Scientific Evaluation of Theories Denying the Hiroshima and Nagasaki Atomic Bombings

— Circulating Narratives and Scientific Facts —

Osamu Sugihara

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Abstract

This paper examines, from the perspectives of physics, radiochemistry, medicine, history, and epistemology, the theories denying the atomic bombings of Hiroshima and Nagasaki—which are circulating on social media, in video programs, books, and lectures—and which claim that "what was dropped on Hiroshima and Nagasaki were not atomic bombs, but a combination of conventional bombs, incendiary weapons, sulfur mustard, etc." and that "nuclear weapons do not exist at all." The subjects of this examination are major statements published in Japan and the key proposition in Michael Palmer's 'Hiroshima Revisited' Version 1.9. Debates regarding normative and historical interpretations—such as the military necessity of the atomic bombings, their moral evaluation, and their contribution to the decision to surrender—are excluded from the direct scope of this paper.

The methodology adopted in this paper consists, first, of organizing the claims under examination as accurately as possible; second, of clarifying the observational results predicted by each claim; and third, of cross-referencing these claims with multiple independent sets of evidence. The evidence is organized in the following order: (1) neutron-induced radioactivity products remaining in bomb-exposed samples; (2) primary sources documenting the development, transport, dropping, and investigation of the atomic bombs; (3) acute symptoms, chromosomal abnormalities, and long-term epidemiological findings observed in atomic bomb survivors; and (4) physical consistency regarding blast waves, heat rays, shielding, and building structures, in that order. We do not rely on a single source or a single testimony, but rather emphasize whether evidence from different fields converges on the same conclusion.

From a radiochemical perspective, radiation-induced products consistent with the neutron field generated by the atomic bombs—such as chlorine-36, europium-152, and cobalt-60—have been

measured in samples from Hiroshima and Nagasaki, depending on the city and the specific sample. The primary research on chlorine-36 concerns Hiroshima samples; regarding Nagasaki , other data such as europium-152 are evaluated separately. Since chlorine-36 exists naturally and can also be produced in nuclear reactors or accelerators, it is not a “substance that cannot be produced by anything other than an atomic bomb.” However, concentrations significantly exceeding natural background levels have been observed in irradiated mineral and concrete samples, and their distribution—which depends on distance from the hypocenter, sample depth, and shielding conditions—generally agrees with neutron transport calculations and and have been reproduced in cross-comparisons conducted by research institutions in multiple countries. Chemical reactions involving conventional explosives, napalm, sulfur mustard, and the like do not possess a mechanism capable of generating such a neutron field.

The fact that trees and buildings remained standing does not, in and of itself, conclusively prove that an atomic bomb was dropped. However, when considering an airburst, thermal radiation lasting on the order of seconds, the direction and duration of the blast pressure, shielding, building structural forms, secondary fires, the moisture content of trees, and their regenerative capacity, the presence of surviving structures is not inconsistent with an atomic bomb explosion. Therefore, the inference that “since something remained, it was not an atomic bomb” does not hold. The response of structures is not determined solely by the static compressive strength of the materials; it must be evaluated as a dynamic problem that includes incident and reflected pressures, impulse, bending and shear of members, joints, openings, and load directions. 3

From a medical perspective, sulfur mustard, as an alkylating agent, can damage the bone marrow, skin, eyes, respiratory system, and DNA; therefore, the cause cannot be determined based solely on superficial similarities between individual symptoms. On the other hand, the time course of acute symptoms observed in Hiroshima and Nagasaki, the severity depending on shielding and distance, the dose-response relationship for stable chromosomal abnormalities, and the long-term dose-response relationships for leukemia and solid cancers cannot be uniformly explained by sulfur mustard exposure alone. It is important that the physical dose assessment and the biological and epidemiological findings correspond independently.

In August 2026, NHK reported on posts claiming “the atomic bombs were a hoax,” some of which reached hundreds of thousands to over one million views, as well as the spread of AI-generated videos that diverged from the reality of the atomic bombings. However, view counts do not equate to the number of supporters, and no representative survey indicating the prevalence of such beliefs in Japanese society has been identified at this time. This paper distinguishes between atomic bomb denialism—which denies historical facts themselves— and the misrepresentations created by generative AI—which, while addressing the atomic bombings, produce footage that diverges from historical facts—and examines the problems they share within the information environment.

Based on the above, this paper concludes that the historical and scientific conclusion that fission weapons exploded in Hiroshima and Nagasaki is supported by a multitude of mutually independent pieces of evidence, and concludes that the "combination of chemical weapons" theory and the "global cover-up" theory are inconsistent with current scientific knowledge and historical records. The purpose of this rebuttal is not to attack individual speakers, but to distinguish between verifiable facts and evaluations or opinions, and to safeguard the dignity of atomic bomb survivors and their bereaved families, the reliability of historical records, and the common ground for public discourse on nuclear weapons.

Regarding Publication

This paper is a publicly available draft prepared by the author individually and has not undergone peer review by a specialized academic journal. It will be continuously revised in response to typographical errors, new materials, and feedback from experts. Video statements are summarized as key points rather than verbatim quotations, and the URL, publication date, and relevant segment are listed in Appendix A. Contact information for corrections is provided at the end of the volume.

Keywords: Hiroshima atomic bombing, Nagasaki atomic bombing, atomic bomb denialism, conspiracy theories, chlorine*36*, neutron-induced radioactivity, DS02, sulfur mustard, Manhattan Project, generative AI, disinformation 4

Chapter 1: Introduction

1.1 Problem Statement

On August 6, 1945, "Little Boy," a gun-type atomic bomb using uranium-235, exploded over Hiroshima, and on August 9 of the same month, "Fat Man," a implosion-type atomic bomb using plutonium, detonated over Nagasaki. In both cities, a combination of blast waves, heat rays, initial radiation, residual radiation, and large-scale fires caused the deaths of numerous civilians and left survivors with long-term health effects and social suffering. These facts have been established through operational records from both Japan and the United States, Japanese investigations conducted immediately after the bombings, physical analyses of samples collected at the blast sites, medical follow-ups of survivors, and verifications by research institutions—including those in third countries—have established these facts.

However, in recent years, claims such as "What was dropped on Hiroshima and Nagasaki were not atomic bombs," "The damage was caused by a combination of napalm, conventional explosives, sulfur mustard, and other substances," "Radiation sickness is a story fabricated later," and "The Japanese and U.S. governments jointly covered it up" have been circulating in Japanese-language videos , books, lectures, and social media posts in the Japanese-speaking world. Furthermore,

narratives that deny the very existence of nuclear weapons in general are also linked to this debate. On August 8, 2026, NHK NEWS WEB published an article titled "'Atomic Bombs Are a Hoax': Absurd Fake News Spreading—AI Videos That Distort the Truth," reporting that some atomic bomb denial posts had been viewed over 1 million times, YouTube videos had been played over 300,000 times, and that have been viewed more than 8 million times (NHK, 2026). While these figures serve as indicators of reach, they may include duplicate views by the same person, views intended to criticize the content, and incidental exposure through recommended content. Therefore, view counts should not be taken at face value as an indicator of the number of believers or the level of support.

What this paper refers to as "atomic bomb denialism" is not a legitimate historical debate concerning the merits of dropping the atomic bombs, their effectiveness in ending the war, U.S. policy intentions, or the range of estimates for the number of victims. The subject of scrutiny is the claim that a fission explosion occurred in Hiroshima and Nagasaki itself, and which seek to offer alternative explanations—such as chemical weapons or deception operations. This distinction is crucial. While the political and ethical evaluation of the bombings is open to debate, the question of whether nuclear explosions occurred is not an "opinion" in the same sense.

1.2 The Issues Addressed in This Paper

There are at least four problems with leaving atomic bomb denialism unchecked. 9

First is the violation of the experiences of the atomic bomb survivors and their bereaved families. Denialism attributes the acute symptoms, long-term radiation-related illnesses, discrimination, and the survivors' years-long efforts to seek compensation—all of which the survivors experienced—to other causes. This does not merely dispute medical diagnoses; it undermines the very credibility of the survivors as witnesses.

Second is the erosion of the public factual foundation. In a democratic society, even when opinions clash over policies and values, there must be a certain degree of shared understanding regarding the facts that serve as the starting point for debate. If established historical facts are relativized by suggesting that "there are two sides to the story," verifiable debate itself becomes difficult.

Third, the impact on perceptions regarding nuclear disarmament, nonproliferation, and security. Claims that nuclear weapons do not actually exist or that their effects have been falsified simultaneously undermine the premises of nuclear deterrence, nuclear disarmament, nuclear nonproliferation, and radiation protection. Whether one supports nuclear weapons or advocates for their abolition, policy discourse cannot be sustained without an accurate understanding of the weapons' existence and effects.

Fourth is the formation of a disinformation industry. Narratives about “hidden truths” and “ the world’s greatest taboo” are narratives that easily lend themselves to video views, book sales, subscription-based streaming, lectures, and donations. Denial of the atomic bombings is not only an ideology but also content tailored to recommendation algorithms and monetization systems. Therefore, it is necessary to analyze not only the motives of individual content creators but also the structures that drive the spread of such content.

1.3 From the Perspective of Defense Administration

The author has the Japan Maritime Self-Defense Force. Nuclear weapons are central to current international security, alliances, deterrence, arms control, and crisis management. Refuting atomic bomb denialism is not merely a matter of preserving past history; it is also a matter of maintaining the common facts that underpin current policy decisions.

This position does not imply prior support for any specific nuclear policy. There may be diverse opinions regarding the effectiveness of nuclear deterrence, Japan’s nuclear policy, and the response to the Treaty on the Prohibition of Nuclear Weapons. However, every position is premised on the recognition that fission and fusion weapons actually exist and that their blast waves, heat rays, and radiation cause immense damage. This paper scientifically verifies that premise.

1.4 Purpose of This Paper

The purpose of this paper is to examine the main propositions of atomic bomb denialism using independent evidence from multiple disciplines and to clearly identify which claims contradict which facts.

Specifically, the paper aims to achieve the following five objectives:

- Formulate the claims of atomic bomb denialism as propositions without distorting the intentions of their proponents.
- Classify the evidence demonstrating the fact of the atomic bombings
- according to their directness and independence.
- Present observational results in the fields of physics, radiochemistry, medicine, and history that alternative hypotheses must explain.
- Analyze the structure of conspiracy theories, including their resistance to falsification, selective use of evidence, and absorption of counterarguments.
- Examine the impact on atomic bomb survivors, education, the media, national security, and the current information environment, including generative AI.

1.5 Terminology and Hierarchy of Evidence

In this paper, evidence is divided into three tiers.

Tier 1: Direct Physical Evidence

These are neutron-induced radioactive products—such as chlorine-36, europium-152, and cobalt-60—found in stone, roof tiles, concrete, and other materials exposed to the atomic bomb. These changes in the atomic nuclei of the materials serve as a record of the presence of a strong neutron field at the site.

Tier 2: Independent Historical and Medical Evidence

These include records of the Manhattan Project's research, manufacturing, transportation, and operations; initial investigations by Japanese scientists; acute symptoms among atomic bomb survivors; chromosomal abnormalities; and dose-response relationships for leukemia and solid cancers. This body of evidence, distinct from physical samples, supports the same event.

Tier 3: Consistent Explanations for Questions Raised by Doubters

Reasons why trees, bridges, buildings, the existence of survivors, and the absence of strong residual radiation in the cities today. While these are not evidence proving the atomic bombings on their own, they demonstrate that they do not contradict the fact of the bombings and explain why the skeptics' counterarguments do not hold.

This hierarchical structure ensures that, even if there is uncertainty in the interpretation of supplementary observations, they are not conflated with the evaluation of more direct evidence.

1.6 Methodology

This paper employs a four-step process for each point of contention: "Presentation of the Claim," "Clarification of Predictions," "Verification Against Evidence," and "Evaluation of Alternative Explanations."

First, we quote or faithfully summarize the statement under examination. Second, we indicate what should be observed if the claim is correct. Third, we verify the claim against observations from primary sources, peer-reviewed articles, and official records. 11

Fourth, we evaluate whether the alternative explanations presented by the opposing side can account for the totality of the evidence with fewer assumptions.

The priority of sources is as follows: peer-reviewed original research papers, official primary sources and technical reports, comprehensive reports from specialized organizations, and reliable secondary research. Videos, sales pages, blogs, and the like are used as sources to verify

what the skeptics are claiming and how their claims are being disseminated; they are not used as evidence for scientific facts.

Numerical values have specific measurement conditions and definitions. For blast pressure, distinguish between incident pressure, reflected pressure, dynamic pressure, and impulse; for radiation measurements, the sample's position, depth, elemental composition, background levels, and shielding conditions must be considered. Do not draw conclusions by isolating a single number from its context.

If there is uncertainty, explicitly state its range. "Consistency" does not imply perfect identity; it includes measurement errors, sample history, and model assumptions. The strength of a scientific conclusion is is demonstrated by the convergence of independent evidence, not by exaggerated assertions.

1.7 Scope and Subject of Verification

The direct subject of verification is the following proposition, explicitly stated in books, magazine articles, videos, and lectures published in Japan, as well as the relevant chapters in Palmer's *Hiroshima Revisited*, Version 1.9.

Proposition A: What was dropped on Hiroshima and Nagasaki were not atomic bombs.

Proposition B: Atomic bombs had not been put into practical use as of August 1945.

Proposition C: The damage was caused by a combination of conventional explosives, napalm, sulfur mustard, and other agents.

Proposition D: The fact that trees, bridges, and the Atomic Bomb Dome were left standing—this is evidence that they were not atomic bombs.

Proposition E: The symptoms of atomic bomb survivors were not radiation sickness but rather chemical weapon poisoning, etc.

Proposition F: Contradictory evidence was fabricated through a global cover-up by the Japanese and U.S. governments and research institutions.

Proposition F functions to incorporate refutations of the other propositions as "evidence of a cover-up." Even if Propositions A through E collapse, F rescues the conclusion, the usual possibility of refutation is lost. This structure will be examined in detail in Chapter 8.

This paper does not evaluate the author's entire body of work, political ideology, or statements in other fields. Furthermore, the legitimacy of the atomic bombings, their contribution to ending the war, their relative importance compared to the Soviet Union's entry into the war, and U.S. postwar strategy are treated as historical controversies separate from the question of whether a nuclear explosion occurred. 12

1.8 Major Sources of the Denialist Argument

Many of the scientific explanations offered by domestic atomic bomb denialists rely on Michael Palmer's self-published work, *Hiroshima Revisited: The Evidence That Napalm and Mustard Gas Helped Fake the Nuclear Bombings*. Although Palmer is a researcher in medicine and biochemistry, the book presents arguments spanning nuclear physics, radiochemistry, explosives engineering, and radiation epidemiology; it is not a review article published in a peer-reviewed journal.

One cannot dismiss his claims solely on the grounds that they fall outside his area of expertise. What must be evaluated is whether the presented data, citations, and reasoning are valid. This paper examines—rather than the author's credentials—the neutron measurements, residual radioactivity, medical statistics, and operational feasibility discussed in the book on a case-by-case basis.

1.8.1 Palmer's Structure of the Book and Its Place in the Evaluation

Palmer's *Hiroshima Revisited*, Version 1.9, consists of 14 chapters that expand the discussion from an introductory problem statement to the fundamentals of radiation and radioactivity, fallout, initial measurements, thermoluminescence, neutron activation, sulfur mustard and napalm, acute symptoms, skin lesions, pathology, dose assessment, long-term illnesses, methodology, and motives. Many of the arguments repeatedly raised in domestic atomic bomb denialism correspond to this chapter structure.

The structure of all 14 chapters, organized to show their correspondence with points of contention in the verification process, is as follows. The Japanese chapter titles are summaries of the content; when citing, please verify the chapter titles and text in the original work.

Chapter 1: Why Are the Nuclear Explosions in Hiroshima and Nagasaki Questioned?

Chapter 2: Fundamentals of Ionizing Radiation and Radioactivity.

Chapter 3: Nuclear Fallout in Hiroshima and Nagasaki.

Chapter 4: Initial Measurements of Residual Radioactivity.

Chapter 5: Measurement of Gamma-Ray Doses Using Thermoluminescence.

Chapter 6: Evidence of Neutron Radiation. This is the primary subject of verification in Chapter 3 of this paper, focusing on chlorine-36 and other elements.

Chapter 7: Sulfur Mustard and Napalm.

Chapter 8: Statistical Observations on Acute "Radiation" Sickness.

Chapter 9: Skin Burns in Survivors.

Chapter 10: Early Clinical and Pathological Findings.

Chapter 11: Radiation Dose Estimates Used in Survivor Studies.

Chapter 12: Diseases Among Long-Term Survivors.

Chapter 13: How the Cover-Up Is Alleged to Have Been Carried Out. 13

Chapter 14: Why It Is Assumed That a Cover-Up Was Carried Out.

Chapters 1 through 6 deal primarily with physical measurements and dose assessment, Chapters 7 through 12 cover medicine and epidemiology, while Chapters 13 and 14 present hypotheses regarding the methods and motives. This paper separates the measurement-based analysis in the first half from the medical and operational hypotheses in the second half, and evaluates each by tracing back to the original source materials in their respective fields.

The significance of this book lies in the fact that individual authors did not independently reach the same conclusion; rather, a single comprehensive text refuting the claims has been has been redistributed across videos, books, and lectures. This paper does not simply dismiss Palmer's claims as "erroneous because they are self-published," but instead cross-checks the measurements, clinical records, statistics, photographs, and operational feasibility cited in each chapter against the original sources.

Palmer uses his knowledge of medicine and biochemistry to discuss in detail the alkylating effects of sulfur mustard and the overlap of symptoms. There are points worth examining in this section. On the other hand, in the sections where Palmer extends his discussion to neutron transport, AMS, nuclear explosion design, blast engineering, and air operations, verification against peer-reviewed research, technical reports, and official documents in each specialized field is essential. The stance of this paper is to evaluate the correspondence between claims and evidence, rather than focusing on the presence or absence of professional qualifications.

1.8.2 Genealogy of Discourse

Palmer's book references Anders Björkman's online claims and works such as *Death Object* by Akio Nakatani. Building on this, Japanese authors and contributors have incorporated Japanese historical documents, atomic-bombed trees, the Atomic Bomb Dome, Imperial Japanese Army records, and photographs to reconstruct a unique narrative.

The significance of tracing this genealogy lies not in treating the originators as a single collective, but in distinguishing which arguments originate from the original work, which were added within the Japanese-speaking sphere, and which citations are repeated. For example, the description of symptoms caused by sulfur mustard and the neutron discrepancy in DS86 are Palmer's core arguments, and while the atomic-bombed trees, the Hyde Park Memorandum, and

interpretations of the Japanese political process are arguments that have been significantly expanded upon within Japan.

Even if the same figures or expressions appear across multiple media, this alone does not constitute an increase in independent corroboration. Arguments derived from common sources must be counted as a single chain of evidence and distinguished from independent verification based on other primary sources or measurements.

1.8.3 Dissemination Channels Within Japan

In Japan, popular books, monthly magazines, long-form video programs, short clips, lectures, paid streaming services, and email subscriptions are all interconnected. A single question raised in a long-form program may be excerpted in a short video as a "decisive contradiction," serving as a gateway to book sales or membership-based content. 14

Video views and playback counts indicate reach but do not indicate the number of supporters. They may include repeat viewings, views for the purpose of criticism, mentions in news reports, and algorithm-driven autoplay. Furthermore, no representative surveys regarding viewers' age groups, political leanings, or strength of beliefs have been identified. While this paper does not underestimate the scale of dissemination, it avoids unmeasured assertions such as "widely permeated a specific generation."

1.8.4 Key Statements A through J

To clarify correspondence with subsequent chapters, the key statements identified in the publicly available videos are organized as follows. Since transcriptions of spoken remarks may contain errors due to mishearing, quotations must be preserved in a format that allows for verification against the context and the original footage.

Statement A: "The surface temperature is 3,000°C to 4,000°C; even 1 kilometer away, it's 2,000°C, so nothing should remain, just like a lunar crater." In Chapter 2, we will examine the fireball temperature, surface temperature, heat absorption, irradiation time, and structural response by distinguishing between them.

Statement B: "As of May of Showa 20, the atomic bomb had not yet been completed; it would take another three years to complete it." In Chapter 6, we will cross-reference this with the primary records of development, testing, transportation, and troop preparations from that spring.

Statement C: "No uranium or plutonium atomic bombs were dropped; the damage was caused by something else." In Chapters 3 and 4, we will examine the feasibility of neutron-induced radioactivity and the composite weapon theory.

Statement D: “Trees, bridges, the Atomic Bomb Dome, and survivors remained near the hypocenter.” In Chapter 2, we will examine whether their survival contradicts the theory of an aerial nuclear explosion.

Statement E: “Doctors’ records from that time indicate that the symptoms were not caused by radiation sickness; radiation was dispersed separately.” In Chapters 3 and 5, we will examine radiation exposure, clinical progression, chromosomes, and long-term epidemiology.

Statement F: “The U.S. military and the Japanese government covered this up from the fall of 1945 onward, and the focus of the peace negotiations was also an agreement to conceal the truth.” In Chapter 7, we will cross-reference pre-occupation reports from the Japanese side, scattered historical documents, and records from third countries.

Statement G: “The Trinity test was a cover-up for a 100-metric-ton TNT test, and its name also derives from TNT.” In Chapter 6, we will separately examine the calibration test on May 7, the nuclear test on July 16, and the origin of the name.

Statement H: “The reason the investigation team did not enter Hiroshima and Nagasaki immediately was due to residual toxic gas.” In Chapters 5 and 6, we will verify the composition of the investigation team, the timing of their arrival, their mission, and the initial Japanese investigations.

Statement I: “Oppenheimer’s photograph of the instrument indicates that there were no radioactive residues.” In Chapter 6, we will examine the circumstances under which the photograph was taken and other physical evidence to determine whether the entire experiment can be refuted based on the instrument reading in a single photograph.

Statement J: “The Army’s August 14 investigation concluded that living in the bombed areas posed no direct health risks.” In Chapter 5, we will verify the scope of the documents, the timing of the measurements, the distinction between residual radiation and acute radiation syndrome, and medical investigations conducted during the same period.

