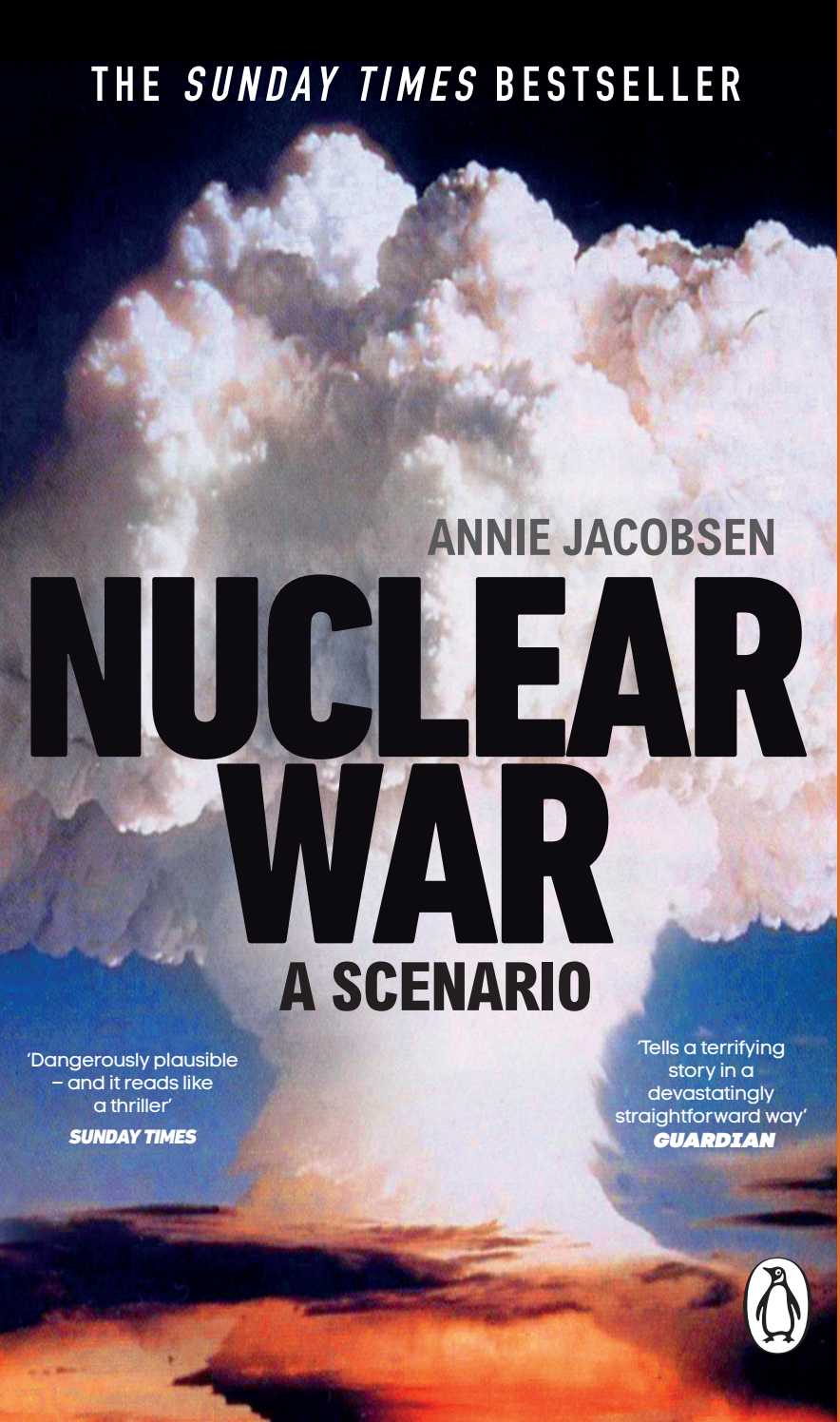
THE *SUNDAY TIMES* BESTSELLER
ANNIE JACOBSEN
NUCLEAR WAR
A SCENARIO
'Dangerously plausible – and it reads like a thriller'
SUNDAY TIMES
'Tells a terrifying story in a devastatingly straightforward way'
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Praise for *Nuclear War*

'The attack is hypothetical, but the resultant scenarios are based on interviews with military experts — and they're terrifying . . . An undeniably gripping narrative. I can see why the Baillie Gifford judges were so hooked.' – Mark Urban, *Sunday Times*

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'Books like Annie Jacobsen's gripping *Nuclear War: A Scenario* are essential if you want to understand the complex and disturbing details that go into a civilization-destroying decision to drop the Bomb on an enemy.' – Barry Gewen, *The New York Times*

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'This terrifying book is a must-read for every world leader.'
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'Using hard data from top military, government, and scientific sources, and brilliantly weaving in historical facts and technical data, Annie Jacobsen masterfully explains the nuclear issue in riveting story form, turning her readers into experts on the one issue that must concern us all . . . Everyone, especially politicians and heads of state, must read this important and very timely book. I cannot recommend it enough.'
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'At once methodical and vivid. In documenting the minutiae of the apocalypse, the writing is redolent of "Hiroshima", a seminal article by John Hersey published in the *New Yorker* in 1946.' – *The Economist*

