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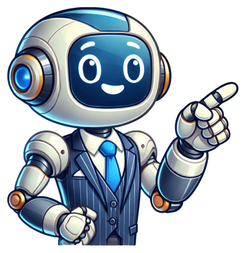

The two nuclear bombs dropped on Japan in 1945 killed and maimed hundreds of thousands of people, and their effects are still being felt today. By the end of 1945, the bombing had killed an estimated 140,000 people in Hiroshima, and a further 74,000 in Nagasaki. In the years that followed, many of the survivors would face leukemia, cancer, or other terrible side effects from the radiation. “Each person had a name. Each person was loved by someone. Let us ensure that their deaths were not in vain.”- Setsuko Thurlow, survivor of the August 1945 atomic bombing of Hiroshima Nobel Peace Prize acceptance speech, December 2017 The uranium bomb detonated over Hiroshima on 6 August 1945 had an explosive yield equal to 15,000 tonnes of TNT. It razed and burnt around 70 per cent of all buildings and caused an estimated 140,000 deaths by the end of 1945, along with increased rates of cancer and chronic disease among the survivors. A slightly larger plutonium bomb exploded over Nagasaki three days later levelled 6.7 sq km. of the city and killed 74,000 people by the end of 1945. Ground temperatures reached 4,000°C and radioactive rain poured down. Photo: Tricycle belonging to 3-years-and-11-months-old Shinichi Tetsutani - who was riding outside of his house in Hiroshima when the atomic bomb was detonated over the city on August 6th, 1945. Courtesy of the Hiroshima Peace Memorial Museum, copying and use of this photo without permission is prohibited. No response capacity If a nuclear weapon were to be detonated over a city today, first responders - hospitals, firemen, aid organisations - would simply be unable to help. This powerful video by the Red Cross explains why: The reason we know this is that the extent of the damage in Hiroshima and Nagasaki in 1945 made it nearly impossible to provide aid. In Hiroshima 90 per cent of physicians and nurses were killed or injured; 42 of 45 hospitals were rendered non-functional; and 70 per cent of victims had combined injuries including, in most cases, severe burns. All the dedicated burn beds around the world would be insufficient to care for the survivors of a single nuclear bomb on any city. In Hiroshima and Nagasaki, most victims died without any care to ease their suffering. Some of those who entered the cities after the bombings to provide assistance also died from the radiation. Photo: Courtesy of the Nagasaki Atomic Bomb Museum, copying and use of this photo without permission is prohibited. Long-term effects It takes around 10 seconds for the fireball from a nuclear explosion to reach its maximum size, but the effects last for decades and span across generations. Five to six years after the bombings, the incidence of leukaemia increased noticeably among survivors. After about a decade, survivors began suffering from thyroid, breast, lung and other cancers at higher than normal rates. Paintings created by survivors. Courtesy of the Hiroshima Peace Memorial Museum, copying and use of without permission is prohibited Pregnant women exposed to the bombings experienced higher rates of miscarriage and deaths among their infants; their children were more likely to have intellectual disabilities, impaired growth and an increased risk of developing cancer. And for all survivors, cancers related to radiation exposure still continue to increase throughout their lifespan, even to this day, seven decades later. The Hibakusha Koko Kondo was buried under rubble with her mother who was holding the 8-month-old child during the attack on Hiroshima, and has spent a lifetime campaigning for the abolition of nuclear weapons. Photo: Ari Beser The Hibakusha (survivors of the bombings of Hiroshima and Nagasaki) are integral to the history of the atomic bombings of these cities - not only because they are among the few true nuclear weapons experts to have experienced the actual impact of these weapons - but also because of the tireless efforts of many Hibakusha to eliminate nuclear weapons. From the iconic story of Sadako’s 1000 paper cranes to the tireless efforts by Hibakusha to rid the world of nuclear weapons to this very day, their stories are stories of hope and determination that must not be lost. Survivors of the atomic bombings of Hiroshima and Nagasaki are living witnesses to the horror of nuclear war and when we talk about nuclear weapons, we must talk about the real unacceptable effects they have on human beings. To learn more, you can find a vast number of Hibakusha testimonies online, but good starting places are Hibakusha Stories and the 1945 project, as well as these resources by the Hiroshima Peace Memorial Museum and the Nagasaki Atomic Bomb Museum. A Path Forward Setsuko Thurlow - Hibakusha and lifelong activist for the elimination of nuclear weapons - delivers the Nobel Lecture on behalf of ICAN in 2017. Photo: Jo Straube After decades of campaigning for a world free of nuclear-weapons, the Treaty on the Prohibition of Nuclear Weapons adopted in 2017 holds great significance for the Hibakusha. A survey among 6000 Hibakusha carried out by Kyodo News showed that a vast majority feel that Japan should join the U.N. treaty banning nuclear weapons, underscoring their discontent with the government’s opposition to the agreement. Joining the treaty would represent a recognition by Japan of its affected citizens’ rights and suffering. 80.2% of Hibakusha welcomed the UN Treaty on the Prohibition of Nuclear Weapons - Kyodo News poll, 2018 Since the Treaty's adoption, many Hibakusha have continued their tireless advocacy efforts to abolish nuclear weapons. The Hibakusha Appeal calls on all governments to join the TPNW. World leaders must heed the calls of Hibakusha, and of concerned citizens around the world, for a nuclear-weapon-free future. Top Image: The devastated downtown of Hiroshima with the dome of the Hiroshima Prefectural Industrial Promotion Hall visible in the distance. National Archives photo.By July 1945, Germany had surrendered, and the war in Europe was over. Japan, however, refused to submit to the terms outlined in the Allies’ Potsdam Declaration. It appeared to American leaders that the only way to compel Japan’s unconditional surrender was to invade and conquer the Japanese home islands. Although an estimated 300,000 Japanese civilians had already died from starvation and bombing raids, Japan’s government showed no sign of capitulation. Instead, American intelligence intercepts revealed that by August 2, Japan had already deployed more than 560,000 soldiers and thousands of suicide planes and boats on the island of Kyushu to meet the expected American invasion of Japan. Additional reports correctly surmised that the Japanese military intended to execute all American prisoners in Japan in the event of an Allied landing. These frightening figures portended a costlier battle for the United States than any previously fought during the war. By comparison, US forces suffered 49,000 casualties, including 12,000 men killed in action, when facing less than 120,000 Japanese soldiers during the battle for the island of Okinawa from April to June of 1945. At least 110,000 Japanese soldiers and more than 100,000 Okinawan civilians, a third of the island’s prewar population, also perished in the campaign. American casualties on Okinawa weighed heavily on the minds of American planners who looked ahead to the invasion of Japan. Japan’s leaders hoped to prevail, not by defeating American forces, but by inflicting massive casualties and thereby breaking the resolve of the American public.This was the situation that confronted American President Harry S. Truman in the summer of 1945 when he authorized the use of the world’s first atomic bomb. In light of intelligence reports about Japan’s commitment to continue fighting, Truman and his military advisors were determined to use every weapon at their disposal in order to bring the war to an immediate end. Consequently, neither Truman nor any of his advisors ever debated if the atomic bombs should be used, only how and where they should be used. In the spring of 1945, the American government convened a committee of scientists and military officers to determine how best to use the bombs. This group unanimously declared that there was no guarantee that demonstrating the bombs to the Japanese in a deserted area would convince Japanese leaders to surrender. It was vital that Japan be convinced to surrender as fast as possible because the United States had just two atomic bombs available in July 1945 and additional weapons would not be ready to deploy for several more weeks. Meanwhile, thousands of Chinese, American, and Japanese soldiers continued to die each day the war continued.Consequently, Truman approved the long-standing plans for the US Army Air Force to drop atomic bombs on a list of preselected Japanese cities. The list of targets excluded Tokyo and Kyoto because of their political and historic importance. Instead, the intended target of the first bomb was Hiroshima, a fan-shaped city of approximately 550,000 people that occupied the estuary of the Ota River. The city was also home to the headquarters of the Japanese army that defended the island of Kyushu as well as a number of war industries.At 2:45 a.m. on Monday August 6, 1945, three American B-29 bombers of the 509th Composite Group took off from an airfield on the Pacific island of Tinian, 1,500 miles south of Japan. Colonel Paul Tibbets piloted the lead bomber, “Enola Gay,” which carried a nuclear bomb nicknamed “Little Boy.” Despite the bomb’s moniker, it weighed nearly 10,000 pounds. As a result, the overloaded Enola Gay used more than two miles of runway to get aloft. At 7:15 a.m., the bomber crew armed the bomb, and the plane began its ascent to the bombing altitude of 31,000 feet. The B-29 Superfortress Enola Gay on the island of Tinian. US Army Air Force photo.Meanwhile, in Hiroshima, Reverend Kiyoshi Tanimoto awoke at 5 a.m. Hiroshima time, which was an hour behind Tinian time. Tanimoto was the pastor of the Hiroshima Methodist Church, and “a small man, quick to talk, laugh, and cry.” Tanimoto was a thoughtful and cautious man who had sent his wife and baby to the relative safety of a northern suburb. Tanimoto remained in the city to remove the transportable objects in his church to the safety of a suburban estate. He had slept poorly because of several air raid warnings the previous night. Hiroshima had not yet endured an American bombing raid, but its good fortune was not expected to last. That morning, Tanimoto had agreed to help a friend move a large armoire filled with clothes out to the suburbs. As the two men trundled the piece of furniture through the streets, they heard an air raid siren go off. The alarm sounded every morning when American weather planes flew overhead, so the men were not particularly worried. They continued on with their handcart through the city streets. When the pair reached their destination, “there was no sound of planes. The morning was still; the place was cool and pleasant.”At 8:14 a.m. Hiroshima time, the Enola Gay arrived over the city. The Aioi Bridge, which bombardier Thomas Ferebee used as an aiming point, was clearly visible through the plane’s bombsight. Ferebee took control of the bomber and opened the bomb bay doors. Just after 8:15 a.m., Ferebee released Little Boy from its