from internal communism was pronounced as 68 percent of Americans believed that the Communist party should be outlawed.²⁶⁸ Furthermore, 90 percent of polled Americans believed that members of the Communist Party should be removed now from jobs that would be important in wartime.²⁶⁹ By 1952 thirty states initiated their own kind of loyalty programs similar to the Federal one Truman started in 1947.²⁷⁰

Even before the Korean War started, in March 1950 when American's were asked "Do you think the United States is winning or losing the Cold War with

Russia” 40 percent believed America was losing with only 28 percent thought we were winning.²⁷¹ Regarding defense expenditures, American’s also expressed opinions that were in-line with precepts in NSC 68. In May, when asked what the U.S. government should do regarding national defense expenditures, 63 percent of those polled answered that the U.S. should increase spending, with only 7 percent believing it should be reduced, and 24 percent thought it should stay the same.²⁷² By the time America was fully engaged in the Korean War, in October 1950, 49 percent of those polled believed that American should “produce planes, tanks, guns and other war equipment on a full war time basis and cut out making autos, refrigerators, television sets, and other items which people may want and need.”²⁷³

By the end of the 1940s, any arguments or concerns over development of the atomic bomb was largely silenced.²⁷⁴ Americans largely accepted the bomb’s existence as the best bet for national security given the international situation at the time.²⁷⁵ In this vein, according to historian Gerard DeGroot, the American “fear of fallout [was] much less dangerous than the fear of falling behind” and the defense of the nation took priority over other considerations.²⁷⁶ In July, a month after the North Korean invasion, in a special message to Congress, Truman called for an “increase in military strength and preparedness not only to deal with Korea but also to increase our common defense.”²⁷⁷ In the same speech he authorized the Secretary of Defense to go beyond the budget allocations of all the services and called for a study to increase the size of the Armed force.²⁷⁸ By the end of the year, Truman called a state of national emergency “which required that the military . . . [and] defenses of this country be strengthened as speedily as possible.”²⁷⁹

While the Korean War served as a sort of catalyst for the implementation of NSC 68, it helped to infuse money into the U.S. defense establishment, and served as a warning of communist encroachment. The North Korean invasion was not looked upon by SAC as another opportunity to prove the efficacy of strategic bombing. When tasked to provide bombers in support of the Far East Air Forces (FEAF), LeMay sent two low priority bomb groups.²⁸⁰ Fearing that a general war might break out during the Korean War, LeMay did not want to risk the strategic capability for what he viewed as a sideshow. In his opinion, along with Catton, the only missions conducted by the B-29 over Korea were interdiction bombings.²⁸¹

Catton argued that there were no strategic targets in North Korea, nor significant factories, transportation centers, or infrastructure that supported the enemy's military might. Most of North Korea's armaments and production were in China and the Soviet Union. Since the UN forces, including the U.S. were prohibited to fly north of the Yalu River to strike targets in China, the only missions available were to bomb supply lines, caches, and a few hydro-electric dams on the Korean peninsula. As far as LeMay was concerned, the only lesson learned from the Korea war experience regarding strategic bombing was "how not to use the strategic air weapon."²⁸²

While the units sent to Korea did not, in LeMay's opinion, conduct a strategic bombing effort, they did eventually conduct bombing operations on the Korean Peninsula that came to resemble to the kind of firebombing done by LeMay during World War II. The commander of the groups sent by SAC to FEAF, Major General Emmitt "Rosie" O'Donnell, initially requested to firebomb five major cities in North

Korea, and selected captured South Korean cities.²⁸³ This request was initially turned down. FEAF Commander, Lieutenant General George Stratemeyer, directed O'Donnell's to strike specific military targets in urban areas but would not allow area bombardment as the overall commander, General Douglas MacArthur, wished to prevent wonton destruction from the air.²⁸⁴ When O'Donnell briefed MacArthur about announcing a declaration to bombing the industrial cities of North Korea that might then serve as a warning for civilians to leave urban areas, MacArthur replied, "No Rosie, I'm not prepared to go that far yet."²⁸⁵ Early in the war, O'Donnell refuted claims made by communist newspapers that the U.S. was conducting "indiscriminate bombing" and argued that his crew's bombs were "aimed at a specific aiming point located with the area of a bona fide military objective."²⁸⁶

Early in the bombing campaign in Korea, Stratemeyer had two major considerations when conducting bombing operations, negative press and the fear of provoking a larger war with China or the Soviet Union.²⁸⁷ After the Chinese entered the war and the ground situation deteriorated, MacArthur changed his opinions regarding firebombing and the prevention of large-scale destruction. He eventually designated every village in communist hands as a military target giving FEAF wide latitude to bomb any target they saw fit. The definition of what was considered a military target was basically any man made structure behind communist lines.²⁸⁸ With this wide latitude, many Korean cities were firebombed as O'Donnell's bombers, burned 60 percent of Sinuiju, 95 percent of Manpojin, 90 percent of Hoeryong and Namsi, with similar percentages in other urban centers.²⁸⁹ While

precise attacks did occur, many of the attacks conducted by the B-29s were area type raids against transportation routes from China and the Soviet Union.²⁹⁰

Eventually the USAF burned the larger cities of Pyongyang, Wonsan, Hamhung, and Hungman but did so without any media coverage. While O'Donnell's bombers were careful not to bomb targets in the Soviet Union or China, they did bomb in areas close to the border but always wary of not wanting to start a larger war. From a propaganda perspective, most in the U.S. were not privy to the nature of the firebombing campaign in Korea, and while some communist newspapers and smaller news outlets decried bombing attacks, no huge public relations backlash occurred. Because of the wide latitude of what was considered a target, bombing operations on the peninsula fell within guidance given by the supreme commander however this guidance certainly diverged from previous doctrinal constructs. Furthermore, ground troops on both sides conducted "scorched earth tactics" that destroyed large parts of urban and rural landscape that rivaled destruction from the air.²⁹¹ In aggregate, much of the bombing either against urban targets or in support of the interdiction missions fell outside the doctrinal boundaries framed by ACTS.

Summary

By the time Truman gave his State of the Union address to Congress on January 8, 1951, the tone of his words had changed significantly from his address a year earlier. No longer did he focus upon domestic prosperity, social programs, and the continued rise of the American standard of living. The overwhelming topic of his 1951 speech related to national security issues and external threats to the U.S. and

western democracies. In his opening remarks he stated, “the threat of world conquest by Soviet Russia endangers our liberty and endangers the kind of world in which the free spirit of man can survive. This threat is aimed at all peoples who strive to win or defend their own freedom and national independence.”²⁹² To a very large degree in a matter of one year, the president went from a preoccupation with peacetime prosperity and economic conservatism to concern over national defense, the spread of global communism, and nuclear war.

After World War II, Americans enjoyed a growth in economic prosperity as the country’s infrastructure remained untouched from the war and possessed a trade surplus that drove a strong economy. Despite a rise in inflation, Truman meant to continue America’s good fortune and placed priority of the economy over defense, and saw that a balanced federal budget was the best way to secure America’s future. Concurrently, Americans came to an uneasy acceptance of nuclear weapons and masked their concerns by embracing atomic culture as a way to alleviate their subconscious fears. The U.S. monopoly over the technology provided a sense of comfort for Americans as they looked forward a promising future utilizing the power of the atom. Nevertheless, with this new power came a dangerous potential and a pervasive worry that permeated much of society. Regardless, the possession of the atomic bomb was America’s “ace-in-the hole” against any potential threats and served as a sort of panacea for contemporary concerns.²⁹³

As the Air Force suffered from demobilization, officers and aviation minded leaders saw increased potential for the airplane in the atomic age. Strategist envisioned that future war would be a different affair as the power of the offense was

now paramount with the existence of atomic weapons and that the country needed to have a standing force at the very outbreak of war. Breaking with the American tradition of a small standing army, many strategists and civilian committees called for the building of a strategic bombing fleet that would meet the needs of the envisioned future conflict. The call for an air “force in-being,” that eventually threatened the roles, missions, and budgets of the other armed services became fodder for political debate. Regardless of its distracters, the public discourse regarding the morality and efficacy of nuclear weapons only resulted in the validation for a strong air arm that precluded allegiance to humanitarian and ethical considerations in the execution of strategic bombardment.

As the USAF grew in importance so too did the reliance upon nuclear weapons. Given the visions for future conflict, many saw the next war as only a nuclear conflict with conventional forces serving little consequence. In light of the Korea War and its conventional battles, Air Force Chief of Staff Nathan Twining remarked, “limited war is nothing but a fad.”²⁹⁴ He and his Air Force counterparts saw that war in the future was going to be a large-scale affair and the smaller conventional actions, in the words of LeMay, only “delayed the inevitable.”²⁹⁵ Prominent Air Force historian Robert Futrell captured the essence of Air Force efforts during this era by observing, “the emphasis of air planners [was] in making war fit the weapon-nuclear power-rather than making the weapon fit the war.”²⁹⁶ Despite their singular ideation regarding war, USAF thinking was accepted not only by the rest of the federal government but also by the American public. Despite the wholesale

slaughter of Russians that might come about from an U.S. nuclear strike, Americans accepted this idea despite its departure from previously accepted cultural mores.

Similarly the leadership of the USAF, and to a larger degree SAC, were victims of their own experiences from World War II and could not grasp the idea that nuclear war was a new dimension of warfare. Left to their own devices with little input from the national leadership, they applied their operational level experiences against Germany and Japan and translated it directly to the strategic level without appreciation for the larger political implications atomic attacks. These men were not schooled in the nuances of international politics nor in grand strategy and failed to see the larger implications of what their attacks might yield. They focused upon the principle of mass without considering the potential, and increasing value, of restraint. Furthermore, their idea to obliterate Russian cities and infrastructure was based upon the principle of simplicity rather than considering the overall political objective of the nuclear strike.

Air Force planners saw their jobs as merely providing a means, but without consideration of the ultimate ends. Indicative of SAC's ideas regarding war and the American approbation of such strategies was evident in another LeMay cover story published in *Time* magazine in September 1950. The story painted his methods, management style, and the B-36 in a very positive light. The article was entitled "Man in the First Plane" stating that the General himself was willing to fly missions in case of war and that "nearly every night, the big B-36s nose through the long twilight of the 55th parallel, learning more and more about Russia's kind of weather, and how to get through it, in case of war, with their death spreading weapons."²⁹⁷

Furthermore, American foreign policies at this time contributed to the draconian nature of Air Force strategies. The various NSC documents that established U.S. foreign policy set the nation on an ersatz war-footing that saw global monolithic communism as a direct threat to the very existence of America, democracy, and western civilization. Utilizing Kennan's long telegram as a starting point, NSC 20/4 and NSC 68 clearly articulated a threat from the Soviet Union that needed to be stopped and deterred. While later interpretations of these documents tended to focus upon economic and diplomatic containment, U.S. foreign policy during this era clearly required military action that stood in contrast to previously held ideas regarding restraint.

As events overseas unfolded and domestic concerns over communist infiltrations grew, American became more concerned with security issues. As these concerns became more pronounced, American's gave tacit approval to the federal government and the USAF to develop plans and acquire resources that might provide security from communist encroachment. This approval included the acceptance of atomic warfare as a means to offset a potential Soviet offensive in Eurasia. While this atomic offensive may cause indiscriminate killing, it was viewed by most American's as a necessary evil given envisioned communist intentions. Taking refuge in nuclear capability, most U.S. citizens concurred with the growth of the Air Force and America's nuclear arsenal.

The same rationales continued well into the 1950s and set the stage for the Eisenhower administration's policy of "massive retaliation" and the "New Look." Based upon the post war ideas, fears, rationales, and events, Americans and the

USAF progressively embraced a bombing theory and methodology that was ever more divergent for previous accepted doctrines and social values. With the emergence of the hydrogen bomb and the Soviet mastery of this same technology, American fears grew as did their acceptance and allegiance to bombing strategies that could effectively “kill a nation.”

¹The B-36 eventually had four jet engines installed on nacelles located on the wings increasing the number of engines to ten. The B-50 was basically a redesigned B-29. The B-50 had new engines and various redesigned subsystems gave the aircraft an extended range and better performance.

