A photograph of a nuclear explosion's mushroom cloud, showing a bright fireball at the top, a dark, flat-topped cloud in the middle, and a large, billowing cloud at the bottom. The scene is set against a dark sky, with the explosion's light reflecting on the ground below.

Nuclear Weapons – From WW II to Today

Don Howard

PHIL 20604 - Modern Physics and Moral
Responsibility
Spring 2023

Don Howard was mentioned in a post.



Wayne Myrvold
February 23 · 🧑



MC Hammer is now tweeting [Don Howard](#).



MC HAMMER
@MCHammer



Albert Einstein as a Philosopher of Science

Einstein's philosophical habit of mind, cultivated by undergraduate training and lifelong dialogue, had a profound effect on the way he did physics.

Don A. Howard

Nowadays, explicit engagement with the philosophy of science plays almost no role in the training of physicists or in physics research. What little the student learns

Thornton, Einstein wrote in a contribution to *Albert Einstein: Philosopher-Scientist*, "The reciprocal relationship of epistemology and science is of noteworthy kind. They ar

He had been saying the same thing for nearly 30 years. He knew from his experience at the forefront of the revolutions in early 20th-century physics that having cultivated a philosophical habit of mind had made him a better physicist.

A few years after his letter to



You, Stathis Psillos, Carl Hoefer and 31 others

12 Comments



Conelrad Emergency Broadcast Frequencies

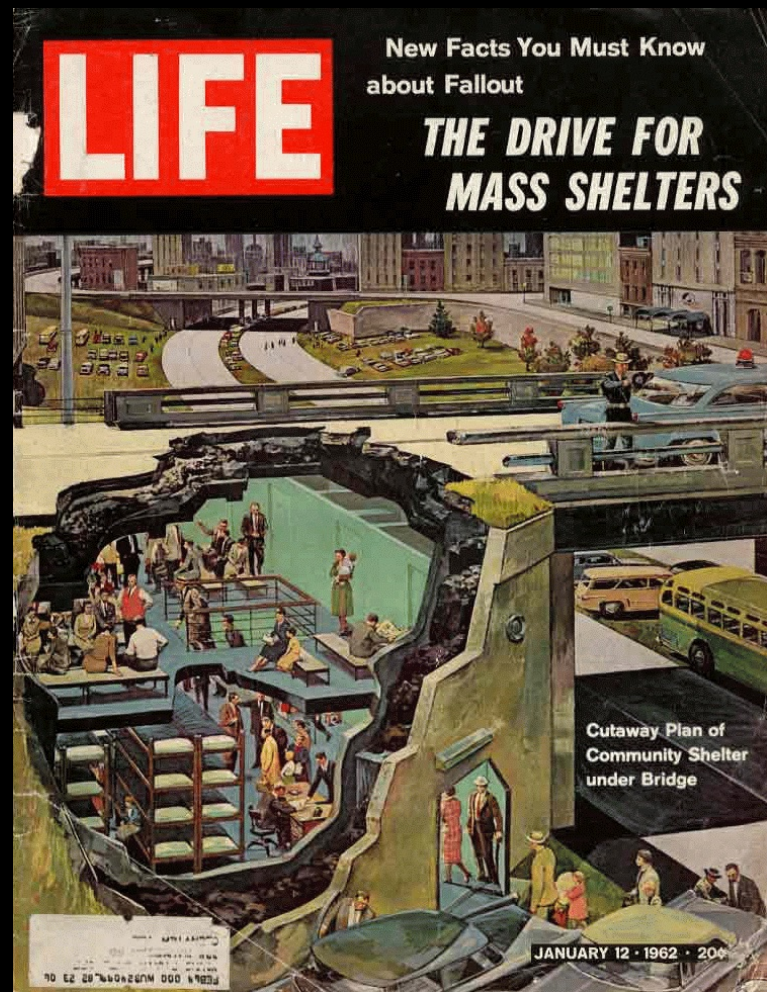


Community Fallout Shelters

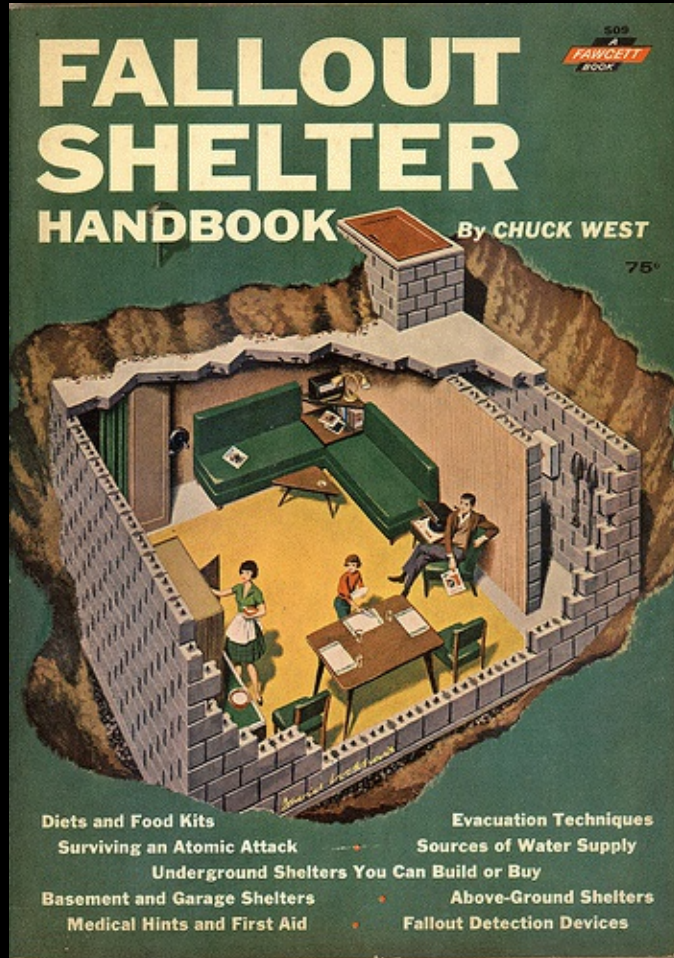


FALLOUT SHELTER

The rays' intensity can be reduced by dense materials such as lead, steel, concrete or packed earth.



Backyard Fallout Shelters



Pop quiz.

How many active nuclear warheads are deployed today?

Current World Nuclear Stockpiles.



Source: Federation of American Scientists
<http://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>

How Destructive Are These Warheads?

A 300Kt. warhead is approximately 20 times more powerful than the bombs dropped on Hiroshima and Nagasaki, where, in each case, about 100,000 people were killed outright and roughly another 100,000 people died later from delayed effects such as radiation sickness or cancer.



Young girl burned by atomic bomb
Nagasaki 1945

What do you think would be, then, the effect of dropping a single 300Kt. warhead on a major city?

A Helpful Blast Simulator:

<http://nuclearsecrecy.com/nukemap/>

By Alex Wellerstein

Estimated fatalities:

847,510

Estimated injuries:

1,987,650

In any given 24-hour period, there are on average 5,808,480 people in the light (1 psi) blast range of the simulated detonation.

Modeling casualties from a nuclear attack is difficult. These numbers should be seen as evocative, not definitive. Fallout effects are deliberately ignored, because they can depend on what actions people take after the detonation. For more information about the model, [click here](#).

Effect distances for a 300 kiloton airburst*:

Radiation radius (500 rem): 460 m (0.67 km²)

500 rem ionizing radiation dose; likely fatal, in about 1 month; 15% of survivors will eventually die of cancer as a result of exposure.

Fireball radius: 0.6 km (1.12 km²)

Maximum size of the nuclear fireball; relevance to damage on the ground depends on the height of detonation. If it touches the ground, the amount of radioactive fallout is significantly increased. Anything inside the fireball is effectively vaporized. Minimum burst height for negligible fallout: 0.54 km.

Moderate blast damage radius (5 psi): 4.71 km (69.6 km²)

At 5 psi overpressure, most residential buildings collapse, injuries are universal, fatalities are widespread. The chances of a fire starting in commercial and residential damage are high, and buildings so damaged are at high risk of spreading fire. Often used as a benchmark for moderate damage in cities. Optimal height of burst to maximize this effect is 2.09 km.

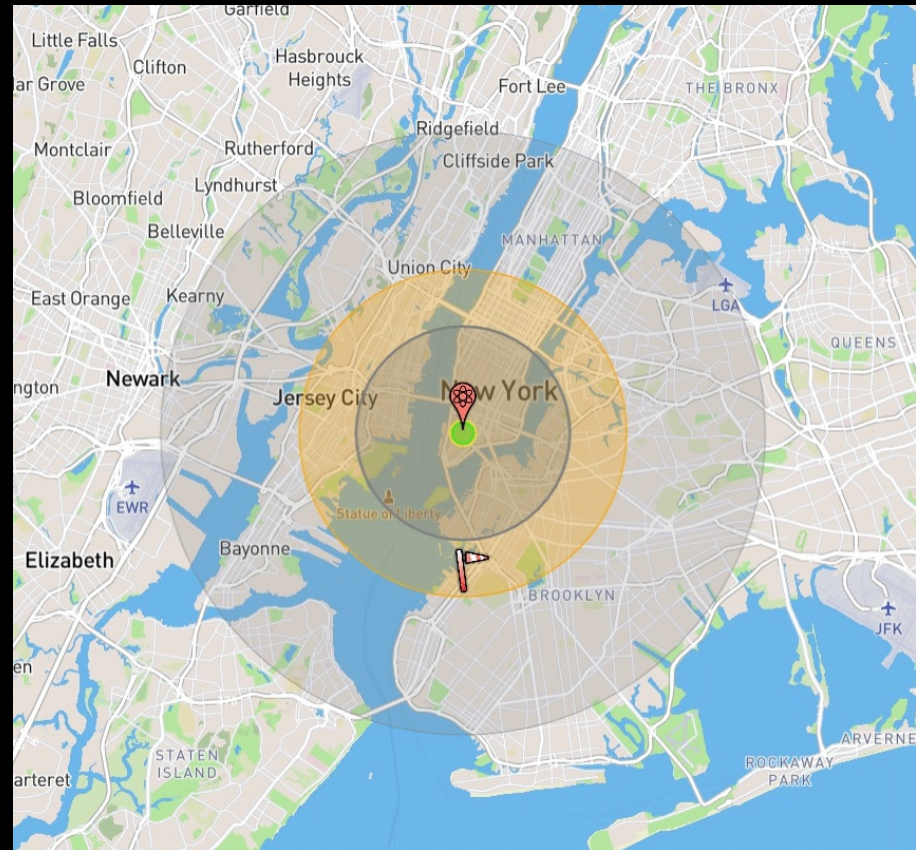
Thermal radiation radius (3rd degree burns): 7.17 km (161 km²)

Third degree burns extend throughout the layers of skin, and are often painless because they destroy the pain nerves. They can cause severe scarring or disablement, and can require amputation. 100% probability for 3rd degree burns at this yield is 10.6 cal/cm².