This analysis is intended to avoid the “straw man fallacy,” which involves . For each claim, we will separately address valid points, unresolved questions, misinterpretations, and physically implausible elements. 15

1.9 Structure of This Paper

Chapter 2 examines whether the survival of trees and buildings serves as evidence to refute the atomic bomb theory, considering heat rays, blast waves, shielding, and structural response. Chapter 3 treats neutron-induced radioactivity as the core physical evidence of this paper. Chapter 4 examines issues regarding energy, time scales, logistics, and operational records related to the combined chemical weapons theory. Chapter 5 analyzes the overlaps and

differences between radiation sickness and sulfur mustard poisoning from clinical, cytogenetic, and epidemiological perspectives.

Chapter 6 covers the Manhattan Project, the Trinity test, and the development and deployment records of “Little Boy” and “Fat Man.” Chapter 7 evaluates the global cover-up theory based on

the dispersion of historical records, third-party verification, early Japanese investigations, and the timing of the occupation. Chapter 8 examines the epistemological structure of conspiracy theories; Chapter 9 addresses social impact and generative AI; and Chapter 10 summarizes the hierarchy of evidence and social recommendations. 16

Chapter 2: Physical Verification

—What Do the Remaining Trees and Buildings Signify?—

2.1 Argumentation in This Chapter

Атом 爆弾否定論主張 that “if it were an atomic bomb, everything around the hypocenter would have vaporized, leaving no trees, bridges, stone or brick buildings, or survivors whatsoever.” However, this premise is based on the misconception that the energy of a nuclear explosion acts on all objects in the same way.

Let me state the conclusion first. The survival of trees and buildings does not, in and of itself, conclusively prove that an atomic bomb was dropped. However, when factors such as the explosion altitude, distance, shielding, material composition, shape, direction of load, duration of heat radiation, secondary fires, and individual variations are taken into account, partial survival is not inconsistent with an aerial nuclear explosion. Therefore, one cannot conclude from the observation that “something remained” that “it was not an atomic bomb” .

2.2 Arguments of the Doubters

The doubters generally employ the following line of reasoning.

It is explained that an atomic bomb explodes “like the sun” at an altitude of approximately 500 to 600 meters above the ground, causing the surface temperature to reach several thousand degrees. If that were the case, there would be no way for trees, the Atomic Bomb Dome, bridges, or survivors to remain near the hypocenter. The very fact that they remain is evidence that it was a conventional bomb or incendiary weapon.

This line of reasoning contains at least four confusions. First, it confuses the temperature inside the fireball with the amount of heat absorbed by objects on the ground; second, it confuses instantaneous heat radiation with prolonged combustion; third, it makes a simplistic comparison

between blast pressure and the static compressive strength of materials; and fourth, it confuses "being able to survive" with "serving as proof of an atomic bomb."

2.3 The Combined Effects of an Airburst

The atomic bomb dropped on Hiroshima exploded at an altitude of approximately 600 meters above the ground, and the atomic bomb in Nagasaki also detonated at an altitude of approximately 500 meters. In an airburst, thermal radiation, initial radiation, and shock waves propagate from the point of detonation. Although these arise from the same event, they differ in terms of interaction with matter, distance attenuation, shielding, and duration.

Thermal radiation travels in a straight line and is significantly reduced in the shadow of buildings, walls, trees, clothing, and the like. The blast wind flows around buildings and generates reflected pressure when it strikes a surface. Initial radiation is absorbed and scattered depending on the type and thickness of the material.

Therefore, even at the same ground-level distance, damage varies between outdoor areas, the interior of wooden houses, the interior of reinforced concrete buildings, basements, and under bridge girders.

Geometric diffusion from a point source is useful as a first approximation for understanding that energy per unit area decreases with distance. However, in actual urban environments, additional factors come into play, such as atmospheric absorption, ground reflection, building shadows, topography, explosion altitude, and the nonlinearity of shock waves. It is not possible to accurately describe heat rays and blast waves cannot be accurately described using only simple inverse-square or inverse-cube laws.

2.3.1 How to Use the Inverse-Square Law

When an ideal point source emits energy isotropically into free space, the intensity I per unit area is inversely proportional to the square of the distance r.

$I \; 1 / r^2 \propto$

This relationship is useful as a first approximation for understanding that thermal radiation rapidly attenuates with distance. If the distance doubles, geometrically, the intensity per unit area becomes approximately one-fourth.

However, the fireball from an atomic bomb has a finite size, and factors such as atmospheric absorption, ground reflection, explosion altitude, angle of incidence, smoke, buildings, and terrain all come into play. The blast is a nonlinear shock wave that cannot be accurately described by the simple inverse-square law alone. Therefore, in this paper, the inverse-square law is used for

conceptual explanation, while precise numerical values for specific locations are left to specialized heat ray and blast assessments.

2.4 Temperature, Heat Quantity, and Duration

Hiroshima City's explains that the temperature at the center of the fireball was extremely high, and that the ground surface around the hypocenter instantly reached 3,000 to 4,000 degrees (Hiroshima City, 2025a). This description is a general explanation intended for the public to illustrate the extreme thermal environment of the atomic bomb. However, when evaluating the destruction or combustion of objects, one must consider not only the maximum temperature but also the amount of thermal radiation absorbed by the object, the duration of exposure, the surface reflectivity, and the moisture, thickness, and thermal conductivity.

The thermal radiation from a nuclear explosion lasts for a few seconds, depending on the weapon's yield. Even over a period of just a few seconds, it can cause severe flash burns to exposed skin and ignite paper, cloth, dry wood, and other materials. Therefore, the explanation that "it won't burn because it's such a short time" is also incorrect. On the other hand, whether an ignited object continues to burn thereafter depends on surrounding combustibles, oxygen supply, wind, building collapse, the inability to extinguish the fire, and the merging of fires.

In Hiroshima, numerous ignition points created by the heat rays, combined with collapsed buildings, damaged infrastructure, and the spread of fire, resulted in a large-scale urban fire. The final condition of trees and buildings varies greatly not only depending on the heat rays during the first few seconds but also on whether they were subsequently engulfed by the fire. When comparing atomic bombs and incendiary bombs, it is necessary to consider not only the burning time of individual weapons but also the urban fire as a whole.

2.4.1 The Fireball, the Ground Surface, and the Interior of Objects Do Not Reach the Same Temperature

Although the interior of a nuclear explosion's fireball reaches extremely high temperatures, stones, wood, metal, and human bodies on the ground surface do not reach the same temperature as the center of the fireball . Objects on the ground absorb a portion of the energy radiated from the fireball, depending on their surface color, roughness, reflectivity, and the angle of incidence. Even if the surface temperature rises sharply, it takes time for the heat to transfer inward.

This distinction is important for evaluating the argument used by skeptics: "If the temperature were several thousand degrees, everything would have evaporated." Simply citing a maximum value of several thousand degrees is insufficient; without knowing the energy per unit area absorbed by the object, the duration of heating, the latent heat of vaporization, the material, and the thickness, it is impossible to determine the extent of vaporization, melting, or charring.

2.4.2 Ignition and combustion are separate processes

Heat rays lasting a few seconds can cause severe burns to exposed skin and ignite paper, cloth, dry wood, paint, and other materials. However, whether an ignited object is completely consumed depends on the subsequent supply of fuel, oxygen, wind, surrounding fires, and the possibility of extinguishing the fire.

Urban fires following an atomic bombing are not phenomena caused solely by heat rays. Building collapses, damage to firefighting equipment, scattered ignition points, blocked roads, and the loss of firefighting capacity all combined, causing fires to merge. Therefore, damage at a given location should not be simplified as resulting solely from “a 3-second heat wave” or “several hours of urban fire.”

2.4.3 Moisture Content and Thermal Conductivity of Living Trees

The sapwood and cambium of living trees contain moisture, and heating and evaporating water requires a great deal of energy. Since the thermal conductivity of wood itself is lower than that of metal, a large temperature difference between the surface and the interior can develop during short heat pulses. In thick trunks, even if the surface is charred, the opposite side, the interior, and parts of the root system may survive.

However, one must not conclude that the charred layer always stops combustion or that the interior of a tree exposed to the blast was always undamaged. Trees exposed to surrounding urban fires for a long time may develop deep cavities or trunk damage. The condition of the tree reflects both the heat radiation and the secondary fire .

2.4.4 The Three Elements of Combustion and Urban Fires

Sustained combustion requires three elements: combustible material, oxygen, and heat exceeding the ignition temperature. Although the thermal radiation from an atomic bomb can cause ignition even for a short time, whether the subsequent combustion continues depends on the surrounding fuel, wind, collapsed buildings, the convergence of fires, and firefighting capabilities. 19

In green wood, energy is expended on heating and evaporating moisture, and the low thermal conductivity of wood can result in a significant temperature difference between the surface and the interior. If the thick trunk, thick bark, root system, and the cambium on the opposite side remain intact, the tree may regenerate even if the above-ground portion is severely damaged.

On the other hand, if a tree is exposed to a surrounding urban fire for an extended period, even trees affected by an atomic bomb may undergo deep charring or hollowing. Therefore, we do not adopt the dichotomy that “since the heat rays last only a few seconds, the damage is necessarily limited to the surface” or “incendiary bombs will inevitably burn everything to the ground.” . Instead, we evaluate short-duration heat pulses and subsequent urban fires separately.

2.5 Reasons Trees May Survive

Unlike dry wood, living trees contain a high moisture content. Their response varies depending on bark thickness, trunk diameter, tree species, health status, the side facing the blast epicenter, surrounding buildings, and root system depth. Even if the above-ground portion is severely damaged, regeneration may occur from the cambium or surviving roots, may regenerate from sprouts or new shoots.

Damage may differ between the side directly exposed to the heat rays and the opposite side of the trunk may differ. Furthermore, thermal radiation is reduced in the shade of buildings or walls. Trees caught in the urban fires immediately following the atomic bombing may have been charred and hollowed out to the core, while trees that escaped the fires may have sustained only surface damage. Therefore, a blanket comparison stating that “all trees exposed to the atomic bombing in Hiroshima were only lightly charred on the surface” or that “all trees damaged by the war in Tokyo were burned through to the core” is inappropriate.

The surviving atomic-bomb-exposed trees are a selected group that survived among the many trees present at the time of the bombing and subsequently underwent the processes of transplantation, preservation, and registration. Estimating the survival rate or distribution of damage among all trees at that time based solely on the surviving examples introduces a survivor bias. This point must be explicitly stated.

2.5.1 Regenerative Capacity and the Selectivity of Surviving Examples

Even if a tree loses part of its trunk or above-ground parts, it may regenerate if a portion of its roots, cambium, or branches , they can regenerate. Cases where new shoots emerged in the year following the bombing do not indicate that the trees were unscathed, but rather that living tissue remained that had escaped lethal damage.

The surviving atomic-bomb-exposed trees are not representative samples of all the trees that existed at the time of the bombing. Only those trees that survived, escaped subsequent urban redevelopment, and were transplanted, preserved, and registered are subject to observation. It is not possible to directly estimate the damage rate of all trees at that time based on the proportion or appearance of surviving trees.

2.5.2 How to Interpret the Direction of Damage

Observations showing a relationship between the tilt of trees exposed to the atomic bomb and the direction of the hypocenter are intriguing. However, it is necessary to examine each individual tree to determine whether it tilted instantly due to the blast, bent over the course of several decades due to damage to the cambium on one side, or to what extent factors such as soil conditions, pruning, light exposure, wind, and species differences influenced the outcome.

Therefore, studies on tree tilt serve as supplementary evidence consistent with the "possibility of having been strongly affected by a single point," rather than direct physical evidence identifying nuclear fission. Weapon identification is based on the radiation contamination discussed in Chapter 3 and the individual doses and biological effects discussed in Chapter 5.

2. 6 Blast Loads and Structural Response

Hiroshima City's public information materials explain that at a point 500 meters from the hypocenter, the shock wave pressure was equivalent to approximately 11 metric tons per square meter. While this is equivalent to approximately 108 kilopascals, in blast assessments, it is necessary to confirm which pressure component is being referred to, the orientation of the surface, reflections, and the measurement and estimation methods (Hiroshima City, 2025b).

Structural failure cannot be compared based solely on blast pressure and the static compressive strength of concrete. Buildings sustain damage due to bending, shear, buckling of walls and columns, failure of connections, roof uplift, pressure influx through openings, flying debris, and fire. It is important to consider not only the peak blast pressure but also the relationship between the impulse—the integral of pressure over time—and the natural period of the structure.

Even when subjected to the same pressure, the wall will respond differently depending on whether they face the blast head-on or are loaded primarily from above. The extent of structural survival also varies depending on factors such as wall thickness, steel frames, span length, the number of openings, and shielding from adjacent buildings. Explosion-resistant engineering is a field that deals with such dynamic responses, and a one-line explanation such as "it survived because the material strength was greater than the pressure" is insufficient.

2.7 Survival of the Atomic Bomb Dome

The Hiroshima Prefectural Industrial Promotion Hall, the predecessor of the Atomic Bomb Dome, was a brick structure that incorporated steel framing in some parts and topped by an elliptical dome in the center. The atomic bomb exploded approximately 160 meters southeast of the building at an altitude of about 600 meters. The building was severely damaged and completely burned by the blast wave and heat rays, losing most of the walls on the second and third floors, as well as the roof and floors; everyone inside perished (Hiroshima City, 2025c).

What remained was not an "intact building," but debris consisting primarily of portions of the thick side walls and the steel frame. Since the blast wave struck almost directly from above, the roof and floors—which had lower load-bearing capacity—collapsed, while parts of the thick side walls were not completely knocked down, according to the City of Hiroshima. This demonstrates that partial survival can occur depending on the direction of the load and the structural design.

The fact that the Atomic Bomb Dome remained standing does not mean that the atomic bomb's destructive power was weak. The fact that the building was severely damaged and completely burned down at close range, completely lost their functionality, and failed to save lives—and the fact that parts of the walls and steel framework remained intact are not mutually exclusive.

2.8 Hiroshima Postal and Communications Hospital and Shelter

The outpatient wing of the former Hiroshima Postal and Communications Hospital was located 1,370 meters from the hypocenter; although it lost its windows due to the blast, it avoided collapse. Even though much of the second floor was destroyed by nearby fires, it became a relief center after the bombing (Hiroshima City, 2026). Since this hospital does not represent a case of survival directly beneath the hypocenter, survivor cases cannot be used to identify the weapon without verifying the distance, building structure, and shielding conditions.

Similarly, the existence of survivors does not constitute grounds for denying the atomic bombing. Reinforced concrete buildings, basements, thick walls, topography, bridges can significantly alter the doses of thermal radiation and ionizing radiation, as well as the risk of injury from the blast wave. The fundamental principle of individual dose estimation—as seen in DS02 and similar models—is to evaluate doses by considering a person's shielding history, rather than determining individual doses based solely on distance from the blast.

2.9 Comparison with War-Damaged Trees in Tokyo

Even in conventional bombing raids, such as the Great Tokyo Air Raid, there are trees that survived despite being charred. This fact refutes the simplistic explanation that "trees are inevitably destroyed by incendiary bombs." At the same time, it is impossible to determine whether the heat source was an atomic bomb or an incendiary bomb based solely on the outward appearance of the surviving trees.

Regarding trees exposed to the atomic bomb in Hiroshima, an observational study analyzed 29 trees within approximately 2 kilometers of the hypocenter that met specific criteria and found that 23 of them—about 79 percent—were leaning toward the direction of the hypocenter (Suzuki et al., 2014). This result serves as supporting evidence suggesting the possibility of a directional relationship with the hypocenter.

However, since this is an observational study, it does not definitively establish the cellular or histological mechanisms that caused the tilt. Factors such as the number of samples, selection criteria, transplantation, topography, wind, postwar growth, and differences among tree species must be taken into account. Therefore, we do not describe this as a "definitive fingerprint unique to the atomic bomb," but rather treat it as an observation consistent with other evidence.

Regarding the claim that chlorine-36 and other elements were detected in concentrated amounts in the 1945 growth rings of A-bomb-exposed trees, we were unable to identify the corresponding primary research paper during the investigation for this paper; therefore, we do not accept this as evidence. Neutron-induced radiation is limited to samples of stone, roof tiles, concrete, and other materials with clearly identified sources and measurement histories, and is discussed in Chapter 3.

2.9.1 What the Great Ginkgo Tree at Senso-ji Temple Demonstrates

The Great Ginkgo Tree at Senso-ji Temple, which survived the Great Tokyo Air Raid, demonstrates that trees exposed to intense incendiary fires do not necessarily vanish without a trace. Even if part of the trunk is deeply charred and and become hollowed out, the tree can still regenerate as long as its roots and living tissue remain.

However, this example alone does not allow us to conclude that "Hiroshima was also caused by incendiary bombs." While the outcome—that the tree survived—is the same, the location of the heat source, the duration of exposure, the nature of the urban fire, the surrounding combustible materials, the tree species, and the size of the individual tree all differ. Outward similarities do not prove that the causes were identical.

2.9.2 Limitations of Comparison

A simple dichotomy—classifying Hiroshima's atomic-bomb-exposed trees as having "only surface charring" and Tokyo's war-damaged trees as having "internal hollowing"—cannot be adopted. Even in Hiroshima, trees caught up in secondary fires sustained deep damage, and in Tokyo, there may have been trees that sustained only partial damage. It is not possible to mechanically classify the two groups based solely on photographs.

A valid comparison requires recording, for each individual tree, its location, shielding, fire history, tree species, age, damaged surfaces, growth rings and tissue, and postwar treatments for each individual tree, and evaluating them using the same criteria. Currently available tree research plays a supplementary role in refuting the "no atomic bomb" theory, but it should not be placed on the same level as direct evidence of a nuclear explosion.

2.10 Summary of This Chapter

The conclusions of this chapter are as follows.

- Distinctions must be made between the fireball temperature, the instantaneous temperature at the ground surface, the heat, and duration of combustion must be distinguished.

- Thermal radiation lasting on the order of seconds can cause severe burns and ignition, but complete destruction depends on secondary fires, fuel, shielding, wind, and building collapse.
- The response of structures to blast waves is a dynamic problem involving incident pressure, reflected pressure, impulse, load direction, bending and shear, joints, and structural form; it cannot be explained by a simple comparison with static compressive strength.
- The Atomic Bomb Dome did not remain intact; it was severely damaged and completely burned, with only parts of the walls and steel framework remaining. Its partial survival can be explained by the load direction and structural form.
- The survival and tilting of trees exposed to the blast are supplementary observations; while they do not, on their own, prove the existence of an atomic bomb, they also do not serve as grounds for denying it. 23 Therefore, the existence of trees, bridges, buildings, and survivors does not contradict the fact that nuclear explosions occurred in Hiroshima and Nagasaki. The purpose of this chapter is to demonstrate that it is not valid to infer the absence of an atomic bomb from the surviving debris; direct physical evidence of a nuclear explosion will be will be examined in the next chapter. 24

Chapter 3: Radiochemical Counterevidence—Neutron-Induced Radioactivation as Evidence of a Nuclear Explosion

3.1 The Argument of This Chapter

This chapter forms the core of the evidence presented in this paper. A fission explosion releases a large number of neutrons; when some of these are captured by surrounding atomic nuclei, radioactive isotopes with mass numbers different from those of the original elements are produced. This phenomenon is called neutron-induced radioactivation. Chemical reactions such as those involving conventional explosives, napalm, sulfur mustard, and flash powder alter the electronic states outside the atomic nucleus and do not generate a city-scale neutron field. Therefore, if traces of neutron radioactivation corresponding to the distance from the epicenter, the depth of the sample, and and shielding conditions, an explanation based solely on chemical weapons is not valid. However, to be scientifically accurate, the following points must be explicitly stated: Radioisotopes such as chlorine-36 exist naturally and can also be produced by other neutron sources, such as nuclear reactors and accelerators. What is important is not merely the “presence” of the isotopes, but their concentration exceeding background levels, their spatial distribution, depth distribution within the sample, the correspondence between multiple nuclides, the sample’s history, independent measurements, and consistency with calculations.

3.2 Arguments of the Denialists

Denialists of the atomic bombings generally offer the following alternative explanations regarding the evidence of neutrons and residual radioactivity:

- There is no residual radioactivity in Hiroshima or Nagasaki indicating a nuclear explosion.
- Since there are discrepancies between early measurements and later dose calculations, neutrons did not exist.
- Radioactive materials were locally scattered at a later date.
- Scattering nuclear reactor waste can be used to falsify the presence of radioactivity.
- Later researchers adjusted their measurements and calculations to align with earlier studies.

To evaluate these claims, it is necessary to avoid conflating fission products, induced radioactivity, fallout, initial radiation, and natural background radiation under the single term "residual radioactivity."

3.3 Fundamentals of Neutron-Induced Radioactivity

The primary production reaction for chlorine-36 is the capture of a neutron by chlorine-35, a stable isotope.

$^{35}\mathrm{Cl} + \mathrm{n} \rightarrow {}^{36}\mathrm{Cl} + \gamma$

The half-life of chlorine-36 is approximately 301,000 years. Even though approximately 80 years have passed since 1945, the decrease due to radioactive decay is extremely small, and trace amounts can be detected using accelerator mass spectrometry (AMS).

Since chlorine-36 is also produced naturally by cosmic rays and other sources, even unexposed samples have background levels. In measurements, unexposed samples from the same region and of the same rock type as the exposed samples are used to to evaluate the background, and the ratio of chlorine-36 atoms to the total chlorine content in the sample—that is, the $^{36}\mathrm{Cl}/\mathrm{Cl}$ ratio—is then compared.

Neutrons from nuclear explosions react with elements in stone and concrete. Thermal and subthermal neutrons are captured by chlorine-35, europium-151, and cobalt-59, respectively, producing chlorine-36, europium-152, and cobalt-60. High-energy neutrons may trigger different reactions. Since the sensitivity to neutron energy varies by nuclide, combining multiple nuclides allows for the verification of the neutron spectrum and transport calculations.

3.3.1 Fission Neutrons and Activation

During the fission of uranium-235 or plutonium-239, typically several neutrons are emitted in addition to fission products and energy. Some of these neutrons trigger subsequent fission, while others are scattered and slowed down by air, the ground, and building materials, and are captured by surrounding atomic nuclei.

The amount of activation produced is not determined simply by the presence of neutrons. It depends on the neutron energy distribution, the irradiation dose, the abundance of the element, the nuclear reaction cross section, the orientation of the sample, shielding, and the explosion altitude. Therefore, measured values for each nuclide are input into neutron transport calculations to evaluate whether multiple reactions are consistent with the same source model.