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- ²⁰⁹Etzold and Gaddis, 362.
- ²¹⁰Ibid.
- ²¹¹M. Armitage and R. Mason, *Air Power in the Nuclear Age* (Urbana, IL: University of Illinois Press, 1983), 183 as referenced in Budiansky, 353.
- ²¹²Rosenberg, "Origins of Overkill," 16.
- ²¹³Ibid.
- ²¹⁴Ibid., 16-17.
- ²¹⁵Truman asked Forrestal to resign on March 28. Apparently suffering from nervous and physical exhaustion, Forrestal died on May 22, 1949 after jumping out of this bedroom window on the 16th floor at the Bethesda Naval Hospital.
- ²¹⁶Executive Office of the President, Bureau of the Budget, Memorandum for the President, April 5, 1949, Development of Atomic Weapons Program, File #11A Box 1 of 2, B File, Harry S. Truman Presidential Library, Independence, MO.
- ²¹⁷Ibid.
- ²¹⁸Ibid.
- ²¹⁹Jeffry G. Barlow, *Revolt of the Admirals-The Fight for Naval Aviation 1945-1950* (Washington, DC: Naval Historical Center, 1993), 207-209.
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- ²²¹"House's B-36 Inquiry Ends With Clearing of Officials," *New York Times*, August 26, 1949.
- ²²²"Revolt of the Admirals." *Time*, October 17, 1949, <http://www.time.com/time/magazine/article/0,9171,853921,00.html> (accessed June 21, 2008); Herman Wolk, "The Battle of the B-36" in *Air Force Magazine* 79, no. 7 (July 1996).
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- ²³²"Report to the President by the Special Committee of the National Security Council on the Proposed Acceleration of the Atomic Energy Program," October 10, 1949, B File, #11A Box 1 of 2, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.
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- ²³⁴Gallup, *The Gallup Poll, Public Opinion 1935-1971, vol. 2*, 791-792.
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- ²³⁶Ibid., 839.
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- ²³⁸Ibid., 929
- ²³⁹Rosenberg, "Origins of Overkill," 16.
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- ²⁴¹Moody, 310.
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- ²⁴³Budiansky, 361.
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- ²⁴⁷Ibid., 5.
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- ²⁴⁹Williamson and Reardon, 133.
- ²⁵⁰Ibid.
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- ²⁵²“United States Objectives and Programs for National Security,” NSC 68, April 14, 1950 in Etzold and Gaddis, 387.
- ²⁵³Ibid., 426-438.
- ²⁵⁴Ibid., 438.
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- ²⁵⁶Ibid., 442.
- ²⁵⁷Williamson and Reardon, 136-137; Offner, 366.
- ²⁵⁸Offner, 366, 383.
- ²⁵⁹Dean Acheson, *Present at the Creation* (New York, NY: Norton, 1969), 374.
- ²⁶⁰Williamson and Reardon, 137.
- ²⁶¹Wittner, 79.
- ²⁶²“Memorandum Op-36C/jm,” March 18, 1954, addendum to Rosenberg and Moore, “Smoking Radiating Ruin at the End of Two Hours.”
- ²⁶³Ibid.
- ²⁶⁴Ibid., 349.
- ²⁶⁵“Memorandum Op-36C/jm,” March 18, 1954, addendum to Rosenberg and Moore, “Smoking Radiating Ruin at the End of Two Hours.”
- ²⁶⁶Jack Catton in Kohn and Harahan, 97.
- ²⁶⁷Boyer, 337.
- ²⁶⁸Gallup, *The Gallup Poll, Public Opinion 1935-1971*, vol. 2, 873.
- ²⁶⁹Ibid., 933.
- ²⁷⁰Wittner, 101.
- ²⁷¹Gallup, *The Gallup Poll, Public Opinion 1935-1971*, vol. 2, 897. The respondents to this poll had been screened in a previous question asking “Will you tell me what the term “cold war” means?” 58 percent answered correctly with the remainder answering incorrectly.
- ²⁷²Ibid., 906. The remaining 6 percent had no opinion.
- ²⁷³Ibid., 648.
- ²⁷⁴Boyer, 334.
- ²⁷⁵Ibid., 336.
- ²⁷⁶DeGroot, 245, 248.
- ²⁷⁷“Special Message to Congress Reporting in the Situation in Korea,” July 19, 1950. Office of the Federal Register, National Archives and Records Service, General Services Administration, *Public Papers of the Presidents of the United States-Harry Truman 1950* (Washington, DC: U.S. Government Printing Office, 1962), 532.
- ²⁷⁸Ibid.
- ²⁷⁹Ibid., 747.
- ²⁸⁰LeMay, in Kohn and Harahan, 87.
- ²⁸¹Ibid.
- ²⁸²Ibid., 88.
- ²⁸³Conway-Lanz, 85-86.
- ²⁸⁴Ibid., 86; Thomas Hone, “Strategic Bombardment Constrained: Korea and Vietnam” in *Case Studies in Strategic Bombardment*, 473.
- ²⁸⁵As referenced in Conrad Crane, “Raiding the Beggar’s Pantry-The Search for Airpower in the Korean War,” *Journal of Military History* 63, (October 1999): 889.
- ²⁸⁶Conway-Lanz., 87-88.

²⁸⁷Hone, 474.

²⁸⁸Conway-Lanz, 103.

²⁸⁹Ibid., 106.

²⁹⁰Ibid., 107.

²⁹¹Ibid., 111.

²⁹²“Annual Message to the Congress on the State of the Union”, January 8, 1951, Office of the Federal Register, National Archives and Records Service, General Services Administration, *The Public Papers of the Presidents of the United States-Harry S. Truman*, 1951 (Washington, DC: U.S. Government Printing Office, 1962), 7.

²⁹³DeGroot, 124.

²⁹⁴Budiansky, 370.

²⁹⁵Worden, 149.

²⁹⁶Robert Futrell, “The Air Power Concept,” 269, as referenced in Budiansky, 371.

²⁹⁷“Man in the First Plane,” *Time*, September 4, 1950.

CHAPTER 6

180 Degrees Out: *The Thermonuclear Decision and Expansion*

On March 1, 1954, a lone Japanese fishing trawler, ironically named the Daigo Fukuryu Maru (Fifth Lucky Dragon), was anchored seventy-one miles east of the Pacific atoll of Bikini. At precisely 0645 a member of the crew looked toward the west and saw the sky light up with “a huge whitish-yellow glow that turned orange.”¹ Startled by the bright light he ran down below deck and yelled to his fellow crewmen, “The Sun is rising in the west!”² Alarmed, other crewmen went up topside and saw the horizon glowing yellow and red, with the yellow giving away to the red.³ The sailors also heard a loud roar described as “many thunders rolled into one” and saw a pyramid shape cloud rising in the distance.⁴

Hours later, a fine white grey powder fell upon the crew that was difficult to wash away from the sailors bodies. Soon after, the men began to lose their appetites, felt dizzy, and began vomiting.⁵ After a few days, the crew’s disposition’s had not improved. Hauling in their nets, the Lucky Dragon headed for home with the catch in its holds destined for Japanese fish markets. When the ship returned to port, it unloaded 16,500 pounds of tuna and twenty-three sharks with the crew still suffering from its afflictions.⁶ Eventually several men were forced to be hospitalized, and with dropping white corpuscle counts, they were finally diagnosed with radiation poisoning. What the crewmen of the Lucky Dragon witnessed was the CASTLE BRAVO test explosion, the largest thermonuclear bomb ever detonated by the U.S.

By the time the Japanese authorities figured out what happened, Lucky Dragon's catch had already been sold and distributed throughout the nation's various fish markets. Almost overnight, the Japanese fish market crashed as fears over contaminated catch spread over the island nation.⁷ The Japanese people were outraged that they had yet again become victims of nuclear weapons at the hands of the Americans. All of the crewmen were quarantined and many of the men remained hospitalized for months. Lucky Dragon sailor, Aiticki Kuboyama eventually died from complications associated with his exposure to the white-gray powder that the Japanese called "Ashes of Death."

The explosion had been part of the CASTLE series of thermonuclear tests and due to a miscalculation on the part of the bomb's designers, the March 1 test detonated at more than twice the projected yield. Instead of creating a seven megaton (MT) blast, the CASTLE BRAVO test erupted into a fifteen MT spectacle.⁸ The explosion created a fireball four miles in diameter and made a two hundred and fifty foot deep crater on the coral atoll where the device was placed.⁹ The giant fireball was so massive that it caused the test's safety director to wonder, "Is it ever going to stop?"¹⁰ The fallout that affected the Japanese fishermen also irradiated adjacent atolls, a band of Marshall Islanders, forced U.S. Navy crewmen on a nearby ship to secure the weather deck of their vessel, and trapped scientists collecting data in the earthen-bank bunker for eleven hours.¹¹

While the CASTLE BRAVO test was the biggest explosion ever conducted by the U.S., it was also the first test of a potential deliverable thermonuclear weapon

design. The test occurred less than two months after President Eisenhower's Secretary of State, and fervent anti-communist, John Foster Dulles, remarked that "defenses must be reinforced by the further deterrent of massive retaliatory power" and that America's "basic decision was to depend primarily upon a great capacity to retaliate instantly, by means and places of our choosing."¹² In this speech the Secretary outlined America's "Massive Retaliation" strategy and the foundation for Eisenhower's "New Look" defense policy.

Following the BRAVO explosion, the U.S. detonated yet another thermonuclear device in the CASTLE series, this one code named ROMEO. Before conducting the explosion the U.S. enlarged the dimension of the test zone to an area representing approximately 1 percent of the earth surface.¹³ This test too far exceeded projections with a yield of eleven megatons instead of the expected four.¹⁴ Both the BRAVO and ROMEO tests dwarfed the atomic attacks of World War II with the BRAVO test equal to almost one thousand Nagasaki bombs.¹⁵ Weighing 23,500 pounds and designed to fit in the bomb bay of the B-47, the CASTLE devices signified America's ever-growing commitment to nuclear weapons, the desire for improved destructive yields, and the continued departure from previously accepted bombing methodologies.

Atomic Expansion and the Debate for the "Super"

On January 1, 1947, the AEC took over control of all nuclear efforts from the Manhattan Project and assumed responsibility for the few atomic weapons in the

American inventory. Since the post-war USAF capability reflected frugal defense spending, there was little interest in further development of America's inventory of atomic weapons. The CROSSROADS and SANDSTONE tests in the late 1940s did refine and improve bomb design, but with little federal guidance, efforts at LASL regarding atomic weapons slowed with many scientists leaving for other pursuits.¹⁶ Additionally, production of fissionable materials at Hanford dropped appreciably with one of the three reactors shut down completely and the other two operating at a substantially reduced rate.¹⁷ As a result of this lethargy, the number of atomic bombs possessed by the U.S. during the later half of the 1940s is estimated at only nine in 1946 and grew to only fifty by 1948.¹⁸ Correspondingly the military was slow to develop definitive target lists for the bomb and fully outline its atomic requirements.

In light of the TROJAN and OFFTACKLE war plans, the USAF developed authoritative requirements regarding the atomic bomb stockpile. In support of these requirements, in January 1949 the JCS wrote to the AEC requesting an increase in the production of atomic materials.¹⁹ Despite Truman's parsimonious fiscal policies, the request for the increase in fissionable materials on the part of the JCS did not apply to the civilian controlled AEC. Coinciding with this request was the May publishing of the Harmon Committee Report that propounded the limited effects of a U.S. atomic attack. In June the JCS again recommended to the AEC an acceleration of the atomic energy program.²⁰

In addressing the need for more bombs, on July 14, Senator Brien McMahon, Chairman of Congress's Joint Committee on Atomic Energy, wrote Secretary of

Defense Johnson and AEC Chairman David E. Lilienthal in support of an increase in the atomic weapons stockpile. In the letter the Senator argued that it was both the AEC's and the Joint Committee's responsibilities to ensure that in case of war, enough bombs were available for use on an enemy and "assuming enough bombs were not available, we [the AEC and the Joint Committee] would be derelict in the discharge of our responsibilities."²¹ He wrote that he was "fearful that we may have not set our sights high enough so far as quantity of output is concerned."²² Days later, on July 26, Truman appointed a special committee of the NSC to review the "adequacy of the then current program of production of fissionable material."²³ Correspondingly, USAF leadership also reported that they were dissatisfied with the size of the current nuclear stockpile and production rate. However, USAF Secretary Symington and Chief of Staff Vandenberg admitted that it was not the responsibility of the Air Force to determine an increase in the production of fissionable materials, but that it was "a matter which must be left to higher authorities."²⁴

On October 10, the special committee of the NSC reported back to Truman about accelerating atomic production. The report specified that in light of the SANDSTONE series of atomic tests "it is probable that atomic bombs may be employed economically in lieu of conventional bombs against relatively small targets."²⁵ The NSC argued further that such weapons "provide a swift and tremendous striking power for certain operations at a smaller over-all cost than other means."²⁶ Since the SANDSTONE series of test proved that more advanced atomic weapons could be built and stored, the report concluded that the proposed

acceleration was “necessary in the interests of national security” and would yield a “net improvement in our military posture...[that]was feasible...and not untimely from the viewpoint of possible international repercussions, particularly in view of the recent atomic explosion in the USSR.”²⁷ Since the August explosion of the Soviet bomb, America based much of its security concerns on nuclear armament and formulated military strategy based upon this threat. The NSC Report argued further that the acceleration of atomic energy production was “consonant with paragraph 21a of NSC 20/4 which states that as a requirement toward the attainment of our national aims vis-à-vis the USSR, we should develop a level of military readiness which can be maintained in the long run.”²⁸

After reviewing the report, Truman concurred with the proposed expansion on 17 October.²⁹ Eventually, this would not be the last time Truman ordered an increase as he ordered two more expansion in his remaining time as president setting the stage for what became an arsenal of over 18,000 weapons by the end of 1959.³⁰ These additional increases in atomic weapons were also supported by the State Department who responded in one instance that, “the planned expansion program is essential to national security.”³¹

Discussion about the increase in atomic material, as it turned out, preceded an even more contentious debate over the development of an even bigger more powerful weapon, the hydrogen bomb, or what at the time was called the “Super.” The genesis of the hydrogen bomb went back to World War II when scientists at LASL discussed the idea of a fusion reaction that could yield even more explosive power than fission.

While fission bombs, as used in “Fat Man” and “Little Boy,” were theoretically limited to a yield of one MT, the concept of fusion promised an unrestricted explosive yield assuming the reaction had sufficient access to thermal energy.³² Early estimates place the lower end of a thermonuclear bomb’s explosive yield between one-thousand to ten-thousand KTs.³³ A one thousand KT weapon, scientists estimated, would destroy a sixty-five square mile area, while a ten-thousand KT bomb could devastate an area of three-hundred square miles.³⁴ These numbers dwarfed the paltry four square miles of devastation wrought from the twenty KT “Little Boy” explosion at Hiroshima.