restraints and the bomb fell away from the Enola Gay. The plane jumped nearly 10 feet at the sudden loss in weight. Tibbets immediately resumed control of the plane and banked it sharply on a 155 degree turn. He had practiced this difficult maneuver for months because he had been instructed that he had less than 45 seconds to get his plane clear of the subsequent explosion. Not even the scientists who designed the bomb were sure if the Enola Gay would survive the shock waves from the blast.Little Boy fell almost six miles in 43 seconds before detonating at an altitude of 2,000 feet. The bomb exploded with the force of more than 15,000 tons of TNT directly over a surgical clinic, 500 feet from the Aioi Bridge. Less than two percent of the bomb’s uranium achieved fission, but the resulting reaction engulfed the city in a blinding flash of heat and light. The temperature at ground level reached 7,000 degrees Fahrenheit in less than a second. The bomb vaporized people half a mile away from ground zero. Bronze statues melted, roof tiles fused together, and the exposed skin of people miles away burned from the intense infrared energy unleashed. At least 80,000 people died instantly. A mushroom cloud rises over Hiroshima after the atomic bomb exploded at 9:15 AM on August 6, 1945. Photo by the Library of Congress.Reverend Tanimoto saw “a tremendous flash of light cut across the sky… from east to west, from the city toward the hills. It seemed a sheet of sun.” Because Tanimoto was two miles from the epicenter of the explosion, he had a few seconds to throw himself between two large rocks in the garden of his friend’s house. “He felt a sudden pressure, and then splinters and pieces of board and fragments of tile fell on him.” The house had collapsed, along with the concrete wall surrounding the garden. The day grew darker and darker under a massive dust cloud. A view of Hiroshima after the bombing. National Archives photo.From the Enola Gay, Tibbets and his crew saw “a giant purple mushroom” that “had already risen to a height of 45,000 feet, three miles above our altitude, and was still boiling upward like something terribly alive.” Though the plane was already miles away, the cloud looked like it would engulf the bomber that had spawned it. “Even more fearsome,” to Tibbets, “was the sight on the ground below. At the base of the cloud, fires were springing up everywhere amid a turbulent mass of smoke that had the appearance of bubbling hot tar… The city we had seen so clearly in the sunlight a few minutes before was now an ugly smudge. It had completely disappeared under this awful blanket of smoke and fire.” Destroyed fire trucks amid the wreckage of Hiroshima. National Archives photo.In the minutes, hours, and days that followed the bombing, survivors in Hiroshima tried desperately to locate loved ones and care for the thousands of wounded. Some people exhibited horrible burns, while others who outwardly appeared unscathed later died painful deaths from radiation poisoning. Thousands of people were buried in the debris of their homes. Most structures in the city had been constructed of wood with tile roofs. All but a handful of concrete structures in the city center had been completely leveled. A Japanese burn victim of the atomic bombings. National Archives photo.President Harry Truman was aboard the cruiser USS Augusta on his way back from the Potsdam Conference when he learned of the bomb’s successful detonation. He immediately shared the news with his advisors and the ship’s crew. As the information was broadcast around the world, Allied soldiers around the globe felt as though they had received a reprieve from a death sentence. The end of World War II finally appeared to be in sight. This article is part of an ongoing series commemorating the 75th anniversary of the end of World War II made possible by Bank of America. Tyler Bamford was the Sherry and Alan Leventhal Research Fellow at the Institute for the Study of War and Democracy at The National WWII Museum from 2019-2021. He obtained his PhD in history from Temple University and his BA in history from Lafayette College. Learn More Most people are aware that Boeing's B-29 Superfortress was the plane that made the first atomic attacks. However, the B-29s delivering America’s first atomic weapons were far from ordinary. Through partnership, research, and remembrance, the Defense POW/MIA Accounting Agency (DPAA) and The National WWII Museum help ensure that no family is forgotten and no hero is left behind. The Oyneg Shabes archive, created by historian Emanuel Ringelblum and other Jews in the Warsaw Ghetto, meticulously documented their lives, suffering, and resistance during the Holocaust, ensuring their stories would survive even as they faced annihilation by the Nazis. The liberation of Mindanao was, in some respects, an unnecessary campaign militarily, but it had important political implications, as it enabled the United States to fulfill its promise of independence to the Philippines. Women warrant officers made up a small portion of the Women’s Army Corps but were trailblazers who created opportunities for women in the US Armed Forces for decades to come. During the war, nearly 1,100 highly trained women tested, flew, and ferried 12,650 aircraft over 60 million miles as Women Airforce Service Pilots (WASP). In her My Day column on May 9, 1945, the day after V-E Day was officially confirmed, Eleanor Roosevelt reflects on the cautious mood, the devastation in Europe, and the unfinished task of winning peace. The concept of genocide has fundamentally altered international law, history, and global geopolitics forever, transforming the way we understand mass violence in the modern world. Whether it played the role of the “Black Cat,” “Mad Cat,” or “Dumbo,” the PBY Catalina proved itself as one of the most instrumental amphibious planes as it struck fear in the Axis and provided hope for the Allies. Image source, Public domainImage caption, This photo shows the aftermath of a nuclear bomb dropped on Hiroshima in Japan - one of only two times that nuclear weapons have been detonated in warIn 1945 World War Two - the biggest war the world had ever seen - came to an end. There were celebrations in Europe after Germany surrendered.But on the other side of the world in the Pacific Ocean, Japan was still fighting against the US, Britain and their allies. The Americans, however, had a secret plan to end the war for good - by using the most powerful weapon ever created. August 2020 marks the 75th anniversary of the dropping of atomic bombs on the Japanese cities of Hiroshima and Nagasaki.On 6 August 1945 at 8.15am Japanese time, an American B-29 bomber plane called Enola Gay dropped an atomic bomb on the Japanese city of Hiroshima. The devastation was unlike anything in the history of warfare. The city was immediately flattened. Around 80,000 people were killed as a direct result of the blast, and another 35,000 were injured.Even after this devastation, Japan did not surrender. Image source, AFP/Getty ImagesImage caption, The atomic bomb destroyed thousands of buildings in HiroshimaThree days later, another nuclear bomb was dropped by the Americans on the Japanese city of Nagasaki. At least 74,000 people died in the Nagasaki blast or from subsequent injuries.The attack on Nagasaki destroyed about 30% of the city, flattening almost everything in the industrial district. Those who survived suffered terrible injuries, or radiation sickness.Shortly afterwards, on 15 August 1945, Japan finally admitted defeat and World War Two was over.A monument was erected at the park, known as the Peace Statue in 1955. Its right hand pointing to the sky is said to "point to the threat of nuclear weapons", while its left hand extending out symbolises peace, according to Japan's national tourism agency's website.A memorial ceremony is held in front of it every year.Image source, EPAImage caption, This building, now called the A Bomb Dome, survived the atomic blast and today it's a memorial in Hiroshima, JapanWhen the bomb exploded in Hiroshima, the city was struck by a flash of blinding light, then a giant cloud shaped like a mushroom rose into the sky. The blast flattened buildings within a 2.5 km radius of the bomb. There were 90,000 buildings in Hiroshima before the bomb was dropped, but only 28,000 remained after the explosion. Thousands and thousands of people were killed. Many were badly injured. Media caption, Bun was 14-years-old when Hiroshima was bombed. Watch her incredible story of survivalBut the suffering didn't end there because it wasn't just a normal bomb.The nuclear radiation released when it exploded caused people to suffer horrible illnesses.Thousands more people died from their injuries and radiation sickness in the weeks, months and years that followed.Image source, Public DomainImage caption, The Hiroshima bomb was nicknamed 'Little Boy' - here it is before being loaded into the Enola Gay's bomb bayJapan was at war with America and its allies, which included Britain and Soviet Union - a nation made up of modern-day Russia and other countries. The allies were winning the war and the Japanese forces had been pushed back from many locations. However, fighting was still very fierce, and soldiers and civilians were dying every day.Image source, Getty ImagesImage caption, This Japanese Kamikaze pilot is about to set off and deliberately crash his plane full of bombs onto American warships during World War Two - he is tying on honorary ribbons that were always worn when on a suicide mission ('Kamikaze' means 'winds of the gods')Japan had been at war for many years. It had invaded the countries near to it such as China, and the Japanese had attacked America. Everywhere the Japanese soldiers went, they were known for their cruelty. They treated prisoners of war very badly, including American and British soldiers who had surrendered.Image source, Getty ImagesImage caption, Children in Hiroshima, Japan, wearing masks to protect themselves from the polluted air caused by the bombingUS President Harry S Truman wanted the Japanese to surrender as quickly as possible so he could save lives.The atomic bomb was a deadly new weapon and President Truman hoped the massive destruction it caused would shock the Japanese into realising they had to surrender.US President Truman wanted to avoid a land invasion of Japan. Image source, Getty ImagesImage caption, Harry S Truman was the US president during World War Two and it was his decision to drop the nuclear bomb on HiroshimaThere were 2.5 million Japanese troops stationed there and Truman's staff estimated that defeating them would cost the lives of 250,000 US soldiers.Some historians also say that the US wanted to avoid Japan being occupied by Soviet troops. America and the Soviet Union were allies but they did not really trust each other.Media caption, Leah looks around Hiroshima's Peace Memorial ParkIt was the first and only time that atomic bombs have been used in a war. Although the scientists who made the bombs were proud of what they'd achieved, it scared them as well. The way the atomic bomb was built meant it had huge power - enough to destroy whole cities on its own. Many people now believe that the devastation caused in Hiroshima and in Nagasaki was so awful that the bombs should never be used again.Image source, EPAImage caption, Two survivors of the atomic bombing - Kinuyo Ikegami (left) and Tsuyuko Nakao (right) - hug each other after offering prayers for victims at a ceremony in 2010Today, a small number of countries around the world, including the US, China and the UK, have nuclear weapons.Some campaigners argue that there is no place for nuclear weapons and that all countries should get rid of them immediately.Others say that having such terrible weapons will help to keep a country safe, even if they are never used.Sadako Sasaki survived Hiroshima, she was aged two when it happened. She became ill a few years later and set herself a task of folding 1,000 origami cranes. Before she died at the age of 12, from leukaemia caused by the nuclear bomb she had folded 644. In 2013 the 'Peace Crane Project' was founded in Sadako's memory and works at promoting world peace. Attitudes towards atomic bombs have changed a lot since 1945. Immediately after Hiroshima, lots of Americans who took part in a survey done by Gallup said they agreed with using nuclear weapons. In 2015 however the same survey showed an all-time low percentage of people supporting the use of nuclear weapons. At Hearst Networks EMEA, we share stories that matter. A global broadcaster since 1995, we reach audiences in over 100 countries, including the UK, Nordics, Benelux, Central & Eastern Europe, Spain, Italy, Germany, Africa and the Middle East. Our stories are global and local, linear and digital, and always compelling. Personalities shine at Hearst Networks EMEA. Our culture embraces individuals, in all their daring, passionate, ambitious glory. Our people are our strength, and our differences are celebrated. We challenge each other, collaborate and come together, just as a family does; winning as a team and celebrating as one too. Everyone has a voice and should feel proud and free to run with their ideas, enjoying their successes and journey with us. And in such an evolving industry, tomorrow is always today. We anticipate change, identify future opportunities and are excited by the potential that tomorrow brings. We want to be famous for creating and sharing stories that matter – unique, trusted, entertaining, everywhere. Whether our stories challenge and inspire intellectually or simply entertain, we know that we are making a positive contribution to our audiences across the many diverse regions and countries in the UK, Europe, The Middle East and Africa. Striving to always do so requires passion. And it’s with just as much passion that we strive to gain new audiences with our creativity and by using innovative technology, by partnering with leading and emerging local platforms. 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You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. August 1945 attacks in Japan during WWII Atomic bombings of Hiroshima and NagasakiPart of the Pacific WarAtomic bomb mushroom clouds over Hiroshima (left) and Nagasaki (right)TypeNuclear bombingLocationHiroshima and Nagasaki, Japan34°23′41″N 132°27′17″E / 34.39472°N 132.45472°E / 34.39472; 132.4547232°46′25″N 129°51′48″E / 32.77361°N 129.86333°E / 32.77361; 129.86333Date6 and 9 August 1945Executed byUnited States Manhattan Project 509th Composite Group CasualtiesHiroshima: 90,000–166,000 killed 80,000–156,000 civilians 10,000 soldiers 12 Allied prisoners of war Nagasaki: 60,000–80,000 killed 60,000–80,000 civilians 150 soldiers 8–13 Allied prisoners of war Total killed (by end of 1945): 150,000–246,000 On 6 and 9 August 1945, the United States detonated two atomic bombs over the Japanese cities of Hiroshima and Nagasaki, respectively, during World War II. The aerial bombings killed between 150,000 and 246,000 people, most of whom were civilians, and remain the only uses of nuclear weapons in an armed conflict. Japan announced its surrender to the Allies on 15 August, six days after the bombing of Nagasaki and the Soviet Union's declaration of war against Japan and invasion of Manchuria. The Japanese government signed an instrument of surrender on 2 September, ending the war. In the final year of World War II, the Allies prepared for a costly invasion of the Japanese mainland. This undertaking was preceded by a conventional bombing and firebombing campaign that devastated 64 Japanese cities, including an operation on Tokyo. The war in the European theatre concluded when Germany surrendered on 8 May 1945, and the Allies turned their full attention to the Pacific War. By July 1945, the Allies' Manhattan Project had produced two types of atomic bombs: "Little Boy", an enriched uranium gun-type fission weapon, and "Fat Man", a plutonium implosion-type nuclear weapon. The 509th Composite Group of the U.S. Army Air Forces was trained and equipped with the specialized Silverplate version of the Boeing B-29 Superfortress, and deployed to Tinian in the Mariana Islands. The Allies called for the unconditional surrender of the Imperial Japanese armed forces in the Potsdam Declaration on 26 July 1945, the alternative being "prompt and utter destruction". The Japanese government ignored the ultimatum. The consent of the United Kingdom was obtained for the bombing, as was required by the Quebec Agreement, and orders were issued on 25 July by General Thomas T. Handy, the acting chief of staff of the U.S. Army, for atomic bombs to be used on Hiroshima, Kokura, Niigata, and Nagasaki. These targets were chosen because they were large urban areas that also held militarily significant facilities. On 6 August, a Little Boy was dropped on Hiroshima. Three days later, a Fat Man was dropped on Nagasaki. Over the next two to four months, the effects of the atomic bombings killed 90,000 to 166,000 people in Hiroshima and 60,000 to 80,000 people in Nagasaki; roughly half occurred on the first day. For months afterward, many people continued to die from the effects of burns, radiation sickness, and other injuries, compounded by illness and malnutrition. Despite Hiroshima's sizable military garrison, estimated at 24,000 troops, some 90% of the dead were civilians. Scholars have extensively studied the effects of the bombings on the social and political character of subsequent world history and popular culture, and there is still much debate concerning the ethical and legal justification for the bombings. According to supporters, the atomic bombings were necessary to bring an end to the war with minimal casualties and ultimately prevented a greater loss of life on both sides; according to critics, the bombings were unnecessary for the war's end and were a war crime, raising moral and ethical implications. Main article: Pacific War Situation of the Pacific War on 1 August 1945. White and green: Areas controlled by Japan Red: Areas controlled by the Allies Gray: Areas controlled by the Soviet Union (neutral) In 1945, the Pacific War between the Empire of Japan and the Allies entered its fourth year. Most Japanese military units fought fiercely, ensuring that the Allied victory would come at an enormous cost. The 1.25 million battle casualties incurred in total by the United States in World War II included both military personnel killed in action and wounded in action. Nearly one million of the casualties occurred during the last year of the war, from June 1944 to June 1945. In December 1944, American battle casualties hit an all-time monthly high of 88,000 as a result of the German Ardennes Offensive. Worried by the losses sustained, President Franklin D. Roosevelt suggested the use of atomic bombs on Germany as soon as possible, but was informed the first usable atomic weapons were still months away.[1] America's reserves of manpower were running out. Deferments for groups such as agricultural workers were tightened, and there was consideration of drafting women. At the same time, the public was becoming war-weary, and demanding that long-serving servicemen be sent home.[2] In the Pacific, the Allies returned to the Philippines,[3] recaptured Burma,[4] and invaded Borneo.[5] Offensives were undertaken to reduce the Japanese forces remaining in Bougainville, New Guinea and the Philippines.[6] In April 1945, American forces landed on Okinawa, where heavy fighting continued until June. Along the way, the ratio of Japanese to American casualties dropped from five to one in the Philippines to two to one on Okinawa.[2] Although some Japanese soldiers were taken prisoner, most fought until they were killed or committed suicide. Nearly 99 percent of the 21,000 defenders of Iwo Jima were killed. Of the 117,000 Okinawan and Japanese troops defending Okinawa in April to June 1945, 94 percent were killed;[7] 7,401 Japanese soldiers surrendered, an unprecedentedly large number.[8] As the Allies advanced towards Japan, conditions became steadily worse for the Japanese people. Japan's merchant fleet declined from 5,250,000 gross register tons in 1941 to 1,560,000 tons in March 1945, and 557,000 tons in August 1945. The lack of raw materials forced the Japanese war economy into a steep decline after the middle of 1944. The civilian economy, which had slowly deteriorated throughout the war, reached disastrous levels by the middle of 1945. The loss of shipping also affected the fishing fleet, and the 1945 catch was only 22 percent of that in 1941. The 1945 rice harvest was the worst since 1909, and hunger and malnutrition became widespread. U.S. industrial production was overwhelmingly superior to Japan's. By 1943, the U.S. produced almost 100,000 aircraft a year, compared to Japan's production of 70,000 for the entire war. In February 1945, Prince Fumimaro Konoe advised Emperor Hirohito that defeat was inevitable, and urged him to abdicate.[9] Main article: Operation Downfall U.S. Army propaganda poster depicting Uncle Sam preparing the public for the invasion of Japan after the end of the war with Germany and Italy Even before the surrender of Nazi Germany on 8 May 1945, plans were underway for the largest operation of the Pacific War, Operation Downfall, the Allied invasion of Japan.[10] The operation had two parts: set to begin in October 1945, Operation Olympic involved a series of landings by the U.S. Sixth Army intended to capture the southern third of the southernmost main Japanese island, Kyūshū.[11] This was to be followed in March 1946 by Operation Coronet, the capture of the Kantō Plain, near Tokyo on the main Japanese island of Honshu by the U.S. First, Eighth and Tenth Armies, as well as a Commonwealth Corps made up of Australian, British and Canadian divisions. The target date was chosen to allow for Olympic to complete its objectives, for troops to be redeployed from Europe, and the Japanese winter to pass.[12] Japan's geography made this invasion plan obvious to the Japanese; they were able to predict the Allied invasion plans accurately and thus adjust their defensive plan, Operation Ketsugō, accordingly. The Japanese planned an all-out defense of Kyūshū, with little left in reserve.[13] In all, there were 2.3 million Japanese Army troops prepared to defend the home islands, backed by a civilian militia of 28 million. Casualty predictions varied widely, but were extremely high. The Vice Chief of the Imperial Japanese Navy General Staff, Vice Admiral Takijirō Ōnishi, predicted up to 20 million Japanese deaths.[14] The Americans were alarmed by the Japanese buildup, which was accurately tracked through Ultra intelligence.