3.3.2 What AMS Measures

Chlorine-36 has a long half-life, and conventional radioactivity measurements—which count the number of radioactive decays—may lack sufficient sensitivity. AMS ionizes and accelerates chlorine atoms extracted from the sample and uses their mass and charge to separate chlorine-36 from stable chlorine , and measures the atomic ratio.

The measurement involves sample cleaning, chemical separation, and the removal of carrier materials, blanks, standard samples, instrument background, and interfering nuclides. Therefore, when evaluating a paper, it is necessary to verify not only the final ratio but also the sample collection site, the distinction between surface and internal samples, the total chlorine content, the analytical facility, and the errors.

3.3.3 Half-Life and the Meaning of “Still Remaining”

The half-life of chlorine-36’s of approximately 300,000 years means that the majority of the atoms produced in 1945 still remain today. However, the concentration in a sample is influenced not only by radioactive decay but also by the original chlorine content, weathering, surface exchange, contamination, and sampling and preservation. A long half-life does not automatically constitute conclusive evidence; background evaluation and the sample’s history are crucial.

3.4 Measurement of Chlorine-36

In Hiroshima, AMS measurements of chlorine-36 were conducted on samples such as granite and concrete found in the vicinity of the hypocenter. In the DS02 study, exposed samples were compared with unexposed background samples, and the correspondence with neutron transport calculations was evaluated by taking into account ground-level distance, sample orientation, shielding, depth, and elemental composition (Young and Kerr, eds., 2005).

Nagashima et al. measured the $^{36}Cl/Cl$ ratio in granite samples from Hiroshima using the tandem accelerator at the University of Tsukuba. Near the hypocenter, a maximum value of approximately 1.6×10^{-10} was obtained, and while the background value for unexposed granite was on the order of 10^{-13}. In other words, values approximately three orders of magnitude higher than the background were observed in close-range samples (Nagashima et al., 2004; Huber et al., 2005).

As distance increased, the measured values decreased, and consistency with the revised DS02 calculations improved in the range from close range to approximately 1,100 meters. This does not mean that there was "perfect agreement at every point." Variations exist due to the local environment of the samples, chlorine concentration, shielding, collection history, and measurement limits. However, the near-field values that significantly exceed the background, along with the systematic decrease with distance from the hypocenter, are consistent with transport from a point-source of neutrons.

Research institutions in the United States, Germany, Japan conducted intercomparisons using split samples and reference samples. Measurements by Lawrence Livermore National Laboratory, the U.S. AMS Group, the Technical University of Munich, and the University of Tsukuba, among others, showed generally consistent results despite differences in analytical methods and equipment (Huber et al., 2003; Young and Kerr, eds., 2005).

In addition to single measurements at the sample surface, the depth distribution within the core sample is also important. The radioactivity generated when neutrons penetrate into the interior of minerals exhibits a depth profile different from that observed when radioactive material is applied or scattered on the surface. In DS02, the sample geometry and surrounding environment were modeled, and and by modeling the sample geometry and surrounding environment, they compared not only surface values but also calculations and measurements along the depth direction.

3.4.1 Measurement Locations and Interpretation of Data

Huber et al. (Technical University of Munich) analyzed granite samples located within a range of approximately 94 to 1,591 meters from the epicenter (Huber et al., 2005). For near-epicenter samples, the $^{36}Cl/Cl$ ratio reached the order of 10^{-10} , while distant, unexposed control samples were on the order of 10^{-13}. Since the magnification factor varies depending on which of the 27 control samples and their average values are used, we do not independently emphasize a single figure such as "833 times" or "approximately 1,000 times."

Independent measurements by Nagashima et al. at the University of Tsukuba also revealed a significant excess in samples near the epicenter, which decreased with distance (Nagashima et al., 2004). On the other hand, Huber et al. reported that at locations farther than approximately 1,300

meters, natural in situ production due to cosmic rays and other factors tends to dominate the signal. This indicates the limit to which bomb-derived components can be distinguished.

What is scientifically significant is not that all distant measurement points match the theoretical curve exactly, but rather that there is significant radioactivity at close range that far exceeds the natural background, that this has been reproduced at multiple facilities, and that it can be explained by calculations that account for distance, depth, and shielding.

3.4.2 Depth Profiles

Depth profiles of stone cores are crucial for distinguishing between surface contamination and neutron irradiation. Neutrons scatter and slow down within rock and are captured at depths corresponding to their energy. The vertical distribution of elements such as chlorine-36 and europium-152 can be compared with calculations based on the incidence of neutrons from an external source.

If radioactive material had simply been applied to the surface afterward, the distribution would generally be concentrated on the surface, in cracks, and along water pathways. For the denialist side to present the "scattering theory" as a quantitative hypothesis, they must simultaneously reproduce the distribution within the stone, the distance gradients, and the ratios of multiple nuclides.

3.4.3 Major Studies, Samples, and Intercomparisons

Research on chlorine-36 in Hiroshima includes studies by Straume et al., who raised the issue of neutron inconsistencies in the DS86 period; Kato, who performed AMS measurements on granite; Huber et al. of the Munich Group; Nagashima et al. of the University of Tsukuba; and Tanaka et al., who addressed the DS02 intercomparison. These studies did not merely measure the same samples using the same equipment; rather, they differed in sampling locations, pretreatment methods, instrumentation, background evaluations, and calculation conditions.

Huber et al. analyzed 18 granite samples collected from locations ranging from approximately 94 meters to 1,591 meters from the hypocenter. The samples included bridges, tombstones, pavement, and buildings; AMS measurements were performed after recording the locations and the surfaces exposed to the blast. Near the hypocenter, the $^{36}Cl/Cl$ ratio reached a maximum of approximately 1.6×10^{-10}, while at distant, unexposed control sites, it was on the order of 10^{-13}.

The high values in close-range samples—including those near the Motokawa Bridge—the decrease with distance, and the fact that natural in situ production becomes dominant at distant locations simultaneously indicate the range within which bomb-derived components can be identified and the limits of detection. Rather than a single "833-fold" multiplier; it is scientifically

more appropriate to list individual measured values, background samples, distance, shielding, and depth.

In the international intercomparison, split samples and related samples were measured using instruments in the United States, Japan, and Germany. The ratio of measured values to DS02 calculated values generally converged to a range close to 1, but not all samples and nuclides were completely identical. differences, instrument background, statistical errors, and uncertainties in nuclear data remain.

What is important is not that "everyone arrived at the same numbers from the start." Taking the discrepancies published in DS86 as a starting point, sample re-examination, evaluation of natural background, AMS measurements, and revisions to the calculation code were carried out, and yet the central observation—strong near-field neutron activation—remained.

3.5 Evidence from Nagasaki and Other Nuclides

While the discussion of chlorine-36 has focused on research on Hiroshima samples, measurements of neutron-induced activation also exist for Nagasaki. The specific activity of europium-152 was measured in roof tiles and stone materials exposed to the atomic bomb in Nagasaki, and its relationship to distance from the hypocenter was analyzed (Nakanishi et al., 1998). Additionally, there have been studies measuring the residual radioactivity of cobalt-60 and europium-152 in rocks from Nagasaki, and DS02 compares these data with calculations.

Europium-152 is produced by the neutron capture of europium-151. Its half-life is approximately 13.5 years, and while radioactivity decreases the later the measurement is taken, it has been evaluated through low-background measurements and chemical separation.

Cobalt-60 is produced by the neutron capture of cobalt-59 and has a half-life of approximately 5.27 years. Since its levels are low in measurements taken decades after the bombings, proper sample preservation and high-sensitivity measurements are crucial. The data on cobalt-60 and europium-152 obtained in Hiroshima and Nagasaki are used to evaluate the atomic bomb neutron field, despite variations among individual samples.

These nuclides differ in half-life, reaction cross section, elemental abundance in the sample, and measurement methods. The fact that multiple nuclides relate to distance and shielding according to their respective physical laws makes it difficult to explain the overall picture based on a single measurement error or a single type of contamination.

3.6 Reasons Why the Chemical Weapons Hypothesis Cannot Explain the Neutron Field

TNT, Composition B, napalm, magnesium-based flash agents, sulfur mustard, and the like are chemical substances, and their reactions involve the rearrangement of electronic bonds outside the atomic nucleus. Even if these substances are detonated or burned, they do not produce a neutron flux capable of radiating chlorine-35, europium-151, and cobalt-59 over a wide area. 29

For the combined chemical weapons hypothesis to hold, it would be necessary to provide, in addition to conventional weapons designed for urban destruction, a neutron source capable of irradiating stone, tiles, and concrete. In that case, the original claim that "this can be explained by chemical weapons alone" can no longer be sustained.

Even if neutron generators or nuclear reactors are proposed as alternative hypotheses, one must explain the existence of the devices, their transportation, irradiation duration, output, irradiation direction, the distance gradient from the epicenter, the depth distribution of the samples, operations across multiple cities, and consistency with both Japanese and U.S. records. No primary sources or physical evidence supporting these claims has been presented.

3.7 Examination of the "Subsequent Spraying" Theory

Physically, there is a difference between spraying radioactive material afterward and neutrons converting stable isotopes at the site into different isotopes. Spraying constitutes contamination from outside the sample, whereas radioactivation is a nuclear reaction occurring within the sample.

If a substance containing chlorine-36 were sprayed onto the ground surface, one would expect a distribution involving adhesion to the sample surface, penetration into cracks, and transport by rainwater. On the other hand, transport and capture reactions occur depending on the sample's orientation, shielding, and depth. The actual DS02 study takes these sample-specific conditions into account.

Furthermore, nuclides with different half-lives from various elements—such as europium-152 and cobalt-60, in addition to chlorine-36—have been measured. The "fabrication theory" must assume that each of these was placed at the appropriate concentration, at appropriate distances and with appropriate shielding distributions within the sample. This assumption is far more complex than the explanation involving neutron irradiation from a single nuclear explosion, and there is no evidence to support it.

3.7.1 Burden of Proof for the Nuclear Reactor Waste Hypothesis

Nuclear reactor waste may contain fission products and radionuclides. However, spreading waste is not the same as converting stable isotopes at the site through neutron capture. If one assumes the presence of reactor-derived material, one must demonstrate the nuclide composition, chemical form, quantity, timing of dispersal, transport, workers, protection measures, surface contamination, and migration into the samples.

Furthermore, for chlorine-36, europium-152, cobalt-60 are evaluated as the result of reactions between parent nuclides present in stones and metals at the site prior to the bombing and the neutron field. A fully developed theory of radioactive material dispersal requires a separate explanation for the correspondence between the amounts of parent nuclides and the amounts produced. 30

3.7.2 Problems with the "Generation Model"

Palmer interprets the history of research—comprising early studies, DS86, the AMS era, and DS02—as a "generation model" in which later researchers adjusted the numbers to fit the fabrications to fit their data to the findings of earlier researchers. However, AMS is not a device created solely for atomic bomb research; it is a general-purpose measurement technique also used in geological dating, groundwater analysis, and cosmic ray research.

If one claims that manipulations spanned generations, it is necessary to show which samples were replaced and when, as well as how the blank samples and blanks, and instrument settings were manipulated, and through which chain of command measurement values from different countries were adjusted. The current "generational model" lacks specific manipulation mechanisms and verifiable predictions.

3.7.3 The Significance of Not Concealing Discrepancies

The fact that the neutron discrepancy in DS86 was reported in an academic journal, and that subsequent research reexamined background production, sample conditions, and calculations, demonstrates that the research process was not a monolithic cover-up. Discrepancies between measurements and calculations were made public; different facilities conducted remeasurements; and the dose system was revised.

Scientific consensus is not strengthened by "everyone reporting the same numbers from the start." It is strengthened by making dissenting opinions and discrepancies public, and by ensuring that central observations remain even after corrections.

3.8 The DS86 “Neutron Discrepancy” and DS02

In the 1986 dose system DS86, discrepancies were noted between measured and calculated values for neutron activation, particularly in long-distance samples from Hiroshima. This was a genuine scientific challenge and must not be denied.

However, discrepancies between measurements and calculations in science do not do not immediately imply that the phenomenon does not exist. Possible causes included outdated nuclear reaction cross sections, neutron transport calculations, bomb models, the sample’s surrounding environment, background corrections, reevaluation of sample locations, and the limitations of low-level measurements.

DS02 reexamined the calculation codes, nuclear data, bomb radiation sources, topographical and building environments, sample locations, and AMS measurements. Regarding chlorine-36 in Hiroshima, consistency between measurements and calculations improved from close range up to approximately 1,100 meters, and international intercomparisons were conducted. Although variations and challenges remain at long distances and for certain nuclides, the inference that “since there was a discrepancy, there was no nuclear explosion” does not hold.

Palmer places significant weight on the discrepancies from the DS86 era as evidence of a cover-up of the atomic bombing, but he does not fully reflect the reevaluation based on DS02 and the results of the comprehensive intercomparison. To offer academically valid criticism, one must evaluate not only the older discrepancies but also where subsequent research has made corrections, the extent to which consistency has been achieved, and what uncertainties remain. 31

3.9 The Significance of International Verification

Radiation measurements were not conducted by a single U.S. government laboratory alone. Japanese universities and research institutions, German research institutions, and multiple U.S. institutions performed measurements using different equipment, technicians, and analytical procedures. The results were published as peer-reviewed papers, the DS02 report, and workshop materials, making them available for review by other researchers.

The Japan-U.S. joint research has a political and organizational history, and criticism of the system is possible. However, criticizing the system is not the same as refuting the measurement results. To refute the measurements, one must demonstrate where a reproducible error exists in the sample identification, chemical processing, AMS blanks, standard samples, counting statistics, background correction, or nuclear reaction calculations.

Merely claiming that “research institutions are also colluding” does not constitute a scientific refutation of measurement results spanning different countries,

institutions, and generations. To refute these findings scientifically, independent measurements using the same or equivalent samples, along with a quantitative model that better explains the data, are required.

3.9.1 Current Radiation Levels in Hiroshima and Nagasaki

Deniers sometimes ask, "If a nuclear explosion really occurred, the cities should still be emitting high levels of radiation today." However, the fact that current environmental radiation levels do not differ significantly from natural background radiation does not negate the 1945 nuclear explosions.

The atomic bombs dropped on Hiroshima and Nagasaki were air bursts; they differed from underground or surface explosions, which would have drawn large amounts of soil and debris into the fireball, concentrating intense fallout in localized areas. Nevertheless, residual radiation from initial radiation, induced radioactivity, fallout, and black rain still exists, and and research on exposure—including among people who entered the cities after the explosions—continues.

The radioactivity of short-half-life nuclides declined significantly early on, and further transport and dilution occurred due to wind, rain, rivers, and urban reconstruction. The City of Hiroshima explains that current radiation levels in Hiroshima and Nagasaki are no different from natural background radiation and are not at levels that affect health. At the same time, this indicates that residual radiation immediately after the explosions decreased rapidly.

On the other hand, long-half-life nuclides such as chlorine-36 can be measured by atomic mass spectrometry (AMS) even if their radioactivity is not high enough to pose a danger to the environment. The fact that it is safe to live there today is consistent with the presence of minute traces of nuclear reactions in samples from the atomic bombings.

3.10 Summary of This Chapter

The points confirmed in this chapter are as follows. 32

- Chlorine-36 occurs naturally and can also be produced by neutron sources other than atomic bombs. Therefore, it is not possible to prove an atomic bomb explosion based solely on the name of a substance.
- In samples from the Hiroshima atomic bomb blast, a $^{36}Cl/Cl$ ratio approximately three orders of magnitude higher than background levels was measured at close range; the trend of decreasing with distance from the hypocenter, the depth distribution, and the shielding conditions are generally consistent with neutron transport calculations.
- Intercomparisons were conducted by research institutions in Japan, the United States, and Germany, and the reproducibility of the measurements has been verified.

- In Nagasaki as well, neutron-induced activation data have been obtained for europium-152 and cobalt-60 have been obtained.
- Chemical reactions involving conventional explosives, napalm, sulfur mustard, and the like do not provide the neutron field necessary to produce these radioactivations.
- The "subsequent dispersal" theory lacks evidence to explain the radioactivity within the samples, the distance- and shielding-dependent distributions, or the correspondence between multiple nuclides.

Based on the above, neutron-induced radioactivity constitutes extremely strong physical evidence supporting the fact that fission weapons exploded in Hiroshima and Nagasaki. It is not a single "magical piece of evidence," but rather forms the core of a body of evidence that converges .33

Chapter 4: Physicochemical Counterarguments: The Feasibility of the Chemical Weapons Combination Theory

4.1 Argumentation in This Chapter

This chapter examines the claim that "the damage in Hiroshima and Nagasaki was caused by a combination of conventional explosives, flash agents, napalm, sulfur mustard, 'Pumpkin' bombs, and other substances" from the perspectives of energy, release time, spatial distribution, logistics, and eyewitness and operational records.

I will state the conclusion first. With a combination of chemical weapons it is possible to produce individual effects such as blast, fire, flash, and toxicity. However, it is impossible to reproduce the wide-area shock wave, thermal radiation, initial gamma rays and neutrons, radioactivity, and specific temporal and spatial distributions simultaneously generated by a single aerial nuclear explosion using the limited number of aircraft deployed in 1945.

4.2 Chemical Reactions and Fission Reactions

A chemical reaction is a change in the electronic bonding outside the atomic nucleus, and the energy per reaction is typically on the order of electron volts. In the fission of uranium-235 or plutonium-239, the atomic nucleus splits, releasing approximately 200 megaelectron volts of energy and multiple neutrons per fission event.

When comparing per reaction, there is a difference of approximately 10^7 to 10^8 times between fission and chemical reactions. However, since the overall yield of a weapon is determined by the amount of reactant, it is inaccurate to say, "Because nuclear reactions are 100 million times more

powerful, chemical explosives can never produce the same total energy." It is possible to increase the total energy by gathering a sufficiently large quantity of chemical explosives.

The decisive differences lie in the required amount of material, energy density, release time, spatial concentration, and the presence or absence of radiation. Nuclear weapons release an extremely large amount of energy from a small mass through a chain reaction on the microsecond scale. Conventional explosives and fuel combustion require a mass that is orders of magnitude greater to produce the same total energy, and their release rates and distribution of effects also differ.

4.2.1 Energy Density and Time Scale

While it is possible to increase the total energy of chemical explosives, even with the same total joules, the pressure, temperature, and radius of destruction will differ depending on the release time. A fission chain reaction proceeds in an extremely short time, forming a fireball and a shock wave. Incendiary agents burn for a relatively long time while consuming surrounding oxygen, primarily sustaining fires.

This difference in time scales is not merely a technical detail. If a large number of conventional bombs are detonated at separate locations and times, the shock waves, fires, and impact craters from each explosion would remain. To create the same spherical pressure field and thermal radiation field as a single airburst, the positions and times of the explosions would need to be synchronized with extreme precision.

4.2.2 Neutrons as a Distinctive Identifying Feature

Apart from the debate over whether conventional explosives or fuels can produce significant energy, neutron activation serves as a distinguishing feature of nuclear reactions. Even if conventional weapons could produce fires and blast waves of comparable magnitude, a strong neutron field capable of activating parent nuclides in rock . The theory of a composite weapon requires a separate mechanism—not just heat and blast—to explain the physical samples discussed in Chapter 3.

4.3 The Correct Interpretation of the TNT Equivalent

The estimated yield of the Hiroshima atomic bomb is generally considered to be equivalent to approximately 15 kilotons of TNT. This is a measure that converts the total energy of the explosion into the heat of detonation of TNT; it does not mean that 15,000 metric tons of TNT would produce exactly the same phenomena as a nuclear explosion over the city.

As a thought experiment, consider transporting 15,000 metric tons of TNT as-is by aircraft. Depending on conditions, a B-29 could carry up to 20,000 pounds, approximately 9.1 metric tons of bombs (National Museum of the USAF, 2026). Even assuming the maximum payload capacity

was always available, a simple mass division would result in over 1,600 aircraft. Assuming a practical payload of 6 metric tons, the number would be approximately 2,500 aircraft.

This calculation does not strictly replicate the actual number of aircraft required. It is a conservative thought experiment that ignores factors such as range, fuel, bomb casings, formation spacing, drop accuracy, simultaneous detonation, mid-air collisions, weather, and interception attempts. Even so, it demonstrates that it is not realistic to concentrate an explosive energy equivalent to 15 kilotons—based solely on the mass of conventional explosives—in a single mission carried out by a small number of aircraft it is unrealistic to concentrate detonation energy equivalent to 15 kilotons based solely on the mass of conventional explosives.

The fuel mass derived from the total heat of combustion of napalm and the number of aircraft obtained by dividing 15,000 metric tons of TNT by an aircraft's payload capacity are conversions based on different physical quantities and must not be conflated. Even if the total heat of combustion of the fuel is summed in joules, it does not .

4.4 The Difference Between Combustion Energy and Detonation

Napalm is an incendiary weapon that burns fuel in a viscous form, adhering to targets to sustain high temperatures. Although its total heat of combustion is high, the chemical energy is released over a relatively long period of time. The blast of a nuclear explosion is determined not only by the total energy but also by how much energy is converted into high-pressure gas within an extremely short period of time.

High-performance explosives such as TNT produce a detonation, whereas napalm primarily undergoes combustion. It is not possible to simply add up the total joules of both and claim that they have "the same destructive power as an atomic bomb." It must be made clear which effects—blast, thermal radiation, localized fires, or urban fires—are being compared.

Even if a large number of conventional explosives are detonated simultaneously in the air , if the detonation times and locations are dispersed, they will not produce a single spherical shock wave. Multiple blast waves will interfere with one another, and the distribution of damage on the ground will reflect multiple impact and detonation points. This differs from the intense single flash and shock recorded in Hiroshima and Nagasaki, as well as the formation of a single fireball and cloud.

4.5 Conventional Weapons Cited by Doubters

4.5.1 Flash Agents and Flash Grenades

Flash agents using magnesium, aluminum powder, oxidizers, and other substances can produce intense light and heat. However, chemical flashes do not simultaneously generate a single fireball

over a city, widespread thermal radiation, shock waves, initial gamma rays and neutrons, or neutron-induced radioactivity simultaneously.

Even if we assume a device capable of mimicking only the flash, the blast, fires, radiation, cloud formation, and operational records would need to be accounted for by separate devices. While this adds to the assumptions of the composite weapon theory, no specific weapon names, manufacturing or loading records, or evidence of a drop have been presented.