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– *Times Literary Supplement*

'In a horrific minute-by-minute overview, Jacobsen brings to life the insane and impossible pressures heaped on decision-makers – and the doomsday ending for humanity. Maybe we all need to learn to start worrying about the bomb.' – Lee Cain, *City AM*

'In *Nuclear War: A Scenario*, Annie Jacobsen, gives us a vivid picture of what could happen if our nuclear guardians fail . . . Terrifying.'
– *Wall Street Journal*

'Not one to read if you have trouble sleeping.'
– Gideon Rachman, *Financial Times*

ANNIE JACOBSEN

NUCLEAR WAR

A SCENARIO

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For Kevin

"The Story of the human race is War.
Except for brief and precarious interludes,
there has never been peace in the world;
and before history began, murderous strife
was universal and unending."

—Winston Churchill

CONTENTS

AUTHOR'S NOTE

Since the early 1950s, the United States government has spent trillions of dollars preparing to fight a nuclear war, while also refining protocols meant to keep the U.S. government functioning after hundreds of millions of Americans become casualties of an apocalyptic-scale nuclear holocaust.

This scenario—of what the moments after an inbound nuclear missile launch could look like—is based on facts sourced from exclusive interviews with presidential advisors, cabinet members, nuclear weapons engineers, scientists, soldiers, airmen, special operators, Secret Service, emergency management experts, intelligence analysts, civil servants, and others who have worked on these macabre scenarios over decades. Because the plans for General Nuclear War are among the most classified secrets held by the U.S. government, this book, and the scenario it postulates, takes the reader up to the razor's edge of what can legally be known. Declassified documents—obfuscated for decades—fill in the details with terrifying clarity.

Because the Pentagon is a top target for a strike by America's nuclear-armed enemies, in the scenario that follows, Washington, D.C., gets hit first—with a 1-megaton thermonuclear bomb. "A Bolt out of the Blue attack against D.C. is what everyone in D.C. fears most," says former assistant secretary of defense for nuclear, chemical, and biological defense programs Andrew Weber. "Bolt out of the Blue" is how U.S. Nuclear Command and Control refers to an "unwarned large [nuclear] attack."

This strike on D.C. initiates the beginning of an Armageddon-like General Nuclear War that will almost certainly follow. "There is no such thing as a small nuclear war" is an oft repeated phrase in Washington.

A nuclear strike on the Pentagon is just the beginning of a scenario the finality of which will be the end of civilization as we know it. This is the reality of the world in which we all live. The nuclear war scenario proposed in this book could happen tomorrow. Or later today.

"The world could end in the next couple of hours," warns General Robert Kehler, the former commander of the United States Strategic Command.

INTERVIEWS

(U.S. Nuclear Command and Control positions are formerly held)

Dr. Richard L. Garwin: nuclear weapons designer, Ivy Mike thermonuclear bomb

Dr. William J. Perry: United States secretary of defense

Leon E. Panetta: United States secretary of defense, director of the Central Intelligence Agency, White House chief of staff

General C. Robert Kehler: commander, United States Strategic Command

Vice Admiral Michael J. Connor: commander, United States [nuclear] submarine forces

Brigadier General Gregory J. Touhill: first U.S. federal chief information security officer (CISO); director, Command, Control, Communications, and Cyber (C4) Systems, U.S. Transportation Command

William Craig Fugate: administrator, Federal Emergency Management Agency (FEMA)

Honorable Andrew C. Weber: assistant secretary of defense for nuclear, chemical, and biological defense programs

Jon B. Wolfsthal: special assistant to the president for national security affairs, National Security Council

Dr. Peter Vincent Pry: CIA intelligence officer, weapons of mass destruction, Russia; executive director, Electromagnetic Pulse Task Force of National and Homeland Security

Judge Robert C. Bonner: commissioner, Customs and Border Protection, Department of Homeland Security

Lewis C. Merletti: director, United States Secret Service

Colonel Julian Chesnutt, PhD: Defense Clandestine Service, Defense Intelligence Agency; U.S. defense attaché; U.S. air attaché; F-16 squadron commander

Dr. Charles F. McMillan: director, Los Alamos National Laboratory

Dr. Glen McDuff: nuclear weapons engineer, Los Alamos National Laboratory; laboratory historian

Dr. Theodore Postol: assistant to chief of naval operations; professor emeritus, MIT

Dr. J. Douglas Beason: chief scientist, United States Air Force Space Command

Dr. Frank N. von Hippel: physicist and professor emeritus, Princeton University (co-founder, Program on Science and Global Security)

Dr. Brian Toon: professor; nuclear winter theory (co-author with Carl Sagan)

Dr. Alan Robock: distinguished professor, climatologist, nuclear winter

Hans M. Kristensen: director, Nuclear Information Project, Federation of American Scientists

Michael Madden: director, North Korea Leadership Watch, Stimson Center

Don D. Mann: team manager, SEAL Team Six, Nuclear, Biological, and Chemical Program