[15] On 15 June 1945, a study by the Joint War Plans Committee,[16] drawing on the experience of the Battle of Leyte, estimated that Downfall would result in 132,500 to 220,000 U.S. casualties, with U.S. dead and missing in the range from 27,500 to 50,000.[17] Secretary of War Henry L. Stimson commissioned his own study by Quincy Wright and William Shockley, who estimated the invading Allies would suffer between 1.7 and 4 million casualties, of whom between 400,000 and 800,000 would be dead, while Japanese fatalities would have been around 5 to 10 million.[18][19] In a meeting with the President and commanders on 18 June 1945, General George C. Marshall stated that "there was reason to believe" casualties for the first 30 days would not exceed the price paid for Luzon. Additionally, with the Japanese position rendered "hopeless" by an invasion of their mainland, Marshall speculated that Soviet entry into the war might be "the decisive action" needed to finally "[leverage] them into capitulation."[20] Marshall began contemplating the use of a weapon that was "readily available and which assuredly can decrease the cost in American lives": poison gas.[21] Quantities of phosgene, mustard gas, tear gas and cyanogen chloride were moved to Luzon from stockpiles in Australia and New Guinea in preparation for Operation Olympic, and MacArthur ensured that Chemical Warfare Service units were trained in their use.[21] Consideration was also given to using biological weapons.[22] Main article: Air raids on Japan A B-29 over Osaka on 1 June 1945 While the United States had developed plans for an air campaign against Japan prior to the Pacific War, the capture of Allied bases in the western Pacific in the first weeks of the conflict meant that this offensive did not begin until mid-1944 when the long-ranged Boeing B-29 Superfortress became ready for use in combat.[23] Operation Matterhorn involved India-based B-29s staging through bases around Chengdu in China to make a series of raids on strategic targets in Japan.[24] This effort failed to achieve the strategic objectives that its planners had intended, largely because of logistical problems, the bomber's mechanical difficulties, the vulnerability of Chinese staging bases, and the extreme range required to reach key Japanese cities.[25] Brigadier General Haywood S. Hansell determined that Guam, Tinian, and Saipan in the Mariana Islands would better serve as B-29 bases, but they were in Japanese hands.[26] Strategies were shifted to accommodate the air war,[27] and the islands were captured between June and August 1944. Air bases were developed,[28] and B-29 operations commenced from the Marianas in October 1944.[29] The XXI Bomber Command began missions against Japan on 18 November 1944.[30] The early attempts to bomb Japan from the Marianas proved just as ineffective as the China-based B-29s had been. Hansell continued the practice of conducting so-called high-altitude precision bombing, aimed at key industries and transportation networks, even after these tactics had not produced acceptable results.[31] These efforts proved unsuccessful due to logistical difficulties with the remote location, technical problems with the new and advanced aircraft, unfavorable weather conditions, and enemy action.[32][33] The Operation Meetinghouse firebombing of Tokyo on the night of 9–10 March 1945, was the single deadliest air raid in history,[34] with a greater area of fire damage and loss of life than either of the atomic bombings of Hiroshima or Nagasaki.[35][36] Hansell's successor, Major General Curtis LeMay, assumed command in January 1945 and initially continued to use the same precision bombing tactics, with equally unsatisfactory results. The attacks initially targeted key industrial facilities but much of the Japanese manufacturing process was carried out in small workshops and private homes.[37] Under pressure from United States Army Air Forces (USAAF) headquarters in Washington, LeMay changed tactics and decided that low-level incendiary raids against Japanese cities were the only way to destroy their production capabilities, shifting from precision bombing to area bombardment with incendiaries.[38] Like most strategic bombing during World War II, the aim of the air offensive against Japan was to destroy the enemy's war industries, kill or disable civilian employees of these industries, and undermine civilian morale.[39][40] Over the next six months, the XXI Bomber Command under LeMay firebombed 64 Japanese cities.[41] The firebombing of Tokyo, codenamed Operation Meetinghouse, on 9–10 March, killed an estimated 100,000 people and destroyed 41 km2 (16 sq mi) of the city and 267,000 buildings in a single night. It was the deadliest bombing raid of the war, at a cost of 20 B-29s shot down by flak and fighters.[42] By May, 75 percent of bombs dropped were incendiaries designed to burn down Japan's "paper cities". By mid-June, Japan's six largest cities had been devastated.[43] The end of the fighting on Okinawa that month provided airfields even closer to the Japanese mainland, allowing the bombing campaign to be further escalated. Aircraft flying from Allied aircraft carriers and the Ryukyu Islands also regularly struck targets in Japan during 1945 in preparation for Operation Downfall.[44] Firebombing switched to smaller cities, with populations ranging from 60,000 to 350,000. According to Yuki Tanaka, the U.S. fire-bombed over a hundred Japanese towns and cities.[45] The Japanese military was unable to stop the Allied attacks and the country's civil defense preparations proved inadequate. Japanese fighters and anti-aircraft guns had difficulty engaging bombers flying at high altitude.[46] From April 1945, the Japanese interceptors also had to face American fighter escorts based on Iwo Jima and Okinawa.[47] That month, the Imperial Japanese Army Air Service and Imperial Japanese Navy Air Service stopped attempting to intercept the air raids to preserve fighter aircraft to counter the expected invasion.[48] By mid-1945 the Japanese only occasionally scrambled aircraft to intercept individual B-29s conducting reconnaissance sorties over the country, to conserve supplies of fuel.[49] In July 1945, the Japanese had 137,800,000 litres (1,156,000 US bbl) of avgas stockpiled for the invasion of Japan. About 72,000,000 litres (604,000 US bbl) had been consumed in the home islands area in April, May and June 1945.[50] While the Japanese military decided to resume attacks on Allied bombers from late June, by this time there were too few operational fighters available for this change of tactics to hinder the Allied air raids.[51] Main article: Manhattan Project Leslie Groves, Manhattan Project director, with a map of the Far East The discovery of nuclear fission in 1938 made the development of an atomic bomb a theoretical possibility.[52] Fears that a German atomic bomb project would develop atomic weapons first, especially among scientists who were refugees from Nazi Germany and other fascist countries, were expressed in the Einstein–Szilard letter to Roosevelt in 1939. This prompted preliminary research in the United States in late 1939.[53] Progress was slow until the arrival of the British MAUD Committee report in late 1941, which indicated that only 5 to 10 kilograms of isotopically-pure uranium-235 were needed for a bomb instead of tons of natural uranium and a neutron moderator like heavy water.[54] Consequently, the work was accelerated, first as a pilot program, and finally in the agreement by Roosevelt to turn the work over to the U.S. Army Corps of Engineers to construct the production facilities necessary to produce uranium-235 and plutonium-239. This work was consolidated within the newly created Manhattan Engineer District, which became better known as the Manhattan Project, eventually under the direction of Major General Leslie R. Groves, Jr..[55] The work of the Manhattan Project took place at dozens of sites across the United States, and even some outside of its borders. It would ultimately cost over US$2 billion (equivalent to about $27 billion in 2023)[56] and employ over 125,000 people simultaneously at its peak. Groves appointed J. Robert Oppenheimer to organize and head the project's Los Alamos Laboratory in New Mexico, where bomb design work was carried out.[57] Two different types of bombs were eventually developed: a gun-type fission weapon that used uranium-235, called Little Boy, and a more complex implosion-type nuclear weapon that used plutonium-239, called Fat Man.[58] There was a Japanese nuclear weapon program, but it lacked the human, mineral, and financial resources of the Manhattan Project, and never made much progress towards developing an atomic bomb.[59] The "Tinian Joint Chiefs": Captain William S. Parsons (left), Rear Admiral William R. Purnell (center), and Brigadier General Thomas F. Farrell (right) The 509th Composite Group was constituted on 9 December 1944, and activated on 17 December 1944, at Wendover Army Air Field, Utah, commanded by Colonel Paul Tibbets.[60] Tibbets was assigned to organize and command a combat group to develop the means of delivering an atomic weapon against targets in Germany and Japan. Because the flying squadrons of the group consisted of both bomber and transport aircraft, the group was designated as a "composite" rather than a "bombardment" unit.[61] Due to its remoteness, Tibbets selected Wendover for his training base over Great Bend, Kansas and Mountain Home, Idaho.[62] Each bombardier completed at least 50 practice drops of inert or conventional explosive pumpkin bombs, targeting islands around Tinian and later the Japanese home islands, until as late as 14 August 1945

before reaching the target area.[133] The Hiroshima atom bomb cloud 2–5 minutes after detonation[134] During the night of 5–6 August, Japanese early warning radar detected the approach of numerous American aircraft headed for the southern part of Japan. Radar detected 65 bombers headed for Saga, 102 bound for Maebashi, 261 en route to Nishinomiya, 111 headed for Ube and 66 bound for Imabari. An alert was given and radio broadcasting stopped in many cities, among them Hiroshima. The all-clear was sounded in Hiroshima at 00:05.[135] About an hour before the bombing, the air raid alert was sounded again, as Straight Flush flew over the city. It broadcast a short message which was picked up by Enola Gay. It read: "Cloud cover less than 3/10th at all altitudes. Advice: bomb primary."[136] The all-clear was sounded over Hiroshima again at 07:09.[137] At 08:09, Tibbets started his bomb run and handed control over to his bombardier, Major Thomas Ferebee.[138] The release at 08:15 (Hiroshima time) went as planned, and the Little Boy containing about 64 kg (141 lb) of uranium-235 took 44.4 seconds to fall from the aircraft flying at about 9,400 meters (31,000 ft) to a detonation height of about 580 meters (1,900 ft) above the city.[139][140] Enola Gay was 18.5 km (11.5 mi) away before it felt the shock waves from the blast.[141] Due to crosswind, the bomb missed the aiming point, the Aioi Bridge, by approximately 240 m (800 ft) and detonated directly over Shima Surgical Clinic.[142] It released the equivalent energy of 16 ± 2 kilotons of TNT (66.9 ± 8.4 TJ).[139] The weapon was considered very inefficient, with only 1.7 percent of its material fissioning.[143] The radius of total destruction was about 1.6 kilometers (1 mi), with resulting fires across 11 km2 (4.4 sq mi).