4.5.2 Pumpkin Bomb

The "Pumpkin Bomb" actually existed as a dummy bomb filled with conventional explosives that had an external shape and ballistic characteristics similar to those of "Fat Man," and it was used for training and in actual combat drops on Japan. Therefore, there is no need to deny its existence.

The high-performance explosive variant is said to have been loaded with approximately 6,300 pounds (about 2.9 metric tons) of explosives. While a single explosion could cause significant localized damage, a simple mass comparison—equivalent to 15,000 metric tons of TNT—would require several thousand such bombs. There are no operational records or eyewitness accounts showing that such a large number of bombs were concentrated in the same airspace at the same time to and make them appear as a single aerial explosion. There are no operational records or eyewitness accounts to support this.

Rather, the records regarding the "Pumpkin" bombs indicate that the U.S. military was training on the ballistics, crew procedures, and evasive maneuvers. It is more consistent with the historical record as a whole to interpret these as preparatory records for the atomic bombing mission rather than as evidence that conventional bombs were used to disguise atomic bombs.

4.6 The Claim of Thermobaric Weapons

Modern thermobaric weapons— fuel-air bombs are weapons that disperse fuel and mix it with air to generate high temperatures and prolonged pressure effects over a wide area. If skeptics wish to apply this term to the 1945 operations, they must provide specific weapon names, design drawings, manufacturing records, mounting devices, drop tests, and operational orders.

Even if there were historical precursors to the concept of explosions utilizing fuel and air, no documents have been confirmed that. Mere analogies based on the fact that the effects of modern weapons resemble some aspects of the atomic bombs are insufficient to cannot prove their existence and use in 1945.

Furthermore, thermobaric weapons do not generate neutrons or gamma rays and do not account for the radioactive byproducts described in Chapter 3. The possibility of mimicking some of the blast and heat effects is distinct from the ability to explain all the observed evidence.

4.7 Operational Issues with Sulfur Mustard and Napalm

Sulfur mustard damages the skin, eyes, and respiratory system, and can damage the bone marrow through systemic absorption. Therefore, it is a highly toxic chemical weapon. However, if it had been dispersed on a large scale in Hiroshima and Nagasaki, traces would surely have remained in the ammunition, containers, dispersal routes, wind direction, surface contamination, secondary exposure of first responders, characteristic odors and eye damage, as well as in military, police, and medical records.

If large quantities of napalm or incendiary bombs had been used, this would have required a large number of dropped ordnance, impact points, shrapnel, dispersal containers, prolonged continuous bombing, and aircraft formations. A large-scale incendiary attack like the Great Tokyo Air Raid would have been recorded as involving hundreds of attacking aircraft, prolonged bombing, countless impact points, and widespread fires.

In contrast, in Hiroshima, the bomber Enola Gay and the observation and photography aircraft Great Artist and Necessary Evil formed the attack formation near the hypocenter. The overall operation also included three separate weather observation aircraft (NPS, 2025a; 2026b). It is inaccurate to state categorically that “there were only three aircraft involved in the Hiroshima mission”, but it is clear that there was no instance of hundreds or thousands of aircraft attacking the target area.

4.7.1 Synchronization and Traces of Multiple Weapons

The composite weapon theory assigns the flash, blast, incendiary effects, toxic effects, and radiation to separate devices. However, to make these appear as a single phenomenon, the explosion altitude, detonation time, dispersion concentration, wind direction, and ignition points must be synchronized. As the number of devices increases, so does the likelihood of misfires, time delays, different clouds, multiple explosions, fragments, containers, and impact craters.

Although there are differences in the details, civilian and military records from Hiroshima and Nagasaki agree on a central narrative: a single, intense flash, followed shortly thereafter by a shock wave and a massive cloud. The absence of any positive evidence indicating the sequential dropping of multiple weapons is not, on its own, conclusive proof, but it increases the burden of proof for the composite weapon theory.

4.7.2 Evidence That Chemical Dispersal Should Have Left Behind

Assuming a large-scale dispersal of sulfur mustard, one would expect to find records of contamination zones heavily influenced by weather conditions; the distribution of exposure to droplets and vapors; lesions to the eyes and respiratory tract; secondary contamination of clothing, the ground surface, and first responders; and records of decontamination and protective

measures. Although not all records may have been fully preserved amid the post-atomic bomb chaos, it cannot be assumed that all records would have been fully preserved; however, substantial positive evidence from munitions, containers, soil, and medical records is required to support the theory of city-wide dispersal.

While the opposing view demonstrates that individual symptoms can also occur with mustard gas, it fails to show what quantity was dispersed, from what altitude and location, under what wind conditions, or how to reproduce the relationship between individual doses from the hypocenter and the medical findings.

4.8 Comparison with Eyewitness and Operational Records Cross-referencing

In Hiroshima, alert reports, ground-based eyewitness accounts, crew logs, photographs, and measurement records document an attack by a small number of aircraft, the dropping of a single bomb, an airburst approximately 43 seconds later, and a single intense flash and shockwave. Regarding Nagasaki as well, there are operational records of the dropping of a single “Fat Man” bomb from a box car and its subsequent airburst.

The activities required by the “combination of chemical weapons” theory—such as multiple aircraft, multiple bombs, simultaneous detonation devices, ground dispersal teams, and radioactive material dispersal teams—do not appear in Japanese or U.S. operational records, air defense records, eyewitness accounts, or debris investigations.

The mere absence of records does not mean it is logically impossible. However, while the atomic bomb theory is supported by a continuous chain of evidence—including weapon design, nuclear material production, component transport, aircraft modification, crew training, the drop, observation, damage, and radiation contamination—whereas the “composite deception” theory lacks the specific records and physical evidence essential for its execution. This asymmetry is significant.

4.9 The Proliferation of Assumptions in the Composite Weapon Theory

The composite weapon theory tends to add new devices every time it responds to individual counterarguments. The flash is attributed to a flashbang; the blast to conventional explosives or a fuel-air explosive; the fire to napalm; the symptoms to sulfur mustard; and the radioactivity to nuclear reactor waste. Distance distribution as a secret dispersal plan, and the lack of records as a cover-up.

However, the more explanatory elements are added, the greater the requirements for personnel, equipment, coordination, secrecy, and the elimination of traces. A scientific alternative hypothesis must explain the observed facts with fewer assumptions and produce independently verifiable predictions.

An airburst from a single fission weapon can explain the intense flash, blast wave, heat ray, initial radiation, neutron-induced radioactivity, a single cloud formation, and a mission involving only a few aircraft—all within a single mechanism. The composite weapon theory assumes separate secret devices for each of these elements but has not presented any verifiable physical evidence.

4.10 Summary of This Chapter

The conclusions of this chapter are as follows:

- Chemical reactions and fission reactions differ fundamentally in terms of energy per reaction, required amount of material, release time, and neutron emission.
- TNT equivalence is a measure of total energy; it does not mean that the same amount of TNT or fuel would produce the same distribution of effects as a nuclear explosion.
- In a thought experiment involving the air transport of 15,000 metric tons of TNT, even assuming the maximum payload capacity of a B-29, the number of aircraft would exceed 1,600; for an actual operational load, it would be approximately 2,500. Although this is merely a lower-bound mass comparison, it illustrates the gap compared to a mission involving a small number of aircraft.
- Distinguish between the total heat of combustion of napalm and its TNT equivalent; do not directly convert the fuel mass derived from the heat of combustion into the number of B-29s required.
- While “Pumpkin” bombs did exist, each contained approximately 2.9 metric tons of high-explosive material and could not serve as a substitute for a nuclear explosion.
- There is no concrete evidence indicating that modern thermobaric weapons were used in Hiroshima and Nagasaki in 1945.
- The “composite weapon” theory cannot simultaneously account for a small number of aircraft, a single bomb, a single aerial explosion, and the formation of radioactive byproducts.

Based on the above, the “combination of chemical weapons” theory is inconsistent with the totality of evidence observed in Hiroshima and Nagasaki, both from a physicochemical and operational standpoint. 39

Chapter 5: Medical Counterevidence

—Examination of the “No Radiation Damage” Theory and the “Sulfur Mustard” Theory—

5.1 Argumentation in This Chapter

The atomic bomb denial theory argue that the skin lesions, hair loss, bleeding, infections, and gastrointestinal symptoms observed in atomic bomb survivors were caused not by radiation but by sulfur mustard or napalm. When listing the symptoms, there is some overlap between those of radiation sickness and chemical weapon poisoning.

This chapter does not underestimate the systemic toxicity of sulfur mustard. Sulfur mustard is an alkylating agent that damages not only the skin, eyes, and airways but also the bone marrow, lymphoid tissue, and DNA, and can cause leukopenia, infections, chromosomal damage, and cancer (CDC/NIOSH, 2026; ATSDR, 2003). Therefore, the counterargument that "mustard gas does not cause bone marrow suppression or chromosomal abnormalities" is incorrect.

Nevertheless, the clinical course observed in the atomic bomb survivors of Hiroshima and Nagasaki—including severity depending on shielding and distance, radiation-specific chromosomal abnormalities, and long-term dose-response relationships—cannot be uniformly explained by sulfur mustard alone. The argument presented in this chapter is based not on the presence or absence of individual symptoms, but on the temporal, spatial, and quantitative combination of multiple findings.

5.2 Arguments of the Dissenting View

The main arguments of the dissenting view can be summarized as follows:

- The blisters and skin ulcers observed in atomic bomb survivors resemble those caused by sulfur mustard.
- Hair loss, leukopenia, bleeding, and infections can also occur due to chemical weapons and therefore do not constitute evidence of radiation exposure.
- Early Japanese physicians did not diagnose these conditions as "radiation sickness."
- Differences in symptoms based on distance from the blast can be explained by the concentration of the gas.
- The long-term studies by the ABCC and RERF were conducted under U.S. influence, and the relationship between radiation dose and disease was fabricated.

The first and second points contain some elements of truth. Precisely because symptoms overlap, it is necessary to integrate exposure pathways, onset timing, lesion morphology, blood counts, chromosomes, dose, and long-term diseases must be integrated to make a differential diagnosis.

5.3 Basics of Acute Radiation Syndrome

Acute Radiation Syndrome (ARS) occurs when the entire body or a large area is exposed to high doses of ionizing radiation over a short period of time. Depending on the dose, prodromal symptoms, an incubation period, hematopoietic syndrome, gastrointestinal syndrome, and neurovascular syndrome may appear.

In typical hematopoietic syndrome, nausea, vomiting, and fatigue appear early after exposure; following a latent period during which symptoms may temporarily appear mild, leukopenia, thrombocytopenia, infection, bleeding, oral and pharyngeal lesions, and alopecia progress due to bone marrow stem cell damage. The higher the dose, the sooner the initial symptoms appear, the shorter the latent period, and the greater the likelihood of severe illness.

Medical records from Hiroshima and Nagasaki document nausea and vomiting beginning on the day of the bombing, as well as hair loss, purpura, and oropharyngitis occurring several days to several weeks later, fever, leukopenia, infections, and bleeding, all occurring from the day of the bombing. Michihiko Hachiya's *Hiroshima Diary*, surveys by Masao Tsuzuki and others, and reports by the Science Council of Japan indicate that physicians at the time observed systemic disorders caused by an unknown bomb and considered the involvement of radiation from an early stage.

It is only natural that, as of August 1945, modern ARS classifications and dose assessments had not yet been established. The fact that the established term "radiation sickness" was not consistently in early records does not mean that radiation did not exist. In clinical medicine, it is common to first record symptoms associated with an unknown exposure, with an understanding of the cause developing later.

5.3.1 Prodromal Phase, Latent Phase, and Onset Phase

The clinical course of ARS does not become more uniform as the radiation dose increases; rather, it varies depending on whether the exposure was whole-body or partial, as well as on shielding, trauma, burns, infection, nutritional status, and the availability of medical care. Nevertheless, the temporal pattern—early nausea and vomiting, followed by a temporary improvement, and then hematopoietic dysfunction several days to several weeks later—provides an important clue for determining the cause.

When hematopoietic stem cells in the bone marrow are damaged, white blood cells, platelets, and red blood cells decrease as mature blood cells reach the end of their lifespan. Leukopenia leads to infection, while thrombocytopenia causes purpura and bleeding. Tissues with high rates of cell division—such as hair follicle cells, the gastrointestinal mucosa, and the oral and pharyngeal mucosa—are also affected.

5.3.2 Atomic Bombing as a Complex Trauma

Survivors of the atomic bombings were not exposed to radiation alone. They suffered a combination of trauma from the blast wave, flying debris, building collapses, burns from heat rays and fires, dehydration, infection, starvation, and the collapse of the healthcare system. Therefore, it is inappropriate to attribute all symptoms to a single cause.

The challenge of medical refutation is not to attribute everything to radiation, but to confirm whether there are findings among the combined injuries that increase in proportion to the radiation dose. The relationship between individual dose and chromosomes, leukemia, and solid cancers is important for this purpose.

5.4 Effects of Mustard Gas

Mustard gas is a blister agent that causes severe delayed inflammation and necrosis in the skin, eyes, respiratory tract. Symptoms are not prominent immediately after exposure; eye pain, conjunctivitis, skin erythema, blisters, and airway dysfunction often appear several hours later.

Sulfur mustard absorbed systemically damages the bone marrow, lymph nodes, and spleen, leading to leukopenia and an increased risk of infection. It alkylates DNA and can cause chromosomal and chromatid abnormalities. In the long term, it is also associated with an increased risk of cancers of the respiratory tract and skin.

Therefore, one should not claim that these effects—"bone marrow suppression, chromosomal abnormalities, and carcinogenesis"—are "unique to radiation" based solely on the terms themselves. Medical differential diagnosis is performed by combining the distribution of lesions, the time course of symptoms, the route of exposure, the dose-response relationship, the spatial distribution within a population, and physical evidence of exposure.

5.4.1 Delayed Onset and Local Distribution of Sulfur Mustard

Skin and eye symptoms caused by sulfur mustard do not necessarily peak immediately after exposure but develop after a latent period. They exhibit a localized distribution depending on the route of exposure, such as on skin where droplets have adhered or in the eyes and airways exposed to vapor. In cases of high-dose exposure, bone marrow suppression due to systemic absorption also occurs.

This finding is important for recognizing the overlap of symptoms. At the same time, the theory of city-wide dispersal requires an exposure map that accounts for wind direction, topography, areas inside and outside buildings, droplet deposition, persistence of contamination, and secondary exposure of first responders. To reproduce the same individual variations observed in physical doses from the hypocenter, a mere generalization that "gas causes the same symptoms" is insufficient.

5.4.2 Skin Lesions and Shielding

In flash burns caused by an atomic bomb, exposed areas facing the hypocenter sustain severe damage, while damage may be mitigated in the shade of clothing, objects, or buildings. Differences also arise depending on the color, thickness, and fit of clothing, as well as body orientation. This is consistent with short-duration, straight-line thermal radiation.

While clothing can also alter the exposure dose to sulfur mustard, the flow of vapor and droplets does not follow the same geometry as the shadow of a heat ray. It is necessary to compare not only similarities in individual photographs but also the overall directionality, shielding, and temporal progression across the entire city.

5.5 Comparison of Clinical Courses

Sulfur mustard-induced skin and eye damage manifests most severely at the sites of chemical contact, with irritation and necrosis of the eyes and airways being key findings. Skin blisters develop later and and depend on the site of exposure, clothing, humidity, and temperature.

Flash burns from atomic bombs occur on exposed surfaces facing the hypocenter and may leave distinct shielding patterns depending on clothing, pillars, window frames, and body orientation. Superficial burns caused by heat rays and hematopoietic disorders caused by radiation can coexist in the same individual. It is not appropriate to categorize all skin symptoms uniformly as either “radiation burns” or “mustard blisters.”

Furthermore, in Hiroshima and Nagasaki, acute symptoms and mortality rates varied depending on distance from the hypocenter, building structure, indoor versus outdoor locations, and shielding conditions. In the case of gas or aerosol dispersal, the distribution is strongly influenced by wind direction, topography, air temperature, deposition, and penetration into buildings; thus, a distribution different from that predicted by radiation dose models based on a single aerial point source is expected.

For the sulfur mustard hypothesis to hold, it must explain why, under the differing meteorological and topographical conditions, the distribution of symptoms in both cities corresponds to the epicenters and estimated doses; the exposure of first responders and those who entered the cities later; the population distribution of eye and airway lesions; and the absence of dispersal munitions, containers, and residues.

5.6 Chromosomal Abnormalities

Ionizing radiation causes double-strand breaks in DNA, leading to diploid chromosomes, circular chromosomes, deletions, and translocations. While diploid and circular chromosomes decrease over time, stable translocations can persist for long periods even after cell division.

The RERF analyzed peripheral blood lymphocytes from atomic bomb survivors and reported the relationship between estimated radiation doses and the frequency of stable chromosomal aberrations. In recent years, a reanalysis using the FISH method and DS02R1 dose data has also examined the association with radiation dose (RERF, 2023).

What is important is not simply the fact that "chromosomal abnormalities were present." Rather, it is the dose-response relationship between estimated radiation dose and the frequency of abnormalities, differences due to shielding conditions, stable translocations that persist over long periods, and the correspondence with physical dose assessments.

Although sulfur mustard is also genotoxic, no evidence has been presented to demonstrate that the population-level distribution of stable translocations corresponds to the physical dose models for atomic bomb neutrons and gamma rays. It is one thing for a chemical to damage DNA, but quite another for it to be the cause of the quantitative patterns observed in atomic bomb survivors.

5.6.1 Diploids, Circular Chromosomes, and Translocations

Ionizing radiation causes double-strand breaks in DNA, and erroneous recombination leads to the formation of diploid chromosomes, circular chromosomes, deletions, and translocations. Diploid and circular chromosomes are used as relatively early indicators of radiation exposure, while stable translocations are used for long-term biological dose assessment because they tend to persist even after cell division.

Mustard gas also alkylates DNA and can cause chromosomal damage. Therefore, the mere presence of chromosomal abnormalities is not considered unique to radiation. What is important is the type of abnormality, its frequency, cellular selectivity, timing, and the quantitative relationship with individual dose.

5.6.2 Relationship with Individual Dose

The DS02R1 dose is estimated not only based on distance from the hypocenter but also using factors such as explosion altitude, location, indoor/outdoor status, and building shielding. A 2023 study of stable chromosomal aberrations using the FISH method reported a strong correlation with re-evaluated individual doses.

If the skeptics wish to explain the same data using sulfur mustard, they must reconstruct each individual's exposure to the chemical agent and demonstrate that the relationship between that exposure and chromosomal abnormalities fits the data better than the physical dose model. No such quantitative model has been presented.

5.7 Leukemia and Solid Cancers

In long-term follow-up studies of atomic bomb survivors, an excess risk of leukemia was observed as a relatively early aftereffect of radiation exposure. The excess incidence of leukemia is said to have begun increasing approximately two years after exposure and peaked around six to eight years later. The dose-response relationship is not a simple straight line but varies depending on the type of cancer, age, and time elapsed (RERF, 2026; Hsu et al., 2013).

Regarding solid cancers, an increase in risk proportional to the radiation dose has been observed in numerous sites following a longer latency period. Not all cancers are caused by radiation, and also involves ordinary background factors. Epidemiology does not determine the cause of an individual's cancer on a case-by-case basis but rather estimates excess risk within a population.

Mustard gas is also a carcinogen and is associated with cancers of the respiratory tract and skin, among others. However, to explain the timing of leukemia onset, the risks by subtype, and the long-term dose-response relationship for solid cancers observed in Hiroshima and Nagasaki cannot be explained solely by the secret dispersal over the two cities; independent evidence regarding exposure levels and individual dose distributions is required. Such evidence has not been presented.

5.7.1 The Establishment and Limitations of the Life Span Study

The Life Span Study (LSS) is a long-term follow-up study that established groups of atomic bomb survivors and comparison groups based on the 1950 Census and other data to track mortality and cancer incidence. It is not a study that tracked everyone under the same conditions starting from the day of the 1945 bombing; therefore, it is necessary to account for the exclusion of early deaths, migration, changes in diagnostic systems, dose errors, and confounding factors such as lifestyle habits.

These limitations have been addressed in research papers, leading to revisions of the dose-assessment system, the establishment of cancer registries, adjustments for factors such as smoking, and sensitivity analyses. The existence of limitations is not the same as the absence of a dose-response relationship.

5.7.2 Time Lag Between Leukemia and Solid Cancers

The excess risk of leukemia appears relatively and varies depending on the type of cancer and age. Solid cancers generally increase after a longer latency period and are evaluated through long-term follow-up. The fact that the onset timing differs even when the cause is the same is expected from the perspective of radiation biology.

Although chemical carcinogens also have latency periods, the question remains whether a single model can explain both the target organs and exposure routes expected from sulfur mustard

exposure and the multi-organ cancer risks consistent with the individual doses received in Hiroshima and Nagasaki.

5. 8 Evaluation of ABCC and RERF Research

The ABCC was established in 1947 and has a complex history that includes criticism that it prioritized research over the medical care of atomic bomb survivors, as well as issues related to power dynamics under the occupation and concerns regarding informed consent and the disclosure of information. These ethical and institutional issues should be examined.

Established in 1975, the RERF is a joint Japanese-U.S. research institution that has continued to conduct life-span studies, adult health surveys, studies on in utero radiation exposure, and genetic research, publishing its data and research findings while protecting personal information. The research has been reviewed in numerous peer-reviewed journals and and have been used in evaluations by the United Nations Scientific Committee and radiation protection agencies.

The fact that the institution has historical issues does not mean that all measurements and statistics were fabricated. To criticize the research, one must specifically examine cohort selection, dose estimation, confounding factors, loss to follow-up, diagnostic accuracy, and statistical models, and present alternative results that can be reanalyzed.

Furthermore, medical evidence does not rely solely on the ABCC and RERF. Clinical records by Japanese physicians immediately after the bombings, and hospital pathology studies, international research on radiation accidents and therapeutic exposure, and cellular and animal experiments all independently support the mechanisms of radiation-induced hematopoietic disorders and carcinogenesis.

5.9 Linking Physical and Medical Evidence

Medical findings alone may make it difficult to establish a definitive diagnosis when multiple causative agents are possible. This is where the physical evidence discussed in Chapter 3 becomes crucial. The persistence of neutron-induced radioactivity in the atomic bomb survivors' samples provides physical evidence that strong neutron fields existed in Hiroshima and Nagasaki.

Physical dose assessments correspond to the dose-response relationships observed in chromosomal aberrations, leukemia, and solid cancers. This means that different subjects—nuclear changes in stone and human cells and diseases—can be explained by a common radiation exposure model.