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H. I. Sutton: analyst and writer, U.S. Naval Institute

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David Cenciotti: aviation journalist; 2nd Lt. (ret.), Aeronautica Militare (Italian Air Force, ITAF)

Michael Morsch: Neolithic archeologist, University of Heidelberg; co-locator Göbekli Tepe

Dr. Albert D. Wheelon: CIA director, Directorate of Science and Technology

Dr. Charles H. Townes: inventor of the laser; Nobel Prize in Physics, 1964

Dr. Marvin L. Goldberger: former Manhattan Project physicist, founder and chairman of the Jason scientists, science advisor to President Johnson

Paul S. Kozemchak: special assistant to director, DARPA (and its longest-serving member)

Dr. Jay W. Forrester: computer pioneer, founder of system dynamics

General Paul F. Gorman: former commander in chief, U.S. Southern Command (U.S. SOUTHCOM); special assistant to the Joint Chiefs of Staff

Alfred O'Donnell: Manhattan Project member, EG&G nuclear weapons engineer, Atomic Energy Commission

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Dr. Alex Wellerstein: professor, author, historian of science and nuclear technology

Fred Kaplan: journalist, author, nuclear weapons historian

PROLOGUE

Hell on Earth

Washington, D.C.,
Possibly Sometime in the Near Future

A 1-megaton thermonuclear weapon detonation begins with a flash of light and heat so tremendous it is impossible for the human mind to comprehend. One hundred and eighty million degrees Fahrenheit is four or five times hotter than the temperature that occurs at the center of the Earth's sun.

In the first fraction of a millisecond after this thermonuclear bomb strikes the Pentagon outside Washington, D.C., there is light. Soft X-ray light with a very short wavelength. The light superheats the surrounding air to millions of degrees, creating a massive fireball that expands at millions of miles per hour. Within a few seconds, this fireball increases to a diameter of a little more than a mile (5,700 feet across), its light and heat so intense that concrete surfaces explode, metal objects melt or evaporate, stone shatters, humans instantaneously convert into combusting carbon.

The five-story, five-sided structure of the Pentagon and everything inside its 6.5 million square feet of office space explodes into superheated dust from the initial flash of light and heat, all the walls shattering with the near-simultaneous arrival of the shock wave, all 27,000 employees perishing instantly.

Not a single thing in the fireball remains.

Nothing.

Ground zero is zeroed.

Traveling at the speed of light, the radiating heat from the fireball ignites everything flammable within its line of sight several miles out in every direction. Curtains, paper, books, wood fences, people's clothing, dry leaves explode into flames and become kindling for a great firestorm that begins to consume a 100-or-more-square-mile area that, prior to this flash of light, was the beating heart of American governance and home to some 6 million people.

Several hundred feet northwest of the Pentagon, all 639 acres of Arlington National Cemetery—including the 400,000 sets of bones and gravestones honoring the war dead, the 3,800 African American freedpeople buried in section 27, the living visitors paying respects on this early spring afternoon, the groundskeepers mowing the lawns, the arborists tending to the trees, the tour guides touring, the white-gloved members of the Old Guard keeping watch over the Tomb of the Unknowns—are instantly transformed into combusting and charred human figurines. Into black organic-matter powder that is soot. Those incinerated are spared the unprecedented horror that begins to be inflicted on the 1 to 2 million more gravely injured people not yet dead in this first Bolt out of the Blue nuclear strike.

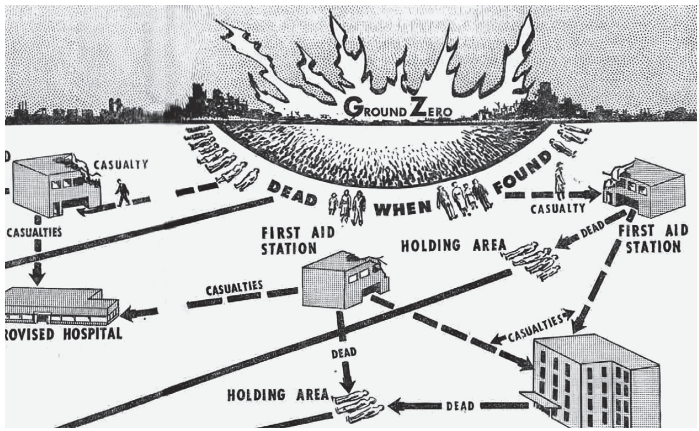
Across the Potomac River one mile to the northeast, the marble walls and columns of the Lincoln and Jefferson memorials superheat, split, burst apart, and disintegrate. The steel and stone bridges and highways connecting these historic monuments to the surrounding environs heave and collapse. To the south, across Interstate 395, the bright and spacious glass-walled Fashion Centre at Pentagon City, with its abundance of stores filled with high-end clothing brands and household goods, and the surrounding restaurants and offices, along with the adjacent Ritz-Carlton, Pentagon

City hotel—they are all obliterated. Ceiling joists, two-by-fours, escalators, chandeliers, rugs, furniture, mannequins, dogs, squirrels, people burst into flames and burn. It is the end of March, 3:36 p.m. local time.