The “super” used the method of fusion, rather than fission, to create even greater explosive power by combining atomic material instead of breaking it apart. The energy created in the “super” is generated when two light nuclei are fused together to form a new heavier nucleus.³⁵ When this event occurs, the result of the reaction weighs less than the original atomic masses, with the resulting difference in mass released in various forms of energy.³⁶ Since the various isotopes of hydrogen (deuterium and tritium) all have only one proton in the nucleus, it is easier to induce fusion with this molecular structure.³⁷ In order to fuse two hydrogen elements together and overcome their natural repulsive properties, the atomic structures are combined by applying large amounts of heat and pressure.³⁸ Ironically, to create sufficient heat and pressure for fusion, scientists determined the best way to enable this environment was to initiate the process with a fission-type device.³⁹

Discussions about building a fusion bomb began as early as 1942, and by summer 1943 a group of physicist at LASL, including Edward Teller, began theoretical calculations.⁴⁰ At that time LASL, had yet to develop a method to create the sufficient thermal heat to enact a fusion device and as a result the work on this concept was a lesser priority.⁴¹ However, following the war, in an April 1946 conference, Teller reported that a fusion reaction was possible and recommended this theoretical prospect be explored further.⁴² Debate about creating such a powerful new weapon was a hot topic of discussion within the scientific community. Nevertheless, in the years following the war, and with the lethargy of American atomic efforts, work on the “super” languished. However, in light of the unexpected Soviet atomic explosion and the request to expand the atomic energy program, the timing for the “super” was propitious.

Prior to October 6, 1949 Truman never heard about the hydrogen bomb.⁴³ However, after the Soviet explosion, members within the U.S. government were pushing for a renewed effort in thermonuclear research. AEC Commissioners Luis Strauss and Gordon Dean, along with Senator McMahon, were proponents of a renewed “super” effort.⁴⁴ On the same day the President authorized the expansion of the atomic energy program, McMahon urged AEC Chairman Lilienthal to be “as bold and urgent [with the development of hydrogen weapons] as the original [Manhattan] atomic program.”⁴⁵ While many technical issues still existed, and the feasibility of such a weapon was still in doubt, the concern over falling behind in nuclear

technology prompted many to favor a renewed research effort. A 1949 JCS report concluded that a “super” weapon might be developed in as little as three years.⁴⁶

Not all elements of the federal government were in agreement regarding the development of the “super.” On October 5, AEC Commissioner Louis Strauss, recommended to his fellow members that an intensive effort to develop the “super” be initiated in the same high-priority manner as the Manhattan Project.⁴⁷ In order to review the request, the AEC’s General Advisory Committee (GAC) met at the end of October to deliberate on the matter.⁴⁸ This committee consisted of various prominent veteran members of the atomic scientific community including J. Robert Oppenheimer, Enrico Fermi, James Conant, and Isidor Rabi.⁴⁹ At the end of their deliberations the GAC unanimously recommended against the development of the weapon for many reasons. First, the GAC believed many technological issues still needed to be solved.⁵⁰ Furthermore the GAC argued that researching the hydrogen bomb might squander precious nuclear resources, but more importantly, these men opposed the “super” largely upon moral grounds.⁵¹ According to a history of the JCS, these scientists argued,

There was no theoretical limit to its size [the “super”]. Clearly such a weapon could not be restricted to use against strictly military targets and would make possible a policy of exterminating civilian populations. Nor was it needed for national security. By the time the Soviets attained an atomic attack capability, the U.S. stockpile of fission weapons would be sufficient to permit an adequate reprisal.⁵²

While the GAC unanimously opposed the “super,” the commissioners of the parent AEC were split on the matter with a count of two to three. Commission members Gordon Dean and Strauss were for the development of the “super” with the

other three members, Chairman Lilienthal, Sumner Pike, and Henry Smyth, against.⁵³ As a result of this split in AEC membership, each commissioner communicated their respective positions to the president via separate correspondence. Barely a month later, on December 3, 1949, the GAC filed a subsequent report that again unanimously protested the development of the “super” based upon moral grounds.⁵⁴

Initially the military was reticent about the potential of the “super” and thought that it might detract from the requested increase in atomic weapons.⁵⁵ However, after the AEC’s split vote, the JCS directed its own study of the weapon. The report submitted to the JCS on November 17 communicated a halfhearted response. Given the estimated low-end, one-thousand KT yield of the “super” and its ability to destroy sixty-five square miles, the JCS report found that only four Soviet cities fit this description.⁵⁶ Furthermore, the study reported that thermonuclear weapons were of limited value in offensive operations, but provided an economy of effort when combined with fission weapons.⁵⁷ The report also took into consideration the psychological aspect of a possible Soviet monopoly on thermonuclear technology if the U.S. chose not to develop the “super.” In that eventuality, the JCS argued that the United States would suffer a demoralizing blow that might shake the “confidence and determination of the western nations.”⁵⁸

In response to the AEC’s and the GAC’s position on the “super,” on 21 November Senator McMahon submitted a seven page letter to Truman outlining the positive aspects of the bomb and arguing for its quick development. McMahon emphasized the “super’s” economy of mass and stated that “23 current-type fission

bombs would be needed to duplicate the effect of one super which destroyed 150 square miles; about 143 fission bombs would be needed to equal the effect of one super that destroyed 1,000 square miles.”⁵⁹ He claimed that development of the bomb “is estimated at only \$200 or \$300 million-less than a sixth of what we spent on the Manhattan project and unit costs . . . may be expected to decline markedly when production and design improvements are achieved.”⁶⁰

Senator McMahon also argued the case for the “super” by referring the issue of bombing accuracy, or lack thereof. “A fission bomb must usually detonate a mile or half-mile or even less distance from the target to be effective,” he observed, “whereas a super might miss its target by ten miles or more and still serve the purpose intended.”⁶¹ With the higher yield of thermonuclear weapons, accuracy was no longer as important. This kind of reasoning reflected SAC targeting methodologies during this period. The bottom line: area targeting once again became acceptable.

Both advocates and proponents subscribed to the same argument used when developing the atomic bomb during World War II. McMahon saw no difference between attacking an enemy with thermonuclear weapons or with conventional or fission-type bombs much as Oppenheimer saw no difference between the atomic bomb and LeMay’s firebombing efforts. In support of this argument McMahon wrote:

There is no moral dividing line that I can see between a big explosion which causes heavy damage and many smaller explosions causing equal or still greater damage. What then is the distinction between 1,000 square miles which one super might scorch and the 1,000 square miles which 143 fission bombs might equally destroy? Is a given weapon to be adjudged moral or immoral depending upon whether it requires hours, days or weeks to take its toll?⁶²

On November 23, the JCS submitted its report to Secretary Johnson. The overriding justification for the development of the “super” was that, “possession of a thermonuclear weapon by the USSR without such possession by the United States would be intolerable.”⁶³ If thermonuclear weapons were feasible:

[T]he possession of such a weapon by the United States may act as a possible deterrent . . . provide an offensive weapon of the greatest known power possibilities thereby adding flexibility to our planning . . . [and that] the cost in money, materials, and industrial effort of developing a thermonuclear weapon appears to be within the capabilities of the United States.⁶⁴

The report speculated that the larger weapon might serve as a “substitute for a greater number of fission bombs . . . [and] more efficient in utilization of available ore and production capacity per unit of destruction.”⁶⁵

To resolve the conflicting recommendations, Truman again enacted a special committee of the NSC.⁶⁶ Debate over the “super” continued through December and well in January 1950. NSC special committee members, AEC Chairman Lilienthal and Secretary of Defense Johnson, could not agree despite Secretary of State Acheson’s efforts to mediate the impasse. As a result, the Committee conducted further deliberation only through correspondence.⁶⁷ Johnson, looking at the issue from a military standpoint, made clear that he would only be dissuaded from recommending development of the weapon only if the Soviets agreed to some international control over nuclear weapons—an event not likely to occur given the history of initiatives such as the Baruch Plan.⁶⁸

The JCS elaborated their position in supplementary correspondence submitted on January 13, 1950. The JCS reported that “they did not intend to destroy large

cities per se; rather only to attack such targets as are necessary in war to impose the national objectives of the United States upon an enemy.”⁶⁹ Furthermore, in the same correspondence, the JCS saw the development of the “super” as a continuation of current strategic initiatives. CJCS Army General Omar Bradley argued that the “super” might have a great value against massed enemy formations.⁷⁰ Despite the position of the JCS, Lilienthal still clung to the moral arguments and continued to oppose development of the weapon.⁷¹

On January 27, members of the AEC met again with the Joint Committee. The logjam between the two organizations could not be broken.⁷² Now public opinion exerted influence. Once the press found out about the argument over the “super,” various public figures rallied support behind the development of the weapon.⁷³ Finally, on January 31, 1950, Truman directed the AEC “to proceed to determine the technical feasibility of a thermonuclear weapon, the scale and rate of effort to be determined jointly by the [AEC] and the Department of Defense.”⁷⁴ One account states that when objections continued to be raised, Truman supposedly barked “What the hell are we waiting for? Get on with it.”⁷⁵ The president declared, “It is part of my responsibility as Commander-In-Chief of the Armed Forces to see to it that our country is able to defend itself against any possible aggressor... Like other work in the field of atomic weapons, it is being and will be carried forward on a basis consistent with the overall objectives of our program of peace and security.”⁷⁶

The decision to explore the possibility of the “super” was overwhelmingly supported by the American public. Polls taken shortly after Truman's announcement

showed that 77 percent of those questioned supported the development of a hydrogen bomb with only 17 percent against.⁷⁷ Correspondingly, concerns over Soviet weapons also persisted as months later 68 percent of those polled thought that Russian would use a hydrogen bomb on the United States if they had it.⁷⁸ Many Americans and foreign nationals decried the building and testing of the H-bomb, to including the editor of the *Bulletin of the Atomic Scientist*, Eugene Rabinowich, *New York Times* Critic Lewis Mumford, as well as India's Jawaharlal Nehru, and members of Great Britain's Labor Party in the House of Commons.⁷⁹ Regardless of these objections, months after his initial decision, 78 percent of polled Americans still supported U.S. development of the weapon.⁸⁰

Reflecting popular enthusiasm, in 1951, Manhattan Project reporter William Laurence published a book entitled *The Hell Bomb* and argued for not only the increase in the atomic program, but for the development of the H-bomb.⁸¹ The same year that Laurence published his book, 56 percent of Americans believed that "war and foreign policy, Russia, threats to peace, and the cold war" were the most important problem facing the country.⁸² While concern over atomic war was an underlying, if not overt issue, the Cold War combined with Soviet advances in atomic weaponry gave impetus to expand and develop American nuclear weapon efforts. Clearly, the public agreed.⁸³

Truman also directed Johnson and Dulles to re-examine national security policy given the Soviet atomic explosion. This re-examination of U.S. policy eventually led to the drafting of NSC 68, a document that defined the parameters of

U.S. foreign policy for a generation, and along with the Korean War, set the stage for American rearmament.⁸⁴ As discussed previously, NSC 68 paved the way for the increase in defense appropriations and what Allen Millet and Peter Maslowski have described as a “holiday on defense spending.”⁸⁵

Truman’s statement called for the development of thermonuclear technology and not necessarily the approval to build a weapon. However, once Truman made his announcement, the momentum behind the development of the “super” built appreciably. On February 3, the Joint Committee was informed of Klaus Fuch’s spying efforts for the Soviets during the Manhattan Project. On February 16, a memo authored by Brigadier General Herbert Loper, member of the Military Liaison Committee to the AEC, speculated that because of Fuch’s espionage the Soviets may have embarked upon an atomic program as early as 1943.⁸⁶ If this was the case, the memo argued, the Soviets might already develop a larger weapons program and production capability that might yield more plentiful and powerful bombs.⁸⁷ Furthermore, Loper speculated that the Soviets may already have established thermonuclear weapons production.⁸⁸

Given Fuch’s spying and the suspicions over Soviet intent during this era, U.S. leaders saw merit in Loper’s speculation.⁸⁹ In March, the JCS forwarded a request to Secretary Johnson asking him to give the thermonuclear effort the highest priority. Forwarded to the president, the request was reviewed by Truman and approved on March 10.⁹⁰ When the North Koreans crossed the border into the South in June, any lingering arguments against the development of the “super” had been

muted.⁹¹ The push by civilian members of the government for the “super,” along with popular U.S. sentiments, clearly made a difference in Truman’s decision to develop the weapon. When Ed Teller was asked who deserved credit for overriding the GAC’s argument regarding the H-bomb, Teller replied, “Senator Brien McMahon, Lewis Strauss, and [ironically] Klaus Fuchs.”⁹²

On November 1, 1952, two days before the presidential election, the small island of Elugelab was vaporized by the world’s first truly thermonuclear explosion. The U.S. effort to develop the technology paid off as the test-bed device, two stories high and weighing some eighty tons, yielded an explosion of ten MTs. The explosion proved the feasibility of a thermonuclear device but was not yet a deliverable weapon. That advance came afterward with the CASTLE series of tests. The only thing needed now was an Air Force capable of delivering such a weapon, and by the time of CASTLE BRAVO in March 1954, the U.S. was already on its way to building that instrumentality.

Air Force Budgeting, Targeting, and Moral Imperatives

On February 2, 1950, the *Fort Worth Star Telegram* newspaper ran an op-ed article lauding Truman’s decision to pursue thermonuclear technology. The author claimed that the President had faced “a Hobson’s choice. He could not, for the security of the nation, have decided otherwise that he did. He nevertheless has assumed an enormous responsibility. It required great courage.”⁹³ While the paper praised the president, it also argued that the decision required further action.

According to the newspaper, what Truman needed to do now was provide the capability to deliver the “super.” The article specified: “The hydrogen bomb is worthless unless the means exist to deliver it to its target. Russia is at work to establish a far-flung warning and interception system and is pressing research in jet aircraft and guided missiles. Sure evasion of interception is as important as the bomb itself.”⁹⁴ These words argue the case for an increase in Air Force capability to leverage the destructive potential of thermonuclear technology. Considering Convair Aircraft Corporation, builder of the B-36, was located in Fort Worth, the op-ed’s argument had a distinctively partisan tone. Regardless of the paper’s local interests, the actions of both the Truman and Eisenhower administrations reflected this idea and provided sufficient resources for the growth of America’s strategic air arm.