Light blast damage radius (1 psi): 13.2 km (550 km²)

At a around 1 psi overpressure, glass windows can be expected to break. This can cause many injuries in a surrounding population who comes to a window after seeing the flash of a nuclear explosion (which travels faster than the pressure wave). Often used as a benchmark for light damage in cities. Optimal height of burst to maximize this effect is 3.13 km.

*Detonation altitude: 2,090 m. (Chosen to maximize the 5 psi range.)



New York City

A Helpful Blast Simulator:

<http://nuclearsecrecy.com/nukemap/>

By Alex Wellerstein

Estimated fatalities:

62,530

Estimated injuries:

93,400

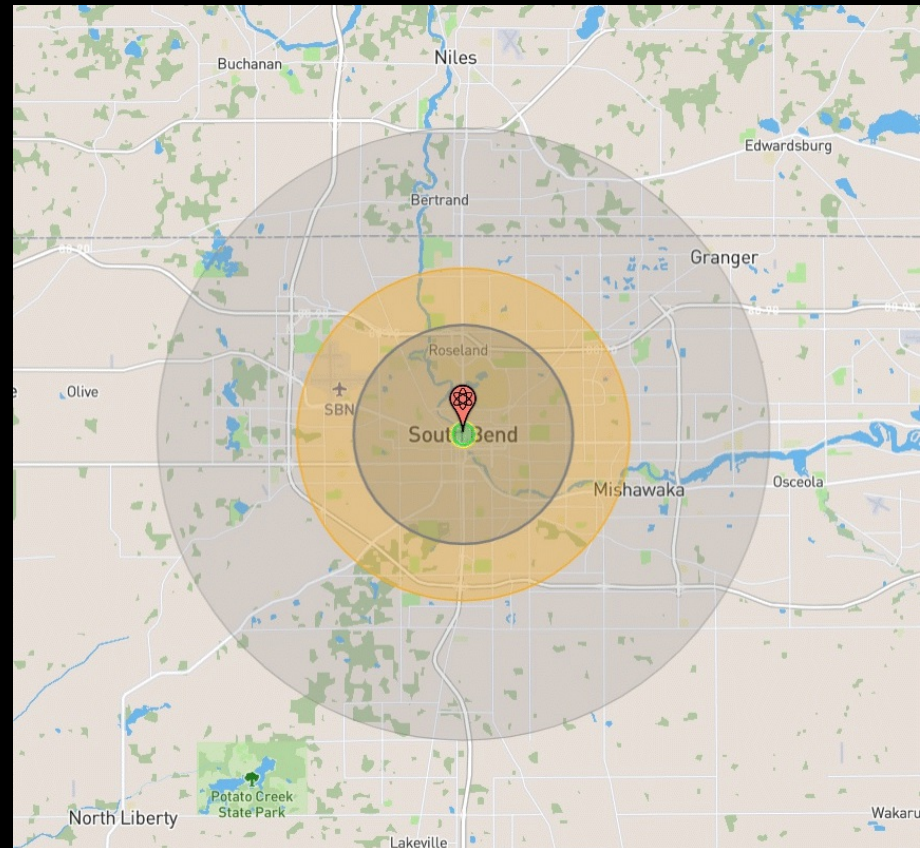
In any given 24-hour period, there are on average 253,236 people in the light (1 psi) blast range of the simulated detonation.

Modeling casualties from a nuclear attack is difficult. These numbers should be seen as evocative, not definitive. Fallout effects are deliberately ignored, because they can depend on what actions people take after the detonation. For more information about the model, click [here](#).

Effect distances for a 300 kiloton airburst* ▼

- Radiation radius (500 rem): 460 m (0.67 km²)**
500 rem ionizing radiation dose; likely fatal, in about 1 month; 15% of survivors will eventually die of cancer as a result of exposure.
- Fireball radius: 0.6 km (1.12 km²)**
Maximum size of the nuclear fireball; relevance to damage on the ground depends on the height of detonation. If it touches the ground, the amount of radioactive fallout is significantly increased. Anything inside the fireball is effectively vaporized. Minimum burst height for negligible fallout: 0.54 km.
- Moderate blast damage radius (5 psi): 4.71 km (60.6 km²)**
At 5 psi overpressure, most residential buildings collapse; injuries are universal, fatalities are widespread. The chances of a fire starting in commercial and residential damage are high, and buildings so damaged are at high risk of spreading fire. Often used as a benchmark for moderate damage in cities. Optimal height of burst to maximize this effect is 2.09 km.
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*Detonation altitude: 2,090 m. (Chosen to maximize the 5 psi range.)



South Bend

Another quiz question.

What is the single most serious threat to humankind from nuclear weapons?

Answer: Nuclear winter.

feature
article

Environmental consequences of nuclear war

Owen B. Toon, Alan Robock, and Richard P. Turco

A regional war involving 100 Hiroshima-sized weapons would pose a worldwide threat due to ozone destruction and climate change. A superpower confrontation with a few thousand weapons would be catastrophic.

Brian Toon is chair of the department of atmospheric and oceanic sciences and a member of the laboratory for atmospheric and space physics at the University of Colorado at Boulder. **Alan Robock** is a professor of atmospheric science at Rutgers University in New Brunswick, New Jersey. **Rich Turco** is a professor of atmospheric science at the University of California, Los Angeles.

More than 25 years ago, three independent research groups made valuable contributions to elaborating the consequences of nuclear warfare.¹ Paul Crutzen and John Birks proposed that massive fires and smoke emissions in the lower atmosphere after a global nuclear exchange would create severe short-term environmental aftereffects. Extending their work, two of us (Toon and Turco) and colleagues discovered “nuclear winter,” which posited that worldwide climatic cooling from stratospheric smoke would cause agricultural collapse that threatened the majority of the human population with starvation. Vladimir Aleksandrov and Georgiy Stenchikov conducted the first general circulation model simulations in the USSR. Subsequent investigations in the mid- and late 1980s by the US National Academy of Sciences² and the International Council of Scientific Unions^{3,4} supported those initial studies and shed further light on the phenomena involved. In that same period, Presidents Ronald Reagan and Mikhail Gorbachev recognized the potential environmental damage attending the use of nuclear weapons and devised treaties to reduce the numbers from their peak in 1986—a decline that continues today. When the cold war ended in 1992, the likelihood of a superpower nuclear conflict greatly decreased. Significant arsenals remain, however, and proliferation has led to several new nuclear states. Recent work by our colleagues and us⁵⁻⁷ shows that even small arsenals threaten people far removed from the sites of conflict because of environmental changes triggered by smoke from firestorms. Meanwhile, modern climate models confirm that the 1980s predictions of nuclear winter effects were, if anything, underestimates.⁸

The Strategic Offensive Reductions Treaty (SORT) of 2002 calls for the US and Russia each to limit their operationally deployed warheads to 1700–2200 by December 2012. The treaty has many unusual features: warheads, rather than delivery systems, are limited; verification measures are not specified; permanent arsenal reductions are not required; warheads need not be destroyed; either side may quickly withdraw; and the treaty expires on the same day that the arsenal limits are to be reached. Nevertheless, should the limits envisioned in SORT be achieved and the excess warheads destroyed, only about 6% of the 70,000 warheads existing in 1986 would remain. Given such a large reduction, one might assume a concomitant large reduction in the num-

ber of potential fatalities from a nuclear war and in the likelihood of environmental consequences that threaten the bulk of humanity. Unfortunately, that assumption is incorrect. Indeed, we estimate that the direct effects of using the 2012 arsenals would lead to hundreds of millions of fatalities. The indirect effects would likely eliminate the majority of the human population.

Casualty and soot numbers

Any of several targeting strategies might be employed in a nuclear conflict. For example, in a “rational” war, a few weapons are deployed against symbolically important targets. Conversely, a “counterforce” war entails a massive attack against key military, economic, and political targets. We consider a “countervalue” strategy in which urban areas are targeted, mainly to destroy economic and social infrastructure and the ability to fight and recover from a conflict. In any case, when the conflict involves a large number of weapons, the distinction between countervalue and counterforce strategies diminishes because military, economic, and political targets are usually in urban areas.

Box 1 on page 38 describes how we estimate casualties (fatalities plus injuries) and soot (elemental carbon) emissions; figure 1 shows results. The figure gives predicted casualties and soot injected into the upper atmosphere from an attack on several possible target countries by a regional power using 50 weapons of 15-kiloton yield, for a total yield of 0.75 megaton. The figure also provides estimates of the casualties and soot injections from a war based on envisioned SORT arsenals. In the SORT conflict, we assume that Russia targets 1000 weapons on the US and 200 warheads each on France, Germany, India, Japan, Pakistan, and the UK. We assume the US targets 1100 weapons each on China and Russia. We do not consider the 1000 weapons held in the UK, China, France, Israel, India, Pakistan, and possibly North Korea. (Box 2 on page 40 provides information on the world’s nuclear arsenals.) The war scenarios considered in the figure bracket a wide spectrum of possible attacks, but not the extremes for either the least or greatest damage that might occur.

As figure 1 shows, a war between India and Pakistan in which each uses weapons with 0.75-Mt total yield could lead to about 44 million casualties and produce about 6.6 trillion

The physicists' role in creating the bomb.

Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Sir:

Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weissäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