[144] Enola Gay stayed over the target area for two minutes and was 16 kilometers (10 mi) away when the bomb detonated. Only Tibbets, Parsons, and Ferebee knew of the nature of the weapon; the others on the bomber were only told to expect a blinding flash and given protective goggles. "It was hard to believe what we saw", Tibbets told reporters, while Parsons said "the whole thing was tremendous and awe-inspiring ... the men aboard with me gasped 'My God'." He and Tibbets compared the shockwave to "a close burst of ack-ack fire".[145] People on the ground reported a pika (ピカ)—a brilliant flash of light—followed by a don (ドン)—a loud booming sound.[146] The experiences of survivors in the city varied depending on their location and circumstances, but a common factor in survivor accounts was a sense that a conventional weapon (sometimes cited as a magnesium bomb, which has a distinctively bright white flash) had happened to go off immediately in their vicinity, causing tremendous damage (throwing people across rooms, breaking glass, crushing buildings). After emerging from the ruins the survivors gradually understood that the entire city had been attacked at the same instant. Survivor accounts frequently feature walking through the ruins of the city without a clear sense of where to go, and encountering the cries of people trapped within crushed structures, or people with horrific burns. As the numerous small fires created by the blast began to grow, they merged into a firestorm that moved quickly throughout the ruins, killing many who had been trapped, and causing people to jump into Hiroshima's rivers in search of sanctuary (many of whom drowned).[147][148] The photographer Yoshito Matsushige took the only photographs of Hiroshima immediately after the bombing. He described in a later interview that, immediately after the bombing, "everywhere there was dust; it made a grayish darkness over everything." He took five photographs in total before he could not continue: "It was really a terrible scene. It was just like something out of hell."[149] Survivor accounts also prominently feature cases of survivors who appeared uninjured, but who would succumb within hours or days to what would later be identified as radiation sickness. Estimating the number of people killed by the blast, firestorm, and radiation effects of the bombing has been hampered by imprecise record-keeping during the war, the chaos caused by the attack, uncertainty about the number of people in the city on the morning of the attack, and variations in methodology. Reports by the Manhattan Project in 1946 and the U.S. occupation–led Joint Commission for the Investigation of the Atomic Bomb in Japan in 1951 estimated 66,000 dead and 69,000 injured, and 64,500 dead and 72,000 injured, respectively, while Japanese-led reconsiderations of the death toll in the 1970s estimated 140,000 dead in Hiroshima by the end of the year.[150] Estimates also vary on the number of Japanese military personnel killed. The United States Strategic Bombing Survey estimated in 1946 that there were 24,158 soldiers present in Hiroshima at the time of the attack, and that 6,789 were killed or missing as a result; the 1970s reconsiderations estimated about 10,000 military dead.[150] A modern estimate by the Radiation Effects Research Foundation (RERF) estimates a city population of 340,000 to 350,000 at the time of the bombing, of which 90,000 to 166,000 died by the end of the year.[121] U.S. surveys estimated that 12 km2 (4.7 sq mi) of the city were destroyed. Japanese officials determined that 69 percent of Hiroshima's buildings were destroyed and another 6 to 7 percent damaged.[151] Some of the reinforced concrete buildings in Hiroshima had been very strongly constructed because of the earthquake danger in Japan, and their framework did not collapse even though they were fairly close to the blast center. Since the bomb detonated in the air, the blast was directed more downward than sideways, which was largely responsible for the survival of the Prefectural Industrial Promotional Hall, now commonly known as the Genbaku (A-bomb) dome, which was only 150 m (490 ft) from ground zero (the hypocenter). The ruin was named Hiroshima Peace Memorial and was made a UNESCO World Heritage Site in 1996 over the objections of the United States and China, which expressed reservations on the grounds that other Asian nations were the ones who suffered the greatest loss of life and property, and a focus on Japan lacked historical perspective.[152] Hiroshima bombing Hiroshima in the aftermath of the bombing Ruins of Hiroshima The Hiroshima Genbaku Dome after the bombing The pattern of the kimono worn by a survivor burned into her skin in tight-fitting areas. Direct, thermal flash burns 22-year old victim Toyoko Kugata being treated at the Hiroshima Red Cross Hospital (6 October 1945) A photograph of the aftermath of the bombing of Hiroshima Memorial at Andersonville NHS for the American airmen who died in the blast A victim with burns A victim with whole body burns A victim with whole body burns Victim with burns on her back Corpse near the Western Parade Ground A mobilized school girl suffered burns to face Elder sister and younger brother who suffered radiation disease. The brother died in 1949 and the sister in 1965. For decades this photo was misidentified as the mushroom cloud of the bomb that formed at c. 08:16.[153][154] However, due to its much greater height, the scene was identified in March 2016 as the firestorm-cloud that engulfed the city,[154] some three hours after the bombing.[155] The air raid warning had been cleared at 07:31, and many people were outside, going about their activities.[156] Eizō Nomura was the closest known survivor, being in the basement of a reinforced concrete building (it remained as the Rest House after the war) only 170 meters (560 ft) from ground zero at the time of the attack.[157][158] He died in 1982, aged 84.[159] Akiko Takakura was among the closest survivors to the hypocenter of the blast. She was in the solidly-built Bank of Hiroshima only 300 meters (980 ft) from ground-zero at the time of the attack.[160] Over 90 percent of the doctors and 93 percent of the nurses in Hiroshima were killed or injured—most had been in the downtown area which received the greatest damage.[161] The hospitals were destroyed or heavily damaged. Only one doctor, Terufumi Sasaki, remained on duty at the Red Cross Hospital.[162] Nonetheless, by early afternoon the police and volunteers had established evacuation center at hospitals, schools and tram stations, and a morgue was established in the Asano library.[163] Survivors of the blast gathered for medical treatment, but many would die before receiving any help, leaving behind rings of corpses around hospitals.[164] Most elements of the Japanese Second General Army headquarters were undergoing physical training on the grounds of Hiroshima Castle, barely 820 meters (900 yd) from the hypocenter. The attack killed 3,243 troops on the parade ground.[165] The communications room of Chugoku Military District Headquarters that was responsible for issuing and lifting air raid warnings was located in a semi-basement in the castle. Yoshie Oka, a Hijiyama Girls High School student who had been mobilized to serve as a communications officer, had just sent a message that the alarm had been issued for Hiroshima and neighboring Yamaguchi, when the bomb exploded. She used a special phone to inform Fukuyama Headquarters (some 100 kilometers (62 mi) away) that "Hiroshima has been attacked by a new type of bomb. The city is in a state of near-total destruction."[166] Since Mayor Senkichi Awaya had been killed at the mayoral residence, Field Marshal Shunroku Hata, who was only slightly wounded, took over the administration of the city, and coordinated relief efforts. Many of his staff had been killed or fatally wounded, including Lieutenant Colonel Yi U, a prince of the Korean imperial family who was serving as a General Staff Officer.[167][168] Hata's senior surviving staff officer was the wounded Colonel Kumao Imoto, who acted as his chief of staff. Soldiers from the undamaged Hiroshima Ujina Harbor used Shin'yō-class suicide motorboats, intended to repel the American invasion, to collect the wounded and take them down the rivers to the military hospital at Ujina.[167] Trucks and trains brought in relief supplies and evacuated survivors from the city.[169] Twelve American airmen were imprisoned at the Chugoku Military Police Headquarters, about 400 meters (1,300 ft) from the hypocenter of the blast.[170] Most died instantly, although two were reported to have been executed by their captors, and two prisoners badly injured by the bombing were left next to the Aioi Bridge by the Kempei Tai, where they were stoned to death.[171][172] Eight U.S. prisoners of war killed as part of the medical experiments program at Kyushu University were falsely reported by Japanese authorities as having been killed in the atomic blast as part of an attempted cover up.[173] The fires created by the atomic bomb detonation carried large amounts of ash into the clouds in the atmosphere. One to two hours after the explosion, a "black rain" fell as a tarry combination of ash, radioactive fallout, and water, causing severe radiation burns in some cases.[174][175] Hiroshima before the bombingHiroshima after the bombing and subsequent firestorm The Tokyo control operator of the Japan Broadcasting Corporation noticed that the Hiroshima station had gone off the air. He tried to re-establish his program by using another telephone line, but it too had failed.[176] About 20 minutes later the Tokyo railroad telegraph center realized that the main line telegraph had stopped working just north of Hiroshima. From some small railway stops within 16 km (10 mi) of the city came unofficial and confused reports of a terrible explosion in Hiroshima. All these reports were transmitted to the headquarters of the Imperial Japanese Army General Staff.[177] Military bases repeatedly tried to call the Army Control Station in Hiroshima. The complete silence from that city puzzled the General Staff; they knew that no large enemy raid had occurred and that no sizable store of explosives was in Hiroshima at that time. A young officer was instructed to fly immediately to Hiroshima, to land, survey the damage, and return to Tokyo with reliable information for the staff. It was felt that nothing serious had taken place and that the explosion was just a rumor.[177] The staff officer went to the airport and took off for the southwest. After flying for about three hours, while still nearly 160 km (100 mi) from Hiroshima, he and his pilot saw a great cloud of smoke from the firestorm created by the bomb. After circling the city to survey the damage they landed south of the city, where the staff officer, after reporting to Tokyo, began to organize relief measures. Tokyo learned that the city had been destroyed by a new type of bomb from President Truman's announcement of the strike, sixteen hours later.