While the AEC and the Joint Committee were initiating debate regarding the “super,” on November 8, 1949, Air Force Secretary Symington wrote to Louis Johnson regarding the size of the Air Force and role it was expected to play in the future. The letter stated that, given the unexpected Soviet atomic explosion, “we must conclude that the question of the survival of the United States may be involved.”⁹⁵ The Air Force Secretary argued that the Russian achievement meant that they would have “a militarily significant number of atomic bombs . . . two or three years earlier than was expected.”⁹⁶ As a result, to deter a Soviet attack or to conduct a strike against the Russians, the Air Force needed to accelerate the planned modernization program.⁹⁷

Symington observed that the current expansion plan was actually “decelerating instead of accelerating” the size and capability of the Air Force.⁹⁸ The Air Force Secretary argued this point because the approved seventy group program of 1947 actually equated to sixty-seven groups as the Air Force changed its bomber group organization and the number of aircraft assigned to various groups.⁹⁹ Based upon the planned budgeted allocation of \$1.1 billion per year, the USAF would only have twenty-nine groups equipped with modern aircraft by 1955. While the Finletter Commission and the Brewster Board both advocated a seventy group air force as a minimum requirement, the trend analysis done by Symington predicted that the 1955 Air Force would fall far short of this requirement in terms of modern aircraft.¹⁰⁰ Additionally, he argued that the seventy group air force was the minimum peacetime requirement, and in light of the recent Soviet activity, this structure was now outdated and needed revision.

Air Force planners adjusted their perceived requirements and in August 1950, Vandenberg forwarded to the JCS a request to increase the number of air groups to 130.¹⁰¹ By September the JCS gave the USAF approval to grow to only ninety-five wings, and after the Chinese entered the Korean War, the NSC directed the Air Force to grow to eighty-seven wings by mid-1951 and then to ninety-five by 1952.¹⁰² While the USAF did not initially get the approval to grow to one hundred and thirty wings, Vandenberg and Finletter accepted the ninety-five wing figure and still hoped to achieve their goal in the future.¹⁰³ Although Truman still concerned himself with economic solvency and a balanced budget, the North Korean invasion, followed by

the Chinese entry into the conflict, changed the political climate in Washington.¹⁰⁴ By 1953, Truman's defense budget included \$48 billion with just under half, \$21 billion, allocated for the Air Force.¹⁰⁵ Indicative of airpower's new found importance was that an additional \$2 billion of the USAF budget came from trimming the Army's allocation.¹⁰⁶

In support of the importance of airpower, in 1951 Robert Lovett, assistant Secretary of Defense, and the designated successor to George Marshall, argued "We must put first things first and not everything at once."¹⁰⁷ Lovett assigned priority to strategic bombing as American's number one defensive priority. Seeing the growth of the Soviet airpower and capability, the JCS agreed that the USAF needed to continue its expansion.¹⁰⁸ CJCS Bradley, while still holding to the idea that airpower itself cannot win a war, understood that airpower was critical.¹⁰⁹ By 1953 the JCS supported the idea of increasing the USAF to an unprecedented one hundred and forty three wings while holding the size of the Army and Navy at existing levels.¹¹⁰

Because NSC 68 stipulated 1954 as the year in which the growing Soviet capability could credibly threaten the U.S., the JCS recommended the one hundred and forty three wing air force be accomplished by January 1954.¹¹¹ Truman concurred with the assessment but asked Lovett to adjust the timeline so that defense expenditures would still be less than \$60 billion annually.¹¹² However, by allocating this much to defense, the nation faced a budget deficient of almost \$10 billion for 1954 and if this spending trend continued, the deficient could climb to \$15 billion by 1955.¹¹³ Despite Truman's guidance to extend the funding timeline, nuclear

deterrence and the role of the USAF ensured the primacy of the service for the rest of the decade. Apart from President Dwight Eisenhower's 1954 budget, for the remainder of the decade, the Air Force alone consumed the lion share of the defense budget at the expense of the other services.¹¹⁴

As the Air Force grew in size, it took steps to remediate its precision bombing capability. LeMay's efforts to whip SAC into shape were paying off. In May 1950, radar bombing accuracy improved as the average error dropped from 10,000 feet, from the 1949 Dayton Mission, to 4,500 feet.¹¹⁵ By 1951 bomb scores and accuracy continued to improve with an average error now only 3,000 feet.¹¹⁶ Some crews were able to place their loads within 2,500 feet and by late 1951, CEP was approximately 1,800 feet.¹¹⁷ Eventually, by 1954 SAC reported that its CEP for all crews using radar bombing from an altitude of 25,000 feet, was 1,400 feet.¹¹⁸ Utilizing visual methods the figure dropped to 600 feet. For lead crews only, those crews specifically designated to initiate the atomic assault due to their superior airmanship, SAC reported that dropping from the same altitude, the CEP was 1,390 feet using radar and 352 feet using visual methods.¹¹⁹

Also throughout the Korean War period SAC grew in both men and machines. The new B-36 began to mature and come into operational service in increasing numbers replacing the older B-50s and B-29s. Not only were pilots and planes important, but trained personnel were key to arming and handling atomic ordnance. The command doubled in size from 85,000 personnel, in 1950 to 170,000 by December 1953.¹²⁰ In 1950 Boeing received its first contract to build SAC's new all-

jet bomber, the B-47, and after the outbreak of the Korean War the company received production orders for what became the mainstay of the strategic bombing fleet, the venerable B-52 “Stratofortress.”¹²¹ By 1952 Convair won the contract to build the first supersonic bomber and what eventually became the sleek looking B-58 “Hustler.”

In September 1952, Truman concurred with a request to have the AEC transfer atomic weapons custody to the DoD despite his initial rejection of such a request years earlier.¹²² In addition to increases in capability and in aircraft, SAC continued to grow in prestige and importance. Along with this meteoric rise came unmatched authority in the nuclear targeting process, as war planners agreed to run all nuclear target nominations through SAC before submitting them to the JCS.¹²³

To maximize the effectiveness of nuclear munitions and the bombing fleet, SAC proposed the concept of area bombardment with atomic weapons. At a meeting in with the Air Staff Targeting Panel at Washington in January 1951, LeMay outlined what he thought was the best method for strategic targeting with nuclear weapons.¹²⁴ While the OFFTACKLE plan called for the bombing of 104 targets with 220 bombs, LeMay thought it would be hard to find, with either visual or radar bombing methods, individual targets. For bomber crews to maximize their efforts and their atomic payloads, LeMay argued that they “should concentrate on industry itself which is located in urban areas” and if a bomb fell off target and missed its mark he claimed “a bonus will be derived from the use of the bomb.”¹²⁵ By dropping on urban areas, LeMay surmised that there was a good chance the bomb would destroy other

elements of Soviet infrastructure and production capabilities even if it missed the intended target.

By targeting urban areas LeMay reasoned he was conserving the atomic arsenal and getting the most out of each bomb dropped.¹²⁶ This rationale was largely accepted in Air Force circles. As a result, the term “bonus damage” became a common expression regarding nuclear targeting along with the ironic and seemingly contradictory phrase “precision attacks with an area weapon.”¹²⁷ While the Air Staff had at one time looked at destroying individual targets and production facilities, LeMay and SAC were looking to attack entire municipal regions.¹²⁸ This idea was not necessarily new, as early as 1947 Air Force planners argued that a city was largely a “collection of industry” and that hitting one city would probably cause the destruction of other factories and infrastructure.¹²⁹ This line of reasoning reflects the ideas espoused in McMahon’s November 21, 1949, letter to Truman regarding the damage one hydrogen bomb might make even if it was dropped off target.

During the first part of the 1950s, SAC planners picked aiming points that were important population and industrial areas that if attacked, would damage not just infrastructure, but also might have a potential effect upon Soviet morale.¹³⁰ However, by 1954, LeMay thought that SAC needed to shift targeting priorities to Soviet air forces in an attempt to cripple Russian military capabilities, but the explicit targeting of urban areas with nuclear weapons during this time certainly subscribed to a Douhetian methodology.¹³¹ Regarding this dichotomy between targeting people or equipment, Air Force Chief of Staff Nathan Twining, who replaced Vandenberg in

June 1953, stated, “Machines and weapons, not people, are the principal targets to be destroyed. It would be a moral blunder and a military blunder to concentrate our hopes for victory on the piling up of casualties when the opportunity now exists to concentrate with great effect on the enemy’s weapons and weapons factories.”¹³² While the Air Force Chief of Staff recognized the dilemma posed by SAC’s “bonus damage” targeting methodology, the net effect of a nuclear attack would still yield much of the same effect by generating massive numbers of Russian casualties.

SAC targeted 118 of the 134 major population centers in Russian and a report conducted by the DoD’s Weapons System Evaluation Group (WSEG) estimated that approximately 80 percent of residents in the target area would be killed.¹³³ The irony is while LeMay was pressing for “bonus targeting” with nuclear weapons, SAC crews were still evaluated on their bombing accuracy and CEP. This seemingly contradictory thought on the part of SAC embraces some aspect of ACTS precepts, but obviously ignores others. The dichotomy regarding massive destruction with either atomic or hydrogen bombs combined with the methodology of precision with nuclear munitions was generally accepted as standard procedure.

Ironically, with the potential of hydrogen bombs yielding five, ten, or twenty MTs, the issue regarding targeting would eventually come down to not what to target, but what not to destroy.¹³⁴ At RAND Strategist Bernard Brodie concluded that war was controlled chaos and violence, and as argued by 19th Century military philosopher Carl von Clausewitz, was merely “policy by other means.”¹³⁵ In this regard war was a rational act, meaning it was a calculated event based upon

deliberate actions with definitive ends. However, Brodie argued, with the advent of hydrogen bombs and their mass effects, the use of the weapons was no longer rational and use of such a weapon would equate to national, if not global, suicide.¹³⁶ Despite this conundrum, Brodie too supported development of the “super.”

Regardless of the arguments over the “super” and the expansion of the atomic stockpile, much of the Air Force concurred with the growth of the strategic bombing fleet and argued in support of the rearmament efforts. While moral and legal implications were debated, a spring 1951 article in AUQR argued,

To say that it [strategic bombing] violates international law is technically correct if the law is taken in light of the times in which the law was created—times when war was treated as combat primarily between easily identifiable military forces. . . . But with the advent of total war these distinctions [between combatant and non combatant] have now faded. Without an established court of final resort with power to bring violators before it and to enforce its judgments, the application of international law to war has faded in the face of nationalism.¹³⁷

While disregarding international legal interpretations and moral underpinnings, the same author stated that, “the United States should not feel that strategic bombardment violates the humane principles to which international law would compel adherence” and argued that “Few can doubt that the moral intentions of our country are of the best as regards for mankind, even though history may record some failures.”¹³⁸ While this article is indicative of American ethnocentric thought, and reiterated General Anderson’s argument in his 1949 AUQR article, other commentaries in this periodical during the early 1950’s repeated this same sentiment by proffering a moral foundation for the USAF, and defended America’s strategic bombing capability.

Somewhat indicative of this idea was the American sentiment regarding the first use of an atomic bomb. In February 1951, a poll asked Americans “If the U.S. gets into an all-out war with Russia, do you think we should drop the atom bomb on Russia first-or do you think we should use the atomic bomb only if it was used on us?”¹³⁹ 66 percent of respondents thought that we should drop the atomic bomb first with 19 percent answering that we should drop it only if it was used on the U.S.¹⁴⁰ Use of the weapon was generally accepted as *fait accompli* but more interesting is that “first use” was a policy many Americans subscribed to regarding nuclear confrontation with the Russians.

The New Look and Massive Retaliation

Two days after the thermonuclear explosion on Nagasaki in November 1952, Dwight Eisenhower easily defeated his Democratic opponent Thomas Dewey for the presidency. With a change in administration and political parties in the White House, American defensive policy took a different direction. While the U.S. conducted rearmament in light of the Soviet atomic explosion, the Korean War, and enacted a policy of containment regarding communist incursion under NSC 68, the Eisenhower administration developed a policy to take the initiative away from the Soviet Union and place emphasis on general war while avoiding smaller regional conflicts.¹⁴¹ Truman’s rearmament plan was based upon a balance equal share approach to defense, but Ike brought nuclear weapons center-stage in U.S. military planning.¹⁴² After assuming office in January 1953, the policies that the Eisenhower

administration eventually embraced were called the “New Look” and had its foundation in nuclear bombing and were the complete reversal from what ACTS taught only a few years earlier. At this point, the USAF completed its 180 degree departure from its original bombing theory.