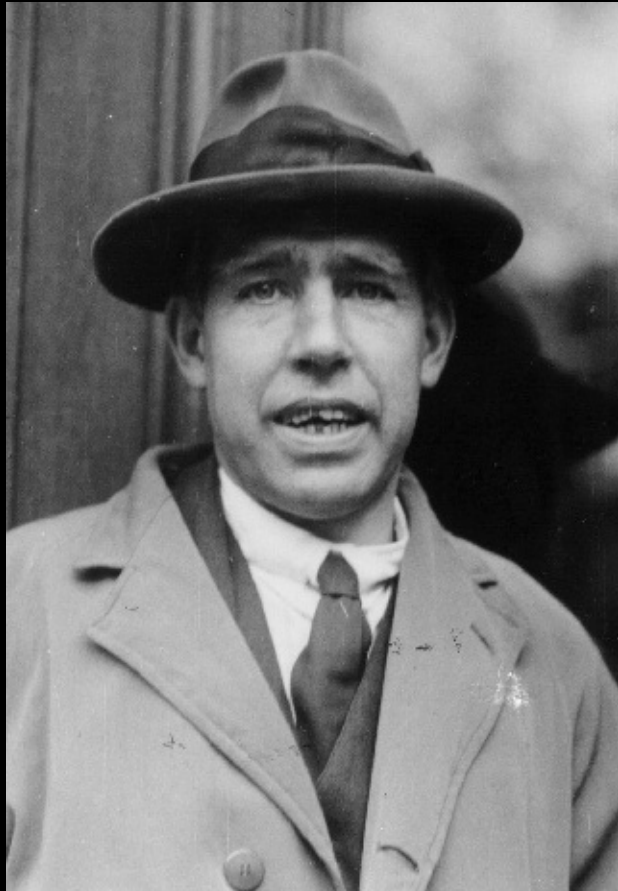
Yours very truly,

A. Einstein
(Albert Einstein)



-2-

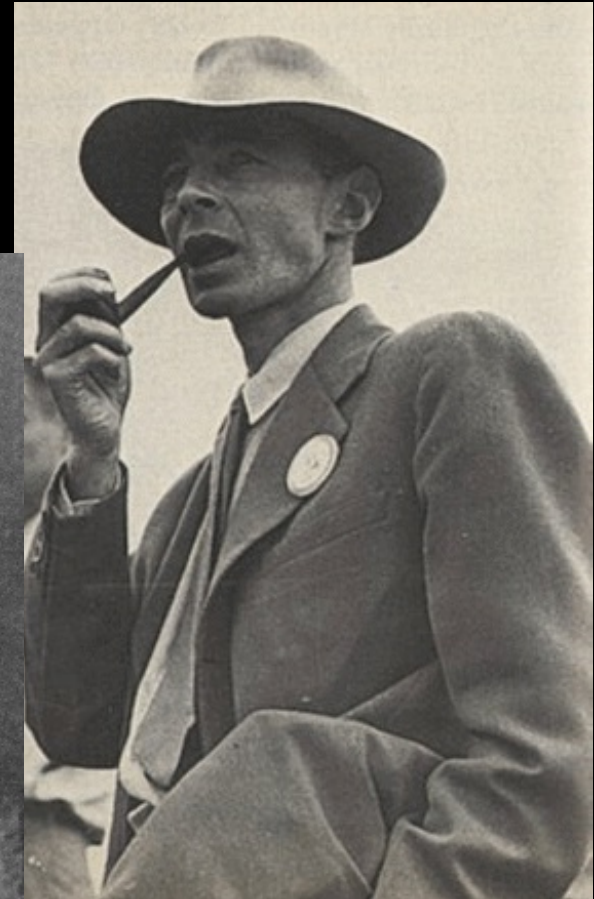
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ng the co-operation of industrial laboratories
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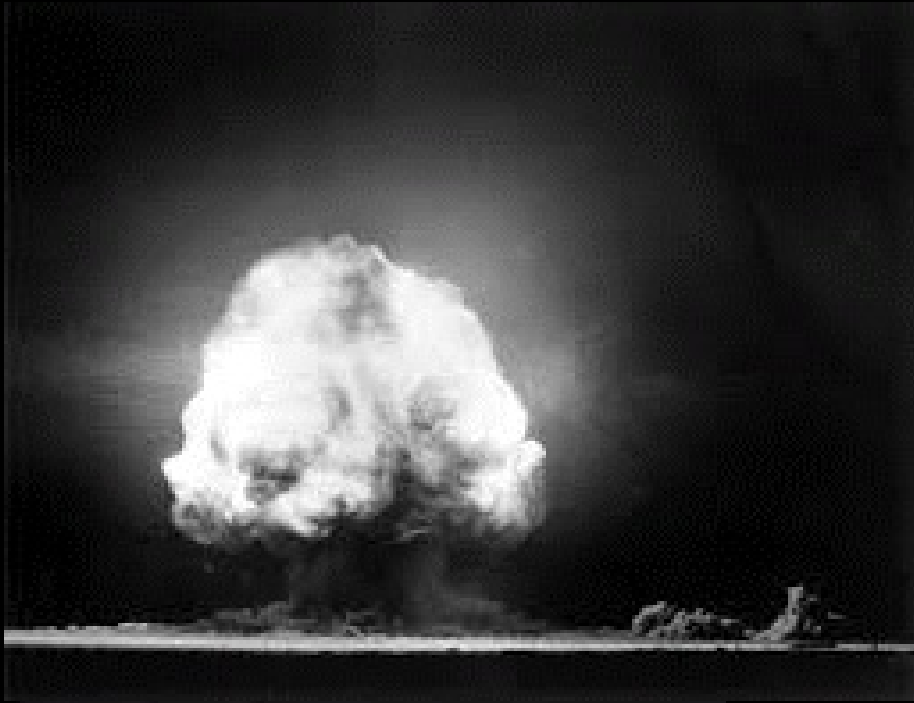
Niels Bohr
(1885-1962)



Werner Heisenberg
(1901-1976)



J. Robert Oppenheimer
(1904-1967)



*If the radiance of a thousand suns were to burst at once into the sky,
that would be like the splendor of the mighty one . . .*

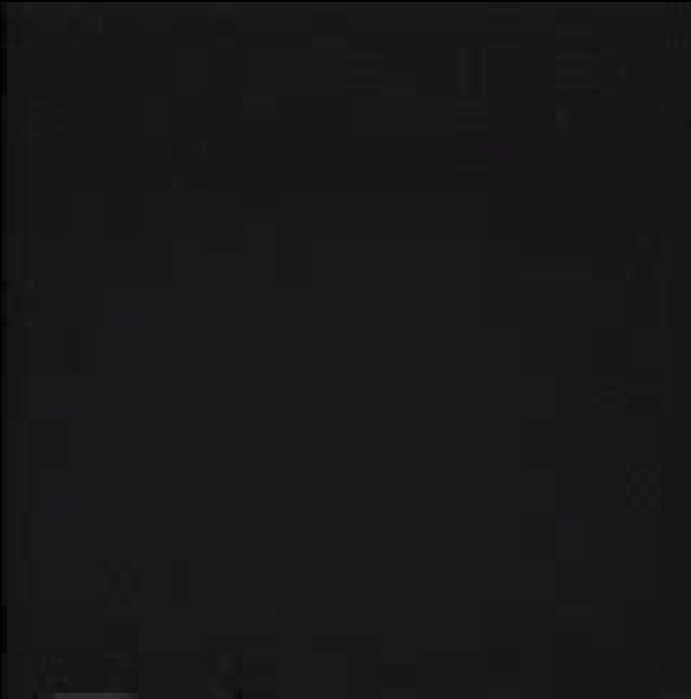
Now, I am become Death, the destroyer of worlds.



– J. Robert Oppenheimer, quoting the *Bhagavad Gita*



Oppenheimer and General
Groves at the Trinity site



Oppenheimer and General
Groves at the Trinity site

*If the radiance of a thousand suns were to burst at once into the sky,
that would be like the splendor of the mighty one . . .*

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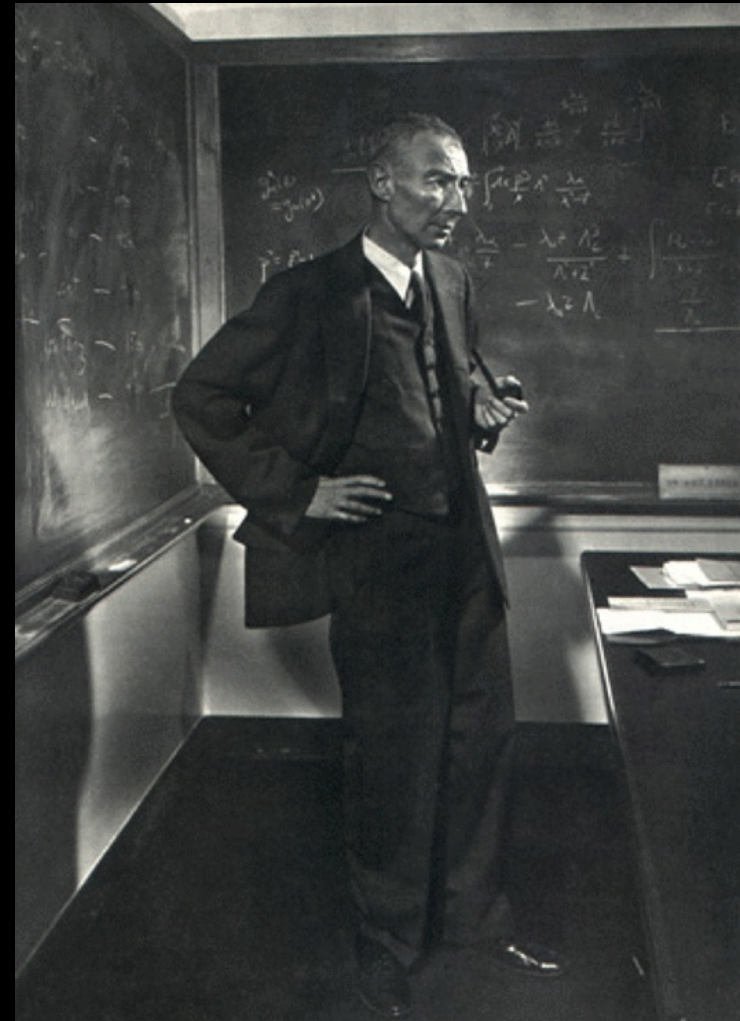
– J. Robert Oppenheimer, quoting the *Bhagavad Gita*

J. Robert Oppenheimer

“Physics in the Contemporary World.”

Arthur Dehon Little Memorial Lecture
Massachusetts Institute of Technology
November 25, 1947

Despite the vision and the far-seeing wisdom of our wartime heads of state, the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge which they cannot lose.



How did the physicists respond?

The Franck Report

Issued by staff of the
Metallurgical Laboratory
at the University of
Chicago, June 11, 1945

We found ourselves, by the force of events, the last five years in the position of a small group of citizens cognizant of a grave danger for the safety of this country as well as for the future of all the other nations, of which the rest of mankind is unaware. We therefore felt it our duty to urge that the political problems, arising from the mastering of atomic power, be recognized in all their gravity, and that appropriate steps be taken for their study and the preparation of necessary decisions. . . .

We believe that these considerations make the use of nuclear bombs for an early, unannounced attack against Japan inadvisable. If the United States would be the first to release this new means of indiscriminate destruction upon mankind, she would sacrifice public support throughout the world, precipitate the race of armaments, and prejudice the possibility of reaching an international agreement on the future control of such weapons.

Much more favorable conditions for the eventual achievement of such an agreement could be created if nuclear bombs were first revealed to the world by a demonstration in an appropriately selected uninhabited area.