The fact that sulfur mustard can cause some of the symptoms does not negate this correspondence. Any alternative hypothesis must explain why, in addition to chemical agent exposure, the radioactivation, dose, chromosomal abnormalities, and epidemiological patterns corresponding to atomic bomb neutrons are present centered on the same epicenter.

5.10 Summary of This Chapter

The conclusions of this chapter are as follows:

- Sulfur mustard can cause not only local toxicity but also but can also cause bone marrow suppression, leukopenia, DNA and chromosomal damage, and carcinogenesis. We revise the previous simplistic comparisons that assumed these effects "do not occur."
- Because individual symptoms overlap, determining causation requires integrating the onset time, lesion morphology, exposure route, shielding, distance, blood counts, chromosomes, and long-term diseases.
- The acute symptoms of atomic bomb survivors are consistent with the time course of Acute Radiation Syndrome (ARS) and show a distribution corresponding to physical dose and shielding.
- Stable chromosomal abnormalities show a correlation with estimated radiation exposure doses, and long-term dose-response relationships are also observed for leukemia and solid cancers.
- While the institutional history of the ABCC and RERF should be critically examined, distrust of these institutions alone does not justify concluding that multidisciplinary, multigenerational data are fabricated.
- Because physical evidence of radiation exposure and medical dose-response data converge independently, the "sulfur mustard alone" theory cannot account for the totality of the evidence.

Based on the foregoing, the atomic bomb denial theory—which attempts to explain the symptoms of atomic bomb survivors solely through sulfur mustard or napalm—is inconsistent with the comprehensive findings of current clinical medicine, cytogenetics, epidemiology, and radiochemistry. 46

Chapter 6: Historical Refutation I

—The Manhattan Project and the "Atomic Bomb Was Unfinished" Theory—

6.1 Argumentation in This Chapter

The atomic bomb denial theory asserts that "the atomic bomb was not completed as of May 1945 and would have required another three years for practical application," "the Trinity test on July 16 was a cover-up involving a TNT explosion," and "the name 'Trinity' derives from trinitrotoluene." .

This chapter examines the organizational records of the Manhattan Project, nuclear material production, weapons design, the Trinity test, the transport of components to Tinian, and the continuity of the drop operation. The conclusion is that while not all processes had been completed by May 1945, the fact that a weapon ready for combat use did not exist in August of that same year are not synonymous.

6.2 The Establishment of the Manhattan Project

Research into nuclear fission and chain reactions progressed rapidly from late 1938 onward. In the United States, following several preliminary studies, the Army Manhattan Engineer District was established in 1942. The project integrated uranium enrichment at Oak Ridge, plutonium production at Hanford, weapons design at Los Alamos, and integrated research, manufacturing, and transportation efforts across various locations.

The U.S. National Archives and Records Administration (NARA) preserves the notebook documenting the world's first controlled, sustained fission chain reaction achieved by Chicago Pile-1 on December 2, 1942. The DOE, NPS, NARA hold a vast amount of historical material regarding facility construction, contracts, nuclear material production, weapon components, testing, and military operations.

It is estimated that over 130,000 people were involved in the project, though the vast majority were unaware of the overall objective and were engaged in compartmentalized work (NPS, 2026c). This number should not be taken at face value as meaning "everyone knew the secret of the atomic bomb." Nevertheless, the scale and consistency of the organizational, industrial, scientific, and military records that were gradually released after the war cannot be explained by a small number of forged documents.

6.2.1 1938–1942

Following the discovery of nuclear fission, the possibility of a chain reaction and its application to weapons was explored in several countries. In the United States, research progressed at the urging of scientists, and in 1942, the Manhattan Project was organized as a large-scale initiative of the U.S. Army Corps of Engineers. This was not limited to a single laboratory but encompassed industrial projects—including ore procurement, isotope separation, reactors, chemical separation, weapons design, aircraft, and base construction.

6.2.2 Oak Ridge, Hanford, and Los Alamos

At Oak Ridge, uranium enrichment was carried out using methods such as electromagnetic separation and gaseous diffusion. At Hanford, plutonium was produced in reactors and separated chemically. At Los Alamos, weapons design, detonation testing, diagnostics, assembly, and experiments were conducted.

These facilities maintained separate records of their technologies, budgets, personnel, and logistics records. The "cover-up" theory must not only explain the mere existence of the name "Manhattan Project," but also account for why the products, equipment, waste, and work records from each facility correspond with one another.

6.3 Two Types of Weapon Designs

The weapons used in Hiroshima and Nagasaki were not of the same design.

"Little Boy" was a gun-type device using enriched uranium-235. It employed a relatively simple method of rapidly joining two subcritical sections to create a critical mass—a relatively simple method—and the U.S. side was confident it would function even without conducting full-scale nuclear tests. This was the type used in Hiroshima.

Fat Man was a implosion-type device in which a plutonium-239 core was compressed by an implosion lens made of high-performance explosives. Reactor-produced plutonium has a background of neutrons from spontaneous fission, and the gun-type design initially considered faced the problem of premature fission. Consequently, a complex design was required to achieve a uniform implosion.

The device tested in the Trinity test on July 16, 1945, was a plutonium implosion device of the same design lineage as Fat Man. It was not a test of the "Little Boy" used in Hiroshima. Twenty-one days after the success of Trinity, a uranium-type bomb was used in Hiroshima, and twenty-four days later, a plutonium implosion-type bomb was used in Nagasaki. This distinction must not be obscured (DOE, 2026a; NPS, 2025d).

6.3.1 Differences Between "Little Boy" and "Fat Man"

The Hiroshima-type "Little Boy" was a gun-type device in which two pieces of highly enriched uranium were rapidly brought together inside a gun barrel. By design, it was judged to have a high probability of success and was deployed without undergoing a full-scale nuclear test.

The Nagasaki-type "Fat Man" employed an implosion design in which a plutonium core is uniformly compressed from all sides by explosive lenses. This design required a high degree of synchrony and symmetry, and the Trinity test was conducted to verify this method. The fact that different nuclear materials and designs were used in Hiroshima and Nagasaki is difficult to reconcile with the simple explanation that "a single camouflaged device was reused in two cities."

6.3.2 Challenges Remaining in the Spring of 1945

It is a fact that unresolved technical challenges, assembly work, testing, and transportation preparations remained in the spring of 1945. However, the fact that development work was

continuing is not the same as saying that "it would have taken three more years to complete." Engineering products undergo *??? something missing here – probably not important.*

Regarding the basis for the "three more years" cited by skeptics, it is necessary to specify which document and which stage of the process is being referred to. The meaning changes depending on whether it refers to atomic bombs in general, mass production capacity, specific components, theoretical research, or postwar improvements. To the extent confirmed by this paper, no primary source has been identified from May 1945 that concludes operational use was three years away.

6.4 The Situation in May 1945

In large-scale technical planning, research, component manufacturing, quality assurance, and operational preparations proceeded in parallel. Unless it is explicitly stated which components, designs, or tests the phrase "unfinished as of May" refers to, it cannot be evaluated as a historical proposition.

In the spring of 1945, enriched uranium production was progressing at Oak Ridge, plutonium was being produced at Hanford, and while at Los Alamos, work on the implosion lenses, the detonation system, diagnostic equipment, and weaponization had entered its final stages. Base preparations on Tinian, the retrofitting of the "Silver Plate" B-29s, and the training of the 509th Composite Group were all well underway.

The fact that unresolved issues remained in May does not preclude completion in July or August. It is not uncommon for design changes and bug fixes to continue right up until the final tests for aircraft, rockets, and naval vessels. To move from the assertion that "it was not completed in May" to the claim that "it did not exist in August," evidence is needed of specific technical obstacles that prevented completion, as well as evidence that they remained unresolved thereafter.

Regarding the claim that "it would have taken another three years to complete," it is not specified which primary document, by whom, which design the estimate refers to. Even if a pessimistic forecast existed at a single point in time, it does not invalidate subsequent experimental, manufacturing, or operational records.

6.5 The Trinity Test

The Trinity Test was conducted on July 16, 1945, at a test site in New Mexico. The device was mounted atop a tower, and numerous high-speed cameras, pressure gauges, radiation and radiation detectors, seismic and meteorological observation equipment, and remote control systems were deployed. After the test, trinitite—formed by the melting of sand—fission products, and induced radioactivity remained.

A preliminary test on a 100-metric-ton scale, using only high-performance explosives, was also conducted to calibrate the measuring instruments and verify the explosive phenomena. The

existence of the preliminary test does not indicate that the main test used TNT. Rather, it was a standard procedure for preparing the measurement systems for the actual nuclear test.

If Trinity is to be regarded as a conventional explosive hoax, then the test apparatus, nuclear materials, radiochemical analysis, film, measurement records, meteorological tracking, Trinite samples, and the subsequent design continuity with the Nagasaki weapon must all be explained by a different mechanism. No verifiable primary sources supporting this have been presented.

6.5.1 100-metric-ton TNT Calibration Test

On May 7, 1945, a preliminary test using approximately 100 metric tons of TNT was conducted at the Trinity Test Site. The purpose was to calibrate instruments, photographs, shock wave observations, and other procedures, and it also incorporated tracers using radioactive materials.

The fact that this test took place does not imply that the nuclear test on July 16 was a TNT explosion. The two events are recorded separately in terms of date, device, scale, observational results, and residuals. To substitute photographs and records from the calibration test for those of the subsequent nuclear test, it is necessary to indicate which materials were swapped out.

6.5.2 Physical Data from the Trinity Test

At Trinity, data were recorded on light, shock waves, radiation, radioactivity, radioactive fallout, and "trinitite"—molten sand and soil. Even in later yield reassessments, different methods—such as photogrammetry, shock waves, activation products, and residual plutonium—have been employed.

It is impossible to assess the entire test based solely on a single photograph, instrument readings, or the remains of the tower. The assessment of a nuclear explosion is conducted by integrating multiple independent measurements.

6.6 The "Trinity = TNT" Theory

The explanation that the name "Trinity" derives from "TNT" is not supported either etymologically or by historical records. TNT is an abbreviation for trinitrotoluene and is not the same as the word "Trinity."

In 1962, when Leslie Groves asked about the origin of the name, Oppenheimer replied that he had been reading John Donne's religious poetry at the time and had the line "Batter my heart, three person'd God" in mind. Los Alamos National Laboratory presents this letter and its background (LANL, 2022).

His own recollections are historical accounts, and they do not mathematically prove the rationale behind the naming.

However, there are no contemporary documents supporting the TNT origin theory, whereas Oppenheimer's own letter supports the explanation derived from John Donne. The weight of the evidence is not equal.

6.7 Transport to Tinian and Operational Preparations

The atomic bombings were not merely events confined to the laboratory; they were military operations that integrated nuclear materials, components, aircraft, bases, crew, weather, target selection, and measurements. The components and nuclear material for "Little Boy," as well as the components for "Fat Man," were transported to Tinian by sea and air and assembled at local facilities.

The "Silver Plate" B-29 had been modified—including its bomb bay, suspension system, weight, and crew procedures—to carry the atomic bomb. The 509th Composite Group trained in dropping and evasion using "Pumpkin" bombs, and and organized teams for weather reconnaissance, observation, and photography.

On August 6, the Enola Gay took off carrying "Little Boy," while the Great Artist and the Necessary Evil carried out observation and photography missions. The overall operation also included three weather reconnaissance aircraft. On August 9, the Boxcar took off carrying "Fat Man" (NPS, 2025a; 2026b).

These records are not limited to crew recollections. Flight logs, unit journals, photographs, weapons assembly records, target data, communications, and weather reports all corroborate one another. The chemical weapons cover-up theory inserts a different type of weapon of mass destruction into the same timeline but fails to provide records of its transport, assembly, or loading.

6.7.1 Assembly and Unit Preparation on Tinian

The atomic bombings required not only the bombs themselves but also the modification of B-29s, crew training, weather reconnaissance, measuring instruments, photography, assembly facilities at the base, and the transport of nuclear materials and conventional components. The 509th Composite Group repeatedly conducted drop training using dummy bombs and practiced evasive maneuvers.

Ships and aircraft were used to transport uranium components and related materials, and the components were assembled on Tinian. These details are preserved in different records: operational orders, aircraft records, base photographs, crew recollections, and transport documents.

6.7.2 Organization of the Hiroshima Mission

Near the Hiroshima target, the drop aircraft Enola Gay, the measurement aircraft Great Artist, and the photographic and observation aircraft Necessary Evil were in operation. The overall operation included three weather reconnaissance aircraft, which reported on weather conditions over the target candidates.

The phrase “three aircraft for the Hiroshima attack” refers to the immediate formation over the target. The entire mission also included three weather observation aircraft. What is important is that it is recorded not as a mission involving hundreds or thousands of aircraft dropping large quantities of conventional bombs, but as a mission involving a small number of aircraft to drop and measure a single special bomb.

6.7.3 The 21 Days from the Trinity Test to the Hiroshima Drop

The 21 days from the Trinity Test to the Hiroshima drop is a short period. However, weapons development, nuclear material production, troop training, and base preparations did not start from scratch after the test; they had already been proceeding in parallel. The major developments that can be traced from declassified historical documents are as follows.

- July 16: The Trinity test is conducted, verifying the plutonium implosion method.
- July 17: The Potsdam Conference begins, and .
- July 23–25: Preparations for and issuance of the order to use the atomic bombs proceeded.
- July 24: President Truman mentioned a “powerful new weapon” to Stalin.
- July 26: The Potsdam Declaration was issued, and the arrival of nuclear material and components for “Little Boy” on Tinian proceeded.
- Late July: Assembly and inspection of “Little Boy” and the preparation of Fat Man components proceed on Tinian.
- August 2: Operational orders for the Hiroshima mission are issued to the 509th Composite Group.
- August 5: “Little Boy” is loaded onto the Enola Gay.
- Around 2:45 a.m. on August 6: The Enola Gay takes off from Tinian.
- Around 8:15 a.m. on August 6: Little Boy is dropped over Hiroshima and detonates in mid-air.

This timeline does not imply that the weapon was invented from scratch in 21 days following the success of Trinity. The uranium-type “Little Boy” was a different design from the implosion-type

tested at Trinity, and the production of nuclear material, the manufacture of components, aircraft modifications, and unit training had been underway prior to that. One cannot dismiss the operational records of continuous manufacturing, transportation, and operational records.

6.8 Initial Assessment by the Japanese Side

Immediately after the bombing of Hiroshima, the Japanese side investigated the cause of the damage. An investigation team, including Yoshio Nishina, arrived in Hiroshima on August 8 and examined the nature of the explosion, radiation, and the damage. The investigation records of the Japanese military, universities, and the Council for Scientific and Industrial Research contain analyses identifying it as an atomic bomb (Nishina Memorial Foundation, 2022; National Institute for Defense Studies Archives Reading Room, 1945).

Crucially, these investigations took place before the occupying forces began their long-term control. Japanese scientists did not conclude that it was an atomic bomb only after reading the U.S. military's postwar reports.

The initial Japanese investigations were marred by a shortage of measuring instruments, confusion, problems with sample preservation, and military secrecy; by modern standards, none of them were perfect. Nevertheless, the blanket assertion that "Japanese doctors and scientists did not conclude that it was an atomic bomb" does not hold up.

6.9 Distinction from Historical Debates

There are diverse debates in historical scholarship regarding the purpose and effects of the atomic bombings. Issues such as the intent to bring the war to an early end, the diplomatic impact on the Soviet Union, the relative significance of the atomic bombs versus Soviet entry into the war in Japan's surrender, and the possibility of alternative means are legitimate research topics concerning the interpretation of primary sources.

Research by the National Institute for Defense Studies also distinguishes between the purposes and effects of the nuclear use and analyzes the process leading to the end of the war (Chichikawa, 2023). These debates are premised on the fact that nuclear weapons were used in Hiroshima and Nagasaki. Questions regarding policy intent cannot be transformed into evidence that the weapons did not exist.

6.10 Summary of This Chapter

The points confirmed in this chapter are as follows:

- The Manhattan Project was a large-scale initiative that integrated nuclear material production, weapons design, and the operation of bases, aircraft, and troops; scattered primary sources remain.

- “Little Boy” in Hiroshima was a uranium gun-type bomb, while “Trinity” and “Fat Man” in Nagasaki were plutonium implosion-type bombs; they are not the same type of weapon.
- The fact that work was still ongoing in May 1945 does not mean that the weapons were not operational by August of that year.
- The Trinity test includes measurements, radiochemical data, samples, and records indicating a nuclear explosion, distinct from the preliminary tests using conventional explosives.
- In Oppenheimer’s own letters, the name “Trinity” is explained as a reference to a poem by John Donne; there is no evidence to support the theory that it derives from TNT.
- Japanese scientists had been conducting research on atomic bombs even before the occupation began.

Based on the above, the claims that “the atomic bomb was incomplete in August 1945” and “Trinity was a substitute for TNT” are inconsistent with the continuous historical records of the Japanese investigation regarding planning, experimentation, transportation, and the drops, Japanese investigations. 53

Chapter 7: Historical Refutation II

— The “Global Cover-Up by the Japanese and U.S. Governments” Theory—

7.1 Argumentation in This Chapter

When counterevidence from physical, medical, and historical sources is presented against atomic bomb denial theories, proponents argue that “those sources themselves were fabricated by the Japanese and U.S. governments and research institutions.” This is Proposition F—a safety net designed to salvage other propositions.

This chapter does not deny the general principle that states may maintain secrecy, control the media, and conceal inconvenient information. In fact, the Manhattan Project was operated under the highest levels of classification, and and during the occupation period, controls were also imposed on media reports and publications regarding the damage caused by the atomic bombs. The question is whether one can conclude from these facts that “nuclear explosions themselves did not exist, and that physical measurements and historical records worldwide have been fabricated for over 80 years.”

7.2 The Difference Between Legitimate Secret Research and a Global Deception

The Manhattan Project was able to maintain secrecy during the war because it compartmentalized tasks, kept the overall objective hidden from many workers, and strictly

controlled access to military facilities and communications . Not all 130,000 people were aware of the full scope of the nuclear weapons program.

On the other hand, maintaining the pretense that atomic bombs did not exist for more than 80 years after the war would require different conditions. It would be necessary to continuously generate mutually consistent fabricated data not only across the U.S. military, government, and research institutes, but also among Japanese scientists, doctors, and local governments; participants from the United Kingdom and Canada; measurement agencies, including those in Germany; international academic journals; radiation protection agencies; nuclear test observers around the world; and researchers from nuclear-weapon states—all of these must have continued to produce mutually consistent fabricated data.

The fact that classified information was possible during the war does not automatically imply that a cover-up extending to postwar public research and international measurements was possible. The subjects of secrecy, duration, participants' knowledge, monitoring methods, and post-disclosure verifiability are all different.

7.3 Dispersion and Cross-Verification of Historical Documents

Historical documents regarding the development and dropping of atomic bombs are not consolidated into a single "official announcement." There are records from various sources, including the U.S. Army, Navy, Manhattan Engineer District, Los Alamos, Oak Ridge, Hanford, the 509th Composite Group, the Department of Transportation, the State Department, and medical investigations, as well as photographs, videos, and medical surveys .

The United Kingdom and Canada were involved in the project in terms of research, nuclear materials, and personnel, and each has its own public records and official histories. On the Japanese side, there are records from the military, universities, hospitals, local governments, atomic bomb survivors, the press, and the Council for Academic Research. Despite differences in the purposes, languages, preserving institutions, and dates of release of these historical sources, the basic chronology of nuclear development and the bombings corresponds.

The "cover-up theory" simply interprets the sheer volume of documents as evidence of "a large-scale forgery." However, in historiography, it is considered significant when historical sources—each created through independent processes—agree on central facts while containing minor discrepancies. The fact that completely identical text would, in fact, raise suspicions of a unified fabrication by later generations.

7.3.1 The Records Do Not Constitute a Single "Atomic Bomb File"

Records documenting the development and use of the atomic bomb are not limited to those compiled into a single official report. They are dispersed across documents created for day-to-day

operations, such as the procurement of ore, electricity, large-scale facilities, chemicals, labor, health management, aircraft modifications, base construction, meteorology, encrypted communications, photographs, and hospital records.

The strength of these dispersed records lies in the fact that materials created for different purposes support the same chronology. For example, nuclear material production volumes, transport schedules, aircraft modifications, crew training, target weather conditions, drop times, photographs, and ground damage all correspond. A comprehensive cover-up theory must explain under whose direction these were replaced, when this occurred, and with which existing records.

7.3.2 British and Canadian Records

The development of the atomic bomb was not solely a U.S. endeavor; it was connected to British research, the Quebec Agreement, and Canadian resources and research centers. British and Canadian documents have different administrative agencies, archival systems, and official histories than those of the United States.

The hypothesis that the U.S. government altered its own documents alone cannot explain the consistency with British and Canadian records. While adding the element of international collusion could logically resolve this, positive evidence demonstrating such collusion would be required.

7.3.3 Specific Examples of Dispersed Historical Sources

- U.S. side: Contracts, facility, and personnel records of the Manhattan Engineer District; the Atomic Energy Commission and Department of Energy's history of technology, Truman-related documents, and the 509th Composite Group's operational, maintenance, and flight records.
- British side: Tube Alloys research, the Quebec Agreement, the participation of British scientists, the British government's official history, and materials from the National Archives.
- Canadian side: Uranium resources, the Montreal Research Institute, and research and supply records, including those related to Chalk River.
- Japanese side: the Army Technical Department, pre-occupation surveys by Yoshio Nishina and others, medical records from universities and hospitals, local government materials, and testimonies from atomic bomb survivors.
- Soviet side: intelligence activities regarding the Manhattan Project, acquired technical information, independent nuclear development, and the 1949 nuclear test.

These are not entirely independent pieces of evidence. They involve joint planning, information sharing, the same samples, and the same dosimetry systems. However, records differing in their creators, purposes, dates, languages, and preservation systems correspond in their basic chronological sequence, albeit with minor discrepancies. The comprehensive cover-up theory bears the responsibility of explaining who replaced this scattered collection of records with which existing operational records, and when.

7.4 Japanese Investigations Prior to the Start of the Occupation

The claim that "U.S. forces entered Japan in October 1945 and began a cover-up with the Japanese government" does not align with the chronology of the occupation. Allied advance parties entered Japan in late August, and the Instrument of Surrender was signed on September 2. The Japanese government established a liaison office with the Allied forces on August 26 (Ministry of Foreign Affairs, 2026).