Much as had his predecessor, Ike too concerned himself with the nation’s economic solvency, especially in light of the cost of America’s rearmament under NSC 68. During his election bid, he promised to balance the federal budget and campaigned against the “Democrat’s profligacy” regarding national defense.¹⁴³ Supporting this contention, during his presidential campaign, Ike claimed “A bankrupt America is more the Soviet goal than an America conquered on the field of battle.”¹⁴⁴ While still acknowledging the requirement to maintain a strong defense given communist expansion, Ike wanted to review American defensive policy in accordance with his campaign platform and in hopes of a balanced budget. Similarly, many Americans during the campaign season were of a similar mindset as 53 percent of polled American’s supported the idea of having a small armed force equipped with special weapons that might be as effective as a large military based upon manpower.¹⁴⁵ In keeping with his campaign promises, upon assuming office, the new administration called a halt to all new defensive spending pending a review of each program.¹⁴⁶

Under the Truman administration’s policy embodied in NSC 68, American planners identified 1954 as a target year for the full development of U.S. military capability. However, by placing emphasis on 1954 and estimating that during this

year the Soviets would have a sufficient stockpile of nuclear weapons and sufficient ability to deliver them, the Truman administration allocated funds to meet a specific timeline. This method of planning essentially front-loaded costs for national defense, and in Ike's opinion, set the stage for a possible economic disaster. To mitigate the fiscal danger and reduce the rapid expenditure of funds for defense, Ike thought the nation should not prepare for some fixed date, but needed to establish a military posture that would suit the nation's needs for the long term.¹⁴⁷ In order to strike a balance between fiscal solvency and the emerging nature of nuclear war, at a Legislative Leadership meeting in May 1953, Ike queried, "the real question . . . was how fast can you translate a peace time economy to a wartime economy, having enough force in being to meet the immediate situation."¹⁴⁸

While the Eisenhower administration reviewed the nation's overall defensive policy, it also proposed to reduce military expenditures for the upcoming fiscal year. In support of his campaign promise to have a more balanced approach to the federal budget, the Eisenhower administration quickly proposed a defensive budget cut for FY 1954. New Secretary of Defense Charles Wilson, fresh from leading General Motors corporation, initiated the process with the belief that DoD's budget, like many other organizations, was bloated or overinflated.¹⁴⁹ Air Force Chief of Staff Vandenberg protested potential budget cuts and clung to the NSC 68 timeline believing that the 1954 target date be heeded.¹⁵⁰ The General argued his case to the new Air Force Secretary, Harold Talbott. Despite Vandenberg's disagreement with the new administration, and with similar objection from the JCS, Secretary Wilson

submitted a revised budget for 1954 that was substantially reduced.¹⁵¹ The newly proposed DoD budget reduced allocations by \$7.5 billion overall, with the USAF's share decreased by \$3.5 billion.¹⁵²

When put before Congress on 5 June, Vandenberg, while suffering from terminal prostate cancer, pleaded with lawmakers to reject the proposed cuts. He was not alone in his displeasure. Members of the Democratic Party, including former USAF Secretary Symington, argued against such actions. The American public was also concerned about this cut in defensive spending and Vandenberg's office received numerous letters protesting the smaller budget and the reduction in Air Force wings. A letter from a Mrs. R. E. Brown from Los Angeles expressed her gratitude to Vandenberg for his defense of the Air Force budget and wrote, "We are rapidly losing all confidence in President Eisenhower and his judgment (especially in his support of McCarthyism!) so appreciate so much[sic] your COURAGE in talking against Secretary Wilson, and his ill-advised reduction in Airforce[sic] "Wings."¹⁵³ A letter from Mr. Garfield C. Burke of Lester, Pennsylvania also wrote to support Vandenberg's stance and closed his letter by stating "IF A MAN IS WITHIN STRIKING DISTANCE OF A RATTLESNAKE, ONLY A FOOL WILL LET DOWN HIS GUARD WHEN THE SNAKE STOPS BUZZING."¹⁵⁴

Regardless of Vandenberg's congressional testimony against a budget cut, and ignoring Mrs. Brown's opinion and Mr. Burke's witticisms, the revised 1954 budget proposal passed on 29 July and Ike signed it on 1 August. The final form of the budget was \$6.7 billion less than the original Truman proposal, and for a time also

returned DoD back to a roughly equal share budget for all branches of the armed forces.¹⁵⁵ However, this budgetary reduction and the implications it had for the Air Force would not be permanent.

Before the debate over the 1954 budget ensued, Ike already began formulating a new defense policy for “the long haul” while looking to avoid protracted regional conflicts like Korea.¹⁵⁶ In December 1952, after winning the election, Ike initiated a defense policy review while aboard the *U.S.S. HELENA* as the president-elect sailed home from his promised visit to Korea. One of the members included in the president’s group was Admiral Arthur Radford, who despite his role in the 1949 “revolt” against the B-36, was eventually named the CJCS. Radford reported to Ike, and to many of the president-elects soon-to-be advisors, that the American military was overextended and overcommitted in various areas throughout the globe.¹⁵⁷ Furthermore, the Admiral believed that local or indigenous defense forces should carry the burden of regional conflicts, with the U.S. providing support should a conflict escalate into general war.¹⁵⁸ Correspondingly, Radford’s ideas fit well with sentiment from future Secretary of State John Foster Dulles who believed that America’s best bet lie not in containing the Soviets around the globe in smaller conflicts, but through deterrence and maintenance of a massive strike capability.¹⁵⁹ Dulles’ ideas regarding national defense were formed before assuming office and were publically expressed in a 1952 *Life* magazine article arguing that, “the free world [needed] to develop the will to organize the means to retaliate instantly against

open aggression by Red armies, so that if it occurred anywhere we could and would strike back where it hurt, by means of our choosing.”¹⁶⁰

In a special message to Congress on April 30, the president asserted, “Our military plans are based primarily on military factors, but they must also take into account a wider range of policy and economic factors, as well as the latest developments of modern science.”¹⁶¹ The same day, in a press conference Ike argued, “We reject the idea that we must build up to a maximum attainable strength for some specific date theoretically fixed for a specified time in the future.”¹⁶² Continuing his effort to conduct a review of national policy, in May 1954 Eisenhower initiated “Operation SOLARIUM.” Aptly named because it started in the White Houses solarium room, this effort analyzed existing national strategy, established new defense priorities, and set the stage for Ike’s new military policies with regard to the Soviet power bloc.¹⁶³ The review included input from some of Ike’s closest advisors and included former Army General Bedell Smith as the new Undersecretary of State, Director of the Central Intelligence Agency, Allen Dulles, Special Assistant for national Security Affairs, Robert Cutler, and Chairman of the Psychological Strategy board, C. D. Jackson.¹⁶⁴

The SOLARIUM effort comprised of three separate “task forces” each directed to draw up differing courses of action regarding a future national security strategy. Task Force A’s course involved increasing American forces while “assist[ing] in the building up of the economic and military strength and cohesion of the free world without risk of general war.”¹⁶⁵ Task Force B focused upon drawing

“a continuous line around the Soviet Bloc beyond which the U.S. will not permit or satellite military forces to advance without general war.”¹⁶⁶ Task Force C looked at a more vigorous offensive action designed to “increase efforts to disturb and weaken the Soviet Bloc and to accelerate the consolidation and strengthening of the free world to enable it to assume the greater risk involved.”¹⁶⁷ In the end, the president went with a solution resembling Task Force A’s course of action, but included some of Task Force B’s. A continuation of a form of Containment developed that became the basis for a new NSC policy, but included a reliance upon airpower.¹⁶⁸

As SOLARIUM proceeded the Soviet Union took the next step in nuclear technology and exploded what was thought to be a thermonuclear device on August 12. While the explosion was really more of a fission rather than a true fusion reaction, the Russians seemingly upped the nuclear ante. As a result, Chairman of the Joint Committee on Atomic Energy, Sterling Cole, wrote to the president “this letter is written to assure you that the members of the Joint Committee on Atomic Energy will lend their support to all measures intended to enlarge [and] still further our present advantage in atomic and hydrogen developments.”¹⁶⁹ Cole reassured Ike that were still ahead in nuclear technology but warned that it was a “fast-evolving science.”¹⁷⁰ In his letter he continued, “I presume that this latest sign of Soviet atomic progress will be reflected in the plans you and your advisors are formulating for more effective defenses against nuclear attack from land and sea.”¹⁷¹

The SOLARIUM effort came to fruition on October 30, 1953 the president approved NSC 162/2 and served as the foundation for the “New Look.” NSC 162/2

noticeably outlined a defensive policy that considered the economic viability of the nation and looked to limit defensive costs. It clearly stated, “The United States must maintain a sound economy based upon free enterprise as a basis for both high defense productivity and for maintenance of its living standards...[and] avoid seriously weakening the U.S. economy or undermining our fundamental values and institutions.”¹⁷² However, in order to provide sufficient security while limiting the economic repercussions, the policy statement argued for an offensive capability with “sufficient atomic weapons and effective means of delivery [that] are indispensable to U.S. security. Moreover, in the face of Soviet atomic power . . . [our] atomic capability is also a major contribution to the security of our allies, as well as this country.”¹⁷³ Furthermore, America needed “a strong military posture, with emphasis on the capability of inflicting massive retaliatory damage by offensive striking power.”¹⁷⁴

Outlining the deterrent effect of atomic weapons, NSC 162/2 speculated that “the risk of Soviet aggression will be minimized by maintaining a strong security posture, with emphasis on adequate offensive retaliatory strength and defensive strength. This must be based on massive atomic capability.”¹⁷⁵ In closing the document stated:

In the face of the developing Soviet threat, the broad aim of the U.S. security policy must be to create, prior to the achievement of mutual atomic plenty, conditions under which the United States and the free world coalition are prepared to meet the Soviet-Communist threat with resolution . . . [and that] the foregoing conclusions are valid only so long as the United States maintains a retaliatory capability that cannot be neutralized by a surprise Soviet attack.¹⁷⁶

In essence, the new policy put the bulk of American defense policy into the nuclear arena. Furthermore by establishing deterrence and retaliation as cornerstones of national defense, NSC 162/2 relied largely upon SAC and its ability to deliver atomic weapons of mass destruction.



Figure 26: Air Force version of national security missions during the 1950s. *Source:* "A Decade of Security Thru Airpower," USAF Pamphlet, Box 96, Papers of General Curtis E. LeMay, Manuscripts Division, Library of Congress, Washington, DC.

Despite the early budget cuts in 1953, guidance outlined in NSC 162/2 returned the Air Force quickly back to a planned growth of 137 wings. For the next three fiscal years, DoD again discarded the equal share method of defense spending

and allocated the majority of the budget, 47 percent, to the Air Force.¹⁷⁷ While the other branches of the armed forces obviously disliked NSC 162/2 and the budget implications it held for the Army and the Navy, the JCS eventually approved the policy in December 1953.¹⁷⁸ Admiral Radford, stated that the NSC 162/2 was designed for the “long pull, not a year of crisis” and that the U.S. “must be ready for tremendous, vast, retaliatory, and counteroffensive blows in the event of global war.”¹⁷⁹ DoD Secretary Wilson stated the “New Look” as “a natural evolution from the crash program that was adopted following the beginning of hostilities in Korea.”¹⁸⁰ The basic underlying principle of the new policy was that overwhelming nuclear firepower would in turn lessen manpower requirements that would equate to lower overall costs.¹⁸¹

On January 12, 1954, while addressing the Council on Foreign Relations in New York, Secretary of State John Foster Dulles gave his famous “Massive Retaliation” speech and outlined American defense policy known as the “New Look.” Massive retaliation was designed to ensure more collective security for the U.S. as Dulles specified that the new policy was “placing more reliance on deterrent power, and less dependence upon defensive power.”¹⁸² The speech outlined America’s intent to regain the initiative by retaliating “by means and places of our choosing.”¹⁸³ According to Air Force historian Herman Wolk, “the stated objective posture marked a significant change from the post World War II containment doctrine which emphasized countermoves against Soviet power at the place of aggression. Deterrence and retaliation were at the heart of the “New Look” strategy, and it would

hinge upon strategic nuclear power and continental defense.”¹⁸⁴ With criticism coming from Democrat Adlai Stevenson, Vice President Richard Nixon argued in support of the ‘New Look’ by stating “rather than let the Communist nibble us to death all over the world in little wars we would rely in the future primarily on our massive mobile retaliatory power which we could use in our discretion against the major source of aggression at the time and places that we choose.”¹⁸⁵

While the centerpiece of NSC 162/2 was SAC, the Eisenhower’s defensive plans included two other distinct elements. As nuclear weapons development made bomb designs more compact and efficient, tactical use of such weapons became a popular option.¹⁸⁶ In order to help in the “retardation mission” if Soviet forces attacked Western Europe, smaller fighter aircraft could now carry smaller atomic weapons and deliver them on massed armies and formations.¹⁸⁷ The program also included a nuclear civil defense capability to maintain “a mobilization base, and its protection against crippling damage.”¹⁸⁸

Concurrently, while developing a new national security strategy, and seeing the need for wide-spread public support, the administration drew up plans for a media campaign to educate the American people about the dangers of the current Cold War. Six months before Dulles’s speech, in June 1953 the administration designed Project CANDOR in an effort to specifically “make clear the dangers that confronted us, the power of the enemy, the difficulty in reducing that power, and the probable duration of the conflict.”¹⁸⁹ The effort consisted of six, fifteen-minute radio and TV talks with the overarching title of “The Age of Peril.”¹⁹⁰ Some of the titles for the series

included, “Nature of Communism,” “The Threat to the United States,” and “What Good Citizens Could Do.”¹⁹¹ Each series included a prominent member of the Eisenhower administration delivering a specified presentation with Ike conducting the last program.