James Franck
(1882-1964)



Eugene Rabinowitch
(1901-1973)

A Different Perspective on the Scientist's Responsibilities to Society

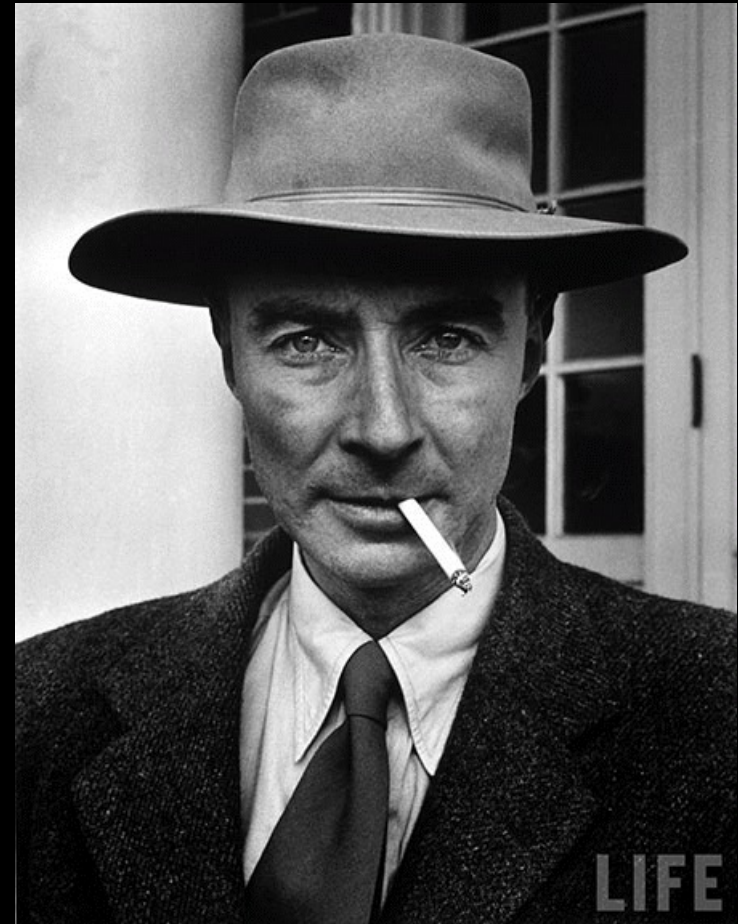
Oppenheimer on the Interim Committee's discussion of the Franck Report on June 16, 1945

“We didn't think that being scientists especially qualified us as to how to answer this question of how the bombs should be used or not.”

“What was expected of this committee of experts was primarily a technical opinion on new questions.”

The scientific members of the Interim Committee:

Vannevar Bush, Karl T. Compton, James B. Conant, J. Robert Oppenheimer, Enrico Fermi, Arthur H. Compton, and Ernest O. Lawrence



J. Robert Oppenheimer (1904-1967)

Debate over Civilian Control of Atomic Energy

The May-Johnson Bill versus the
McMahon Bill

October 1945 – August 1946

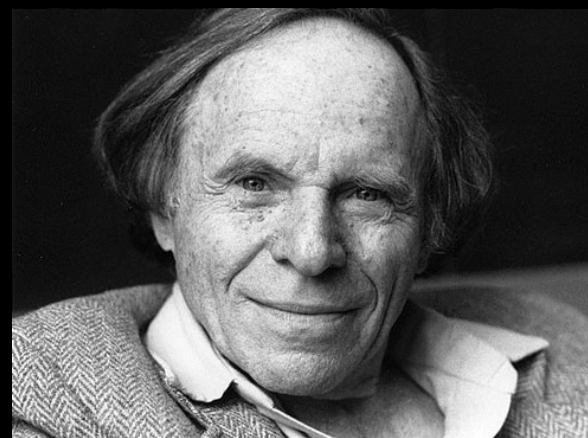


President Truman signs the McMahon Bill,
August 1, 1946

The Federation of Atomic Scientists

Founded November 1945 by
Manhattan Project scientists

such as Leo Szilard and Philip
Morrison



Philip Morrison
(1915-2005)



Leo Szilard
(1898-1964)

Federation of Atomic Scientists

The following statement has been prepared regarding the aims of the newly formed Federation of Atomic Scientists:

We, the undersigned representatives of the Associations of Scientists who have worked on the atomic bomb, hereby agree to form a united group, to be known as "The Federation of Atomic Scientists," in order to carry out more effectively the common aims of the separate organizations.

Each of the six Associations shall retain its identity and independence of action. The Federation will provide a central office and staff for the purpose of aiding and coordinating the activities of the several member Associations.

The component organizations were founded to achieve the following aims:

- (1) To study the implications to our nation and to the world of the liberation of nuclear energy.
- (2) To create a realization of the dangers that this nation and all civilization will face if the tremendous destructive potential of nuclear energy is misused.
- (3) To help establish an atmosphere of world security in which the beneficial possibilities of nuclear energy may be developed.
- (4) To study the relation between national legislation and the establishment of an adequate international policy.

. . . and to give all possible publicity to the following convictions:

- (1) That a continuing monopoly of the atomic bomb by the United States is impossible.
- (2) That there can be no specific defenses against the destructive effects of the atomic bomb.

- (3) That in view of the existence of the atomic bomb, no nation can, in this new age, feel secure until the problem of the control of atomic power is solved on a world level.

The council of the Federation will consist of those delegates of the component associations who are in Washington at any given time. It is intended that one such member from each association should be present in Washington at all times and two will frequently be present. There will be a central office which will act primarily as headquarters for the Associations. It will also serve as an information and speakers' bureau and will handle contacts with other groups which hold views similar to our own.

The Washington office shall be made available to all scientists' organizations in America which find it necessary to have the same information that we are to supply to the Associations. Many of these newly formed groups have the same aims and purposes as our own organization.

Signed by representatives from:

Association of Oak Ridge Scientists at Clinton Laboratories
The Atomic Scientists of Chicago
The Association of Los Alamos Scientists
The Association of Manhattan Project Scientists, New York City Area
The Atomic Production Scientists, Oak Ridge
The Atomic Engineers, Oak Ridge

The Federation of Atomic Scientists may be reached by calling National 5818, Washington, D. C. Its street address is 1621 K Street, N.W., Washington 6, D. C.

Reorganized as the Federation of American Scientists a short time after its founding, FAS still thrives today.

FAS

FEDERATION of AMERICAN SCIENTISTS

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 - Digital Human
 - Learning Federation
 - Technology for Training Against Terror

Nuclear Weapons in the 21st Century

Nuclear weapons have been a focus of FAS work since its founding in 1945 by scientists concerned about control of the awesome new technology they had helped create.

Today we are often asked to speak on the dangers of radiological weapons known as **dirty bombs**. We inform on the dangers of nuclear weapons **proliferation** by individuals, non-state terrorists, or states. We follow **next generation nuclear weapons** development including proposed **"bunker busters."**



Major US cities are hit after Russia launches some its 5,000 nuclear warheads in error due to its decaying warning system. This graphic opened *Doomsday Machine I* on History Channel's Modern Marvels in which FAS experts discussed the dangers. *Image: History Channel Dec. 28, 2004.*

We stay on top of the debate over resuming nuclear weapons **testing**. We track **Administration** policy and hard-to-find reports for Congress.

In January 2005 FAS released a study that asked: **What missions remain for US nuclear weapons** now, 15 years after the end of the Cold War? What rationales justify our keeping 6,000 deployed warheads, plus missiles, bombers and other support, at a cost of <\$8 billion taxpayer dollars per year? Why does Russia try to keep <5,000 warheads officially deployed, though they are daily more prone to accidental launch against?

In **Missions for Nuclear Weapons after the Cold War** FAS Strategic Studies Project Director Ivan Oelrich finds that, of 15 missions claimed for US nuclear forces, only one justifies their present size and structure: a first strike against Russia's vast nuclear arsenal. Our continued ability to execute such an attack, makes Russia keep its large force to deter us. The two nations stay locked in Cold War military postures, even though no stakes between us justify such holocaust.

"The US and Russian arsenals are the elephant in the living room that no one wants to talk about," Oelrich says. "Yet millions of Americans could be killed after the launch of even part of the Russian force. By comparison, a dirty bomb attack most likely would kill hundreds of thousands."

--

Try our NEW **Bomb-A-City Calculator**. Pick an American city. Pick the size of the bomb you wish to detonate virtually (1 kt to 4 MT). Choose your method of delivery (aircraft or automobile/suitcase). Then see the radius within which most buildings would be destroyed.

What can we do?

"November 2005 will mark the 15th anniversary of the fall of the Berlin Wall. This is the year to downsize and restructure both sides' nuclear forces more drastically than is required by 2012 by the Moscow Treaty," Oelrich said in **releasing his report**. How low should we go? Oelrich did the numbers in a **paper** published by the Institute for Defense Analyses in 2001.

The American Physical Society awards an annual prize in honor of Szilard's commitment to the scientist's citizen involvement.

The screenshot shows the American Physical Society (APS) website. At the top left is the APS logo. To the right are navigation links for "American Physical Society Sites", "APS", "Journals", "PhysicsCentral", and "Physics Magazine". Below these is a search bar and links for "Login", "Become a Member", and "Contact Us". A dark blue navigation bar contains links for "Publications", "Meetings & Events", "Programs", "Membership", "Policy & Advocacy", "Careers In Physics", "Newsroom", and "About APS". On the left side, a "Programs" menu lists various categories, with "Honors, Prizes & Awards" selected. The main content area features a breadcrumb trail: "Home | Programs | APS Honors | Prizes & Awards | Leo Szilard Lectureship Award". The title "Leo Szilard Lectureship Award" is prominently displayed. The text describes the award's purpose: to recognize outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in areas like the environment, arms control, and science policy. It details the award's components: a \$5,000 prize, a certificate, and \$2,000 in travel expenses for lectures. The "Establishment & Support" section notes the award was created in 1974 as a memorial to Leo Szilard and was expanded in 1998 to include a lectureship format. The "Rules & Eligibility" section is partially visible. On the right, the "2022 Recipient" is identified as Michael E. Mann, a physicist at The Pennsylvania State University, accompanied by a portrait photograph.

APS
physics

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Leo Szilard Lectureship Award

To recognize outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in such areas as the environment, arms control, and science policy. The lecture format is intended to increase the visibility of those who have promoted the use of physics for the benefit of society. The award consists of \$5,000, a certificate citing the contributions of the recipient, plus \$2,000 travel expenses for lectures given by the recipient at an APS meeting and at two or more educational institutions or research laboratories in the year following the award. The lectures should be especially aimed at physicists early in their careers.


Establishment & Support

This annual award was established in 1974 by the Forum on Physics and Society as a memorial to [Leo Szilard](#) in recognition of his concern for the social consequences of science. The award was endowed in 1998 by donations from the John D. and Catherine T. MacArthur Foundation, the Energy Foundation, the David and Lucille Packard Foundation and individuals. It was also expanded to a lectureship format to promote awareness of the application of physics to social problems and to increase the visibility of those engaged in such activities.

Rules & Eligibility

2022 Recipient

[Michael E. Mann](#)
The Pennsylvania State University



Equally noteworthy was the award to NASA atmospheric physicist, James Hansen, in 2007.

The screenshot shows the American Physical Society (APS) website. At the top left is the APS physics logo. To the right are navigation links: American Physical Society Sites | APS | Journals | PhysicsCentral | Physics. Below these is a search bar and links for Login, Become a Member, and Contact Us. A dark blue navigation bar contains: Publications, Meetings & Events, Programs, Membership, Policy & Advocacy, Careers in Physics, Newsroom, and About APS. The main content area has a breadcrumb trail: Home | Programs | Prizes, Awards and Fellowships | Prizes | Leo Szilard Lectureship Award. On the left is a sidebar menu with categories: Programs (Education, International Affairs, Physics Outreach, Women in Physics, Minorities in Physics, LGBT Physicists, Industrial Physics), Prizes, Awards & Fellows (Prizes, Awards & Lectureships, Dissertation Awards, APS Fellows, Other APS Honors). The main content features the title "2007 Leo Szilard Lectureship Award Recipient" and a profile for James E. Hansen, National Aeronautics and Space Administration. It includes a citation: "For his seminal contributions to climate physics, especially the incorporation of radiative transfer in climate models, and his tireless efforts to bring the results of climate science to the attention of policymakers and the public." and a list of the Selection Committee: Steve Fetter (Chair), Barbara Levi, Paul G. Richards (06 Recipient), Prof. Peter D. Zimmerman, Chair (V. Chair), and David Albright. A portrait photo of James E. Hansen is shown to the right.