It has been three seconds since the initial blast. There is a baseball game going on two and a half miles due east at Nationals Park. The clothes on a majority of the 35,000 people watching the game catch on fire. Those who don't quickly burn to death suffer intense third-degree burns. Their bodies get stripped of the outer layer of skin, exposing bloody dermis underneath.

Third-degree burns require immediate specialized care and often limb amputation to prevent death. Here inside Nationals Park there might be a few thousand people who somehow survive initially. They were inside buying food, or using the bathrooms indoors—people who now desperately need a bed at a burn treatment center. But there are only ten specialized burn beds in the entire Washington metropolitan area, at the MedStar Washington Hospital's Burn Center in central D.C. And because this facility is about five miles northeast of the Pentagon, it no longer functions, if it even exists. At the Johns Hopkins Burn Center, forty-five miles northeast, in Baltimore, there are less than twenty specialized burn beds, but they all are about to become filled. In total there are only around 2,000 specialized burn unit beds in all fifty states at any given time.

Within seconds, thermal radiation from this 1-megaton nuclear bomb attack on the Pentagon has deeply burned the skin on roughly 1 million more people, 90 percent of whom will die. Defense scientists and academics alike have spent decades doing this math. Most won't make it more than a few steps from where they happen to be standing when the bomb detonates. They become what civil defense experts referred to in the 1950s, when these gruesome calculations first came to be, as "Dead When Found."



"Dead When Found." (U.S. Federal Civil Defense Administration)

At the Joint Base Anacostia-Bolling, a 1,000-acre military facility across the Potomac to the southeast, there are another 17,000 victims, including almost everyone working at the Defense Intelligence Agency headquarters, the White House Communications Agency headquarters, the U.S. Coast Guard Station Washington, the Marine One helicopter hangar, and scores of other heavily guarded federal facilities that cater to the nation's security. At the National Defense University, a majority of the 4,000 students attending are dead or dying. With no shortness of tragic irony, this university (funded by the Pentagon and founded on America's two-hundredth birthday) is where military officers go to learn how to use U.S. military tactics to achieve U.S. national security dominance around the world. This university is not the only military-themed higher-learning institution obliterated in the nuclear first strike. The Eisenhower School for National Security and Resource Strategy, the National War College, the Inter-American Defense College, the Africa Center for Strategic Studies, they all immediately cease to exist. This entire waterfront area, from Buzzard

Point Park to St. Augustine's Episcopal Church, from the Navy Yard to the Frederick Douglass Memorial Bridge, is totally destroyed.

Humans created the nuclear weapon in the twentieth century to save the world from evil, and now, in the twenty-first century, the nuclear weapon is about to destroy the world. To burn it all down.

The science behind the bomb is profound. Embedded in the thermonuclear flash of light are two pulses of thermal radiation. The first pulse lasts a fraction of a second, after which comes the second pulse, which lasts several seconds and causes human skin to ignite and burn. The light pulses are silent; light has no sound. What follows is a thunderous roar that is blast. The intense heat generated by this nuclear explosion creates a high-pressure wave that moves out from its center point like a tsunami, a giant wall of highly compressed air traveling faster than the speed of sound. It mows people down, hurls others into the air, bursts lungs and eardrums, sucks bodies up and spits them out. "In general, large buildings are destroyed by the change in air pressure, while people and objects such as trees and utility poles are destroyed by the wind," notes an archivist who compiles these appalling statistics for the Atomic Archive.

As the nuclear fireball grows, this shock front delivers catastrophic destruction, pushing out like a bulldozer and moving three miles farther ahead. The air behind the blast wave accelerates, creating several-hundred-mile-per-hour winds, extraordinary speeds that are difficult to fathom. In 2012, Hurricane Sandy, which did $70 billion in damage and killed some 147 people, had maximum sustained winds of roughly 80 miles per hour. The highest wind speed ever recorded on Earth was 253 miles per hour, at a remote weather station in Australia. This nuclear blast wave in Washington, D.C., destroys all structures in its immediate path, instantly changing the physical shapes of engineered structures

including office buildings, apartment complexes, monuments, museums, parking structures—they disintegrate and become dust. That which is not crushed by blast is torn apart by whipping wind. Buildings collapse, bridges fall, cranes topple over. Objects as small as computers and cement blocks, and as large as 18-wheeler trucks and double-decker tour buses, become airborne like tennis balls.

The nuclear fireball that has been consuming everything in the initial 1.1-mile radius now rises up like a hot-air balloon. Up from the earth it floats, at a rate of 250 to 350 feet per second. Thirty-five seconds pass. The formation of the iconic mushroom cloud begins, its massive cap and stem, made up of incinerated people and civilization's debris, transmutes from a red, to a brown, to an orange hue. Next comes the deadly reverse suction effect, with objects—cars, people, light poles, street signs, parking meters, steel carrier beams—getting sucked back into the center of the burning inferno and consumed by flame.

Sixty seconds pass.