[177] See also: Mokusatsu Truman talks about the bombing of Hiroshima President Truman talks about the bombing of Hiroshima, which he describes as "a military base", after his return from the Potsdam Conference. Problems playing this file? See media help. After the Hiroshima bombing, Truman issued a statement announcing the use of the new weapon. He stated, "We may be grateful to Providence" that the German atomic bomb project had failed, and that the United States and its allies had "spent two billion dollars on the greatest scientific gamble in history—and won". Truman then warned Japan: "If they do not now accept our terms, they may expect a rain of ruin from the air, the like of which has never been seen on this earth. Behind this air attack will follow sea and land forces in such numbers and power as they have not yet seen and with the fighting skill of which they are already well aware."[178] This was a widely broadcast speech picked up by Japanese news agencies.[179] The 50,000-watt standard wave station on Saipan, the OWI radio station, broadcast a similar message to Japan every 15 minutes about Hiroshima, stating that more Japanese cities would face a similar fate in the absence of immediate acceptance of the terms of the Potsdam Declaration and emphatically urged civilians to evacuate major cities. Radio Japan, which continued to extoll victory for Japan by never surrendering[88] had informed the Japanese of the destruction of Hiroshima by a single bomb.[180] Soviet Foreign Minister Vyacheslav Molotov had informed Tokyo of the Soviet Union's unilateral abrogation of the Soviet–Japanese Neutrality Pact on 5 April.[181] At two minutes past midnight on 9 August, Tokyo time, Soviet infantry, armor, and air forces had launched the Manchurian Strategic Offensive Operation.[182] Four hours later, word reached Tokyo of the Soviet Union's official declaration of war. The senior leadership of the Japanese Army began preparations to impose martial law on the nation, with the support of Minister of War Korechika Anami, to stop anyone attempting to make peace.[183] On 7 August, a day after Hiroshima was destroyed, Yoshio Nishina and other atomic physicists arrived at the city, and carefully examined the damage. They then went back to Tokyo and told the cabinet that Hiroshima was indeed destroyed by a nuclear weapon. Admiral Soemu Toyoda, the Chief of the Naval General Staff, estimated that no more than one or two additional bombs could be readied, so they decided to endure the remaining attacks, acknowledging "there would be more destruction but the war would go on".[184] American Magic codebreakers intercepted the cabinet's messages.[185] Purnell, Parsons, Tibbets, Spaatz, and LeMay met on Guam that same day to discuss what should be done next.[186] Since there was no indication of Japan surrendering,[185] they decided to proceed with dropping another bomb. Parsons said that Project Alberta would have it ready by 11 August, but Tibbets pointed to weather reports indicating poor flying conditions on that day due to a storm, and asked if the bomb could be readied by 9 August. Parsons agreed to try to do so.[187][186] The Bockscar and its crew, who dropped a Fat Man atomic bomb on Nagasaki The city of Nagasaki had been one of the largest seaports in southern Japan, and was of great wartime importance because of its wide-ranging industrial activity, including the production of ordnance, ships, military equipment, and other war materials. The four largest companies in the city were Mitsubishi Shipyards, Electrical Shipyards, Arms Plant, and Steel and Arms Works, which employed about 90 percent of the city's labor force, and accounted for 90 percent of the city's industry.[188] Although an important industrial city, Nagasaki had been spared from firebombing because its geography made it difficult to locate at night with AN/APQ-13 radar.[120] Unlike the other target cities, Nagasaki had not been placed off limits to bombers by the Joint Chiefs of Staff's 3 July directive,[120][189] and was bombed on a small scale five times. During one of these raids on 1 August, a number of conventional high-explosive bombs were dropped on the city. A few hit the shipyards and dock areas in the southwest portion of the city, and several hit the Mitsubishi Steel and Arms Works.[188] By early August, the city was defended by the 134th Anti-Aircraft Regiment of the 4th Anti-Aircraft Division with four batteries of 7 cm (2.8 in) anti-aircraft guns and two searchlight batteries.[115] The harbor at Nagasaki in August 1945 before the city was hit with the atomic bomb In contrast to Hiroshima, almost all of the buildings were of old-fashioned Japanese construction, consisting of timber or timber-framed buildings with timber walls (with or without plaster) and tile roofs. Many of the smaller industries and business establishments were also situated in buildings of timber or other materials not designed to withstand explosions. Nagasaki had been permitted to grow for many years without conforming to any definite city zoning plan; residences were erected adjacent to factory buildings and to each other almost as closely as possible throughout the entire industrial valley. On the day of the bombing, an estimated 263,000 people were in Nagasaki, including 240,000 Japanese residents, 10,000 Korean residents, 2,500 conscripted Korean workers, 9,000 Japanese soldiers, 600 conscripted Chinese workers, and 400 Allied prisoners of war in a camp to the north of Nagasaki.[190] The Bockscar B-29 and a post war Mk III nuclear weapon painted to resemble the Fat Man bomb, at the National Museum of the United States Air Force, Dayton, Ohio Responsibility for the timing of the second bombing was delegated to Tibbets. Scheduled for 11 August, the raid was moved earlier by two days to avoid a five-day period of bad weather forecast to begin on 10 August.[191] Three bomb pre-assemblies had been transported to Tinian, labeled F-31, F-32, and F-33 on their exteriors. On 8 August, a dress rehearsal was conducted off Tinian by Sweeney using Bockscar as the drop airplane. Assembly F-33 was expended testing the components and F-31 was designated for the 9 August mission.[192] Special Mission 16, secondary target Nagasaki, 9 August 1945[193] Aircraft Pilot Call sign Mission role Enola Gay Captain George W. Marquardt Dimples 82 Weather reconnaissance (Kokura) Laggin' Dragon Captain Charles F. McKnight Dimples 95 Weather reconnaissance (Nagasaki) Bockscar Major Charles W. Sweeney Dimples 77 Weapon delivery The Great Artiste Captain Frederick C. Bock Dimples 89 Blast measurement instrumentation Big Stink Major James I. Hopkins, Jr. Dimples 90 Strike observation and photography Full House Major Ralph R. Taylor Dimples 83 Strike spare – did not complete mission At 03:47 Tinian time (GMT+10), 02:47 Japanese time,[127] on the morning of 9 August 1945, Bockscar, flown by Sweeney's crew, lifted off from Tinian island with the Fat Man, with Kokura as the primary target and Nagasaki the secondary target. The mission plan for the second attack was nearly identical to that of the Hiroshima mission, with two B-29s flying an hour ahead as weather scouts and two additional B-29s in Sweeney's flight for instrumentation and photographic support of the mission. Sweeney took off with his weapon already armed but with the electrical safety plugs still engaged.[194] During pre-flight inspection of Bockscar, the flight engineer notified Sweeney that an inoperative fuel transfer pump made it impossible to use 2,400 liters (640 U.S. gal) of fuel carried in a reserve tank. This fuel would still have to be carried all the way to Japan and back, consuming still more fuel. Replacing the pump would take hours; moving the Fat Man to another aircraft might take just as long and was dangerous as well, as the bomb was live. Tibbets and Sweeney therefore elected to have Bockscar continue the mission.[195][196] Nagasaki before and after the bombing, after the fires had burned out This time Penney and Cheshire were allowed to accompany the mission, flying as observers on the third plane, Big Stink, flown by the group's operations officer, Major James I. Hopkins, Jr. Observers aboard the weather planes reported both targets clear. When Sweeney's aircraft arrived at the assembly point for his flight off the coast of Japan, Big Stink failed to make the rendezvous.[194] According to Cheshire, Hopkins was at varying heights including 2,700 meters (9,000 ft) higher than he should have been, and was not flying tight circles over Yakushima as previously agreed with Sweeney and Captain Frederick C. Bock, who was piloting the support B-29 The Great Artiste. Instead, Hopkins was flying 64-kilometer (40 mi) dogleg patterns.[197] Though ordered not to circle longer than fifteen minutes, Sweeney continued to wait for Big Stink for forty minutes. Before leaving the rendezvous point, Sweeney consulted Ashworth, who was in charge of the bomb. As commander of the aircraft, Sweeney made the decision to proceed to the primary, the city of Kokura.[198] After exceeding the original departure time limit by nearly a half-hour, Bockscar, accompanied by The Great Artiste, proceeded to Kokura, thirty minutes away. The delay at the rendezvous had resulted in clouds and drifting smoke over Kokura from fires started by a major firebombing raid by 224 B-29s on nearby Yahata the previous day.[199] Additionally, the Yahata Steel Works intentionally burned coal tar, to produce black smoke.[200] The clouds and smoke resulted in 70 percent of the area over Kokura being covered, obscuring the aiming point. Three bomb runs were made over the next 50 minutes, burning fuel and exposing the aircraft repeatedly to the heavy defenses around Kokura, but the bombardier was unable to drop visually. By the time of the third bomb run, Japanese anti-aircraft fire was getting close, and Second Lieutenant Jacob Beser, who was monitoring Japanese communications, reported activity on the Japanese fighter direction radio bands.[201] With fuel running low because of the failed fuel pump, Bockscar and The Great Artiste headed for their secondary target, Nagasaki.[194] Fuel consumption calculations made en route indicated that Bockscar had insufficient fuel to reach Iwo Jima and would be forced to divert to Okinawa, which had become entirely Allied-occupied territory only six weeks earlier. After initially deciding that if Nagasaki were obscured on their arrival the crew would carry the bomb to Okinawa and dispose of it in the ocean if necessary, Ashworth agreed with Sweeney's suggestion that a radar approach would be used if the target was obscured.[202][203] At about 07:50 Japanese time, an air raid alert was sounded in Nagasaki, but the "all clear" signal was given at 08:30. When only two B-29 Superfortresses were sighted at 10:53 Japanese Time (GMT+9), the Japanese apparently assumed that the planes were only on reconnaissance and no further alarm was given.[204] A few minutes later at 11:00 Japanese Time, The Great Artiste dropped instruments attached to three parachutes. These instruments also contained an unsigned letter to Professor Ryokichi Sagane, a physicist at the University of Tokyo who studied with three of the scientists responsible for the atomic bomb at the University of California, Berkeley, urging him to tell the public about the danger involved with these weapons of mass destruction. The messages were found by military authorities but not turned over to Sagane until a month later.[205] In 1949, one of the authors of the letter, Luis Alvarez, met with Sagane and signed the letter.