Even earlier, on August 8, Yoshio Nishina and others had entered Hiroshima, and the Japanese investigation had already begun. Doctors, universities, and military personnel were investigating radiation, the altitude of the explosion, the damage, and the effects on photographic film even before the occupation forces had established long-term control.

This fact does not imply that there was no censorship during the occupation period. Controls were exerted over photographs of the damage, medical information, and news reports. However, "restricting the public disclosure of the damage" and "fabricating the nuclear explosion out of nothing" are two distinct propositions. The historical fact of the former does not support the latter.

7.5 Physical Samples Differ from Documents

Documents can be altered. Photographs can also be edited. Testimonies are subject to memory errors. That is precisely why this paper treats the radioactivity of the A-bomb-exposed samples as primary evidence.

The isotopes found in stone, roof tiles, and concrete tell a different story than the words in the documents. If one claims that the measurement values were falsified, one must indicate exactly where—in the origin of the samples, elemental analysis, blanks, standard samples, AMS and gamma-ray measurements, depth distribution, distance distribution, or cross-comparisons among multiple institutions— and what kind of manipulation was carried out.

Furthermore, measurement techniques were not fixed as of 1945. Technologies independently developed in later years—such as AMS, low-background gamma-ray measurement, and FISH chromosome analysis—are reexamining data from atomic bomb-exposed samples and survivors.

The assumption that those who falsified data in 1945 foresaw the development of general-purpose analytical technologies decades later and rigged all results in advance lacks plausibility.

7.6 How to Address the Absence of Whistleblowers

If a massive cover-up were to continue for an extended period, it would be highly likely to result in defections among those involved, contradictions in documents, inconsistencies in physical evidence, and counterevidence from third countries. The fact that no verifiable internal documents or physical evidence supporting the non-existence of the atomic bombs has been presented for over 80 years works against the cover-up theory.

However, the argument that "the absence of whistleblowers proves the truth" does not in itself constitute proof. There are cases where whistleblowing is delayed in secret projects. This paper treats the absence of whistleblowers as a supporting factor and places its primary emphasis on publicly available historical records and physical measurements.

7.6.1 Secrecy Was Actually Breached

Although the Manhattan Project was highly classified, Soviet intelligence networks obtained internal information. This demonstrates that while large-scale secret projects can be concealed for a certain period, they are not completely impenetrable.

Based on this fact, one cannot simply conclude that "since there were no whistleblowers, the atomic bomb existed." However, the fact that a hostile nation obtained technical information, used it for its own nuclear weapons program, and conducted a nuclear test in 1949 is inconsistent with the explanation that this was merely a unilateral U.S. propaganda campaign.

7.6.2 The Correct Interpretation of the Absence of Whistleblowers

It is difficult to prove their absence conclusively. Therefore, the failure to find documents exposing the cover-up should be treated merely as circumstantial evidence. The core evidence consists of extant physical samples, pre-occupation Japanese investigations, records from multiple countries, and observations of later nuclear tests.

On the other hand, if the cover-up theory claims that the deception lasted for over 80 years, it must present the expected positive evidence. This includes records of the procurement and deployment of conventional weapons, containers for chemical agents, dispersal orders, the production and transport of radioactive materials, instructions to swap samples, and records of those involved. To date, no such systematic evidence has been presented.

7.7 Third Countries and Postwar Nuclear History

Since 1945, countries other than the United States have developed and tested nuclear weapons, and nuclear explosions have been monitored internationally through seismic waves, radioactive

fallout, atmospheric samples, and optical and electromagnetic observations. The existence of nuclear weapons is not a proposition that depends solely on U.S. public relations.

The nuclear programs of the former Soviet Union, the United Kingdom, France, China, and others competed with one another and involved adversarial relationships. The claim that all -possessing states and monitoring nations have cooperated to maintain a common fictional weapon does not account for the historical facts of the Cold War and nuclear arms race.

Even if one were to claim that only the Hiroshima and Nagasaki tests were hoaxes and that subsequent nuclear weapons were real, it would still be necessary to indicate at what point in the continuous technological history—from the Manhattan Project through Trinity, the "Two Cities" tests, and postwar designs—the transition from fake to real occurred. There is no unified response to the denialist argument.

7.7.1 Traces of Postwar Atmospheric Nuclear Tests

Postwar atmospheric nuclear tests left behind global-scale radioactive fallout. Cesium-137, strontium-90, plutonium isotopes, and other elements have been recorded so extensively that they are used in soil, ice cores, ocean, human tissue samples, and radiocarbon dating.

The general proposition that "nuclear weapons do not exist" would require explaining not only the events in Hiroshima and Nagasaki but also these global isotopic records, as well as data from test sites, observation stations, and meteorological, seismic, and radionuclide data from various countries—all of which must be attributed to other causes.

7.7.2 International Monitoring System

The international monitoring system of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) employs various technologies—including seismic waves, underwater acoustics, atmospheric pressure fluctuations, and radionuclides—in locations around the world. Underground nuclear tests are detected not only by video footage released by the testing nation but also by physical signals from remote locations.

While this is not direct evidence proving the 1945 events in the two cities, it refutes the claim that "nuclear explosions do not physically exist." In the modern era, a nuclear explosion is not a phenomenon that can be concealed solely through a single nation's information control.

7.8 Conditions for Falsifiability

If the theory of a global cover-up is to be treated as an academic hypothesis, it is necessary to specify which observations would lead to its rejection as false. For example, even if radiation measurements by independent organizations, official documents from countries other than the

United States, or preliminary investigations by the Japanese side are presented, the hypothesis becomes unfalsifiable if all of these are interpreted as part of a conspiracy.

Unfalsifiable claims appear to have high explanatory power because they can fit any outcome. However, in reality, since they do not limit predictions or specify conditions under which they might be wrong, they are difficult to subject to scientific verification.

A more valid alternative hypothesis must limit the necessary conspirators and assumptions, present specific primary sources and physical evidence, and explain the data better than existing measurements. Merely asserting that "differences from the official explanation constitute a cover-up" does not satisfy these conditions.

7.9 Summary of This Chapter

The conclusions of this chapter are as follows.

- The wartime secrecy of the Manhattan Project and the global scientific cover-up that has persisted for more than 80 years since the war's end are distinct propositions with different conditions.
- Historical materials related to the atomic bombs are dispersed across numerous countries, organizations, purposes, and creation dates, yet they correspond with one another along a basic chronological sequence.
- Japanese scientists and physicians investigated the atomic bomb even before the long-term control exercised by the occupying forces took shape.
- The existence of information control during the occupation period does not indicate that the nuclear explosion itself did not occur.
- Physical samples and independent analytical techniques developed in later generations cannot be explained by document forgery alone.
- The absence of whistleblowers is a secondary factor; the central evidence lies in publicly available historical records and reproducible measurements.
- The theory that all counterevidence was incorporated into a cover-up loses its falsifiability.

Based on the above, the claim that the Japanese and U.S. governments, together with research institutions around the world, jointly staged the atomic bombings is inconsistent with the dispersion of historical records, the chronology, physical measurements, and the nuclear histories of third countries. 59

Chapter 8: Epistemological Considerations

—Structural Analysis of Conspiracy Theories—

8.1 Argumentation in This Chapter

The preceding chapters have ??? denial. This chapter analyzes the logical structure of the discourse to explain why beliefs are maintained even when refutation is demonstrated.

The term “conspiracy theory” is sometimes misused to deny actual conspiracies by those in power. Cases where governments, corporations, and the military have engaged in covert operations or misconduct do exist in reality. Therefore, doubting those in power should not be regarded as pathological in and of itself.

The focus of this paper is not on evidence-based investigations of conspiracies, but rather on rather the form of reasoning that transforms all counterevidence into evidence of a conspiracy, thereby rendering the conclusion irrefutable.

8.2 Falsifiability

A scientific hypothesis must specify under which observations it would be deemed false. For example, if the hypothesis is that Hiroshima was destroyed solely by chemical weapons, then if neutron-induced radioactivity is detected in samples that existed prior to the bombing and an independent organization is able to reproduce the results, the hypothesis should be revised or rejected.

However, in conspiracy theories, even such measurements are explained away as having been “scattered afterward,” “fabricated by researchers,” or “the measuring equipment rigged.” The more new evidence emerges, the more conspirators and methods of deception are added—yet the central proposition remains unchanged.

Under this structure, the hypothesis is compatible with any observation. If the government remains silent, it is interpreted as a cover-up; if it refutes the claims, it is seen as panic; if it releases documents, they are deemed forged; and if experts agree, it is interpreted as manipulation. If the conclusion remains the same no matter what happens, there is no predictive power.

8.3 The “Cover-Up Theory” as a Safety Net

Propositions A through E, outlined in Chapter 1, are specific claims in the fields of physics, medicine, and history. Proposition F—the theory of a global-scale cover-up—serves to salvage the conclusion when those propositions are refuted.

This mechanism can be called a “safety net for failure.” If neutron measurements are presented, the research institute is deemed to be in collusion; if operational records are presented, the official documents are deemed forged; if a Japanese investigation is presented, the Japanese government is deemed to be in collusion; and if research from a third country is presented, international organizations are deemed to be in collusion—thus expanding the scope.

The unlimited proliferation of auxiliary assumptions necessary to protect a hypothesis undermines the simplicity of the explanation and its testability. This does not mean that individual questions are unjustified. The problem lies in the fact that, every time a question is answered, the scope of the conspiracy is expanded without examining the answer itself.

8.4 Asymmetric Selection of Evidence

In conspiracy theories, while materials from official agencies are generally viewed with suspicion, images of unknown origin, anonymous testimonies, edited video clips, and fragments of old measurements may be highly valued. It is an asymmetry in which the reliability of evidence is determined not by method, but by whether it “contradicts existing explanations .”

For example, discrepancies in DS86 are emphasized, while the remeasurements and cross-comparisons in DS02 are ignored. The fact that the initial physicians used unknown medical terms is highlighted, but mentions of hair loss, purpura, leukopenia, and suspected radiation exposure—found in the same records—are omitted. While the remaining portions of the Atomic Bomb Dome are shown, the fact that most of the roof, floor, and walls collapsed and were completely burned is downplayed.

Sound criticism evaluates evidence unfavorable to one’s own conclusions using the same standards. It is necessary to compare the source’s author, date, primary source status, measurement method, reproducibility, and citation context using consistent criteria.

8.4.1 The Three Types of Citation Discontinuity

Arbitrary citation of primary sources manifests as “contextual discontinuity” (cutting off the text’s context), “temporal discontinuity” (failing to address subsequent research), and “source set discontinuity” (ignoring contradictory sources that exist simultaneously).

Using only a single sentence from an Army document without indicating what or what a physician observed during the same period constitutes a “contextual and source set disconnection.” Pointing out discrepancies in DS86 while failing to address the remeasurement in DS02 constitutes a “temporal disconnection.”

Sound critical analysis of sources presents the whole picture—including unfavorable evidence—and clearly limits the extent to which the cited passage supports the conclusion.

8.4.2 Recalculating the Independence of Evidence

Numerous videos citing the same blog or book do not constitute multiple independent pieces of evidence. Conversely, multiple documents issued by the same government may also rely on a common source. It is necessary to evaluate the independence of the samples, measurement methods, creators, purposes, and time periods—not merely the number of pieces of evidence.

The reason this paper distinguishes between physical samples, operational records, initial Japanese investigations, and medical and epidemiological data is that it is unlikely for the same error to enter the entire series simultaneously. 61

8.5 “Secret Truths” and Collective Identity

Conspiracy theories are underpinned by a powerful narrative: “While the vast majority are being deceived, only we know the truth.” This provides a framework not only for intellectual superiority but also for processing distrust of authority, social anxiety, feelings of alienation, and political anger.

Once a belief becomes tied to collective identity, admitting an error is not merely a matter of correcting the facts; it a rejection of one’s peers, self-image, past statements, and purchases, donations, or activities. Consequently, accepting counterevidence entails psychological and social costs.

Responses that mock the speaker or label supporters as ignorant may reinforce this defensive reaction. It is important to direct criticism toward the claims and evidence, rather than attacking the person or their dignity.

8.6 Reassessment of the Backfire Effect

The simplistic notion that “correcting misinformation always backfires and strengthens beliefs” is not supported by current research. In large-scale replication studies, the classic backfire effect—where corrections lead to stronger false beliefs compared to control conditions—has not been consistently replicated (Prike et al., 2023).

On the other hand, issues remain, such as the limited effectiveness of corrections, their fading over time, strong resistance on political and health-related issues, and the risk that corrections may inadvertently spread misinformation to those encountering it for the first time. Corrections are not always successful.

Effective corrections must not only assert that a claim is false but also specifically explain why it is false, present an alternative, correct causal explanation, and link to reliable sources (Ecker et al., 2023). This is why this paper demonstrates, alongside refuting individual propositions, how a nuclear explosion provides a unified explanation for the observed facts.

8. 7 Designing Correction Information

The following principles are effective when addressing atomic bomb denialism.

- Present established facts first, and avoid over-repeating the sensational wording of the misinformation in the headline.
- Summarize the misinformation to the bare minimum, and immediately present the physical and historical evidence.
- Do not seek acceptance based solely on the names of authorities; explain the measurement methods, samples, distance distributions, and falsifiability.
- Do not conceal uncertainties or past scientific controversies. For issues such as the discrepancies in DS86, indicate what has been revised.
- Do not pit survivors' testimonies against physical measurements; treat them as different types of evidence that mutually reinforce one another.
- Do not stifle debates over the morality of the bombings; distinguish between the existence of facts and normative evaluations.

These guidelines are primarily intended not only for those who already hold firm beliefs, but also for undecided readers who are encountering the discourse for the first time.

8.7.1 The Sequence: Fact—Misinformation—Fact

Corrections should ideally be structured to first present the correct facts, then present the misinformation to the absolute minimum extent necessary, and finally return to the correct causal explanation. Repeating sensational false claims in headlines or thumbnails risks spreading misinformation to people who were previously unaware of the content.

8.7.2 Providing Alternative Explanations

If misinformation is simply deleted, gaps remain in people's understanding of the causal relationships behind an event. Therefore, it is not enough to simply state, "It was not mustard gas"; it is necessary to explain why acute symptoms, chromosomal abnormalities, and long-term illnesses correlate with radiation exposure. For the question, "Why did the trees remain standing?" alternative explanations such as heat rays, shielding, regrowth, and secondary fires.

8.7.3 Those Making Corrections Must Also Be Open to Correction

The credibility of a counter-narrative is enhanced not by pretending to be infallible, but by acknowledging errors and updating the narrative. This paper revised its descriptions of blast

pressure, distance from the hospital, sulfur mustard toxicity, and chlorine-36 in part to demonstrate its openness to responding to criticism.

8.8 Academic Skepticism and Conspiracy Theoretical Skepticism

Academic skepticism questions existing theories while simultaneously questioning one's own hypotheses. When new measurements emerge, it revises conclusions, explains counterevidence, and publishes reproducible methods.

Conspiracy-theory skepticism demands infinite proof only from existing theories, while deeming even fragments of weak origin sufficient for its own theories. Since it labels the absence of evidence as a cover-up and the presence of evidence as fabrication, its conclusions are predetermined.

The prevailing views in atomic bomb research are not exempt from criticism. Reevaluations have continued regarding the explosion altitude, yield, radiation dose, death toll, residual radiation, and long-term effects. The revision from DS86 to DS02 demonstrates that scientific consensus is not infallible and is updated through measurement and criticism. This very capacity for revision is what distinguishes it from conspiracy theories.

8.9 Summary of This Chapter

While atomic bomb denialism encompasses individual doubts, it exhibits the following characteristics as a whole:

- It transforms counterevidence into evidence of a cover-up, thereby losing its falsifiability. 63
- To protect its central thesis, they endlessly increase auxiliary assumptions and the number of alleged conspirators.
- They exhibit asymmetry in evidence selection, placing high value only on materials that are unfavorable to the existing explanation.
- They are linked to a group identity that claims to know a "secret truth."
- It reinterprets counterarguments as personal attacks or attempts at speech suppression, thereby absorbing criticism internally.

To counter this structure, verifiable evidence, alternative explanations, transparent acknowledgment of uncertainty, and a distinction between facts and value judgments are necessary—not ridicule or censorship.64

Chapter 9: Social Impact and Ethical Issues

—The Contemporary Implications of Atomic Bomb Denial—

9.1 Argumentation in This Chapter

This chapter discusses the social impact of atomic bomb denialism, dividing it into verifiable facts and future risks. What can be confirmed at this point is that it has achieved a certain level of reach on videos and social media, is linked to books, lectures, and membership-based content, and has been addressed by public broadcasters as a disinformation issue.

On the other hand, no representative surveys demonstrating these points have not yet been identified. When discussing the impact,

we must distinguish between view counts, supportive comments, beliefs, and voting or policy-related actions.

9.2 Impact on Atomic Bomb Survivors and Bereaved Families

For atomic bomb survivors, atomic bomb denialism is not merely an abstract debate about weapons. Claims such as “What your family suffered was not an atomic bomb” or “Radiation sickness was fabricated” deny the memory of the deceased, the understanding of their illnesses, the history of their quest for compensation, and their standing as witnesses.

Survivors’ testimonies vary due to individual differences in memory, the passage of time, and . Historical research does not uncritically treat testimonies as absolute truths but cross-checks them against other testimonies, photographs, medical records, and physical evidence. However, dismissing an entire testimony as “collusion” based on minor discrepancies is not critical analysis of the sources.

As A-bomb survivors continue to age, the time we have to hear their firsthand accounts is limited. Going forward, we must not only preserve testimonies in video, audio, and text formats but also link them to location, time, buildings, photographs, medical records, and physical measurements, and preserve them as a verifiable archive.

9.3 Passing on Memories and Education

In school education, it is necessary not only to teach the atomic bombings as moral symbols but also to provide opportunities to learn why they can be identified as nuclear explosions. If students are taught—in a manner appropriate to their age—about heat rays, blast waves, neutron-induced radioactivity, chromosomes, and how to interpret historical documents—if explained in an age-appropriate manner—will foster evidence-based understanding rather than mere rote memorization of authority.

Deniers often criticize memorial museums and textbooks for "imposing the official narrative." In response, educators should not merely repeat conclusions but should openly disclose the sources of primary documents, measurement uncertainties, revisions in the history of science, and distinctions between legitimate historical debates.

Teaching not only "what to believe" but also "which evidence supports which claims, and what evidence would lead to a change in conclusion" builds long-term resilience against conspiracy theories.

9.4 Impact on Nuclear Disarmament Diplomacy

As a nation that suffered atomic bombings during the war, Japan holds a unique historical position in international discussions on nuclear disarmament and non-proliferation. The experiences of Hiroshima and Nagasaki form the foundation for diplomacy and civic movements that highlight the humanitarian impact of nuclear weapons.

If atomic bombs denial were to spread, it could be exploited to launch attacks claiming that "the damage caused by nuclear weapons was exaggerated" or that "Japan's status as a nation that suffered atomic bombings was fabricated." However, there is currently no empirical evidence that this has led to specific changes in Japan's diplomatic policy or international negotiations. What is discussed here are potential future impacts.

Atomic bomb denial is a problem not only for those advocating the abolition of nuclear weapons but also for those who prioritize nuclear deterrence. If the effects of nuclear weapons are denied, discussions regarding the effectiveness of deterrence, crisis management, damage assessment, and arms control become untenable.

9.4.1 The Historical Chain of the Anti-Nuclear and Disarmament Movements

The understanding of the damage inflicted on Hiroshima and Nagasaki has long influenced the postwar anti-nuclear and disarmament movements, including the Daigo Fukuryu-maru incident, the Pugwash Conferences, the International Physicians for the Prevention of Nuclear War, international conferences on the humanitarian impact of nuclear weapons, ICAN, the Treaty on the Prohibition of Nuclear Weapons, and the activities of the Japan Confederation of A- and H-Bomb Sufferers Organizations.

These movements are not monolithic; they hold differing positions on nuclear deterrence, phased disarmament, a total ban, and compensation for victims. Nevertheless, they share a common understanding of the fact that nuclear weapons actually cause damage through blast waves, heat rays, and radiation.

There is no direct evidence that atomic bomb denialism has already weakened the international movement. However, the potential impact—that discourses dismissing atomic bomb survivors'

testimonies and medical research as fabrications could serve as ammunition to attack the movement's moral and historical foundations—should be carefully considered.

Key historical milestones include the 1954 hydrogen bomb test at Bikini Atoll and the Daigo Fukuryu-maru incident, the 1957 Pugwash Conference, and 1985, when the International Physicians for the Prevention of Nuclear War received the Nobel Peace Prize; the 1996 advisory opinion by the International Court of Justice on the use of nuclear weapons; the 2017 adoption of the Treaty on the Prohibition of Nuclear Weapons and ICAN's Nobel Peace Prize; and and the 2024 Nobel Peace Prize awarded to the Japan Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo).

Although these movements and institutions differ in their objectives and policy means, they have all been premised on the common fact that nuclear weapons cause real damage from blast waves, heat rays, and radiation. This paper does not assert that atomic bomb denialism has already weakened these efforts; rather, it assesses that discourses relativizing the physical and medical facts of the atomic bombings can serve as material to attack their historical foundations.

9.4.2 Distinguishing Between Diplomacy by A-bomb Survivor Organizations and Policy Debates

There is tension between the Japanese government's nuclear disarmament diplomacy, its reliance on U.S. extended deterrence, and its response to the Treaty on the Prohibition of Nuclear Weapons. Refuting atomic bomb denialism does not justify either side of this policy conflict.

Rather, in order to critique policy contradictions and limitations, it is necessary to establish the existence of nuclear weapons and the harm they cause as common facts . Separating the establishment of facts from policy evaluation safeguards freedom of debate.

9.5 Impact on Perceptions of National Security

The claim that "nuclear weapons do not exist" leads to viewing the nuclear arsenals of Russia, China, the United States, and North Korea, nuclear tests, delivery systems, and alert postures as fictitious. This risks underestimating real threats and undermining rational debate on defense policy.

Conversely, the perception that "the damage caused by atomic bombs is exaggerated" may psychologically lower the threshold for nuclear use. It is necessary to discuss deterrence, disarmament, prohibition, nuclear sharing, and non-nuclear policies based on an accurate understanding of the reality of nuclear weapons and the devastation they cause.

This paper does not conclude in favor of any specific security policy. What it argues is that, as a prerequisite for policy choices, we must share a common understanding of the physical and medical realities of nuclear explosions.