The mushroom cap and stem, now grayish white, rises up five then ten miles from ground zero. The cap grows too, stretching out ten, twenty, thirty miles across, billowing and blowing farther out. Eventually it reaches beyond the troposphere, higher than commercial flights go, and the region where most of the Earth's weather phenomena occurs. Radioactive particles spew across everything below as fallout raining back down on the Earth and its people. A nuclear bomb produces "a witch's brew of radioactive products which are also entrained in the cloud," the astrophysicist Carl Sagan warned decades ago.

More than a million people are dead or dying and less than two minutes have passed since detonation. Now the inferno begins. This is different from the initial fireball; it is a mega-fire beyond measure. Gas lines explode one after the next, acting like giant

blowtorches or flamethrowers, spewing steady streams of fire. Tanks containing flammable materials burst open. Chemical factories explode. Pilot lights on water heaters and furnaces act like torch lighters, setting anything not already burning alight. Collapsed buildings become like giant ovens. People, everywhere, burn alive.

Open gaps in floors and roofs behave like chimneys. Carbon dioxide from the firestorms sinks down and settles into the metro's subway tunnels, asphyxiating riders in their seats. People seeking shelter in basements and other spaces belowground vomit, convulse, become comatose, and die. Anyone aboveground who was looking directly at the blast—in some cases as far as thirteen miles away—has been blinded.

Seven and a half miles out from ground zero, in a 15-mile diameter ring around the Pentagon (the 5 psi zone), cars and buses crash into one another. Asphalt streets turn to liquid from the intense heat, trapping survivors as if caught in molten lava or quicksand. Hurricane-force winds fuel hundreds of fires into thousands of fires, into millions of them. Ten miles out, hot burning ash and flaming wind-borne debris ignite new fires, and one after another they continue to conflate. All of Washington, D.C., becomes one complex firestorm. A mega-inferno. Soon to become a mesocyclone of fire. Eight, maybe nine minutes pass.

Ten and twelve miles out from ground zero (in the 1 psi zone), survivors shuffle in shock like the almost dead. Unsure of what just happened, desperate to escape. Tens of thousands of people here have ruptured lungs. Crows, sparrows, and pigeons flying overhead catch on fire and drop from the sky as if it is raining birds. There is no electricity. No phone service. No 911.

The localized electromagnetic pulse of the bomb obliterates all radio, internet, and TV. Cars with electric ignition systems in a

several-mile ring outside the blast zone cannot restart. Water stations can't pump water. Saturated with lethal levels of radiation, the entire area is a no-go zone for first responders. Not for days will the rare survivors realize help was never on the way.

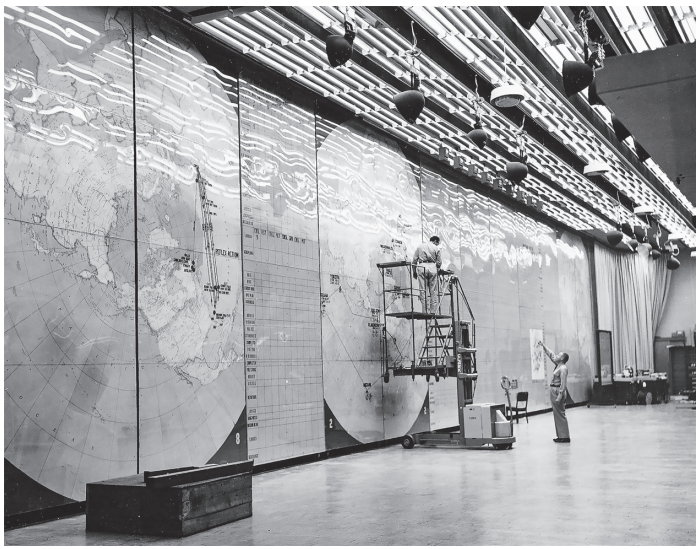
Those who somehow manage to escape death by the initial blast, shock wave, and firestorm suddenly realize an insidious truth about nuclear war. That they are entirely on their own. Former FEMA director Craig Fugate tells us their only hope for survival is to figure out how to "self-survive." That here begins a "fight for food, water, Pedialyte . . ."

How, and why, do U.S. defense scientists know such hideous things, and with exacting precision? How does the U.S. government know so many nuclear effects–related facts, while the general public remains blind? The answer is as grotesque as the questions themselves because, for all these years, since the end of World War II, the U.S. government has been preparing for, and rehearsing plans for, a General Nuclear War. A nuclear World War III that is guaranteed to leave, at minimum, 2 billion dead.

To know this answer more specifically, we go back in time, more than sixty years. To December 1960. To U.S. Strategic Air Command, and a secret meeting that took place there.