[206] At 11:01 Japanese Time, a last-minute break in the clouds over Nagasaki allowed Bockscar's bombardier, Captain Kermit Beahan, to visually sight the target as ordered. The Fat Man weapon, containing a core of about 5 kg (11 lb) of plutonium, was dropped over the city's industrial valley. It exploded 47 seconds later at 11:02 Japanese Time[127] at 503 ± 10 m (1,650 ± 33 ft), above a tennis court,[207] halfway between the Mitsubishi Steel and Arms Works in the south and the Nagasaki Arsenal in the north. This was nearly 3 km (1.9 mi) northwest of the planned hypocenter; the blast was confined to the Urakami Valley and a major portion of the city was protected by the intervening hills.[208] The resulting explosion released the equivalent energy of 21 ± 2 kt (87.9 ± 8.4 TJ).[139] Big Stink spotted the explosion from 160 kilometers (100 mi) away, and flew over to observe.[209] The bomb destroyed the Roman Catholic Urakami Tenshudo Church Bockscar flew on to Okinawa, arriving with only sufficient fuel for a single approach. Sweeney tried repeatedly to contact the control tower for landing clearance, but received no answer. He could see heavy air traffic landing and taking off from Yontan Airfield. Firing off every flare on board to alert the field to his emergency landing, the Bockscar came in fast, landing at 230 km/h (140 mph) instead of the normal 190 kilometers per hour (120 mph). The number two engine died from fuel starvation as he began the final approach. Touching down on only three engines midway down the landing strip, Bockscar bounced up into the air again for about 7.6 meters (25 ft) before slamming back down hard. The heavy B-29 slewed left and towards a row of parked B-24 bombers before the pilots managed to regain control. Its reversible propellers were insufficient to slow the aircraft adequately, and with both pilots standing on the brakes, Bockscar made a swerving 90-degree turn at the end of the runway to avoid running off it. A second engine died from fuel exhaustion before the plane came to a stop.[210] Following the mission, there was confusion over the identification of the plane. The first eyewitness account by war correspondent William L. Laurence of The New York Times, who accompanied the mission aboard the aircraft piloted by Bock, reported that Sweeney was leading the mission in The Great Artiste. He also noted its "Victor" number as 77, which was that of Bockscar.[211] Laurence had interviewed Sweeney and his crew, and was aware that they referred to their airplane as The Great Artiste. Except for Enola Gay, none of the 393rd's B-29s had yet had names painted on the noses, a fact which Laurence himself noted in his account. Unaware of the switch in aircraft, Laurence assumed Victor 77 was The Great Artiste,[212] which was in fact, Victor 89.[213] Although the bomb was more powerful than the one used on Hiroshima, its effects were confined by hillsides to the narrow Urakami Valley.[214] Of 7,500 Japanese employees who worked inside the Mitsubishi Munitions plant, including "mobilized" students and regular workers, 6,200 were killed. Some 17,000–22,000 others who worked in other war plants and factories in the city died as well.[215] The 1946 Manhattan Project report estimated 39,000 dead and 25,000 injured, and the 1951 U.S.-led Joint Commission report estimated 39,214 dead and 25,153 injured; Japanese-led reconsiderations in the 1970s estimated 70,000 dead in Nagasaki by the end of the year.[150] A modern estimate by the Radiation Effects Research Foundation (RERF) estimates a city population of 250,000 to 270,000 at the time of the bombing, of which 60,000 to 80,000 died by the end of the year.[121] Yōsuke Yamahata photographed this child incinerated in Nagasaki. American forces censored such images in Japan until 1952.[216][217] Unlike Hiroshima's military death toll, only 150 Japanese soldiers were killed instantly, including 36 from the 134th AAA Regiment of the 4th AAA Division.[115] At least eight Allied prisoners of war (POWs) died from the bombing, and as many as thirteen may have died. The eight confirmed deaths included a British POW, Royal Air Force Corporal Ronald Shaw,[218] and seven Dutch POWs.[219] One American POW, Joe Kieyoomia, was in Nagasaki at the time of the bombing but survived, reportedly having been shielded from the effects of the bomb by the concrete walls of his cell.[220] There were 24 Australian POWs in Nagasaki, all of whom survived.[221] The radius of total destruction was about 1.6 km (1 mi), followed by fires across the northern portion of the city to 3.2 km (2 mi) south of the bomb.[144][222] About 58 percent of the Mitsubishi Arms Plant was damaged, and about 78 percent of the Mitsubishi Steel Works. The Mitsubishi Electric Works suffered only 10 percent structural damage as it was on the border of the main destruction zone. The Nagasaki Arsenal was destroyed in the blast.[223] Although many fires likewise burnt following the bombing, in contrast to Hiroshima where sufficient fuel density was available, no firestorm developed in Nagasaki as the damaged areas did not furnish enough fuel to generate the phenomenon. Instead, ambient wind pushed the fire spread along the valley.[224] Had the bomb been dropped more precisely at the intended aiming point, which was downtown Nagasaki at the heart of the historic district, the destruction to medical and administrative infrastructure would have been even greater.[64] As in Hiroshima, the bombing badly dislocated the city's medical facilities. A makeshift hospital was established at the Shinkozen Primary School, which served as the main medical center. The trains were still running, and evacuated many victims to hospitals in nearby towns. A medical team from a naval hospital reached the city in the evening, and fire-fighting brigades from the neighboring towns assisted in fighting the fires.[225] Takashi Nagai was a doctor working in the radiology department of Nagasaki Medical College Hospital. He received a serious injury that severed his right temporal artery, but joined the rest of the surviving medical staff in treating bombing victims.[226] The atomic bomb explosion generated a windstorm several kilometers wide that carried ash, dust, and debris over the mountain ranges surrounding Nagasaki. Approximately 20 minutes after the bombing, a black rain with the consistency of mud or oil came down carrying radioactive material for one to two hours before turning clear.[227] Main article: Third Shot Memorandum from Leslie Groves to George C. Marshall regarding the third bomb, with Marshall's hand-written caveat that the third bomb not be used without express presidential instruction There were plans for further attacks on Japan following Hiroshima and Nagasaki. Groves expected to have another "Fat Man" atomic bomb ready for use on 19 August, with three more in September and a further three in October.[87] A second Little Boy bomb (using U-235) would not be available until December 1945.[228][229] On 10 August, he sent a memorandum to Marshall in which he wrote that "the next bomb ... should be ready for delivery on the first suitable weather after 17 or 18 August." The memo today contains hand-written comment written by Marshall: "It is not to be released over Japan without express authority from the President."[87] At the cabinet meeting that morning, Truman discussed these actions. James Forrestal paraphrased Truman as saying "there will be further dropping of the atomic bomb," while Henry A. Wallace recorded in his diary that: "Truman said he had given orders to stop atomic bombing. He said the thought of wiping out another 100,000 people was too horrific. He didn't like the idea of killing, as he said, 'all those kids.'"[230] The previous order that the target cities were to be attacked with atomic bombs "as made ready" was thus modified.[231] There was already discussion in the War Department about conserving the bombs then in production for Operation Downfall, and Marshall suggested to Stimson that the remaining cities on the target list be spared attack with atomic bombs.[232] Two more Fat Man assemblies were readied, and scheduled to leave Kirtland Field for Tinian on 11 and 14 August,[233] and Tibbets was ordered by LeMay to return to Albuquerque, New Mexico, to collect them.[234] At Los Alamos, technicians worked 24 hours straight to cast another plutonium core.[235] Although cast, it still needed to be pressed and coated, which would take until 16 August.[236] Therefore, it could have been ready for use on 19 August. Unable to reach Marshall, Groves ordered on his own authority on 13 August that the core should not be shipped.[231] Main articles: Surrender of Japan and Occupation of Japan Until 9 August, Japan's war council still insisted on its four conditions for surrender. The full cabinet met at 14:30 on 9 August, and spent most of the day debating surrender. Anami conceded that victory was unlikely, but argued in favor of continuing the war. The meeting ended at 17:30, with no decision having been reached. Suzuki went to the palace to report on the outcome of the meeting, where he met with Kōichi Kido, the Lord Keeper of the Privy Seal of Japan. Kido informed him that the emperor had agreed to hold an imperial conference, and gave a strong indication that the emperor would consent to surrender on condition that kokutai be preserved. A second cabinet meeting was held at 18:00. Only four ministers supported Anami's position of adhering to the four conditions, but since cabinet decisions had to be unanimous, no decision was reached before it ended at 22:00.[237] Calling an imperial conference required the signatures of the prime minister and the two service chiefs, but the Chief Cabinet Secretary Hisatsune Sakomizu had already obtained signatures from Toyoda and General Yoshijirō Umezu in advance, and he reneged on his promise to inform them if a meeting was to be held. The meeting commenced at 23:50. No consensus had emerged by 02:00 on 10 August, but the emperor gave his "sacred decision",[238] authorizing the Foreign Minister, Shigenori Tōgō, to notify the Allies that Japan would accept their terms on one condition, that the declaration "does not comprise any demand which prejudices the prerogatives of His Majesty as a Sovereign ruler."[239] On 12 August, the Emperor informed the imperial family of his decision to surrender. One of his uncles, Prince Asaka, asked whether the war would be continued if the kokutai could not be preserved. Hirohito simply replied, "Of course."[240] As the Allied terms seemed to leave intact the principle of the preservation of the Throne, Hirohito recorded on 14 August his capitulation announcement which was broadcast to the Japanese nation the next day despite an attempted military coup d'état by militarists opposed to the surrender.