9.6 Proliferation Channels and Monetization

Current atomic bomb denialism is not spread solely through individual books. It often employs a complex information distribution strategy: free videos are used to raise awareness of the issue, which then directs viewers to longer videos, lectures, books, email subscriptions, paid memberships, and related merchandise.

Video platforms highly value viewer retention, engagement, and sharing. Sensational "hidden truths" tend to attract more clicks than careful research-based commentary. From an algorithmic perspective, reactions from critics—as well as supporters—may be counted as engagement.

Therefore, it is necessary to investigate not only the creator's ideology but also which videos serve as entry points, which sales pages viewers are directed to, and in which communities the content is further disseminated. It would be desirable to conduct an analysis that distinguishes between view counts, unique viewers, watch time, traffic sources, book sales, and subscriber counts.

9.6.1 Design as an Information Product

Content denying the atomic bombings is often structured in stages: free videos phrased as questions, assertive short-form videos, lengthy commentaries, books, lectures, and paid memberships. Phrases like "hidden" and "not reported by the media" create an illusion of the information's rarity and exclusivity, strengthening the motivation to see more.

The fact that such content is commercialized is not in itself proof that it is false. Conventional publishing and journalism also generate revenue. The problem is that strong assertions and fear-mongering are financially advantageous, while corrections, reservations, and uncertainty tend to be at a disadvantage.

9.6.2 Metrics to Investigate

In impact analysis, it is necessary to distinguish not only simple view counts but also unique viewers, retention rates, referral rates, sharing networks, email subscriptions, book sales, lecture attendance, and membership conversions. Many of these metrics are not publicly disclosed, making it impossible to definitively determine the current market size.

News organizations should should investigate not only who believed what, but also which entry points led to which sales funnels and how platform recommendations influenced the process.

9.7 Initial Reactions Following NHK's Report

NHK's August 8, 2026, article brought to light atomic bomb denial posts and generative AI videos as a nationwide disinformation issue. Following the report, some on the denialist side interpreted it as "censorship born of fear of the truth" and reused the report itself as propaganda material.

This reaction illustrates the structure described in Chapter 8, where counterarguments are transformed into evidence of a conspiracy. However, the backlash from existing supporters on social media is not the same as an increase in the number of believers in the general public. To evaluate the impact of the broadcast and article, data such as search volume before and after the coverage, video traffic, attitude surveys, and book sales is necessary.

Furthermore, the rebroadcast of the archived program "The Atomic Bombing: 10 Seconds of Shock," which aired on August 7, 2026, can be understood as part of the programming commemorating the 81st anniversary of the atomic bombings. In the absence of internal NHK decision-making documents, I will not conclude that the sole reason for the broadcast was to counter historical denialism.

9.8 Distinguishing Between Historical Denialism and Misrepresentations by Generative AI

Historical denialism—which asserts that "the atomic bomb was not dropped"—is not the same as AI-generated videos that, while using the atomic bombing as a subject, produce imagery that differs from historical facts.

Historical denialism denies the fact of a nuclear explosion and asserts that a different weapon was used or that there was a conspiracy. Misrepresentations by generative AI, while acknowledging the atomic bombing itself, but may depict aircraft, explosions, cities, people, time, damage in a manner that differs from the facts. The latter includes not only malicious misrepresentation but also a lack of knowledge, artistic license, and mass production for profit.

What both have in common is the danger that, due to their visual persuasiveness and repetition, artificial footage may leave a stronger impression on viewers' memories than primary sources. In particular, when labels such as "live-action," "reenactment," or "archival footage" are ambiguous, viewers may mistakenly believe the generated content to be actual footage from that era.

Countermeasures also differ. While historical denialism requires refutation based on evidence, AI-generated misrepresentations require disclosure of the generation status, source, watermarks, production process, comparison with primary footage, and labeling on the platform.

9.9 Freedom of Speech and Social Responsibility

Whether false historical interpretations should be legally prohibited is deeply tied to freedom of expression. This paper does not does not argue that atomic bomb denialism should be uniformly subject to criminal penalties or administrative regulations.

Censorship risks providing the denialist side with a narrative of "suppressed truth" and could stifle even legitimate historical research and policy criticism. The fundamental approach lies in

the disclosure of historical records, expert explanations, improvements to search results, education, platform transparency, and support for atomic bomb survivors.

On the other hand, intentional misrepresentation, impersonation, fraudulent sales, false labeling of AI-generated videos, and defamation or threats against individuals may fall under general legal systems and platform terms of service. It is necessary to distinguish between the regulation of ideological content and measures against deceptive acts and rights violations.

9.10 Future Empirical Research

To accurately assess the social impact, the following studies are necessary:

- Conduct a representative nationwide survey to measure the awareness and credibility of atomic bomb denialism, as well as differences by age group and information source.
- Analyze social media and video data to track posting accounts, views, shares, movement between communities in social media and video data.
- Measure search volume, video views, and changes in attitudes before and after NHK news reports and fact-checking.
- Investigate the psychological burden experienced by atomic bomb survivors and their bereaved families when exposed to denialist claims, while adhering to ethical considerations.
- Verify the effectiveness of education using physical evidence in schools and museums on resilience to misinformation.
- Conduct experiments to determine the extent to which displaying, sourcing, and labeling AI-generated videos reduces misperceptions.

At this stage, expressions such as “widespread,” “believed by the majority of young people,” and “influencing policy” ???. What can be confirmed is the scale of reach—which cannot be ignored—and the existence of commercial and algorithmic dissemination mechanisms.

9.10.1 Classifying Impact into Three Stages

Social impact should be measured in three stages: first, awareness; second, belief; and third, action. Watching a video constitutes awareness, which is distinct from believing its content. Even if someone believes the content, it does not necessarily lead to voting, donating, refusing education, or supporting policies.

At this point, the aspects that are relatively easy to verify are awareness and reach. For beliefs and behavior, representative surveys, follow-up studies, experiments, and sales and search data are required.

9.10.2 Ethics of Harm Measurement

Research that measures the psychological impact on atomic bomb survivors and their bereaved families by showing them texts or videos promoting denialism has the potential to cause secondary trauma. Such studies must include informed consent, the option to withdraw, access to support services, and anonymization, and researchers must carefully assess whether the benefits of the research outweigh the burdens.

9.11 Summary of This Chapter

The current impact of atomic bomb denialism can be assessed as follows:

- Some content has reached hundreds of thousands to over one million views, bringing the issue to the public's attention.
- View counts do not equate to the number of supporters; there are still no representative surveys indicating the prevalence of these beliefs.
- There are potential impacts on the psychological well-being of atomic bomb survivors and their bereaved families, as well as on the transmission of memories, education, and the common ground for nuclear disarmament and security.
- A monetization structure linking videos, books, lectures, and subscription-based content supports the continued dissemination of these messages.
- Measures must distinguish between historical denial and misrepresentations caused by generative AI.
- Responses should focus on the disclosure of evidence, transparent corrections, education, archiving, and improvements to platform labeling rather than censorship.

The greatest danger lies not only in the majority of society immediately becoming complete deniers. It lies in the spread of ambiguous relativism—the notion that "we will never really know whether the atomic bombs were actually dropped"—which downgrades established facts to mere opinions. 70

Chapter 10: Conclusion

—Scientific Facts and Ethical Responsibility—

10.1 Hierarchy of Evidence

This paper has organized the counterarguments against atomic bomb denial into three layers based on the directness of the evidence.

The first layer consists of neutron-induced radioactivity remaining in samples from the atomic bombings. Chlorine-36 from Hiroshima, europium-152 from Hiroshima and Nagasaki, and cobalt-60, among others, correspond to background levels, distance, depth, shielding, and nuclear reaction calculations, and have been measured by multiple institutions. Chemical weapons do not produce this neutron field.

The second tier consists of independent historical and medical evidence. The Manhattan Project, the Trinity test, nuclear material production, transport to Tinian, B-29 missions, initial Japanese investigations, acute symptoms, stable chromosomal abnormalities, and dose-response relationships for leukemia and solid cancers all support the same event, based on different sources and methodologies.

The third layer consists of consistent explanations for phenomena—such as trees, buildings, and survivors—that skeptics cite as points of doubt. While these do not prove the existence of an atomic bomb on their own, they can be explained by an airburst, shielding, dynamic structural responses, thermal radiation, secondary fires, and individual biological variations; therefore, they do not constitute grounds for concluding that an atomic bomb did not exist.

10.2 Comprehensive Evaluation of Each Proposition

Proposition A: “What was dropped on Hiroshima and Nagasaki was not an atomic bomb” contradicts neutron-induced radioactivity, operational records, Japanese investigations, and medical dose-response data.

Proposition B: “Atomic bombs had not been operationalized by August 1945” contradicts records of two types of weapon designs, the Trinity test, nuclear material production, component transport, and the sequence of events leading up to the bombing missions. The fact that work was still ongoing in May 1945 does not preclude operationalization by August.

Proposition C “The damage was caused by a combination of conventional explosives, napalm, sulfur mustard, etc.” cannot explain the required quantities of materials, the release time, the mission involving a small number of aircraft, a single airburst, or neutron radiation.

Proposition D: “The fact that trees and buildings remained standing is evidence that it was not an atomic bomb” ignores temperature and heat output, dynamic blast loads, shielding, structural forms, secondary fires, and survivor bias. The fact that structures remained standing is not inconsistent with an atomic bomb.

Proposition E: “The symptoms of the atomic bomb survivors are consistent with sulfur mustard, etc.” is worth considering insofar as it points out some overlapping symptoms. However, the acute course of the illness, shielding and distance, chromosomal abnormalities, leukemia and solid

cancers, and the convergence of physical dose data cannot be explained by chemical agents alone. 71

Proposition F: “All contradictory evidence is part of a global cover-up,” is inconsistent with the dispersion of historical records, pre-occupation investigations by the Japanese side, measurements by third countries, later analytical techniques, and international observation of nuclear tests. By classifying all counterevidence as part of a conspiracy, it has lost its falsifiability.

10.2.1 Evaluation of Chapter 2

The existence of trees, the Atomic Bomb Dome, and survivors does not prove that the atomic bombing did not occur. Rather than treating these remnants as definitive “proof of the atomic bombing,” they should be positioned as a third-tier explanation demonstrating that the counterexamples presented by the denialist argument do not hold.

10.2.2 Evaluation of Chapter 3

Neutron-induced radioactivity is the central physical evidence of this paper. While chlorine-36 exists naturally and can be produced by other neutron sources, the excess at close range, the depth distribution, depth distribution, the presence of multiple nuclides, and international cross-comparisons are inconsistent with an explanation based solely on conventional weapons. The study of chlorine-36 in Hiroshima is described separately from that of europium-152, cobalt-60, and other elements in Nagasaki.

10.2.3 Evaluation of Chapter 4

Chemical weapons can individually produce blast effects, fire, and toxicity. However, they do not provide a unified explanation for the operational scenario involving the dropping of a single device by a small number of aircraft, nor do they account for the neutron and gamma-ray radioactive contamination, a single thermal and shock event, or records of debris and impact points. The number of B-29s is limited to a thought experiment based on TNT mass, and combustion heat is not confused with detonation blast.

10.2.4 Evaluation of Chapter 5

Mustard gas also causes bone marrow suppression, DNA damage, chromosomal abnormalities, and carcinogenicity. Therefore, we do not accept the counterargument that a single symptom is specific to radiation. The rebuttal is based on the temporal progression of symptoms, the geometry of flash burns, individual doses, stable chromosomal abnormalities, leukemia and solid cancers, and the convergence of physical neutron irradiation.

10.2.5 Evaluation of Chapters 6 and 7

The development and use of atomic bombs cannot be traced solely to a single official U.S. announcement; it can be verified through intelligence from the United Kingdom, Canada, and the Soviet Union; pre-occupation investigations by the Japanese side; and scattered records of industrial, transportation, and aviation operations. The cover-up theory should not be dismissed based solely on numbers; one must ask which documents and samples were manipulated, by what methods, and under what conditions the claims would be retracted.

10.2.6 Evaluation of Chapters 8 and 9

The problem with atomic bomb denialism lies not in its being a dissenting view, but in the asymmetrical evaluation of evidence and the practice of dismissing counterevidence as part of an unrestricted cover-up. Socially, the scale of the movement, the harm inflicted on atomic bomb survivors, the false presentation of both sides of the argument, the misrepresentation by generative AI, and commercialization can be confirmed; however, its level of public support and policy impact remain unmeasured.

10.3 Overall Conclusion

The conclusion that fission weapons exploded in Hiroshima and Nagasaki does not rely on a single government announcement, a single photograph, a single testimony from a survivor. Changes in atomic nuclei, records of military operations, human cells and diseases, the destruction of cities, and research from multiple countries all converge.

In science, individual figures and models are subject to revision. The update from DS86 to DS02, and the reexamination of estimates for explosion altitude, radiation doses, and death tolls are examples of this. However, the revision of details is not the same as the collapse of central facts. Rather, the convergence of multiple lines of evidence—which has withstood criticism and remeasurement—enhances the reliability of the conclusion.

Therefore, what was dropped on Hiroshima and Nagasaki were atomic bombs that utilized nuclear fission reactions. The theories regarding a combination of chemical weapons, an unfinished atomic bomb, and a global cover-up are inconsistent with the totality of currently available scientific and historical evidence.

10.4 Social Recommendations

First, regarding the facts of the atomic bombings, rather than accepting them simply “because authorities say so,” but based on what the evidence demonstrates. Information on chlorine-36, europium-152, cobalt-60, chromosomes, and operational records should be provided through both illustrated materials for the general public and specialized documents.

Second, a digital archive should be established that links survivors' testimonies with physical and historical records. The location, time, obstacles, and medical history, and ensure that primary sources can be distinguished from AI-generated footage.

Third, the media should not treat atomic bomb denialism as "both sides of the argument." While it is acceptable to report on the debate over the legitimacy of the bombings, claims regarding whether a nuclear explosion actually occurred—which lack established evidence and grounds—should not be presented on an equal footing.

Fourth, when issuing corrections, avoid sensationally repeating misinformation; instead, present the correct facts, evidence, and alternative explanations first. Past measurement discrepancies and institutional history should not be concealed; it should be clearly stated what is known and where uncertainties lie.

Fifth, generative AI videos must include a "generated" label, source attribution, an edit history, and a clear distinction from live-action footage. It is desirable for museums, broadcasters, and archives to provide provenance information for authentic videos and photographs in a machine-readable format.

Sixth, Quantify social impact. Do not conclude that something is trending based solely on view counts; instead, conduct representative surveys, network analysis, educational experiments, and measurements of the effectiveness of corrections.

Seventh, governments, research institutions, and archives should enhance their support systems for answering critical questions and expand their publicly available data. A lack of explanation does not imply that a conspiracy theory is correct, but information gaps can sometimes facilitate its spread.

10.5 Limitations of This Paper and Future Research

This paper focused on major propositions published domestically and the scientific claims in Palmer Version 1.9. It does not cover all of the author's works or videos, and additional verification will be necessary if their claims change in the future.

Radioactivity measurements are subject to factors such as sample history, local shielding, element concentration, background correction, and measurement limits. DS02 is also not an error-free system. This edition avoids the term "perfect match" and distinguishing the range within which measurements and calculations align and where variability remains. Moving forward, it would be desirable to include Japanese explanations of the key original papers and data tables for each sample in the appendices.

Medical research involves dose estimation errors, cohort selection, confounding factors, and diagnostic time lags. Continuous review by experts in radiation medicine and toxicology is necessary, including an assessment of the systemic toxicity of sulfur mustard.

Regarding social impact, quantitative data on the prevalence of beliefs and policy impact . Without future representative surveys and time-series analyses, one must not conclude that these beliefs have “become widely accepted in Japanese society.”

10.6 Conclusion

When confronting atomic bomb denialism, anger and ridicule alone are insufficient. Respect for the atomic bomb survivors and their bereaved families is demonstrated by carefully verifying the facts, correcting one’s own writings when errors are found, and presenting evidence that anyone can trace.

The evidence for the nuclear explosions in Hiroshima and Nagasaki is not confined to a single government announcement but is dispersed across stones, roof tiles, concrete, documents, photographs, flight records, medical records, and chromosome , and long-term epidemiological studies. Although each has its limitations, these mutually independent pieces of evidence converge on the same conclusion.

Defending historical facts is not the same as defending a specific political ideology. Whether one supports or criticizes the atomic bombings, discussions should be based on a shared understanding of the facts. Not downgrading facts to mere opinions and distinguishing between what is unknown and what is known are the minimum conditions for passing on the memory of the atomic bombings to future generations.

Appendix

A: Correspondence Between Major Propositions and Counterevidence

—An Index for Readers to Track the Verification Process—

A.1 Proposition A: The atomic bombs were not dropped

The primary evidence for this proposition consists of neutron-induced radioactivity (Chapter 3), records of weapons development and the dropping of the bombs (Chapter 6), and individual radiation doses and biological effects (Chapter 5). The assessment is based on the convergence of different lines of evidence, rather than on a single surviving building or photograph.

A.2 Proposition B: In August 1945 had not yet been operationalized

The verification materials include records from Oak Ridge, Hanford, and Los Alamos, the May 1945 100-metric-ton TNT calibration test, the July 16 Trinity test, assembly on Tinian, training of the 509th Composite Group, and mission records from August 6 and 9. We distinguish between "development was ongoing" and "operational deployment was three years away."

A.3 Proposition C: That damage was caused by composite chemical weapons

The necessary evidence includes specific weapon design and manufacturing records, payloads, the number of aircraft used, synchronized detonation, the amount of chemical agent dispersed and wind direction, containers and debris, impact craters, secondary contamination, and the neutron source responsible for radioactivity. The claims currently presented indicate similarities in individual effects but do not demonstrate an integrated operational model.

A.4 Proposition D: Remnants Indicate the Absence of an Atomic Bomb

Verification requires the use of data on explosion altitude, thermal radiation, irradiation duration, shielding, dynamic blast loads, structural configurations, secondary fires, and tree regrowth and selectivity. The conclusion is that "the remains are not inconsistent with an atomic bomb," and not that "the remnants alone prove the atomic bomb was used."

A.5 Proposition E: The Symptoms Were Caused by Sulfur Mustard

After correctly acknowledging the toxicity of sulfur mustard, we compare exposure routes, onset times, effects on the skin, eyes, and airways, bone marrow, chromosomes, individual doses, and long-term illnesses. While the overlap in general symptoms can serve as a starting point for alternative theories, a city-wide quantitative exposure model is necessary.

A.6 Proposition F: Everything Was Covered Up

The subjects of verification include pre-occupation Japanese documents, British and Canadian records, Soviet intelligence and nuclear development, physical samples, later AMS analyses, global traces of postwar nuclear tests, and CTBTO monitoring. The cover-up hypothesis requires specific mechanisms of manipulation, predictions, and conditions for retraction.

A.7 Sources and Summaries of Key Statements

The following is a summary of the arguments presented in publicly available videos by atomic bomb denialists, to the extent that the targets of refutation are identifiable; it is not a verbatim quotation. Since time stamps may change due to video re-editing or re-publication, the video title, URL, publication date, relevant segment, and verification date are included.

Statement A: Physical Characteristics

Summary: The claim that if the atomic bomb had exploded like the sun at an altitude of approximately 500 meters, causing the ground surface to reach several thousand degrees, nothing would have remained—just as with craters on the moon's surface.

Statement B: The "Atomic Bomb Was Not Yet Complete" Theory

Summary: The claim that the atomic bomb was not yet complete as of May 1945 and that it would have taken approximately three more years to complete.

Statement C: Denial of Nuclear Material

Summary: The claim that uranium-type or plutonium-type atomic bombs were not used in Hiroshima and Nagasaki, and that the damage was caused by a different type of weapon.

Statement D: Trees, Buildings, and Survivors

Summary: The claim that the presence of trees, bridges, the Atomic Bomb Dome, and survivors remaining near the hypocenter is evidence that it was not an atomic bomb.

Statement E: Denial of Radioactivity

Summary: The claim that medical records from August to September 1945 show no signs of radiation sickness, and that radioactive material was dispersed locally by other means.

Statement F: The Cover-Up Theory

Summary: The claim that after the U.S. military occupation, the Japanese government and the U.S. military jointly covered up the truth through a cover-up, and that the agreement to conceal the truth was central to the end-of-war negotiations.

Sources (Statements A–F)

CPAC JAPAN "Interview with Modern History Researcher Chikakatsu Hayashi! The Truth Behind the 'Atomic Bomb' Dropped on Japan—the World's Greatest Taboo [JCU Insight]," published November 30, 2024, YouTube, https://www.youtube.com/watch?v=GjdpcwD6U2k. The sections regarding the atomic bombs begin at 14 minutes and 17 seconds. Approximate timestamps: B = 14:17, A and D = 15:34, C, E, and F = 16:55 and later. Verified on August 10, 2026. Supplementary Material 76

Source: Frank, "(Updated) Interview with Modern History Researcher Chikakatsu Hayashi! The World's Greatest Taboo: The Truth Behind the 'Atomic Bombs' Dropped on Japan," note, December 1, 2024.Statement G: Denial of the Trinity Test

Summary: Based on the existence of a 100-metric-ton TNT calibration test, the etymology of "Trinity" and "trinitrotoluene," and the fact that tower materials appeared to remain after the test,

this argument suggests the possibility that the Trinity test was a cover-up involving a TNT explosion.

Statement H: The Investigation Commission and Residual Poison GasSummary: An argument that the postwar investigation commission did not enter Hiroshima and Nagasaki immediately but stopped in Yokohama because they feared residual poison gas.

Statement I: The Oppenheimer Photo TheorySummary: An argument that, based on the display in the photo of Oppenheimer looking at instruments, it is .

Statement J: Interpretation of the Army InvestigationSummary: The claim is that since the Army investigation document dated August 14, 1945, states, “It is not considered that living in the bombed areas would cause any direct harm,” there were no radiation-related health effects, Sources (Statements G–J)New Japan Culture Channel Sakura, “[What Is Happening in the World Right Now?] Chikakatsu Hayashi × So Mizushima, Episode 39: ‘Trump Makes Deals Even with Wall Street, While Japan Becomes a Globalist Special Zone?’ [Sakura R7/3/15],” published March 15, 2025, YouTube, https://www.youtube.com/watch?v=18rRdbJDPNM. The section regarding the atomic bombings begins at 31 minutes and 27 seconds. Verified August 10, 2026. Supplementary Material: Kirakkusu Consciousness and Energy Research Group, “Chikatsu Hayashi 6-1: The Inconvenient Truths of the World Order,” March 29, 2025. When refuting a citation, one must indicate what the proposition what it predicts and which sources it contradicts. In particular, for Statement J, it is necessary to check the entire original document to determine whether the subject of the sentence is residual radiation, continued daily life, or acute symptoms.