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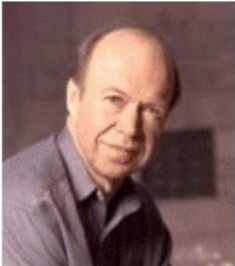
2007 Leo Szilard Lectureship Award Recipient

James E. Hansen
National Aeronautics and Space Administration

Citation:

"For his seminal contributions to climate physics, especially the incorporation of radiative transfer in climate models, and his tireless efforts to bring the results of climate science to the attention of policymakers and the public."

Selection Committee:
Steve Fetter (Chair), Barbara Levi, Paul G. Richards (06 Recipient), Prof. Peter D. Zimmerman, Chair (V. Chair), David Albright



Bulletin of the Atomic Scientists

JUNE 1947

HAROLD C. UREY

An Alternative Course for the Control of Atomic Energy

AUSTIN M. BRUES

With the Atomic Bomb Casualty Commission in Japan

YOSHIO NISHINA

A Japanese Scientist Describes Destruction of Cyclotrons

SYLVIA EBERHART

How the American People Feel About the Atomic Bomb

WAR DEPARTMENT THINKING on the Atomic Bomb

HARRISON BROWN

The World Government Movement in the United States

THE SENATE DEBATES Mr. Lillenthal's Confirmation

BOOKS UN Atomic Energy News

Vol. 3

PRICE: 25 CENTS

No. 6

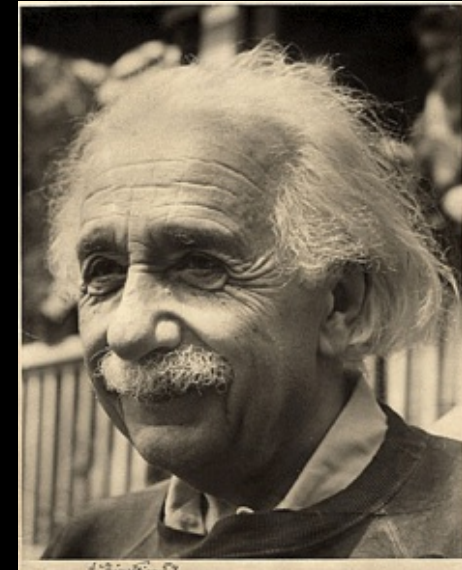
Founded in the fall of 1945 at about the same time when the Federation of Atomic Scientists was established, the *Bulletin of the Atomic Scientists* introduced its famous “doomsday clock” in its June 1947 issue.

The hands were set at eight minutes to midnight.

They were set at three minutes to midnight in 1984, at the height of the debate over US plans to place intermediate-range nuclear missiles in Europe.



The Russell-Einstein Manifesto
July 9, 1955



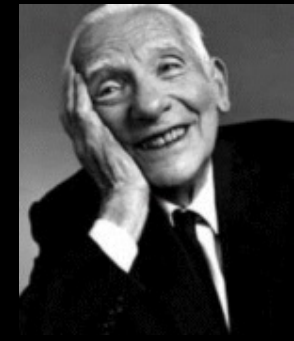
“Here, then, is the problem which we present to you,
stark and dreadful and inescapable: Shall we put an end
to the human race; or shall mankind renounce war?”





First Pugwash Conference, Pugwash,
Nova Scotia, July 8-11, 1957.

The 1995 Nobel Peace Prize was
awarded jointly to the Pugwash
Conferences and to their leading
figure, the physicist Joseph
Rotblat.



Left to right: Iwao Ogawa, Zhou Peiyuan, Vladimir P. Pavlichenko, Shinichiro Tomonaga, Cecil F. Powell, Antoine M. B. Lacassagne, Alexander V. Topchiev, Alexander M. Kuzin, Eugene Rabinowitch, George Brock Chisholm, Dmitri V. Skobelzyn, John S. Foster, Cyrus S. Eaton, Hermann J. Muller, Joseph Rotblat, Hans Thirring, Leo Szilard, Walter Selove, Eric H. S. Burhop, Mark L. E. Oliphant, and Marian Danysz. David F. Cavers, Paul Doty, Victor F. Weisskopf, and Hideki Yukawa were absent when this photograph was taken.



Zhou Peiyuan (1902-1993). B.Sc. Tsinghua 1924. Ph.D. Caltech 1928. Studied with Einstein at the Institute for Advanced Study, Princeton, 1935-1936. Founding member of the Chinese Academy of Sciences, 1955. President of Peking University.



First Pugwash Conference, Pugwash,
Nova Scotia, July 8-11, 1957.

The meeting location as it appeared
when I visited the site in 2012.



Pugwash Today

Pugwash Conferences on Science and World Affairs

Pugwash seeks a world free of nuclear weapons and other weapons of mass destruction. Through our long-standing tradition of 'dialogue across divides' that also earned us the Nobel Peace Prize in 1995, Pugwash aims to develop and support the use of scientific, evidence-based policymaking, focusing on areas where nuclear and WMD risks are present. By facilitating track I.5 and track II dialogues, we foster creative discussions on ways to increase the security of all sides and promote policy development that is cooperative and forward-looking.

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Pugwash document on the NPT Review Conference Postponement and Risks after the Pandemic

6 May 2020 This is a Pugwash document concerning nuclear problems and tensions in the time of COVID-19. This document...

#NPT, #Nuclear weapons, #Pugwash national groups.



Tehran meeting on JCPOA

On 23-24 June 2019 a delegation from Pugwash travelled to Iran to participate in a

Statement on the Open Skies Treaty

24 May 2020 After the Open Skies Treaty, What Fate for New START? A Treaty on Open Skies was initially...

#OpenSkiesTreaty, #USA

Geneva Workshop on Hypersonic Weapons



Student Pugwash USA
@StudentPugwash

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November 29, 2019

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Page Transparency
Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content.
Page created · November 7, 2007

How did ordinary citizens respond?

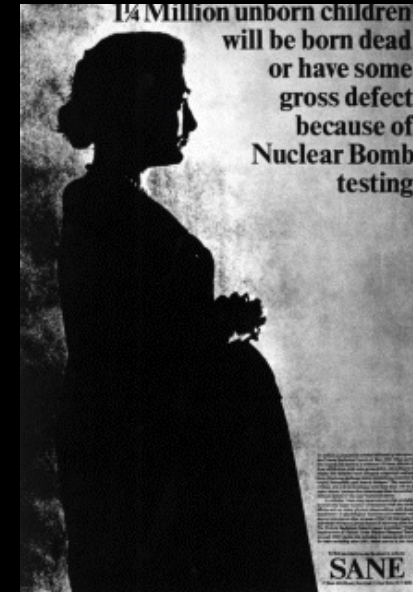


Campaign for Nuclear
Disarmament
Established 1958



Bread not Bombs/Plowshares
Established 1958

Tom Lehrer
“We Will All Go Together
When We Go”
1959



National Committee for
a SANE Nuclear Policy
Established 1958

Sheldon Allman.

“Crawl Out Through the Fallout”



Arms control.



President John F. Kennedy signs Limited Nuclear Test Ban Treaty October 7, 1963.

The first step back from the brink.



1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005

SALT I
ABM
1971

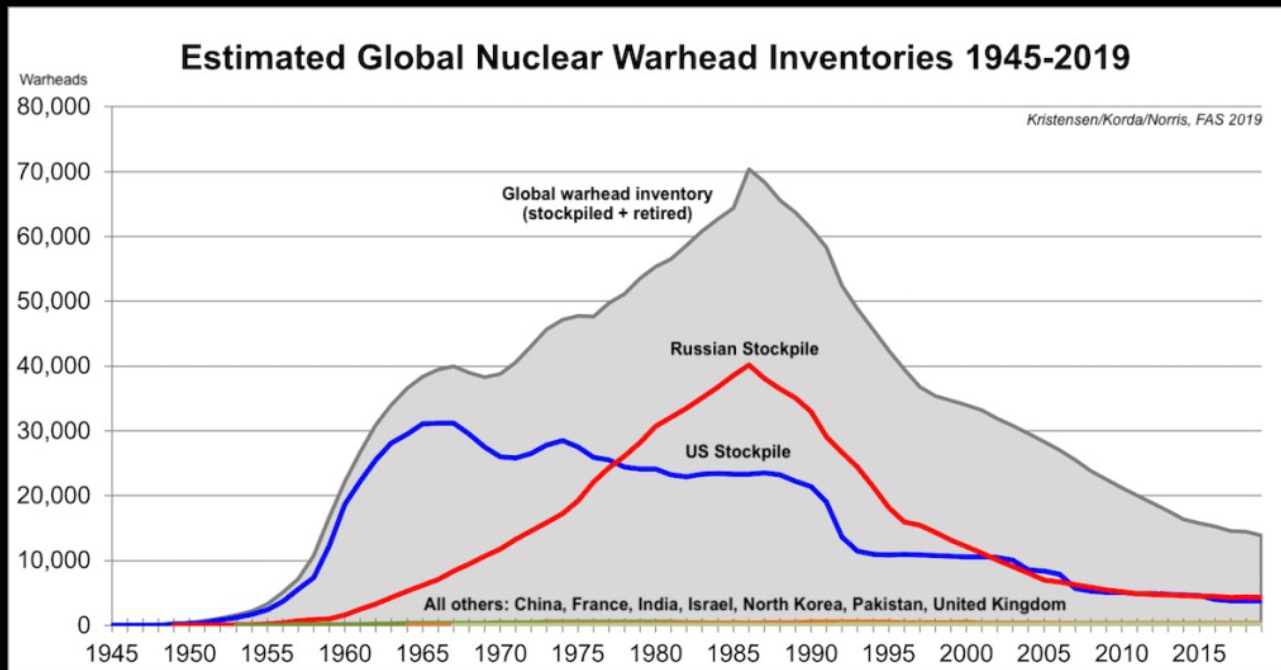
SALT II
1979

INF
1988

START I
1991

CTBT
1996

START II
2000



From 1971 to 2000 a series of nuclear arms control agreements led to a reduction in the number of warheads from a high of about 70,000 around 1996 to about 30,000 warheads by 2005, with approximately 10,000 of those warheads deployed, the rest in stockpiles.