Before CANDOR was broadcast, the program was merged with the Administration’s “Atoms for Peace” program.¹⁹² When Ike presented “Atoms for Peace” at the UN in December 1953, he portrayed American as a peaceful nation but addressed several of the messages included in CANDOR and clearly stated:

Should such an atomic attack be launched against the United States, our reactions would be swift and resolute. But for me to say that the defense capabilities of the United States are such that they could inflict terrible losses upon an aggressor, for me to say that the retaliation capabilities of the United States are so great that such an aggressor's land would be laid waste, all this, while fact, is not the true expression of the purpose and the hopes of the United States.¹⁹³

Twelve days after Dulles’ speech, Ike presented his annual budget message to Congress of which one element was his fiscal plan for the “New Look.” In comparison to four previous defense budget submissions, the trend for the Eisenhower administration was an overall reduction in expenditures. For 1955, Ike recommended only \$34 billion for new obligations, down from a previous four year NSC 68 average of \$55 billion.¹⁹⁴ Net defense budget expenditures went down only slightly from an average of \$47 billion to \$44 billion.¹⁹⁵ Correspondingly however, the budget for the AEC rose to record levels as Ike proposed to increase its allocation from \$912 million in 1954, to \$1,182 million for 1955.¹⁹⁶

Weeks later, in March, the CASTLE BRAVO test occurred and following the explosion, new AEC Chairman Lewis Strauss reported in an interview to *Time Magazine* that the H-bomb could be made as large as “military requirements demanded, that is to say an H-bomb can be made as large enough to take out a city . . . any city.”¹⁹⁷ In light of the possible explosion of a Soviet thermonuclear device in late 1953, and given the nature of American sentiment, the news of the CASTLE BRAVO explosion was accepted without widespread indignation. Many accepted the development of the weapons as defensive requirement. Dr Louis De Voti Newton of Atlanta’s Druid Hills Baptist Church expressed a common sentiment regarding the bomb; “In the H-bomb era we can’t go back to muskets. We’ve got to maintain anything essential to our defense, the H-bomb or any other kind of bomb.”¹⁹⁸

As the hydrogen bombs tests continued, the American public continued to support the weapon’s development. Approbation was widespread as 71 percent of Americans polled thought that the U.S. needed to continue such efforts.¹⁹⁹ Americans found security in their new weapons as 44 percent of those asked thought that the hydrogen bomb made another war less likely with only 21 percent arguing the opposite.²⁰⁰ Excepting of disarmament or an agreed moratorium between the two powers, Americans largely resigned themselves to the idea that nuclear weapons were a necessity and accepted the idea of nuclear bombardment as a viable strategy. *Time* magazine expressed the opinion that, “the non-communist world must protect itself, and in such a way as to exert maximum persuasion on the Communist.”²⁰¹ Additionally, Don Murray, editorial writer for the *Boston Herald* received a Pulitzer

Prize for his editorial “Defense in an Air Age.”²⁰² In the piece Murray argued against the equal share budgeting of the armed forces and in support of the rise of strategic nuclear bombing he wrote, “we want the best force not the best balanced force. We’re with you Mr. Wilson.” In regards to the application of force, Murray declared, “We must be able to deliver paralyzing blows to the solar plexus of their [Soviet] land mass.”²⁰³

However, *New York Times* reporter Hanson Baldwin was not so enamored with the new policy. The veteran commentator warned, “If we depend too greatly upon air power and the atomic bomb to deter war or to win it if it starts, we have certainly reverted to the much criticized “one weapon, one service, all the eggs in basket concept of some years ago.”²⁰⁴ Baldwin ended the article with the ominous comment that, “while the strategy of retaliation might nominally ‘win’ a war if one came, it offers no political objectives for victory. An atomic war, with its mutual devastation and destruction, could certainly not result in a more stable peace; the ultimate outcome might well be the triumph of extremist doctrines and a reversion of the large areas of the earth to the Dark Ages.”²⁰⁵

Based upon the “New Look,” airpower, in the form of strategic bombing, became a powerful and important extension of national policy to a level never before imagined. A single arm of one military branch now served as the standard bearer not only for military applications, but also as the centerpiece diplomatic/political tool to influence allies and foes alike. While no longer only a tool of precision for use war, as originally envisioned at ACTS, strategic bombing was now an instrument for

widespread destruction. In fact, the mere threat of its use was a powerful political and psychological weapon. The “New Look” and the promise of “massive retaliation” not only made SAC, with associated nuclear weapons, the preeminent element of national military power, but elevated the mere threat of strategic bombing as a means of diplomatic discourse in the international arena.

1955

On 29 June 1955, the first B-52 jet bomber arrived at 93rd Bomb Wing at Castle Air Force Base, California. The new jet had a range of 6,000 miles, was capable of being refueled in the air, flew at a speed of 650 mph, and had a service ceiling of 50,000 feet.²⁰⁶ During the same year the Air Force began testing the first Intercontinental Ballistic Missile (ICBM) and Air-to-Ground Missiles (AGM) designs as additional platforms for nuclear attack.²⁰⁷ As the Air Force received its new bomber and developed missile technology, the budget for the USAF began to grow again and allowed the organization to expand from 114 wings in 1954 to an eventual 137 wings by 1957.

Concurrently, a corresponding reduction occurred in the budgets sizes of the other branches of the armed services, a drop by approximately 13 percent.²⁰⁸ This growth of the Air Force was in line with popular contemporary thought at 71 percent of Americans surveyed thought that the Air Force was the most important branch of military service.²⁰⁹ During this same time LeMay argued that “for some time now Strategic Air Command has been this nation’s only real offensive force.”²¹⁰

Hollywood reinforced these ideas with its release of the movie *Strategic Air Command* (Paramount, 1955), an opus that was nominated for an Academy Award. The patriotic film portrayed the mission of SAC in the very best light while emphasizing the primacy of the deterrence mission.

America survived 1954, often referred to “as the year of maximum danger” under the auspices of NSC 68, but anxiety over confrontation with communist countries continued. While the Eisenhower administration set forth a new policy akin to a “floating D-Day” regarding wartime preparedness, Americans remained deeply concerned over the Soviet threat and the potential for war.²¹¹ Supporting the “New Look” and the 1955 budget, Air Force Chief of Staff Nathan Twining reported to the House Appropriations Committee that “this new strategy is based on long term needs rather than preparations for a year of greatest danger. It is intended to satisfy a two-fold requirement—preparedness for general war, should one occur; and maintenance of the capability to cope with lesser situations—with at the same time less of a drain on our manpower, material, and financial resources.”²¹² While saving manpower, material, and financial resources, Twining envisioned a USAF utilizing nuclear weapons in various exigencies by testifying further, “a major portion of our atomic strength will be available for a wide range of military purposes—not only during general war, but also in situations of limited hostilities.”²¹³ In this regard the Chief of Staff argued that “the strategic air offensive is designed to deliver a sudden, massive blow against the will and ability of the enemy to wage war. Our ability to react immediately, and with tremendous force, is the principle deterrent to aggression.”²¹⁴

Regarding Russia and its potential for aggression, in February 1955, 64 percent of Americans still thought that “there was bound to be a major war sooner or later.”²¹⁵ Representing the largest single concern of polled Americans in 1955, most thought that foreign policy and our relationship with Russia and China posed the biggest challenges for the new mid-term Congress.²¹⁶ When asked about China, roughly half of the respondents thought that we should use atomic or hydrogen bombs if a war occurred.²¹⁷ American concerns over communist incursion and the impending threat of war served as the rationale for public support of strategic bombing and the development of nuclear capabilities.

While America put its defensive eggs in the nuclear basket under the New Look as directed in NSC 162/2, it also subscribed to a bombing policy that diverged greatly from what had preceded World War II. While the large-scale bombardment of the communist bloc with nuclear weapons was widely accepted as a feasible and acceptable plan, included in this was an implicit acceptance of mass destruction and wholesale killing. SAC still focused upon CEP and held bombing competitions to promote accuracy, but the development of thermonuclear technology and successfully converting it into a deliverable weapon promised huge explosive yields that enabled SAC planners to count upon “bonus damage.” Despite General Kuter’s statement in 1944 that it was “contrary to our national ideals to wage war against civilians,” the U.S. largely turned to the idea of that very application.²¹⁸ As a result, attacking the war making capabilities of an enemy nation became indistinguishable from attacking urban centers and cities.²¹⁹ By 1955 the policy of massive retaliation and the “New

Look” put the onus of American defensive posture on the threat of nuclear violence and widespread destruction. Americans accepted this policy and supported their government in this departure from previous ideas.

¹Norman Moss, *Men Who Play God: The Story of the H-Bomb and How the World Came to Live with It* (New York, NY; Harper and Row, 1968), 89-90.

²Ibid.

³“Ashes of Death,” *Time*, 29 March 1954, <http://www.time.com/time/magazine/article/0,9171,819647,00.html> (accessed June 20, 2008).

⁴Ibid.

⁵Moss, 90; “Ashes of Death.”

⁶“Ashes of Death.”

⁷“Ashes of Death.”

⁸Moss, 87. A Mega Ton (MT) is the explosive yield of 1 million tons of TNT.

⁹Rhodes, *Dark Sun*, 541.

¹⁰Moss, 86.

¹¹Ibid.

¹²Speech by John Foster Dulles, January 12, 1954 before the Council on Foreign Relations, New York, as referenced in Dale O. Smith, *U.S. Military Doctrine: A Study and Appraisal* (New York, NY: Duell, Sloan, and Pearce, 1955), 230.

¹³“Operation Castle” at Nuclear Weapons Archive.Org.

¹⁴Michael Light, *100 Suns* (New York, NY; Knopf, 2003); Ibid., 542.

¹⁵David Allen Rosenberg, “American Atomic Strategy and Hydrogen Bomb Decision,” *The Journal of American History* 66, no. 1 (June 1979), 81.

¹⁶Ibid., 66.

¹⁷Ibid.

¹⁸Ibid., 65; Reardon, *The Formative Years*, 439.

¹⁹Ibid., 71.

²⁰Conduit, 531; “Report to the President by the Special Committee of the National Security Council on the Proposed Acceleration of the Atomic Energy Program,” October 10, 1949, Expansion of Atomic Energy File, Advisory Committee Atomic Energy, Box 174, NSC-Atomic File, Subject File 1940-1953, Personal Secretary File, Harry S. Truman Presidential Library, Independence, MO.

²¹Enclosure to Correspondence from Brian McMahon to Harry S. Truman, May 30, 1952, entitled “The Scale and Scope of Atomic Production: A Chronology of Leading Events,” 13, Thermonuclear Folder, Atomic Weapons, Box 176, NSC-Atomic File, Subject File 1940-1953, Personal Secretary File, Harry S. Truman Presidential Library, Independence, MO.

²²Ibid.

²³Ibid.

²⁴Ibid.

²⁵Condit, 533-534; “Report to the President by the Special Committee of the National Security Council on the Proposed Acceleration of the Atomic Energy Program, 2.

²⁶Ibid.

²⁷Ibid., 8.

²⁸Ibid., 9.

²⁹Rosenberg, “American Atomic Strategy and Hydrogen Bomb Decision,” 78; Enclosure to Correspondence from Brian McMahon to Harry S. Truman, May 30, 1952, entitled “The Scale and Scope of Atomic Production: A Chronology of Leading Events,” 14, Box 176, NSC-Atomic File 1940-1953, Personal Secretary File, Harry S. Truman Presidential Library, Independence, MO.

- ³⁰Williamson and Reardon, 152-153; Rosenberg, "The Origins of Overkill," 23.
- ³¹Memorandum for The Executive Secretary, National Security Council, May 14, 1952, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.
- ³²Rhodes, *Dark Sun*, 252-253.
- ³³Condit, 546.
- ³⁴Ibid.
- ³⁵"The Hydrogen Bomb," *Los Alamos Science Laboratory News*, January 1, 1963, 38, Research Material Photographs, Box 2, Papers of Lansing Lamont, Harry S. Truman Presidential Library, Independence, MO.
- ³⁶Ibid.
- ³⁷Ibid., 39.
- ³⁸Ibid.
- ³⁹Ibid.
- ⁴⁰Rhodes, *Dark Sun*, 248.
- ⁴¹Condit, 542.
- ⁴²Ibid., 252.
- ⁴³Rhodes, *Dark Sun*, 381.
- ⁴⁴Condit 543; Rosenberg, "American Atomic Strategy and Hydrogen Bomb Decision," 79.
- ⁴⁵Enclosure to Correspondence from Brien McMahon to Harry S. Truman, May 30, 1952, entitled "The Scale and Scope of Atomic Production: A Chronology of Leading Events," 14.
- ⁴⁶Condit, 546,
- ⁴⁷Condit, 543.
- ⁴⁸Condit, 543; Kunsman and Lawson, 26.
- ⁴⁹Condit, 543.
- ⁵⁰Rosenberg, "American Atomic Strategy and Hydrogen Bomb Decision," 80 and Enclosure to Correspondence from Brien McMahon to Harry S. Truman, May 30, 1952, entitled "The Scale and Scope of Atomic Production: A Chronology of Leading Events," 15; Condit, 544; Kunsman and Lawson, 27.
- ⁵¹Ibid.
- ⁵²Condit, 544.
- ⁵³Ibid., 545, Enclosure to Correspondence from Brien McMahon to Harry S. Truman, May 30, 1952, entitled "The Scale and Scope of Atomic Production: A Chronology of Leading Events," 15; Kunsman and Lawson 27.
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- ⁵⁵Moss, 27-28.
- ⁵⁶Condit, 546-547.
- ⁵⁷Ibid.
- ⁵⁸Ibid., 547.
- ⁵⁹Correspondence to Harry S. Truman from Brien McMahan, November 21, 1949, Atomic Energy Folder, Box 10, Naval Aide to the President Files 1945-1953, Staff Member and Office Files, Harry S. Truman Presidential Library, Independence, MO.
- ⁶⁰Ibid.
- ⁶¹Ibid.
- ⁶²Ibid.
- ⁶³Condit, 548.
- ⁶⁴Memo, JCS to Sec Def, "The United States Military Position with Respect to Development of the Thermonuclear Weapon," November 23, 1949 as referenced in Condit, 548-549.
- ⁶⁵Ibid.
- ⁶⁶Condit, 549.
- ⁶⁷Ibid., 550.
- ⁶⁸Ibid.

⁶⁹Memo, JCS to Sec Def, "request for Comments on Military Views of Members of General Advisory Committee," January 13, 1950 (derived from JCS 2096, CCS 471.6 (12-14-49) sec 1, as referenced in Condit, 555; Rhodes, *Dark Sun*, 406.

⁷⁰Omar Bradley to Secretary of Defense, January 13, Bradley Folder, General File, Presidents Secretary file, Harry S. Truman Presidential Library, Independence, MO, as referenced in Rosenberg, "American Atomic Strategy and Hydrogen Bomb Decision," 83.

⁷¹Condit, 550.

⁷²*Ibid.*, 557.

⁷³*Ibid.*

⁷⁴Correspondence from Harry Truman to David Lilienthal, January 31, 1950, Thermonuclear Folder, Box 176, Subject File, 1940-1953 NSC-Atomic File, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.

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⁷⁶Statement by the President on the Hydrogen Bomb, January 31, 1950, *Public Papers of Harry S. Truman, January 1 to December 31 1950* (Washington, DC: U.S. Government Printing Office, 1965), 138.

⁷⁷Gallup, *The Gallup Poll, Public Opinion 1935-1971, vol. 2 1949-1953*, 888.