B: How to Interpret Terms and Numerical Values

Supplementary Explanation to Avoid Misunderstandings

B.1 Epicenter, Point of Explosion, and Distance from the Ground

The “epicenter” refers to the point on the ground directly below the point of explosion; the bomb exploded in the air above it. The distance to the ground is not the same as the slant distance from the point of detonation. When calculating heat rays, initial radiation, and blast wind, use distances that include the explosion altitude.

B.2 Temperature and Heat

Temperature is a quantity that indicates a state, while heat and radiant energy are energy transferred to an object. Even at high temperatures, if the duration is short and the amount absorbed is small, the entire thick object will not reach the same temperature. Conversely, even at relatively low temperatures, prolonged heating can cause deep damage.

B.3 Overpressure, Reflected Pressure, Dynamic Pressure, and Impulse

Overpressure is pressure exceeding atmospheric pressure; reflected pressure is the pressure that increases when a shock wave strikes a surface; dynamic pressure is the load caused by flow; and impulse is the integral of pressure over time. The failure of a structure is determined not only by peak pressure but also by the duration of the load and the structure's dynamic response.

B.4 TNT Equivalence

TNT equivalence is a common measure of total energy. Even with the same TNT equivalence, nuclear explosions, detonations, and combustion differ in terms of energy release time, the distribution of energy between blast and heat, radiation, and residual materials. Do not equate the nature of damage based solely on TNT equivalents.

B.5 Initial Radiation, Residual Radiation, Fallout, and Radioactivation

Initial radiation refers to neutrons and gamma rays that arrive immediately after an explosion; residual radiation is a general term for radiation that remains afterward; fallout consists of fission products and other materials that have fallen to the ground; and neutron-induced radioactivation is the phenomenon in which materials at the site capture neutrons and become radionuclides. These should not be conflated under the single term "radioactivity."

B.6 Chlorine-36 Multiplier

The multiplier for close-range samples and natural background radiation varies depending on the reference sample used and the average value. What is important is not a single multiplier, but the actual measured values, the reference, distance, depth, shielding, and reproducibility across multiple facilities. 78

B.7 Dose and Distance

Exposure dose is not determined solely by distance from the epicenter. Factors such as explosion altitude, buildings, walls, topography, indoor/outdoor locations, body posture, and material properties must be considered. The relationship between individual dose and chromosomal abnormalities or diseases requires more rigorous verification than a simple distance correlation.

B.8 View Counts and Approval Ratings

Video view counts include duplicate views by the same person, critical , and incidental viewing resulting from recommendations. To determine approval ratings, representative sample surveys, specific survey questions, response options, and time-series comparisons are necessary. 79

C: Version 4.2 Public Record

—The Final Step in Preparing the Consolidated Draft for Public Review—

C.1 Consolidated Content

We have maintained the evidence hierarchy, methodology, cautious wording, and appendix structure from Version 3.4, while incorporating from Version 4.0 the structure of all 14 chapters of Palmer's work, supplementary explanations of physical phenomena, sample data and cross-comparisons from the Chlorine-36 study, analyses by weapon type, and chronological sequence from the Trinity test to the Hiroshima bombing, specific examples of dispersed historical sources, and the historical milestones of the anti-nuclear and disarmament movements.

C.2 Content Not Included

We did not include the following elements remaining in Version 4.0: unconfirmed statements claiming that radioactive nuclides were detected in the A-bomb-exposed trees themselves; expressions treating the survival of trees and buildings as definitive proof of the atomic bombing; claims of "perfect agreement" between measurements and calculations; the rejection of the cover-up theory based solely on the absence of whistleblowers; descriptions that underestimate the systemic toxicity of sulfur mustard, and assertions regarding the number of aircraft based on a conflation of TNT equivalents and heat of combustion were not included.

C.3 Wording and Evaluation of Evidence

The strength of assertions was adjusted to match the directness and uncertainty of the evidence. We distinguished between direct physical evidence, independent historical and medical evidence, and coherent explanations for specific questions, while specifically pointing out aspects that alternative theories cannot explain. Expressions such as "absolute" "absolute," "all match," and similar expressions are not used except when logically necessary.

C.4 Positioning of This Edition

Version 4.2 maintains the arguments and main text of Version 4.1 while it is a publicly available verification draft that includes the version number, "unreviewed" notation, correction policy, and sources and relevant excerpts from video statements as required for publication. Statements A through J are presented as summaries of key points rather than verbatim quotations. Peer review by external experts in radiochemistry, blast and structural engineering, toxicology, radiation epidemiology, and modern history has not yet been completed; this is explicitly noted as a topic for future revision. 80

D: Answers to Frequently Asked Questions

—A Verification Guide for Readers Encountering the Counterarguments— D.1 Why Do Present-Day Hiroshima and Nagasaki Not Emit High Levels of Radiation? Radiation levels in present-day Hiroshima and Nagasaki are not significantly different from natural background radiation. This does not mean that the atomic bombings did not occur.

—A Verification Guide for Readers Who Have Encountered Such Arguments—

D.1 Why Do Hiroshima and Nagasaki Not Emit High Levels of Radiation Today?

Current radiation levels in Hiroshima and Nagasaki are not significantly different from natural background radiation. This does not mean the atomic bombings did not occur. The atomic bombs dropped on Hiroshima and Nagasaki were airbursts, and the initial radiation reached the ground immediately after the explosions. Residual radiation decreased rapidly over time, and many short-half-life nuclides decayed early on. The City of Hiroshima's FAQ explains that most of the residual radiation was released early on and has decreased significantly over time.

On the other hand, even trace amounts of long-half-life radioactive products can be detected through highly sensitive analysis. "The current radiation levels at which people can live" and "the fact that nuclear isotopes originating from the atomic bombs can be analyzed in samples" are not contradictory.

D.2 Wouldn't a nuclear explosion create a massive crater in the ground?

In underground or surface explosions, large amounts of soil are dislodged, creating massive craters. In Hiroshima and Nagasaki, however, the bombs exploded high in the air, so even though shock waves and heat rays acted on the ground surface, the conditions differed from those where explosives push soil aside underground. The presence or absence of a crater alone cannot determine whether an event was a nuclear explosion.

D.3 Why Did the Atomic Bomb Dome and Bridges Remain?

What remained were not the entire buildings, but rather parts of structures that had been severely damaged and burned parts of the structures. Due to differences in the direction of the blast, wall thickness, steel framing, span, openings, and duration of loading, parts of the walls and framework may remain even if the roof and floors are lost. Similarly, for bridges, the response varies depending on the superstructure, bearings, piers, and deck.

D.4 Why Were There Survivors Near the Hypocenter?

The effects of an airburst are not uniform. Exposure to heat rays, radiation, and blast waves varies depending on basements, thick walls, reinforced concrete buildings, terrain, bridge girders, and the orientation of the body. Cases of survival at close range are exceptions amid extremely severe damage and must be evaluated in conjunction with the mortality rate and symptom distribution across the entire city.

D.5 If incendiary bombs can also cause massive fires, isn't it impossible to distinguish them from atomic bombs?

Since both incendiary bombs and atomic bombs can cause massive fires, photographs of burned-out towns alone are insufficient to identify the weapon. Distinctions are made using the number of attacking aircraft, the type of munitions dropped, impact craters, the number of explosions, shock waves, heat pulses, initial radiation, neutron activation, and operational records. Photographs of fires are only part of the evidence. 81

D.6 Don't the symptoms of sulfur mustard resemble those of radiation exposure?

There are similar symptoms. Sulfur mustard damages the skin and eyes, and the respiratory tract; at high exposure levels, it can cause bone marrow suppression, DNA damage, and cancer. Therefore, the cause cannot be determined based on symptom names alone. What is needed is information on the onset time, exposure distribution, flash burn shadows, individual doses, chromosome types and frequencies, and whether long-term illnesses can be explained by a single model.

D.7 Could radioactive material be scattered afterward to create a false impression?

In principle, it is possible in principle. However, the distribution of parent nuclides within stone—which existed prior to the explosion—converting into different nuclides depending on distance from the hypocenter, shielding, and depth is difficult to reproduce through surface spreading alone. The spreading hypothesis requires a quantitative explanation of the amount of material, nuclide composition, timing of spreading, transport,

migration into the samples, and measurements by multiple institutions.

D.8 If there were discrepancies in DS86, wouldn't the atomic bomb theory collapse?

The discrepancies were real scientific challenges. However, discrepancies between measurements and calculations provide grounds for reexamining the source model, nuclear data, background radiation, sample locations, and measurement sensitivity. In DS02, remeasurements and recalculations were performed, and the consistency of the main results at close range was . Merely pointing out the previous issues does not negate the existence of intense neutron irradiation.

D.9 Can we trust U.S. government documents?

There is no need to trust government documents unconditionally. We must examine their purpose, original versions, revisions, and contradictions with other sources. This paper cross-references not only U.S. documents but also pre-occupation surveys by the UK, Canada, and Japan,

as well as Soviet intelligence and nuclear development, extant samples, and later independent measurements. It is important that different lines of evidence converge on the same conclusion.

D.10 Is questioning the conventional wisdom itself a conspiracy theory?

No. Since secret plans, censorship, and disinformation do exist, questioning the conventional wisdom is essential to scholarship. A position becomes "conspiracy-theorist" when one reinterprets all contrary evidence as proof of a conspiracy, fails to specify conditions under which one would retract one's own theory, and conveniently alters the standard of evidence.

D.11 If the atomic bombings are a fact, does that mean they were justified?

No, it does not. Establishing the fact that a nuclear explosion occurred is one thing, while assessing military necessity, international law, morality, and the contribution to surrender are separate issues. This paper addresses the former and does not prejudge the conclusions of the latter. 82

D.12 What Evidence Would Require a Reconsideration of the Atomic Bomb Denial Theory?

For example, if atomic bomb-exposed samples with verified provenance were remeasured at multiple independent facilities and neutron activation could not be reproduced; if specific records of the procurement, dropping, or dispersal of conventional weapons or chemical agents were found; if individual chemical exposure models better explained chromosome and disease data than radiation models; or or if it is demonstrated that the scattered records related to the atomic bombs all originate from the same source of forgery.

Current denial theories have not presented such positive evidence or quantitative models. We must distinguish between raising questions and presenting alternative explanations that surpass existing theories. 83

E: How to Read Key Documents

—For Tracking Primary Sources and Peer-Reviewed Research—

E.1 DS86 and DS02

DS86 and DS02 are dosimetric systems used to estimate individual doses for atomic bomb survivors in Hiroshima and Nagasaki. They account for the bomb's radiation source, explosion altitude, ground position, transport through air, ground, and buildings, and individual shielding. DS02 was developed in response to the limitations of DS86 and reevaluated nuclear data, calculation codes, location information, and measurements . It is necessary to read not only the conclusions of the reports but also the measured values, calculated values, errors, and unresolved issues.

E.2 Chlorine-36 Studies by Nagashima, Huber, Kato, et al.

These are studies that examine the $^{36}Cl/Cl$ ratio, distance distribution, depth distribution, and natural background in granite samples using AMS. Since the samples, pretreatment, equipment, and controls differ for each paper; therefore, comparisons should not be made by isolating a single magnification factor. It is important to simultaneously understand the large excess at close range and the dominance of natural production at long range.

E.3 Europium-152 and Cobalt-60 Studies

Europium-152 and cobalt-60 have different parent nuclides, half-lives, and and measurement methods than chlorine-36. Data from multiple nuclides verify different aspects of neutron energy and transport. Regarding Nagasaki, we do not substitute Hiroshima data for chlorine-36; instead, we refer individually to europium-152 and other nuclides in the Nagasaki samples.

E.4 Japanese Documents from August 1945

The "Report on the Investigation of the Hiroshima Bombing" and similar documents are important sources for examining Japanese assessments prior to the full implementation of occupation policies. Verify the document's date of creation, the department that produced it, the subjects of observation, the measuring instruments used, and its provisional nature. We will not isolate individual sentences from the context but will cross-reference them with reports by Yoshio Nishina and others from the same period, as well as medical surveys.

E.5 Manhattan Project Materials

Government documents, official histories, and memoirs of those involved each have their own purposes and limitations. We will not rely solely on memoirs—which may include justifications for the operation—but will cross-reference them with operational records of production, transportation, facilities, and training. Also verify their independence from British and Canadian sources, the history of Soviet intelligence, and Japanese sources. 84

E.6 RERF Chromosome and Epidemiological Studies

In these studies, verify the study population, the start year of follow-up, individual doses, diagnostic methods, confounding factors, dropouts, and statistical models. While the institutional history and ethical issues of the ABCC are important, distinguish between institutional criticism and the validity of individual measurements and analyses. Examine whether the data have been reanalyzed internationally and updated in accordance with revisions to the dose assessment system.

E.7 Dissenting Sources

Books and videos presenting dissenting views are primary sources for understanding their claims, but they must be distinguished from evidence based on scientific facts. Record the source, page number or timestamp, original context, responses to subsequent research, and conditions for refutation. Do not count the number of videos repeating the same claim as separate pieces of evidence. 85

F: Related Timeline

—Nuclear Development, Atomic Bomb Survivor Surveys, Dose Assessment, and the Spread of Deniers' Arguments—

F.1: Leading Up to the Development of the Atomic Bomb

- 1938: Research leading to the experimental discovery of uranium fission is published.
- 1939: Theoretical explanations of fission, as well as the possibilities of chain reactions and weaponization, are examined in various countries. Efforts are also made to urge the U.S. government to promote research.
- 1942: The Manhattan Project begins in earnest as a large-scale, Army-led initiative. A controlled chain reaction is achieved in Pile 1 at the Chicago Pile 1.
- 1943: Los Alamos National Laboratory becomes the center for weapons design, and construction of facilities such as Oak Ridge and Hanford proceeds.
- 1944: The reactor and chemical separation facilities at Hanford begin producing plutonium, and preparations for operations in the Pacific, including Tinian, proceed.

F.2 1945

- May 7: A preliminary measurement and calibration test using approximately 100 metric tons of TNT is conducted at the Trinity Test Site.
- July 16: The Trinity nuclear test of a plutonium implosion device is conducted in New Mexico.
- Late July: Components and nuclear materials for the Hiroshima- and Nagasaki-type weapons are assembled on Tinian, and assembly and mission preparations proceed.
- August 6: The Enola Gay drops "Little Boy" on Hiroshima. Measuring instruments and cameras are carried on board, and a separate weather observation aircraft
- participated in the operation.

- August 8–10: Japanese scientists and military engineers conducted investigations in Hiroshima and prepared a report concluding that it was an atomic bomb.
- August 9: The B-29 “Boxcar” dropped “Fat Man” on Nagasaki.
- August 15: Japan announced its acceptance of the Potsdam Declaration.
- From the end of August onward: The Allied forces begin their entry into and occupation of Japan. Although censorship and control of information regarding the atomic bombs were enforced during the occupation period, Japanese investigations conducted prior to the occupation already existed.

F.3 Postwar Research

- 1947: The ABCC is established, and medical surveys of atomic bomb survivors are organized.
- 1950: Based on the national census and other data, follow-up studies of atomic bomb survivors and control groups—which would later lead to life-span studies—proceeded. 86
- 1953: The Council for Scientific Research published the *Report on the Investigation of Atomic Bomb Damage*, compiling early Japanese research.
- 1975: The ABCC was reorganized into the Radiation Effects Research Foundation (RERF), jointly operated by Japan and the United States.
- 1986: The DS86 dose assessment system was compiled. Discrepancies between neutron measurements and calculations later became a subject of research.
- 1980s–2000s: Reevaluations of chlorine-36, europium-152, cobalt-60, and other isotopes progressed through AMS, low-background measurements, and core sample analysis.
- 2002–2005: The DS02 calculation and measurement system was established and published.
- 2023: The Japanese translation of Palmer’s *Hiroshima Revisited*, titled *The Falsified Atomic Bombing*, is published and cited as a scientific reference for atomic bomb denialism in the Japanese-speaking world.
- 2024–2026: Atomic bomb denialism is continuously disseminated through books, videos, lectures, and social media.
- August 2026: NHK reports on the spread of posts claiming “the atomic bombings were a hoax” and AI-generated videos that diverge from historical facts.

This timeline is not intended to establish a single political assessment. It serves as supplementary material to verify which claims align with which historical documents at specific points in time and to examine chronological assertions such as “the narrative of the atomic bombings was first fabricated after the occupation.” 87

G: Index of Independent Evidence by Institution

—How the Same Conclusion Was Reached Through Different Channels—

G.1 Japanese Side

Evidence from the Japanese side includes investigations by the military, scientists, and doctors in August 1945; municipal records from Hiroshima and Nagasaki; and radiation measurement data from universities and research institutes, the RERF’s medical and epidemiological studies, and A-bomb-related materials from archives. A distinction is made between pre-occupation, occupation-era, and postwar measurements.

G.2 U.S. Side

The U.S. side includes the Manhattan Project’s research, production, transportation, and air operations, government documents, measurements by national laboratories, and the technical histories of the military and the Department of Energy. We examine not only official histories and memoirs of those involved but also the correspondence between routine operational records and physical samples.

G.3 United Kingdom and Canada

British research on tube alloys, the Quebec Agreement, and and Canada’s cooperation in resources and research demonstrate that the development of the atomic bomb was not a closed story confined solely to the United States. Official records and official histories vary by country due to differences in preservation systems and editorial processes.

G.4 German Measurement Institutions

The AMS Group in Munich and others measured chlorine-36 in granite samples from Hiroshima using independent equipment. While the numerical values were not identical, it is significant that they reproduced the key findings: a large excess at close range and a decrease with distance.

G.5 Soviet and Russian History

Soviet intelligence activities indicate that internal information regarding the Manhattan Project leaked through channels separate from U.S. public announcements. The Soviet Union’s independent nuclear development and its 1949 nuclear test are incompatible with the proposition that nuclear weapons were merely a propaganda fiction created by the United States.

G.6 International Organizations

UNSCEAR evaluates the effects of nuclear tests, medical exposure, and natural radiation, while the CTBTO Preparatory Commission operates an international monitoring system for seismic waves, microbarometric pressure, underwater acoustics, and radionuclides. Although these are not direct sources of data on Hiroshima and Nagasaki, they demonstrate that nuclear explosions are detectable physical phenomena. 88

G.7 Limits of Independence

Different institutions do not automatically guarantee complete independence. There are shared samples, common dosimetry systems, research funding, reference materials, and citation relationships. Independence is evaluated not by the name of a country or organization, but by the extent to which the samples, equipment, analysts, objectives, and data processing are distinct.

At the same time, if one explains the fact that all institutions reach the same conclusion simply by claiming that "everyone conspired," concrete mechanisms of the conspiracy and positive evidence are required. Independence is not an absolute binary concept; its degree is evaluated for each chain of evidence. 89

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Author Profile

Osamu Sugihara

Editor-in-Chief, Gogatsu Shobo Shinsha Co., Ltd. Commissioned by the Ministry of Defense and the Japan Maritime Self-Defense Force, he engaged in research on overseas military affairs for approximately nine years, conducting field surveys throughout Europe with a focus on Germany. As an engineer, he holds multiple patents (including international patents) in the fields of electromagnetic shielding technology and packet communications. He has been involved in the planning and editing of nonfiction works, primarily in the fields of international politics and security security, and has overseen the Japanese editions of works such as J. Mearsheimer’s *The Tragedy of Great Power Politics* and Spengler’s *The Decline of the West*. He is the lead editor of *The Six-Volume Practical Guide to Defense* and *Collection of Laws and Regulations Concerning States of Emergency*.

Contact: sugihara@osamu.name

Note: “Editor-in-Chief Sugihara’s Busy Days” https://note.com/su616

Note: “Structural Analysis of National Security” https://note.com/boueitech

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he belongs. The subject of verification is the content of publicly released statements and documents; this paper does not comment on the character, beliefs, or legal liability of any specific individual. 94

Revision History

Version 4.2.1 (August 10, 2026)

Corrected the attribution of chlorine-36 measurements in Section 3.4 (attributed the sample range of 94–1,591 meters and the numerical series of 10^{-10}–10^{-13} to Huber et al., 2005, and reclassified the data from Nagashima et al., 2004 as independent measurements by the Tsukuba Group, and changed the in-text citation to a co-citation). Corrected the title of the ATSDR reference to "Toxicological Profile for Sulfur Mustard" and resolved a duplication in the abstract of Statement G in Appendix A

Version 4. 2 (August 10, 2026)

In preparation for the official release, "Public Verification Draft (Unreviewed)" was clearly indicated on the cover and in the main text, and a policy for ongoing revisions and corrections was added. Statements A–J were changed from verbatim quotations to summaries of key points, and the URLs of the original videos, publication dates, relevant sections, verification dates, and supplementary materials were added. The update years for NPS materials, the volume, issue, and page numbers for Huber et al. (2005), and the verification dates for online materials were organized, and internal information within the document intended for external sharing was removed.

Version 4.1 (August 2026)

Based on the evidence hierarchy, methodology, and appendix structure of Version 3.4, we selectively integrated the explanatory power and specificity of Version 4.0. We did not adopt the claims regarding unconfirmed radioactivity in A-bomb-exposed trees, complete consistency in measurements, counterarguments centered on population estimates, or medical contradictions between chapters.

Version 3.4 (August 2026)

In this edition, while generally restoring the detailed explanations from Version 3.2, we 3. Blast pressure and structural response, the distance to the Hiroshima Postal and Telecommunications Hospital, the structure of the Atomic Bomb Dome, the natural production of chlorine-36 and alternative neutron sources, estimates of the required number of B-29s, the systemic toxicity of sulfur mustard, the positioning of research on trees exposed to the atomic bomb, the distinction between the Trinity test and the Hiroshima- and Nagasaki-type weapons, the start date of the

occupation, the backfire effect, and the assessment of the social impact following NHK's report were reexamined. We deleted descriptions regarding radioisotopes in the tree-ring records of atomic-bomb-exposed trees for which sources could not be verified, and revised overly definitive statements to ones that explicitly indicate the convergence of independent evidence and the associated uncertainties.