<http://www.johnstonsarchive.net/nuclear/nwhdet.html>

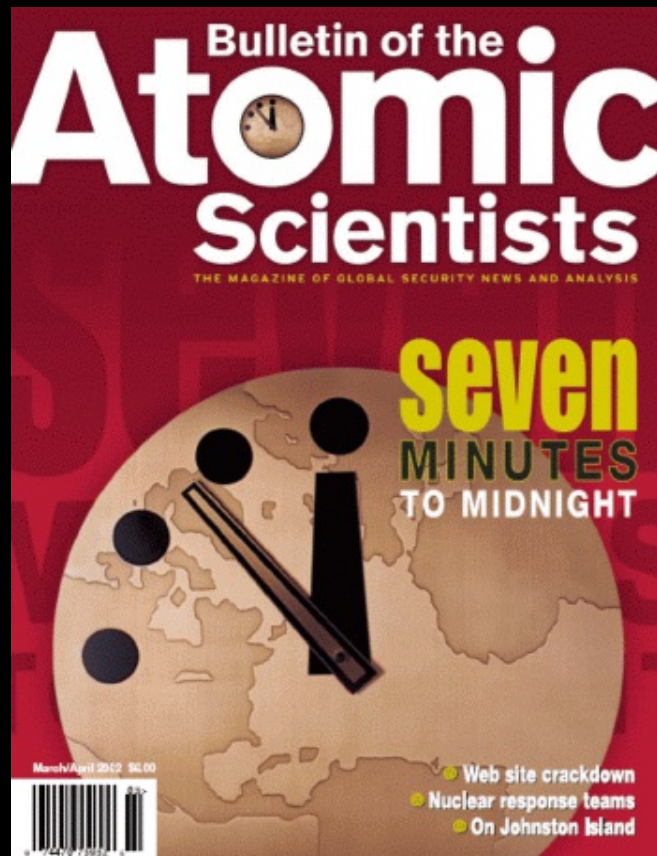
Bush and Putin sign SORT (Strategic Offensive Reductions Treaty), May 24, 2002 in Moscow.

The treaty obligates each side to reduce operationally deployed warheads to 1,700-2,200 each.

But many critics thought that the treaty was a sham, pointing out that:

- There were no verification procedures.
- Reductions were not permanent, because warheads were not required to be destroyed.
- Reductions were not required until December 31, 2012, the day when the treaty expired.





In spite of SORT, in 2002 the hands of the Doomsday Clock maintained by the *Bulletin of the Atomic Scientists* were moved to seven minutes to midnight, one minute closer to midnight than when the clock was introduced in 1947.

High among the reasons cited for moving the hands forward to seven minutes to midnight was the decision by the Bush administration in 2002 to have the United States unilaterally abrogate the Anti-Ballistic Missile (ABM) treaty signed in 1971. In response, Russia declared that it would no longer abide by the terms of the START II treaty, which the United States had also failed fully to ratify.

Thirty-one years of progress in the reduction of nuclear weapons had come to a halt.

New START Treaty (2010-2021)

Aggregate limits:

- 1,550 warheads. Warheads on deployed ICBMs and deployed SLBMs count toward this limit and each deployed heavy bomber equipped for nuclear armaments counts as one warhead toward this limit.

This limit is 74% lower than the limit of the 1991 START Treaty and 30% lower than the deployed strategic warhead limit of the 2002 SORT Treaty.

- A combined limit of 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.
- A separate limit of 700 deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments.

This limit is less than half the corresponding strategic nuclear delivery vehicle limit of the START Treaty

Russia and U.S. Sign Nuclear Arms Reduction Pact



Doug Mills/The New York Times

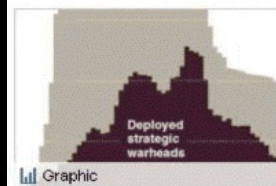
President Obama and President Dmitri A. Medvedev of Russia signing the treaty in Prague on Thursday.

By PETER BAKER and DAN BILEFSKY

Published: April 8, 2010

PRAGUE — The United States and [Russia](#) opened what they called a new era in their tumultuous relationship on Thursday as they signed an arms control treaty and presented a largely united front against [Iran's nuclear program](#), marking a sharp change since they broke over the Georgia war two years ago.

Multimedia



Graphic

Nuclear History

In a ceremony filled with flourish and the echoes of history, [President Obama](#) and President [Dmitri A. Medvedev](#) put aside the tensions of recent years to seal the New Start pact paring back their nuclear arsenals. The two leaders used the moment to showcase their growing personal relationship and a mutual commitment to cooperation on a host of issues.

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At doom's doorstep: It is 100 seconds to midnight

2022 Doomsday Clock Statement

Science and Security Board
Bulletin of the Atomic Scientists

Editor, John Mecklin



In January of 2007, the hands of the Doomsday Clock were moved forward again, to five minutes to midnight, closer than at any time since the heights of tension during the Cold War from 1947 to 1963 and again from 1981 to 1988. In 2015, we were at three minutes to midnight. In 2018, two minutes. Today we are at one-hundred seconds to midnite, closer than ever in history.

The *Bulletin* now includes not only the threat of nuclear war, but also climate change as an existential threat to humankind, and earlier this year it began to track deliberate disinformation campaigns as another, serious global threat.



Nuclear weapons today

The bulk of our nuclear force consists of 228 Trident SLBMs each carrying six or so warheads with yields of either 100 Kt or 400 Kt, about 1,200 warheads in total.



Approximately 500 warheads, each with a yield of up to 150 Kt, are mounted on cruise missiles or other tactical delivery vehicles.



Minuteman III MIRV bus. Each warhead has a yield of ca. 300 Kt. We now deploy 450 of these missiles with about 500 warheads. Minuteman III is expected to be operational through 2025.



Source: The Center for Arms Control and Non-Proliferation

In May 2007, Russia announced a successful test launch of its new RS-24 ICBM, which can carry up to three MIRVed warheads and is said to be capable of penetrating any existing missile defense shield. The test was widely viewed as Russia's response to US plans to install an X-Band missile detection radar facility in the Czech Republic and an advanced PAC-3 Patriot anti-missile battery in Poland.

The US insists that defense of Europe against Iranian missiles is the intent.



Russian RS-24 ICBM



X-Band Radar Installation in the Pacific



Putin and Bush
Camp David, 2003



Patriot PAC-3

Russia saw the installation of this system in two former Warsaw-Pact countries as a hostile act directed toward Russia.

Russia Accuses U.S. Of Starting New Arms Race



Lavrov (left) and Rice in Potsdam today (AFP)

May 30, 2007 – Russia's foreign minister today accused the United States of starting a new arms race with its plans to deploy a missile-defense system in Central Europe.

Sergei Lavrov was speaking after a meeting of foreign ministers from the Group of Eight (G8) major industrial nations in Germany.

In response, U.S. Secretary of State Condoleezza Rice said Washington has repeatedly explained its plan to Moscow, and is ready to discuss the matter further.

Russian officials say the planned defense system is a threat to Russia. The United States says it is aimed at preventing countries like Iran from someday threatening Europe.

Also at the meeting, a statement was issued saying G8 members would support "further appropriate measures" if Iran failed to comply with UN resolutions demanding that it suspend uranium enrichment.

The UN Security Council has already imposed two rounds of sanctions on Iran for failing to suspend enrichment amid fears it is seeking to produce nuclear weapons.

(Reuters, AP, AFP)

When Obama came into office in 2009, he proposed a new course of action on nuclear arms control, and he negotiated the New START treaty in 2010.

President Obama's Nuclear Agenda

Below are some of President Obama's completed and planned steps for arms control and disarmament, going from the relatively quick and easy to the increasingly hard and distant. Their success, Mr. Obama argues, would help realize his goal of a nuclear-free world.

CANCELING NEW U.S. WARHEADS Early on, Mr. Obama ended research on the Reliable Replacement Warhead, a program begun in the Bush years to make new generations of arms.

LOCKING UP LOOSE NUCLEAR MATERIAL In Prague in April, Mr. Obama vowed to secure "all vulnerable nuclear material around the world within four years" as a way to fight nuclear terrorism. A Harvard analysis says the budget request for now is too small "to implement such a plan."

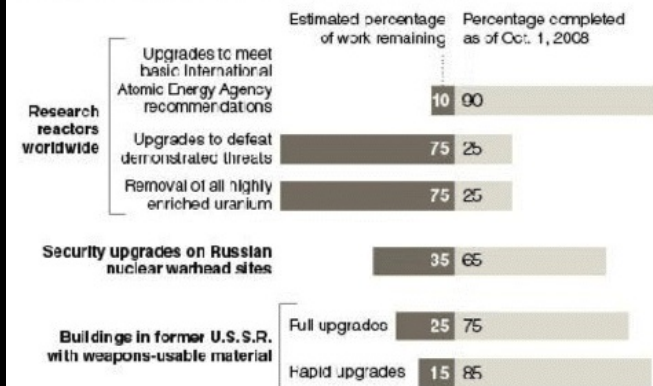
NEGOTIATING ARMS REDUCTIONS WITH MOSCOW Mr. Obama wants a new treaty this year that would reduce each side's arsenal to roughly 1,500 permitted warheads from 2,200. It would be a first step to deeper cuts.

RATIFYING THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY The U.S. has signed, but not ratified, the treaty, which would ban nuclear testing as a way to end arms innovation. In Prague, Mr. Obama vowed to "immediately and aggressively" pursue ratification, moving the treaty closer to global completion.

STRENGTHENING THE NUCLEAR NONPROLIFERATION TREATY The 1968 accord seeks to halt the spread of nuclear arms but has suffered from cheating by some nations and other setbacks. Mr. Obama wants more aid for international atomic inspectors, new ways to punish cheaters and new fuelling methods for peaceful nuclear power that lower the risk of arms proliferation.

NEGOTIATING A FISSILE MATERIAL CUTOFF TREATY It would ban making fuel for nuclear arms, in theory ending their spread.

Progress Report: Securing Nuclear Material



Sources: *Project on Managing the Atom*, Belfer Center at Harvard Kennedy School; Nuclear Threat Initiative

THE NEW YORK TIMES

But some critics argued that, in spite of his visit to Hiroshima in 2016, Obama's nuclear legacy might be that he started a new arms race by championing modernization of our nuclear arsenal.



Obama and Japanese Prime Minister at Hiroshima
27 May 2016

Obama says he's working towards a nuclear-free world. That's a lie
Trevor Timm



When Obama says he's 'reduced the number and role of nuclear weapons in our national security strategy', he's referring to a drop in the ocean



Just two BFFs discussing nuclear security at this week's summit. Photograph: Kevin Lamarque/Reuters

At the head of the 50-country Nuclear Security Summit that met in Washington DC this past week, President Obama publicly touted his administration's alleged progress towards "a world without nuclear weapons". In reality, his administration's record on reducing nuclear weapons is largely a dismal failure.

Source: *The Guardian*, 1 April 2016

One fruit of the “modernization” of our nuclear arsenal was the deployment in February 2020 of a new line of low-yield warheads, with a yield of under 10 Kt. In order to do this, the United States unilaterally withdrew from the INF, the Intermediate-Range Nuclear Forces Treaty, on August 2, 2019. The theory is that this gives us a more flexible array of options, but critics argue that the introduction of these weapons is inherently destabilizing.