Part I

THE BUILDUP
(OR, HOW WE GOT HERE)



SAC headquarters, underground command post. The "big board." View in early 1957. (U.S. Air Force Historical Research Agency)

CHAPTER ONE

The Top Secret Plan for General Nuclear War

December 1960, Strategic Air Command Headquarters, Offutt Air Force Base, Nebraska

One day not so long ago, a group of American military officials got together to share a secret plan that would result in the death of 600 million people, one-fifth of the world's then population of 3 billion people. Those in attendance that day included:

U.S. Secretary of Defense Thomas S. Gates Jr.
U.S. Deputy Secretary of Defense James H. Douglas Jr.
U.S. Deputy Director of Defense Research and Engineering John H. Rubel
The Joint Chiefs of Staff
Commander of U.S. Strategic Air Command General Thomas S. Power
Army Chief General George H. Decker
Navy Chief Admiral Arleigh A. Burke
Air Force Commander General Thomas D. White
Marine Corps Commandant General David M. Shoup
A multitude of additional top-ranking U.S. military officials

The room was located underground. Walls more than 150 feet long, several stories tall, with an overhead glass-enclosed balcony on the second floor. There were banks of desks, telephones, and maps. Panels of maps. A whole wall of maps. Strategic Air Command headquarters in Omaha, Nebraska, was where generals and admirals would run nuclear war when it happened. True then, true now in 2024—with the underground command center updated for twenty-first-century nuclear war.

Everything you are about to learn of this meeting comes from a firsthand witness—someone who was actually in the room that day—a business executive turned defense official named John H. Rubel. In 2008, in his late eighties, a few years before he died, Rubel revealed this information in a short memoir. As Rubel prepared for his own death, he summoned the courage to express a long-repressed truth. That he felt remorse for having participated in such a "heart of darkness" plan. For saying nothing for so many decades after the fact. What he was part of, Rubel wrote, was a plan for "mass extermination." His words.

Inside the large underground bunker in Nebraska that day, Rubel was seated alongside his fellow nuclear war planners in neat rows of folding chairs, the old-fashioned kind with wooden slats. The four-star generals sat in the front row, the one-star generals in the back. Rubel, U.S. deputy director of Defense Research and Engineering at the time, sat in the second row.

On a signal from Strategic Air Command commander General Thomas S. Power, a briefer stepped forward onstage. Then an aide appeared carrying an easel, and a second aide carrying a pointing stick. The first man was there to flip charts, the second to point things out. General Power (his actual name) explained to his audience that what was being witnessed was how a full-scale nuclear attack against the Soviet Union would go down. Two airmen walked forward and stood one at each end of the 150-foot-long wall

of maps, each man carrying a tall stepladder. The map showed the Soviet Union and China (then called the Sino-Soviet bloc) and the surrounding countries.

Rubel recalled, "Each man climbed his tall ladder at the same brisk rate, reaching the top at the same instant as his counterpart. Each man reached up toward a red ribbon which, we now noticed, encircled a large roll of clear plastic. With a single motion, each untied the bowknot securing the ribbon at his end of the roll, whereupon the plastic sheet unrolled with a *whoosh!*, flapped a bit and then dangled limply in front of the map." The map showed hundreds of small black marks, "most of them over Moscow," each one representing a nuclear explosion.

The first of General Power's briefers began to describe the U.S. nuclear attack plan against the Soviet Union. The first wave of attacks would come from U.S. fighter jets that would take off from aircraft carriers stationed near Okinawa, Japan. "Wave after wave" of attacks would ensue. Successive bombing runs by Boeing B-52 long-range strategic bombers, each carrying in its bomb bay multiple thermonuclear weapons—each capable of thousands of times the destruction of the atomic bombs dropped on Hiroshima and Nagasaki, Japan. Each time the briefer described a new wave of attacks, Rubel wrote, the two men on their stepladders "would untie another pair of red ribbons, a plastic roll would come whooshing down and Moscow would be even further obliterated beneath the little marks on those layers of plastic sheets."

What shocked Rubel most, he wrote, was that with regards to Moscow alone, "the plan called for a total of forty megatons—*megatons*—on Moscow, about four thousand times more than the bomb over Hiroshima and perhaps twenty to thirty times more than all the non-nuclear bombs dropped by the Allies in both theaters during more than four years of World War II."

And yet, all during this meeting in 1960, Rubel sat in his chair and said nothing.

Not one thing. Not for forty-eight years. But the admission is remarkable—the first known instance where an attendee of this meeting dared reveal such personal details about what went on. Details that convey the simple truth to anyone outside that room: that this plan for nuclear war was genocide.

The airmen descended the ladders, folded them up, tucked them under their arms, and stepped out of view.

Four thousand times more explosive power than the bomb dropped on Hiroshima.

What does this even mean—and is it something one's brain can fully comprehend?

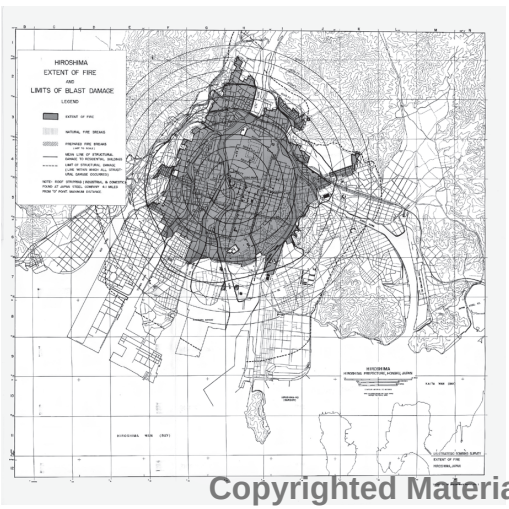
More immediately, can anyone stop the plan for mass extermination before it happens?