⁷⁸*Ibid.*, 895.

⁷⁹"The Road Beyond Elugelab," *Time*, April 12, 1954.

⁸⁰*Ibid.*

⁸¹Boyer, 349; William Laurence, *The Hell Bomb* (London; Hollis and Carter, 1951).

⁸²Gallup, *The Gallup Poll, Public Opinion 1935-1971, vol. 2 1949-1953*, 1018.

⁸³Boyer, 341.

⁸⁴Kunsman and Lawson, 28; Condit, 560.

⁸⁵Allen R. Millet and Peter Maslowski, *For the Common Defense-A Military History of the United States of America* (New York, NY; The Free Press, Macmillan, 1994), 513.

⁸⁶Memorandum For: Mr. Robert LeBaron, Chairman Military Liaison Committee to the AEC, Subject: A Basis for Estimating Maximum Soviet Capabilities for Atomic Warfare, February 16, 1950, Atomic Energy Folder-Russia, Box 175, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.

⁸⁷*Ibid.*

⁸⁸*Ibid.*; Rosenberg, "American Atomic Strategy and Hydrogen Bomb Decision," 84.

⁸⁹*Ibid.*

⁹⁰*Ibid.*, 85.

⁹¹Moss, 51.

⁹²Stanley Blumberg and Gwinn Owens, *Energy and Conflict: The Life and Times of Edward Teller* (New York, NY; Putnam and Sons, 1976), 213.

⁹³"A Terrible Weapon and a Courageous Decision," *Fort Worth Star Telegram*, February 2, 1950, in Folder 1, Correspondence File C-General, Box 2, Papers of Stuart Symington, Harry S. Truman Presidential Library, Independence, MO.

⁹⁴*Ibid.*

⁹⁵Correspondence, Papers of Stuart Symington to Louis Johnson, November 8, 1949, Atomic Energy File, Box 175, NSC Atomic File, Subject File 1940-1953, Presidents Secretary File, Truman Library.

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⁹⁷*Ibid.*

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¹⁰⁰*Ibid.*

¹⁰¹Robert Futrell, *Ideas, Concepts, Doctrine, Basic Thinking in the U.S. Air Force 1907-1960* (Maxwell AFB, AL: Air University Press, 1989), 317.

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- ¹⁰³Futrell, 320 and 322.
- ¹⁰⁴Williamson and Reardon, 144.
- ¹⁰⁵Moody, 446.
- ¹⁰⁶*Ibid.*
- ¹⁰⁷Futrell, 323.
- ¹⁰⁸*Ibid.*, 324.
- ¹⁰⁹*Ibid.*
- ¹¹⁰Futrell, 323; Rosenberg, “The Origins of Overkill,” 22.
- ¹¹¹Futrell, 324.
- ¹¹²*Ibid.*, 325, 419-420.
- ¹¹³*Ibid.*, 421.
- ¹¹⁴Budiansky, 366; Rosenberg, “The Origins of Overkill,” 22.
- ¹¹⁵Moody, 403.
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- ¹¹⁸Rosenberg and Moore, Document One, “Memorandum Op-36C/jm, Subj: Briefing given to the representatives of all services at SAC headquarters, Offutt Air Force Base Nebraska,” March 18, 1954, pg 23.
- ¹¹⁹*Ibid.*
- ¹²⁰J. C. Hopkins, *The Development of Strategic Air Command 1946-1981* (Offutt AFB, NE; Office of the Historian, Headquarters Strategic Air Command, 1982), 20 and 40.
- ¹²¹Lorell, 16-17.
- ¹²²Memorandum for the President, James Lay Jr., September 10, 1952, NSC Atomic File, Presidents Secretary File, Harry S. Truman Presidential Library, Independence, MO.
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- ¹²⁴*Ibid.*
- ¹²⁵*Ibid.*; Rhodes, *Dark Sun*, 440.
- ¹²⁶Rosenberg, “The Origins of Overkill,” 18; Williamson and Reardon, 49.
- ¹²⁷Rhodes, *Dark Sun*, 440.
- ¹²⁸Kaplan, 46.
- ¹²⁹Futrell, 218.
- ¹³⁰Steven L. Reardon, “U.S. Strategic Bombardment Doctrine Since 1945” in R. Cargill Hall, 409.
- ¹³¹*Ibid.*, 408-409.
- ¹³²General Nathan F. Twining, Chamber of Commerce Banquet Speech, Galveston Texas, February 9, 1954, 1954 folder, Speeches and Writing file, Box 153, General Nathan F. Twining Papers, Library of Congress, as reference in Hall, 408.
- ¹³³*Ibid.*, 409. The WSEG was created in 1947 by James Forrestal to conduct analysis of targeting effects. This group served in an advisory capacity regarding the effectiveness of targeting methodologies.
- ¹³⁴Kaplan, 79.
- ¹³⁵Karl Clausewitz, *On War*, ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 69; Kaplan, 79.
- ¹³⁶Kaplan, 79-81.
- ¹³⁷Colonel Willis G. Carter, “Strategic Bombardment and National Objectives,” in *Air University Quarterly Review* 4, no. 3 (Spring 1951), 10.
- ¹³⁸*Ibid.*, 11.
- ¹³⁹Gallup, *The Gallup Poll, Public Opinion 1935-1971, vol. 2, 1949-1953*, 965.
- ¹⁴⁰*Ibid.*
- ¹⁴¹Herman S. Wolk, “The New Look,” *Air Force Magazine* 86, no. 8 (August 2003), 81.

- ¹⁴²Rosenberg, "Origins of Overkill," 28.
- ¹⁴³Samuel Wells, "The Origins of Massive Retaliation," *Political Science Quarterly* 96, no. 1 (Spring 1981): 31; Kunsman and Lawson, 33.
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- ¹⁴⁵Gallup, *The Gallup Poll, Public Opinion 1935-1971, vol. 2 1949-1953*, 1073.
- ¹⁴⁶Futrell, 421.
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²¹⁷Ibid., 1322.

²¹⁸L. Kuter correspondence to H. Arnold, August 9, 1944, Box 153, General Carl Spaatz Papers, Manuscripts Division, Library of Congress, Washington, DC.

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CHAPTER 7

Conclusions

On January 17, 1991, the opening salvos of Operation DESERT STORM proclaimed the USAF's strategic bombing operations against Saddam Hussein's military and selected elements of Iraqi national infrastructure. Using a mix of both precision guided munitions (PGMs) and conventional "dumb" bombs, coalition Air Forces attacked airfields, communication centers, chemical facilities, electrical plants, Hussein himself, and many other significant Iraqi targets. One hundred and fifty two places were struck within a twenty-four hour period and targeted more sites than the entire Eighth Air Force had in 1942 and 1943.¹ For the next few weeks, utilizing both PGMs and unguided bombs, the USAF effectively neutralized Iraqi command and control capabilities, destroyed much of its military support and logistical infrastructure, and eventually shattered its combat power. As a result, when the ground campaign began on February 24, coalition forces rolled over the Iraqi Army with relative ease and in less than four days.

While only 2 percent of the munitions dropped by the coalition air forces were done by F-117 "Nighthawk" stealth fighters with PGMs, these strikes comprised 43 percent of the high priority targets on the master target list.² The effectiveness of the air campaign during DESERT STORM helped paved the way for a quick ground victory. Through the use of PGMs and stealth, what would have taken the USAAF in 1943 over one thousand B-17 sorties to destroy, was done with one F-117 carrying a few PGMs.³ Furthermore, while the initial CEP for the B-17s in World War II was

over 3,000 feet, the F-117s CEP during DESERT STORM was reduced to a mere 10 feet.⁴ This phenomenal decrease in CEP occurred by leveraging technology and stealth and allowed precision to redefine the concept of mass.⁵

What occurred during the 1991 air campaign was similar to the kind of precision bombing ACTS envisioned back in the late 1930s. While the officers at ACTS hoped to reduce collateral damage and strike only significant elements of an enemy's war making capacity and thus avoid wholesale death and destruction, the reality of this vision was not yet a fully practical idea. According to Air Force General David Deptula, chief architect of the DESERT STORM master air attack plan, new and advanced precision technology provided the capability to achieve these strategic effects.⁶ In this regard, technology was a key ingredient in fulfilling many of the ideas proffered by ACTS. While target analysis and effective intelligence is still a significant challenge in the execution of any air campaign, technology provided the USAF the ability to accurately strike a designated objective on a regular basis. Erroneous intelligence, poor situational awareness, and technical problems still result in cases of fratricide and collateral damage, but use of precision bombardment is now a mainstay of USAF strategic air operations.

However, this remarkable ability on the part of the USAF to strike, with ever-increasing accuracy, designated targets is very different from what preceded it during World War II and the following post war era. The select targeting and destruction of a single building, structure, and in some cases even an individual, is a significant change from mid-20th Century bombing methodologies. The growing importance of

precision in modern strategic bombing application came from a changing definition as to what constituted precision as well as increased appreciation for its efficiency. It also came from a growing rejection on the part of the military and the American public regarding mass casualties and widespread destruction.

This shift in attitude is reflected in current U.S. joint doctrine. Regarding targeting in contemporary conflict, DoD Joint Publication 3-60 states, “Incidental civilian injury or collateral damage to civilian objects must not be excessive in relation to the concrete and direct military advantage expected to be gained . . . this factor must be carefully balanced against the military benefits when making proportionality determination.”⁷ Current U.S. doctrine also specifies that “direct attacks on civilians or civilian objects are prohibited.”⁸ While much of this thought was resident in the pre-World War II bombing concepts and ideas, the preceding treatise argues that the current doctrine is a complete reversal from what became accepted during World War II and era following the war.

As technology improved and values changed, Americans demanded a modification in bombing applications. With the development of laser-guided bombs and other PGMs, the American populace in the late 20th Century was loathe to create widespread destruction and saw that accuracy was a more palatable and a politically feasible method of bombardment rather than wholesale attack. Americans increasingly viewed collateral damage as anathema in the conduct of war much as had been the case prior to World War II. While the Iraqi’s claimed that the U.S. targeted “Baby Milk Plants” and struck public air raid shelters, strategic bombing in the 1990’s was

conducted largely in line with a new appreciation and concern over collateral damage and civilian casualties.

Professors W. Michael Reisman and Chris Antonious argue that popular support for modern military action will erode “if people believe that the war is being conducted in an unfair, inhumane, and iniquitous way.”⁹ For America to win contemporary, and future, engagements and maintain the support of the people, the U.S. is required to apply discriminate use of its military power. One observer noted, “winning today is much more dependent upon domestic and international public support as much as it is defeating the enemy on the battlefield.”¹⁰ In recent conflicts, America’s enemies are quick to highlight collateral damage done by the U.S. and use such events in their information operations and propaganda efforts. Since U.S. military power in a conventional linear battlefield is largely unmatched, these enemies seek to undermine U.S. resolve and national will through an information campaign aimed at the emotions of the American people.

Despite this recent concern and antipathy regarding collateral damage, mass has historically been a staple of U.S. military applications, especially as it pertained to airpower during the mid-20th century. While the teachings of ACTS lessons during the inter-war years and the pre-war pronouncements of public officials attempted to curtail indiscriminate bombing, as World War II unfolded and in the years following, the USAAF and USAF embraced the application of mass. This application came about from a synergy of reasons.

During World War II, public support allowed the USAAF to target Germany population centers, firebomb Japanese cities, and utilize atomic bombs. The American public provided approbation of these bombing methodologies regardless of the widespread destruction caused by the Eighth, Fifteenth, and Twentieth Air Forces. Despite a prewar doctrine that focused upon targeting select elements of an enemy's national infrastructure, and a widely held belief that civilian casualties were to be avoided, the USAAF was implicitly given a free hand to conduct the strategic bombing effort in any manner it saw fit without widespread condemnation from the American populace.

While internal debate arose over acceptance of area bombing and the deliberate targeting of urban centers, the USAAF conducted raids like THUNDERCLAP, the firebombing efforts against Japan, and atomic warfare with the unspoken approval from the American public and support from elements of the national leadership. The effects of the strategic bombing campaign were widely lauded by the American public with proof of this approbation resident in many venues. While news agencies reported the devastation of Axis cities by Allied bombing, the articles filed by the press were largely laudatory and depicted strategic bombing in a positive light. As a population, Americans were largely indifferent to the casualties and destruction created by USAAF and saw them as part of the price for victory, and in the case of the Pacific due to Pearl Harbor, as just retribution on an inferior and malevolent race.

This is not to say that the USAAF deliberately changed bombing tactics to celebrate naked violence at the behest of the American people. The USAAF did not target Axis populations and raze cities merely for revenge or because the average American citizen wanted to, but initiated large scale-bombing operations as a means to a strategic end. To obtain strategic end states, bombardment in World War II began to target not only national military objectives, but gradually began to served in a more pronounced political capacity. As the war progressed, bombing alone became a political tool apart from the other elements of the U.S. military and by itself became an implement for achieving national goals.

In Europe, area bombing was thought to hold promise for the quick capitulation of the Nazis and destruction of German morale. In this regard, bombing raids were seen as a way to expedite the defeat of Germany and completely destroy the Nazi state, its political base, and its support structure. Operations such as THUNDERCLAP and CLARION bear this out. In the Pacific, LeMay hoped that the firebombing would bring about the defeat of Japan without need of a ground invasion. Although other members of the national leadership still envisioned the requirement for an amphibious assault of the Japanese home islands, LeMay and other USAAF officers saw the strategic bombing effort as a way to negate that requirement. LeMay believed that the Twentieth Air Force's firebombing efforts alone would preclude the need for any land invasion. While Arnold supported the idea of invading the island of Kyushu, he also believed that by transferring the Eighth Air Force to the Pacific

theater and combining it with the efforts of the Twentieth, that airpower alone would then bring about the fall of Honshu and the remainder of the Japanese empire.