US Deploys New Low-Yield Nuclear Submarine Warhead

By Hans Kristensen · January 29, 2020

By William M. Arkin* and Hans M. Kristensen



The USS Tennessee (SSBN-734) at sea. The Tennessee is believed to have deployed on an operational patrol in late 2019, the first SSBN to deploy with new low-yield W76-2 warhead. (Picture: U.S. Navy)

The other major new development is work on hypersonic delivery vehicles. They can fly at speeds that are many multiples of the speed of sound, reportedly as high as Mach 20 or roughly 15,000 miles per hour. They are maneuverable and can deliver a warhead with pinpoint accuracy halfway around the world in minutes. A Mach 20 hypersonic vehicle could go from New York to Moscow in eighteen minutes. The speed and maneuverability of hypersonic vehicles make defense against them more or less impossible.

The Pentagon Plans to Deploy An Arsenal Of Hypersonic Weapons In The 2020s

 **Sebastien Roblin** Contributor
Aerospace & Defense
I cover international security, conflict, history and aviation.



Source: *Forbes*, 30 April 2020

The view from elsewhere

The Nuclear Non-Proliferation Treaty (1968)

We hear a lot of concern, and justifiably so, about new nuclear states developing nuclear weapons in violation of the Nuclear Non-Proliferation Treaty. But in the eyes of much of the rest of the world, especially the developing world, the major failure to abide by the treaty is seen as the failure of the major nuclear powers – the United States and Russia – to do as required by Article VI of the Non-Proliferation Treaty.

Article VI

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

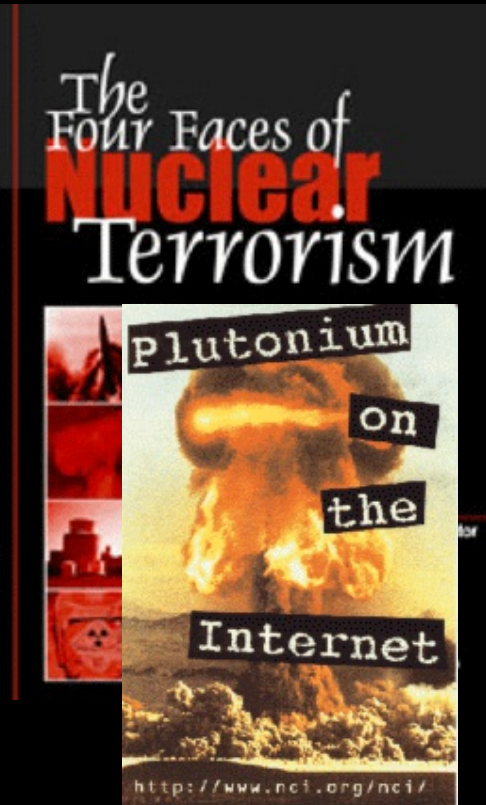
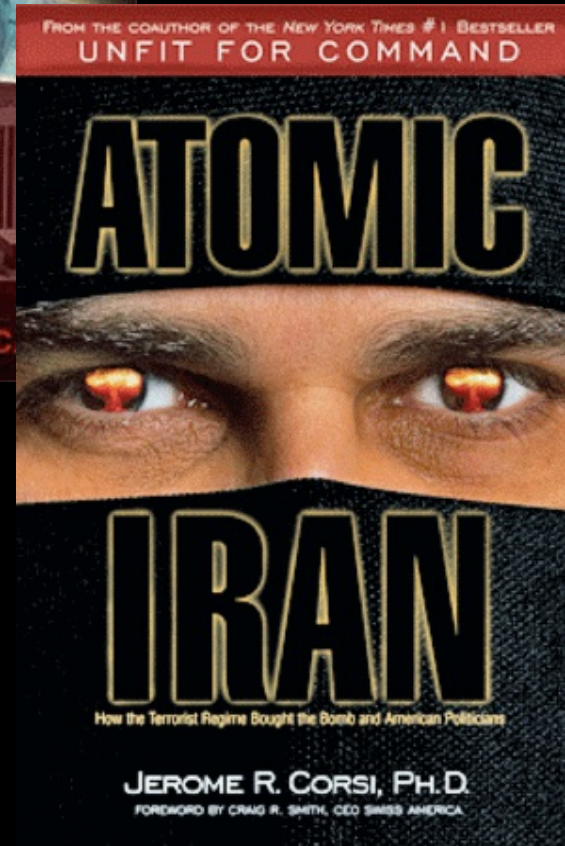
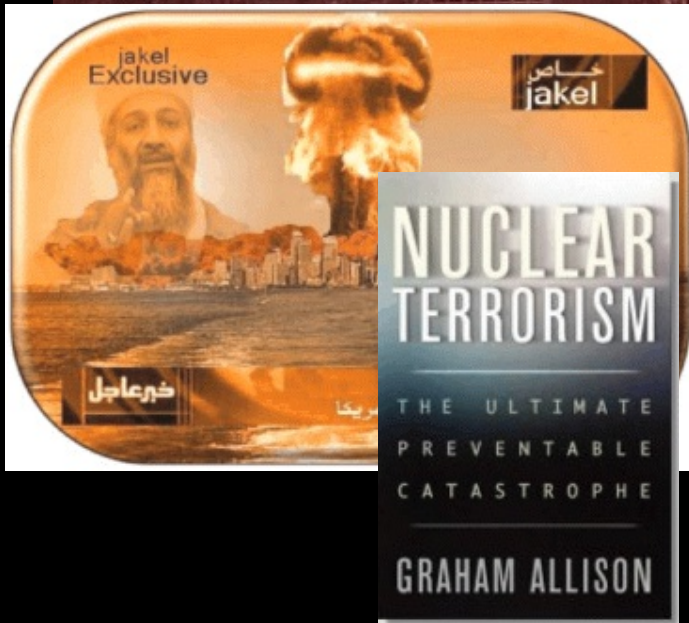



Kim Jong-un



Ebrahim Raisi

In spite of all of the hype about nuclear terrorism . . .



A dramatic, high-contrast photograph of a nuclear explosion's mushroom cloud. The cloud is dark and billowing, set against a sky filled with horizontal bands of bright orange and red light, suggesting intense heat and fire. The overall tone is ominous and powerful.

The fact
remains
that the
United
States
and
Russia
have,

by far,

the largest
arsenals of
weapons of
mass
destruction

of any
nation
or
group
on earth.

Do physicists have a role to play today?

Hans A. Bethe's Letter to the Science Community

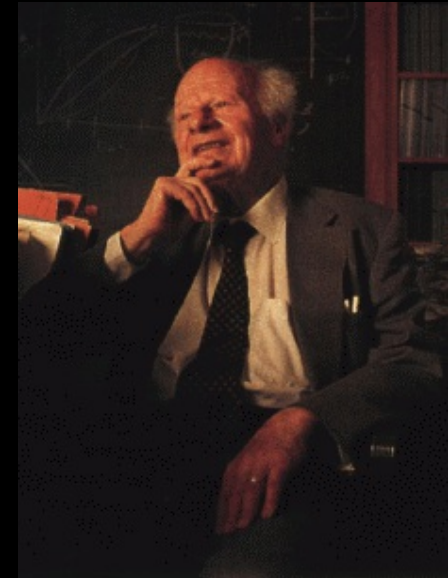
As the Director of the Theoretical Division at Los Alamos, I participated at the most senior level in the World War II Manhattan Project that produced the first atomic weapons.

Now, at age 88, I am one of the few remaining such senior persons alive. Looking back at the half century since that time, I feel the most intense relief that these weapons have not been used since World War II, mixed with the horror that tens of thousands of such weapons have been built since that time one hundred times more than any of us at Los Alamos could ever have imagined.

Today we are rightly in an era of disarmament and dismantlement of nuclear weapons. But in some countries nuclear weapons development still continues. Whether and when the various Nations of the world can agree to stop this is uncertain. But individual scientists can still influence this process by withholding their skills.

Accordingly, I call on all scientists in all countries to cease and desist from work creating, developing, improving and manufacturing further nuclear weapons and, for that matter, other weapons of potential mass destruction such as chemical and biological weapons.

Hans A. Bethe
July 23, 1995



Hans Bethe
(1906-2005)

April 17, 2006

The Honorable George W. Bush
President of the United States
1600 Pennsylvania Avenue
Washington, DC 20500

Dear Mr. President:

Recent articles in the New Yorker and Washington Post report that the use of tactical nuclear weapons against Iran is being actively considered by Pentagon planners and by the White House. As members of the profession that brought nuclear weapons into existence, we urge you to refrain from such an action that would have grave consequences for America and for the world.

1800 of our fellow physicists have joined in a petition opposing new US nuclear weapons policies that open the door to the use of nuclear weapons in situations such as Iran's. These policies represent a "radical departure from the past", in the words of Linton Brooks, National Nuclear Security Administration director. Indeed, since the end of World War II, US policy has considered nuclear weapons "weapons of last resort", to be used only when the very survival of the nation or of an allied nation was at stake, or at most in cases of extreme military necessity. Instead, the new US nuclear weapons policies have significantly lowered the threshold for the potential use of nuclear weapons, as clearly evidenced by the fact that they are being considered as another tool in the toolbox to destroy underground installations that are "too deep" to be destroyed by conventional weapons. This is a major and dangerous shift in the rationale for nuclear weapons. In the words of the late Joseph Rotblat, Nobel Peace Prize recipient for his efforts to prevent nuclear war, "the danger of this policy can hardly be over-emphasized".

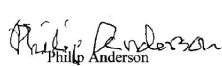
Nuclear weapons are unique among weapons of mass destruction: they unleash the enormous energy stored in the tiny nucleus of an atom, an energy that is a million times larger than that stored in the rest of the atom. The nuclear explosion releases an immense amount of blast energy and thermal and nuclear radiation, with deadly immediate and delayed effects on the human body. Over 100,000 human beings died in the Hiroshima blast, and nuclear weapons in today's arsenals have a total yield of over 200,000 Hiroshima bombs.


Using or even merely threatening to use a nuclear weapon preemptively against a non-nuclear adversary tells the 182 non-nuclear-weapon countries signatories of the Nuclear Non-Proliferation Treaty that their adherence to the treaty offers them no protection against a nuclear attack by a nuclear nation. Many are thus likely to abandon the treaty, and the nuclear non-proliferation framework will be damaged even further than it already has, with disastrous consequences for the security of the United States and the world.


There are no sharp lines between small "tactical" nuclear weapons and large ones, nor between nuclear weapons targeting facilities and those targeting armies or cities. Nuclear weapons have not been used for 60 years. Once the US uses a nuclear weapon again, it will heighten the probability that others will too. In a world with many more nuclear nations and no longer a "taboo" against the use of nuclear weapons, there will be a greatly enhanced risk that regional conflicts could expand into global nuclear war, with the potential to destroy our civilization.


It is gravely irresponsible for the U.S. as the greatest superpower to consider courses of action that could eventually lead to the widespread destruction of life on the planet. We urge you to announce publicly that the U.S. is taking the nuclear option off the table in the case of all nonnuclear adversaries, present or future, and we urge the American people to make their voices heard on this matter.