[241] In his declaration's fifth paragraph, Hirohito solely mentions the duration of the conflict; and did not explicitly mention the Soviets as a factor for surrender: But now the war has lasted for nearly four years. Despite the best that has been done by every one—the gallant fighting of military and naval forces, the diligence and assiduity of Our servants of the State and the devoted service of Our one hundred million people, the war situation has developed not necessarily to Japan's advantage, while the general trends of the world have all turned against her interest. The sixth paragraph by Hirohito specifically mentions the use of nuclear ordnance devices, from the aspect of the unprecedented damage they caused: Moreover, the enemy has begun to employ a new and most cruel bomb, the power of which to do damage is, indeed, incalculable, taking the toll of many innocent lives. Should we continue to fight, not only would it result in an ultimate collapse and obliteration of the Japanese nation, but also it would lead to the total extinction of human civilization. The seventh paragraph gives the reason for the ending of hostilities against the Allies: Such being the case, how are we to save the millions of our subjects, or to atone ourselves before the hallowed spirits of our imperial ancestors? This is the reason why we have ordered the acceptance of the provisions of the joint declaration of the powers.[242] In his "Rescript to the Soldiers and Sailors" delivered on 17 August, Hirohito did not refer to the atomic bombs or possible human extinction, and instead described the Soviet declaration of war as "endangering the very foundation of the Empire's existence."[243] See also: Atomic bombings of Hiroshima and Nagasaki in popular culture The front page of Chicago Daily Tribune dated 8 August 1945. The cartoon refers back to the Japanese Pearl Harbor Attack to rationalize the American atomic bombing. The Hiroshima ruins in March and April 1946, by Daniel A. McGovern and Harry Mimura On 10 August 1945, the day after the Nagasaki bombing, military photographer Yōsuke Yamahata, correspondent Higashi, and artist Yamada arrived in the city with instructions to record the destruction for propaganda purposes. Yamahata took scores of photographs, and on 21 August, they appeared in Mainichi Shimbun, a popular Japanese newspaper. After Japan's surrender and the arrival of American forces, copies of his photographs were seized amid the ensuing censorship, but some records have survived.[244] Leslie Nakashima, a former United Press (UP) journalist, filed the first personal account of the scene to appear in American newspapers. He observed that large numbers of survivors continued to die from what later became recognized as radiation poisoning.[245] On 31 August, The New York Times published an abbreviated version of his 27 August UP article. Nearly all references to uranium poisoning were omitted. An editor's note was added to say that, according to American scientists, "the atomic bomb will not have any lingering after-effects."[246][245] A telegram sent by Fritz Bilfinger, delegate of the International Committee of the Red Cross (ICRC), on 30 August 1945 from Hiroshima Wilfred Burchett was also one of the first Western journalists to visit Hiroshima after the bombing. He arrived alone by train from Tokyo on 2 September, defying the traveling ban put in place on Western correspondents.[247] Burchett's dispatch, "The Atomic Plague", was printed by the Daily Express newspaper in London on 5 September 1945. The reports from Nakashima and Burchett informed the public for the first time of the gruesome effects of radiation and nuclear fallout—radiation burns and radiation poisoning, sometimes lasting more than thirty days after the blast.[248][249] Burchett especially noted that people were dying "horribly" after bleeding from orifices, and their flesh would rot away from the injection holes where vitamin A was administered, to no avail.[247] The New York Times then apparently reversed course and ran a front-page story by Bill Lawrence confirming the existence of a terrifying affliction in Hiroshima, where many had symptoms such as hair loss and vomiting blood before dying.[247] Lawrence had gained access to the city as part of a press junket promoting the U.S. Army Air Force. Some reporters were horrified by the scene, however, referring to what they saw as a "death laboratory" littered with "human guinea pigs". General MacArthur found the reporting to have turned from good PR into bad PR and threatened to court martial the entire group. He withdrew Burchett's press accreditation and expelled the journalist from the occupation zones.[250] The authorities also accused him of being under the sway of Japanese propaganda and later suppressed another story, on the Nagasaki bombing, by George Weller of the Chicago Daily News. Less than a week after his New York Times story was published, Lawrence also backtracked and dismissed the reports on radiation sickness as Japanese efforts to undermine American morale.[251][247] A member of the United States Strategic Bombing Survey, Lieutenant Daniel A. McGovern, arrived in September 1945 to document the effects of the bombing of Japan.[252] He used a film crew to document the effects of the bombings in early 1946. The film crew shot 27,000 m (90,000 ft) of film, resulting in a three-hour documentary titled The Effects of the Atomic Bombs Against Hiroshima and Nagasaki. The documentary included images from hospitals, burned-out buildings and cars, and rows of skulls and bones on the ground. It was classified "secret" for the next 22 years.[253][254] Motion picture company Nippon Eigasha started sending cameramen to Nagasaki and Hiroshima in September 1945. On 24 October 1945, a U.S. military policeman stopped a Nippon Eigasha cameraman from continuing to film in Nagasaki. All Nippon Eigasha's reels were confiscated by the American authorities, but they were requested by the Japanese government, and declassified.[254] The public release of film footage of the city post-attack, and some research about the effects of the attack, was restricted during the occupation of Japan,[255] but the Hiroshima-based magazine, Chugoku Bunka, in its first issue published on 10 March 1946, devoted itself to detailing the damage from the bombing.[256] The book Hiroshima, written by Pulitzer Prize winner John Hersey and originally published in article form in The New Yorker,[257] is reported to have reached Tokyo in English by January 1947, and the translated version was released in Japan in 1949.[258][259][260] It narrated the stories of the lives of six bomb survivors from immediately prior to, and months after, the dropping of the Little Boy bomb.[257] Beginning in 1974, a compilation of drawings and artwork made by the survivors of the bombings began to be compiled, with completion in 1977, and under both book and exhibition format, it was titled The Unforgettable Fire.[261] Life among the rubble in Hiroshima in March and April 1946. Film footage taken by Lieutenant Daniel A. McGovern (director) and Harry Mimura (cameraman) for a United States Strategic Bombing Survey project. The bombing amazed Otto Hahn and other German atomic scientists, whom the British held at Farm Hall in Operation Epsilon. Hahn stated that he had not believed an atomic weapon "would be possible for another twenty years"; Werner Heisenberg did not believe the news at first. Carl Friedrich von Weizsäcker said "I think it's dreadful of the Americans to have done it. I think it is madness on their part", but Heisenberg replied, "One could equally well say 'That's the quickest way of ending the war'". Hahn was grateful that the German project had not succeeded in developing "such an inhumane weapon"; Karl Wirtz observed that even if it had, "we would have obliterated London but would still not have conquered the world, and then they would have dropped them on us".[262] Hahn told the others, "Once I wanted to suggest that all uranium should be sunk to the bottom of the ocean".[262] The Vatican agreed; L'Osservatore Romano expressed regret that the bomb's inventors did not destroy the weapon for the benefit of humanity.[263] Rev. Cuthbert Thicknesse, the dean of St Albans, prohibited using St Albans Abbey for a thanksgiving service for the war's end, calling the use of atomic weapons "an act of wholesale, indiscriminate massacre".[264] Nonetheless, news of the atomic bombing was greeted more positively in the U.S.; a poll in Fortune magazine in late 1945 showed a significant minority of Americans (23 percent) wishing that more atomic bombs could have been dropped on Japan.[265][266] The initial positive response was supported by the imagery presented to the public (mainly the powerful images of the mushroom cloud).[265] During this time in America, it was a common practice for editors to keep graphic images of death out of films, magazines, and newspapers.[267] See also: Epidemiology data for low-linear energy transfer radiation, Acute radiation syndrome § History, Radiobiology, Hiroshima (book), and Terufumi Sasaki Silent film footage taken in Hiroshima in March 1946 showing survivors with severe burns and keloid scars. Survivors were asked to stand in the orientation they were in at the time of the flash, to document and convey the line-of-sight nature of flash burns, and to show that, much like a sunburn, thick clothing and fabric offered protection in many cases. The sometimes extensive burn scar contracture is not unusual, being common to all second- and third-degree burns when they cover a large area of skin. An estimated 90,000 to 166,000 people in Hiroshima (between 26 and 49 percent of its population) and 60,000 to 80,000 people in Nagasaki (between 22 and 32 percent of its population) died in 1945, of which a majority in each case were killed on the days of the bombings, due to the force and heat of the blasts themselves. Nearly all of the remainder of victims died within two to four months, due to radiation exposure and resulting complications.[121][150] One Atomic Bomb Casualty Commission (ABCC) report discusses 6

2018. ^ Harry S. Truman, Diary, 25 July 1945. File Unit: Ross, Mr. And MRS. Charles G. [Truman's Potsdam diary], 1945–1953. Harry S. Truman Presidential Library and Museum. 25 July 1945. Retrieved 23 October 2020. ^ Hewlett & Anderson 1962, pp. 389–390. ^ Hewlett & Anderson 1962, pp. 395–396. ^ Frank 1999, pp. 233–234. The meaning of mokusatsu can fall anywhere in the range of "ignore" to "treat with contempt". ^ Bix 1996, p. 290. ^ Asada 1996, p. 39. ^ Thomas & Morgan-Witts 1977, pp. 326, 356, 370. ^ a b Hoddeson et al. 1993, p. 262. ^ a b Hoddeson et al. 1993, p. 265. ^ Coster-Mullen 2012, p. 30. ^ Coster-Mullen 2012, p. 45. ^ Campbell 2005, pp. 38–40. ^ Giangreco 2009, pp. 64–65, 163. ^ Goldstein, Dillon & Wenger 1995, p. 41. ^ Giangreco 2009, pp. 70, 163. ^ a b c Zaloga & Noon 2010, p. 59. ^ United States Strategic Bombing Survey (June 1946). "U. S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki". Nuclear Age Peace Foundation. 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The strike report said 9,200 meters (30,200 ft), the official history said 9,600 meters (31,600 ft), Parson's log entry was 10,000 meters (32,700 ft), and the navigator's log was 9,470 meters (31,060 ft)—the latter possibly an error transposing two digits. A later calculation using the indicated atmospheric pressure arrived at the figure of 9,800 meters (32,200 ft). Similarly, several values have been reported as the altitude of the Little Boy bomb at the moment of detonation. Published sources vary in the range of 550 to 610 m (1,800 to 2,000 ft) above the city. The device was set to explode at 575 m (1,885 ft), but this was approximate. Malik uses the figure of 580 m (1,903 ft) plus or minus 15 m (50 ft), determined after data review by Hubbell et al 1969. Radar returns from the tops of multistory buildings near the hypocenter may have triggered the detonation at a somewhat higher altitude than planned. Kerr et al. 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