CHAPTER TWO

The Girl in the Rubble

August 6, 1945, Hiroshima, Japan

The atomic bomb that was dropped on Hiroshima in August 1945 killed more than 80,000 people in a single strike. The total numbers are debated still. In the days and weeks after the bombing, no accurate counting of the victims could be performed. The mass destruction of Hiroshima's government facilities, its hospitals, police, and fire departments created a state of total chaos and confusion in the immediate aftermath.



U.S. Strategic Bombing Survey map of Hiroshima's fire and blast damage. (U.S. National Archives)

Thirteen-year-old Setsuko Thurlow was 1.1 miles from ground zero when this atomic weapon, code-named Little Boy, detonated over Hiroshima at an altitude of 1,900 feet—an airburst, as it's known. This was the first nuclear weapon used in battle. Its burst height was based on a figure that had been precisely calculated by the American defense scientist John von Neumann, whose assigned task was to figure out a way to kill the most people possible on the ground below with this single atomic bomb. Exploding a nuclear bomb directly on the ground "wastes" a lot of energy, displacing massive volumes of earth, as military planners had figured out and agreed. Setsuko Thurlow was knocked unconscious by this blast.

When she first regained consciousness, Setsuko could not see or move. "Then I started hearing whispering voices of the girls around me," she recalled years later, and that she could hear them saying, "God, help me, mother help me. I'm here."

Sheltered by a collapsed building, Setsuko had somewhat miraculously survived the initial blast that comes with the detonation of an atomic bomb. Everything was very dark around her, she remembered. Her first sensation was that she had turned into smoke. After some time—seconds, or maybe minutes—it registered in her brain that the voice of a man was instructing her to do something.

"Don't give up," the man said. "I'm trying to free you."

This man, a stranger, was shaking Setsuko's left shoulder and pushing her from behind. "Get out . . . crawl as quickly as possible," she thought to herself.

At the time of the atomic bombing of Hiroshima, Setsuko Thurlow was an eighth-grade student attending a school for girls. She was one of more than thirty teenage girls who had been recruited and trained to do top secret recording work at the Japanese army headquarters in Hiroshima, which is where she was when the bomb went off.

"Can you imagine," Setsuko later reflected, "a 13-year-old girl doing such important work? That shows how desperate Japan was."

In these early moments after the atomic bomb exploded, Setsuko realized this man was trying to free her from the rubble and it was important she take action or she would likely die. She pushed and pushed. Began kicking. Somehow, she managed to crawl out of the rubble and through a doorway. "By the time I came out of the building, it was on fire," she remembered. "That meant about 30 other girls who were with me in that same place were burning to death."

The atomic bomb had been dropped out of a U.S. Army Air Forces airplane, which at the time was the only way to deliver such a bomb to its target. The weapon was ten feet long and weighed 9,700 pounds, about as much as a medium-sized elephant. A second plane flew directly behind the bomber plane, this one carrying three Los Alamos physicists, along with scores of scientific instruments with which to collect data.

The bomb's actual yield (the force required to produce an equivalent explosion) was for years debated among defense scientists and military officials. Finally, in 1985, the U.S. government settled on that number as being equivalent to 15 kilotons of TNT. A Strategic Bombing Survey conducted after the war estimated that 2,100 tons of conventional bombs would have had to have been dropped on Hiroshima all at once to achieve a similar effect.

Setsuko Thurlow made it outside. It was early in the morning, but it looked like night. The air was thick with dark smoke. Setsuko saw a black object shuffling toward her, followed by other black objects that, at first, she mistook for ghosts.

"Parts of the bodies were missing," she realized. "The skin and flesh were hanging from the bones. Some were carrying their own eyeballs."

Down the road a ways, Dr. Michihiko Hachiya, director of the Hiroshima Communications Hospital, had been lying on his living room floor, recovering from a night shift at work, when a strong flash of light—one that indicated the atomic bomb had detonated—startled him. Then came a second flash of light. He was knocked out, or was he? Through swirling dust Dr. Hachiya began to discern what was going on. Parts of his body, his thighs and his neck, were mangled and bleeding. He was naked. His clothes had been blown off. "Embedded in my neck was a sizable fragment of glass which I matter-of-factly dislodged," Dr. Hachiya later recalled, and that he wondered, "Where was my wife?" He looked at his own body again. "Blood began to spurt. Had my carotid artery been cut? Would I bleed to death?"

After some time, Dr. Hachiya found his wife, Yaeko-san. Their small house was collapsing around the two of them and they raced outside, "running, stumbling, falling," he remembered. "Getting to my feet I discovered that I had tripped over a man's head."

Setsuko Thurlow's survivor experience, and Dr. Hachiya's survivor experience, and countless others like theirs were for decades suppressed by the U.S. Army and its occupation forces in Japan. The effects that atomic weapons used in combat had on people and buildings were kept classified and proprietary because U.S. defense officials wanted that information for themselves. For another nuclear war. The Pentagon wanted to make sure it knew more about nuclear blast effects than any future enemy could possibly know.