Additionally, on both fronts the political goal of “unconditional surrender” not only mandated the complete destruction of the Axis powers political structures, but also intimated their physical destruction. In this regard, as the war progressed strategic bombing increasingly began to directly support political objectives established by the national leadership in addition to the military objectives of theater commanders. The attacks of Hiroshima and Nagasaki highlight this political use of strategic bombing.

Regarding atomic warfare in World War II, the dropping of *Fat Man* and “Little Boy” had more to do with psychological operations than practical military necessity. While military considerations were paramount to actual target selection, the use of the atomic bomb was largely political in purpose and was deliberately intended to influence the Japanese leadership. The discussions of the Interim Committee in 1945 and Secretary of War Stimson’s own accounts prove that the atomic bombings were aimed primarily at the psychological over the physical. The Japanese denunciation of the Potsdam Declaration, the Diet’s call for a mobilized national army, and the results of the Okinawa and Iwo Jima experiences provided ample evidence that the Japanese would continue to fight. As a result, the atomic missions were largely diplomatic actions seeking to influence the Japanese government. Conversely, any argument that the atomic bombings were politically

motivated to influence the leadership in the Kremlin for post war geopolitical posturing is specious and unsubstantiated by the historical record.

Furthermore, Truman's decision to use these bombs was largely a "non decision." Assuming the bombs would work, his approval of atomic bombing was more of a continuation of a predetermined course of action and a "rubber stamp" rather than an actual choice. Organizational momentum was already in play by the summer of 1945 for the time, effort, and expense committed to the Manhattan Project had taken on a life of its own.¹¹ Internal domestic political forces mandated the use of the atomic bomb especially if Americans were to suffer tremendous casualties in the OLYMPIC and CORONET assaults. Truman and the Democratic Party would have much to answer for if America withheld the use of the weapon while casualty lists climbed as a result of the planned amphibious assaults. As the war dragged on and looked to continue into 1946, the development of atomic weapons and the promise of this technology provided a unique opportunity to spare American lives, shorten the war, and avoid potential economic crises on the home front. In this regard, the USAAF alone provided the ways and means for the political end. The idea of atomic bombing did not originate with the USAAF but was tasked to the organization by outside forces. While Arnold was eager to assume this new mission, the USAAF found itself elevated to an entirely new and unique role.

For many practical reasons, each unique to a particular theater of war, bombing applications transformed. In Europe the ability to actually hit a given building or target from 20,000 feet in cloudy skies proved problematic for advocates

of precision bombing. Advanced optical bombsights were ineffective over cloud-covered Germany and Allied technology failed to fully mitigate visibility problems. Early radar systems were unable to provide the definition and accuracy required for precision bombardment. Furthermore, trying to develop a corps of men sufficiently trained to conduct precision bombardment while being attacked by enemy fighters or by anti-aircraft fire in an inhospitable environment also precluded full realization of the prewar doctrine.

In the Pacific, not only clouds and prohibitive weather patterns, but winds aloft and the jet stream prevented the realization of precision bombing. Additionally, the perceived nature of Japanese manufacturing processes added to the departure as cottage industry was, at one time, a staple of the Empire's production base. This means of production, and the known susceptibility of Japanese cities to fire, set the stage for the incendiary effort. These considerations, combined with the early poor high altitude performance and mechanical difficulties associated with the newly fielded B-29, forced LeMay to develop pragmatic solutions that mitigated the Twentieth Air Force's challenges. These solutions increased the lethality of the strategic bombing effort and maximized the capabilities of the B-29. The synergy of these practical considerations exacerbated the departure during the Pacific war.

Additionally, on both fronts, Hap Arnold looked to establish airpower as a potent and important tool in warfare. He wanted to make the most of the USAAF's opportunity and establish an independent air force. Furthermore, his reputation was at stake not only in Europe, but was especially at risk given his advocacy of the B-29

and the huge expenditures allocated for the aircraft. His personal influence on field commanders encouraged them to produce results that often equated to RAF style methods in Europe while lauding the annihilation of Japanese cities. Although Arnold understood the fine line in which he was walking regarding precision and widespread destruction, his desire for the validation of the USAAF and the B-29 served as catalysts for the change in bombing applications.

In the decade following the Allied victory, similar issues continued to affect USAF practices and ideas. Considerations that shaped bombing applications during the war were equally relevant in years following. While the rationales and motivations for bombing concepts were significantly different than war time concerns and influences, the net effect was a continuation in the acceptance of mass, with an approval regarding the exacerbation of destructive methods.

After the war Americans quickly shed their affinity for the Soviet Union and “Uncle Joe” with the Cold War beginning in earnest. In addition to the rekindling of anti-communist sentiment, Americans saw communist encroachment as a threat to national security and world peace. Following the Berlin Blockade, the fall of Eastern Europe to Russian influence, the explosion of the Soviet atomic bomb, Mao’s success in China, and the invasion of South Korea, Americans largely supported the further refinement and development of nuclear weapons. Widespread support existed for the development of thermonuclear technology and the development of it as a deliverable weapon. In tandem with this approval over the development of nuclear weaponry was popular support for a strategic bombing fleet and an Air Force capable of

delivering a lethal blow to the Soviet Union. Despite the nature of nuclear warfare and the potential effect it had for humanity and the survival of the planet, Americans largely accepted the idea of an offensive, atomic-equipped force, posed for the annihilation of the Soviet Union and its populations.

Concurrently, Americans developed a tenuous sense of security with their nuclear monopoly and largely accepted atomic bombs as part of the military's inventory of weapons. Given the "witch hunts" of Joseph McCarthy, the trial of the Rosenbergs, and the establishment of the Employee Loyalty Program, collective American thought reinforced anti-communist sentiment of the era. Americans embraced nuclear technology as a way to protect itself from the "red menace" despite anxiety over the existence of atomic energy. Given the contemporary political climate of the time, Americans saw the need for such defensive measures and envisioned that their superior nuclear capability would result in an "atomic pax Americana."¹²

From a military standpoint, atomic weapons served to offset the large Soviet Army. Despite the poor shape of the post war U.S. military, its small budget allocations, and the dwindling numbers of troops, America reorganized its armed services under the Department of Defense and established an independent U.S. Air Force. Under the new Air Force, the Strategic Air Command served as the lead component of America's defense. Despite complaints from the other armed service, the USAF increasingly became the most prominent branch. While Truman initially enacted equal share budgeting practices for the DoD, and as the Air Force gained in

prominence, airpower received more and more of the defense allocations. “More bang for the buck” was a common euphemism regarding the increase in both Air Force and AEC budgets. With the Korean War and NSC 68 serving as a catalyst for increased defense spending in the Truman administration, the primacy of nuclear airpower was re-enforced with Eisenhower's massive retaliation policy under NSC 162/2.

Additionally, in order to defeat the Soviet Union, Air Force leaders applied World War II targeting methodologies to the new war plans and assumed that complete devastation of the Soviet state was required for victory. The legacy of the World War II experience shaped post war targeting methods without considering the fundamental changes and dimensions brought about by nuclear warfare. Without any real reflection regarding the use of nuclear weapons, and with no real guidance from American political leadership, Air Force planners were free to target the Soviet Union in much the same way they did Axis nations in World War II. To these officers the reduction of Soviet cities to rubble equated to an American victory. While recognizing that one B-47 with a nuclear bomb could destroy a city as opposed to thousands of B-17s, the Air Force hoped to destroy the Soviet Union in a few weeks. Furthermore, with the advent of the H-bomb, the USAF embraced the idea of “bonus damage” and continued adhering to the idea of mass.

In the political realm, in addition to suspicions over Soviet intent following World War II, much of the nation’s attention turned inward as reconversion of the domestic economy, labor issues, and inflation became prevailing issues. After VJ

Day America experienced an era of new found prosperity and as servicemen left the military for civilian life, the size of the budget allocated for defense shrank appreciably. As a result, a small U.S. military needed some way to cope with the growing threat of the Soviet Union. Use of atomic bombs and maintaining the American lead in nuclear technology was seen by both the Truman and Eisenhower administrations as a way to defend America without ruining the economy and preserving the nation's financial prosperity. While the development of atomic technology slowed following the war, the U.S. refined atomic bomb design, increased explosive yields, and improved handling characteristics. Nuclear weapons served a number of political roles with each presidential administration having different policies regarding these weapons. However, both saw them as a cornerstone to America's defensive position and a means to continue national economic prosperity.

In the post war era both the executive and legislative branches of the U.S. government supported the change in American bombing applications and provided resources for a nuclear armed air force. Both the Finletter and Brewster Reports reflected this acceptance of atomic defense from both the president and the congress and served as starting points for policies enabling America's nuclear arsenal. In response to these reports and other influences, Congress approved budget appropriations to both the Air Force and the AEC that reflected the Truman administration national security policies. Explicit of this support from the legislative branch was the efforts of Brien McMahon and his push to build the H-bomb over the objections of Oppenheimer and the rest of the General Advisory Committee. During

the Eisenhower years, Congress continued in this theme and allocated funds in line with NSC 162/2 and also increased the budget for the AEC.

Most important, post war presidential administrations came to the conclusion that nuclear weapons had a significant role to play in American national security policies. While Truman directed the expansion of atomic capabilities in reaction to several global events, Ike saw nuclear weapons as a way to wrestle the initiative away from the Soviet Union and avoid protracted U.S. involvement in regional conflicts. Both NSC 68 and 162/2 put America's defense on a foundation of nuclear capabilities that also affected the diplomatic element of national power. In response to this, nuclear weapons and strategic bombing became a part of the political discourse between the U.S. and the rest of the world, especially the Soviet Union. Much as it had with the Hiroshima and Nagasaki attacks, strategic bombing now became a political tool in the same way Theodore Roosevelt wielded his "Great White Fleet" early in the beginning of the century. For decades following the 1950s, the mere threat of nuclear attack became a cornerstone of American diplomacy and a tenet of its international relationships.

Concurrent with the changes in bombing methodologies was the idea of precision. While ACTS initially based the doctrine on striking targets within a certain CEP, this method fell out of practice toward the end of the war with area bombing in Europe and the firebombing efforts over Japan. This is not to say that precision was forgotten completely by the end of the war, as accuracy increased as the war progressed, but it became less important by spring 1945. Ironically, after the creation

of SAC and LeMay's assumption of command, precision once again became an important part of bomber crew training despite the widespread effect that the new atomic weapons would create. As a result, a dichotomy was created between SAC's quest for precision in comparison to mass effects of nuclear munitions. Initiation of bombing competitions and the grading and recording of aircrew CEP's prove that SAC still placed emphasis on precision.

While the accurate placement seems absurd considering nuclear weapons and their effects, precision is still important. The physical location of the target in a geographic setting, its individual characteristics and composition, and the desired effects still require accurate placement of nuclear munitions regardless of their high end yield. Current USAF aircrews are still evaluated on their ability to hit targets within a given CEP. What did change was acceptance of large scale destruction and the idea that entire cities or even nations were to be destroyed as part of the strategic attack. As war became more mechanized, technologically advanced, and lethal, widespread destruction became an accepted characteristic of modern war by the military, the government, and the constituent population. Douhet's blurring of combatant and non-combatant had come to fruition in both reality of World War II and theoretically in a nuclear war plans.

By 1955, the U.S. had gone 180 degrees from its precision bombing doctrine of the 1930s. The reasons for this change are as complex as they are varied and were a result of both domestic and foreign influences. Political, economic, social, racial, and military factors were all in play regarding the shift in American bombing

methods with the synergy of these considerations effecting the change in American's bombing concepts. In this regard, strategic bombing reflects not just the nation's military applications, but is representative of the whole country. Indicative of this sentiment is a statement made by the noted scholar Samuel P. Huntington who in the 1980s wrote, "The United States is a big country, as we should fight wars in a big way. One of our greatest advantages is our mass; we should not hesitate to use it. . . . Bigness, not brains is our advantage, as we should exploit it. If we have to intervene, we should intervene with overwhelming force."¹³ American bombing methodologies were not just the sole realm of men like LeMay and Arnold, but were a reflection of the American society, its government, and the values they collectively embraced. The nation's cultural values, moral tenets, and collective temperament were manifest in this departure.

These same values and temperament are also in play in years following 1955 as the USAF began to gradually move back to the concept of precision bombardment as conducted in DESERT STORM. Perhaps because of the widespread criticism of the carpet bombing of Southeast Asian jungles during the Vietnam War, the USAF began utilizing laser guided bombs and continued to develop the technology. Following DESERT STORM, the USAF further refined its precision bombardment capabilities and continued to leverage technology in an ever increasing capacity. As the result, the USAF, along with the American populace and the federal government, increasingly favored precision over mass and sought to avoid widespread destruction and annihilation. By the end of the 20th Century, America came 'full circle' and

conducted a 360 degree turn regarding bombing methods and found that the precept of ACTS could now be successfully executed.

¹David Deptula, *Effects Based Operations: Change in the Nature of Warfare* (Arlington, VA: Aerospace Education Foundation, 2001), 2.

²*Ibid.*, 10.

³*Ibid.*, 8.

⁴*Ibid.*

⁵*Ibid.*

⁶Correspondence between author and Lieutenant General David Deptula, September 4, 2005.

⁷U.S. Department of Defense, Joint Publication 3-60, *Joint Targeting*, Washington, DC: U.S. Government Printing Office, 2007), E-4.

⁸*Ibid.*, E-5.

⁹W. Michael Reisman and Chris T. Antoniou, *The Laws of War* (New York, NY: Vintage Books, 1994), xxiv.

¹⁰Kenneth Payne, "Media as an Instrument of War," *Parameters* (Spring 2005): 81.

¹¹Walker, 92.

¹²Boyer, 34.

¹³Samuel P. Huntington, "American Military Strategy," *Policy Papers in International Affairs*, No. 28 (Berkeley, CA: Institute of International Studies, University of California, Berkeley, 1986), 16.

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