Sincerely,

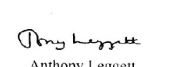

Philip Anderson

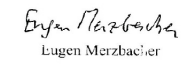

Michael Fisher



David Gross

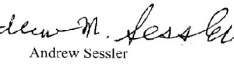

Leo Kadanoff

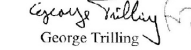

Joel Lebowitz

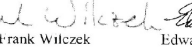

Anthony Leggett



Eugen Merzbacher



Douglas Suckale


Andrew Sessler


George Trilling


Frank Wilczek


Edward Witten


Jorge Hirsch

p.2

Physicists' letter to President Bush on the "nuclear option," April 17, 2006.

Do educated members of the public have a role to play?

Wall Street Journal, January 5, 2007

George Schultz, William Perry, Henry Kissinger, and Sam Nunn propose that the United States commit itself to the goal of complete nuclear disarmament.

OPINION

A World Free of Nuclear Weapons

By GEORGE P. SHULTZ, WILLIAM J. PERRY, HENRY A. KISSINGER and SAM NUNN
January 4, 2007

Nuclear weapons today present tremendous dangers, but also an historic opportunity. U.S. leadership will be required to take the world to the next stage -- to a solid consensus for reversing reliance on nuclear weapons globally as a vital contribution to preventing their proliferation into potentially dangerous hands, and ultimately ending them as a threat to the world.

Nuclear weapons were essential to maintaining international security during the Cold War because they were a means of deterrence. The end of the Cold War made the doctrine of mutual Soviet-American deterrence obsolete. Deterrence continues to be a relevant consideration for many states with regard to threats from other states. But reliance on nuclear weapons for this purpose is becoming increasingly hazardous and decreasingly effective.

North Korea's recent nuclear test and Iran's refusal to stop its program to enrich uranium -- potentially to weapons grade -- highlight the fact that the world is now on the precipice of a new and dangerous nuclear era. Most alarmingly, the likelihood that non-state terrorists will get their hands on nuclear weaponry is increasing. In today's war waged on world order by terrorists, nuclear weapons are the ultimate means of mass devastation. And non-state terrorist groups with nuclear weapons are conceptually outside the bounds of a deterrent strategy and present difficult new security challenges.

Apart from the terrorist threat, unless urgent new actions are taken, the U.S. soon will be compelled to enter a new nuclear era that will be more precarious, psychologically disorienting, and economically even more costly than was Cold War deterrence. It is far from certain that we can successfully replicate the old Soviet-American "mutually assured destruction" with an increasing number of potential nuclear enemies world-wide without dramatically increasing the risk that nuclear weapons will be used. New nuclear states do not have the benefit of years of step-by-step safeguards put in effect during the Cold War to prevent nuclear accidents, misjudgments or unauthorized launches. The United States and the Soviet Union learned from mistakes that were less than fatal. Both countries were diligent to ensure that no nuclear weapon was used during the Cold War by design or by accident. Will new nuclear nations and the world be as fortunate in the next 50 years as we were during the Cold War?

Cardinal Mahony and William Perry discussed the nuclear-free option here at Notre Dame, October 18, 2011.

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Perry, Cardinal Mahony to Address Ethics of a World without Nuclear Weapons

October 18, 2011
Contact: Renée LaReau, rlareau1@nd.edu, 574-631-5098

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While the dangers of nuclear holocaust have diminished since the end of the Cold War, the threat of proliferation and the risk of nuclear weapons use have increased.

In response to these dangers, former **U.S. Secretary of Defense William Perry** and other former senior national security officials have declared their support for a world without nuclear weapons.

Perry and **Cardinal Roger Mahony, Archbishop Emeritus of Los Angeles**, will address the ethical challenges posed by nuclear policy at **4:15 p.m., October 25** (Tuesday), at the Hesburgh Center for International Studies. This event is free and open to the public.



Former U.S. Secretary of Defense William Perry and Cardinal Roger Mahony, Archbishop Emeritus of Los Angeles, will address nuclear policy on Oct. 25 at the Kroc Institute.

Notre Dame's President Jenkins urging a "fresh examination of the ethics of nuclear weapons in today's world." - April 2014

Bishops, Notre Dame and other universities encouraged by Shultz, Perry and Nunn commit to revitalizing Catholic engagement on nuclear disarmament

Paul Browne April 28, 2014

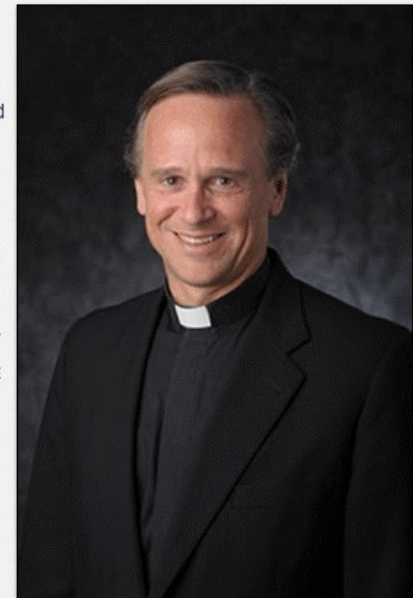
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Citing the long-held opposition to nuclear arms of newly canonized Popes John XXIII and John Paul II, University of Notre Dame President [Rev. John I. Jenkins, C.S.C.](#), called for a "fresh examination of the ethics of nuclear weapons in today's world" at the Colloquium on Revitalizing Catholic Engagement on Nuclear Disarmament, hosted April 24 to 25 (Thursday to Friday) by former U.S. Secretary of State George Shultz and former Secretary of Defense William Perry at Stanford University's [Hoover Institution](#) and [Freeman Spogli Institute for International Studies](#).

Shultz said he welcomed "the important moral and religious voice that the Catholic community in the United States contributes to this effort."

Forty bishops, policy specialists, Catholic scholars and students gathered to explore ways of making a world without nuclear weapons a reality. Former U.S. Sen. Sam Nunn also participated. The project is sponsored by Notre Dame's [Kroc Institute for International Peace Studies](#) in collaboration with the [United States Conference of Catholic Bishops'](#) Office of International Justice and Peace; Georgetown University's Berkley Center for Religion, Peace, and World Affairs; and Boston College.

Noting that Pope John XXIII's encyclical "Pacem in Terris," issued 51 years ago and just six months after the Cuban missile crisis, declared that "the arms race should cease" and that "all come to agreement on a fitting program of disarmament," Father Jenkins said that the canonization of the two pontiffs would encourage the United States Conference of Catholic Bishops and others working to revitalize the Church's engagement in nuclear disarmament. He called the canonizations on Sunday "fortuitous timing, as we can surely use more high-placed opponents of nuclear weapons to hear our prayers and intercede for us." He added: "As bishops and popes have been saying for decades, nuclear weapons are morally tolerable only for the purpose of nuclear deterrence, and even then, only as a step on the way toward progressive disarmament. This narrow moral justification for nuclear weapons is based, in part, on the belief that deterrence will indeed deter, and that ... is an increasingly uncertain assumption."



Rev. John I. Jenkins, C.S.C.

Final exam.

What role will you play?

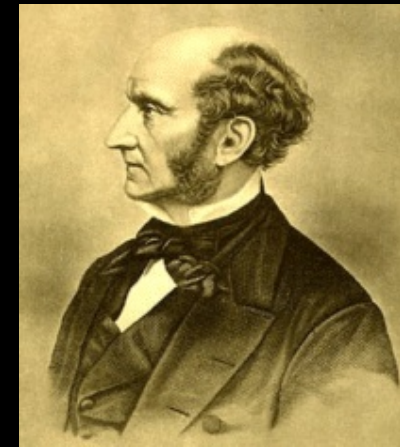
Billy Hughes & His Buccaroos.

“Atomic Sermon”



Frameworks for moral decision.

- Utilitarianism – Greatest good for the greatest number
John Stuart Mill
- Deontology – Universalizability – The golden rule,
“Do unto others as you would have others do unto you.”
Treat every individual as an end, not a means.
Immanuel Kant
- Virtue Ethics – What would the person of good character do?
Aristotle, St. Thomas Aquinas
- Moral Codes – The Decalogue, The Noble Eightfold Path, etc.



Mill



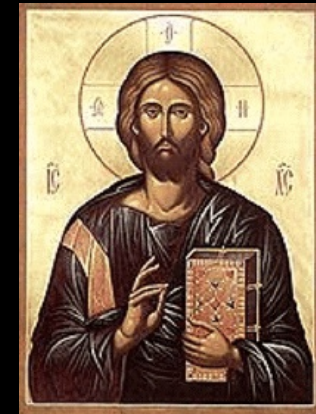
Kant



Aristotle



Aquinas



Catholic Just War Theory Guidelines

A just war can only be waged as a last resort. All non-violent options must be exhausted before the use of force can be justified.

A war is just only if it is waged by a legitimate authority. Even just causes cannot be served by actions taken by individuals or groups who do not constitute an authority sanctioned by whatever the society and outsiders to the society deem legitimate.

A just war can only be fought to redress a wrong suffered. For example, self-defense against an armed attack is always considered to be a just cause. Further, a just war can only be fought with “right” intentions: the only permissible objective of a just war is to redress the injury.

A war can only be just if it is fought with a reasonable chance of success. Deaths and injury incurred in a hopeless cause are not morally justifiable.

The ultimate goal of a just war is to re-establish peace. More specifically, the peace established after the war must be preferable to the peace that would have prevailed if the war had not been fought.

The violence used in the war must be proportional to the injury suffered. States are prohibited from using force not necessary to attain the limited objective of addressing the injury suffered.

The weapons used in war must discriminate between combatants and non-combatants. Civilians are never permissible targets of war, and every effort must be taken to avoid killing civilians. The deaths of civilians are justified only if they are unavoidable victims of a deliberate attack on a military target.

Pope Benedict XVI Statement on Nuclear Weapons

What can be said, too, about those governments which count on nuclear arms as a means of ensuring the security of their countries? Along with countless persons of good will, one can state that this point of view is not only baneful but also completely fallacious. In a nuclear war there would be no victors, only victims. The truth of peace requires that all – whether those governments which openly or secretly possess nuclear arms, or those planning to acquire them – agree to change their course by clear and firm decisions, and strive for a progressive and concerted nuclear disarmament. The resources which would be saved could then be employed in projects of development capable of benefiting all their people, especially the poor .

In this regard, one can only note with dismay the evidence of a continuing growth in military expenditure and the flourishing arms trade, while the political and juridic process established by the international community for promoting disarmament is bogged down in general indifference. How can there ever be a future of peace when investments are still made in the production of arms and in research aimed at developing new ones? It can only be hoped that the international community will find the wisdom and courage to take up once more, jointly and with renewed conviction, the process of disarmament, and thus concretely ensure the right to peace enjoyed by every individual and every people. By their commitment to safeguarding the good of peace, the various agencies of the international community will regain the authority needed to make their initiatives credible and effective.

[This excerpt is from a longer message by Pope Benedict XVI prepared for the World Day of Peace, celebrated on January 1, 2006.]