In flashes of energy and light, two atomic bombs—one dropped on Hiroshima on August 6, 1945, and a second dropped on Nagasaki three days later—ended a world war in which 50 to 75 million people already had died. Now, starting in 1945, a small group of nuclear scientists and defense officials in the U.S.

began making new and bigger plans, to use scores of atomic weapons in the next world war. A war that could be expected to kill, at minimum, 600 million people, one-fifth of the entire world's population.

Which brings us back to the men seated in the underground bunker, in December 1960, listening to plans for General Nuclear War.

CHAPTER THREE

The Buildup

1945–1990:
Los Alamos, Lawrence Livermore,
and Sandia National Laboratories

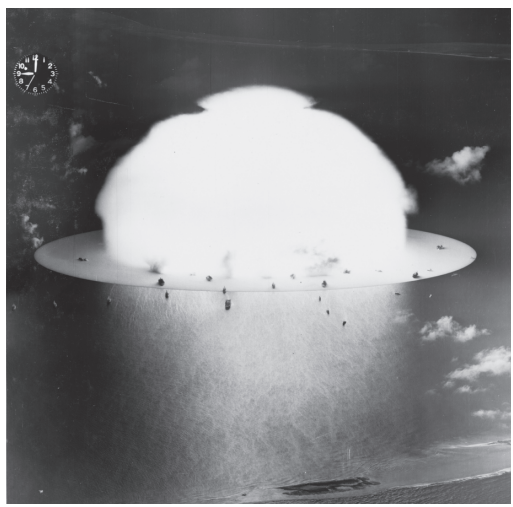
The plan for nuclear war being secretly shown at Strategic Air Command headquarters in 1960 had been a year or so in the making. It was ordered for the U.S. president by the secretary of defense. Fifteen years had passed since the two atomic weapons were dropped on Japan, each one killing tens of thousands of people in an instant with tens of thousands more people burning to death in the ensuing firestorms.

Back in August 1945, the U.S. had a third bomb ready to be shipped out, with enough nuclear material in its arsenal to produce a fourth bomb by the end of the month, which was the plan of action had Japan not surrendered. "The original atomic bombs were like school science projects," says Dr. Glen McDuff, a long-serving Los Alamos nuclear weapons engineer and the former historian-curator of the laboratory's classified museum. "Nineteen out of every twenty pieces of scientific equipment they had," explains McDuff, "they designed and built themselves with only about eighty common vacuum tubes."

With the world war finally over, the fate of the Los Alamos

nuclear laboratory was anyone's guess. "After the war, with just one atomic bomb in the stockpile, the Los Alamos lab and town infrastructure crumbled," reflects McDuff. "It was a daily struggle just to keep the lights on. Half the Los Alamos staff left. Things looked bleak. Until, that is, the navy got involved."

The U.S. Navy was by far the most powerful maritime fighting force in the world and it was deeply worried about its looming obsolescence in this new age of atomic warfare. So it planned a live-action series of three atomic bomb tests—for all to see.



Atomic test Baker burst through the lagoon surface, lofting 2 million cubic yards of radioactive seawater and sediment into the air in 1946. (U.S. Library of Congress)

Operation Crossroads was a grand, celebratory affair. A massive, public-relations-based military test designed to demonstrate how eighty-eight naval vessels could survive—even thrive—in a future nuclear battle fought at sea. More than 42,000 people gathered at Bikini Atoll in the Marshall Islands. World leaders, journalists, dignitaries, heads of state—they traveled to this far corner

of the Pacific to witness the live-fire atomic explosions. This was America's first use of an atomic weapon since the war. A demonstration of what lay ahead.

"For a crumbling Los Alamos in 1946," says McDuff, "the navy was their savior."

Operation Crossroads injected the atomic bomb program with new life. By mid-1946, the American nuclear stockpile grew to nine atomic bombs. After the test, the Joint Chiefs of Staff requested an evaluation of the "atomic bomb as a military weapon" to determine its next move. The report—classified until 1975—set the burgeoning military-industrial complex alight. The details were alarming.

Atomic bombs were "a threat to mankind and to civilization," warned the group of admirals, generals, and scientists who authored the report, "weapons of mass destruction" able to "depopulate vast areas of the Earth's surface." But they could also be very useful, the group told the Joint Chiefs of Staff. "If used in numbers," they wrote, "atomic bombs not only can nullify any nation's military effort, but can demolish its social and economic structures and prevent their reestablishment for long periods of time."

The board's recommendation was to stockpile more bombs.

Russia would soon have its own atomic arsenal, the report made clear, and that made America vulnerable to a surprise attack—later to be known as a Bolt out of the Blue attack. "With the advent of the atomic bomb," the board warned, "surprise has achieved supreme value so that an aggressor, striking suddenly and unexpectedly with a number of atomic bombs [could] insure the ultimate defeat of an initially stronger adversary"—meaning the United States.

What America had created presaged its own potential demise.

"The United States has no alternative but to continue the manufacture and stockpiling of weapons," the Joint Chiefs were advised. They took notice, and approved.