The Role of Scientists in Reducing Nuclear Threats

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Pugwash Meeting, Hiroshima, 2 Nov. 2025, 1:30-3 PM

Russell-Einstein…Yukawa…Manifesto (1955)

"scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction, and…discuss a resolution"

But will the politicians listen?

It depends:

If the public is engaged, then it is more likely.

My examples

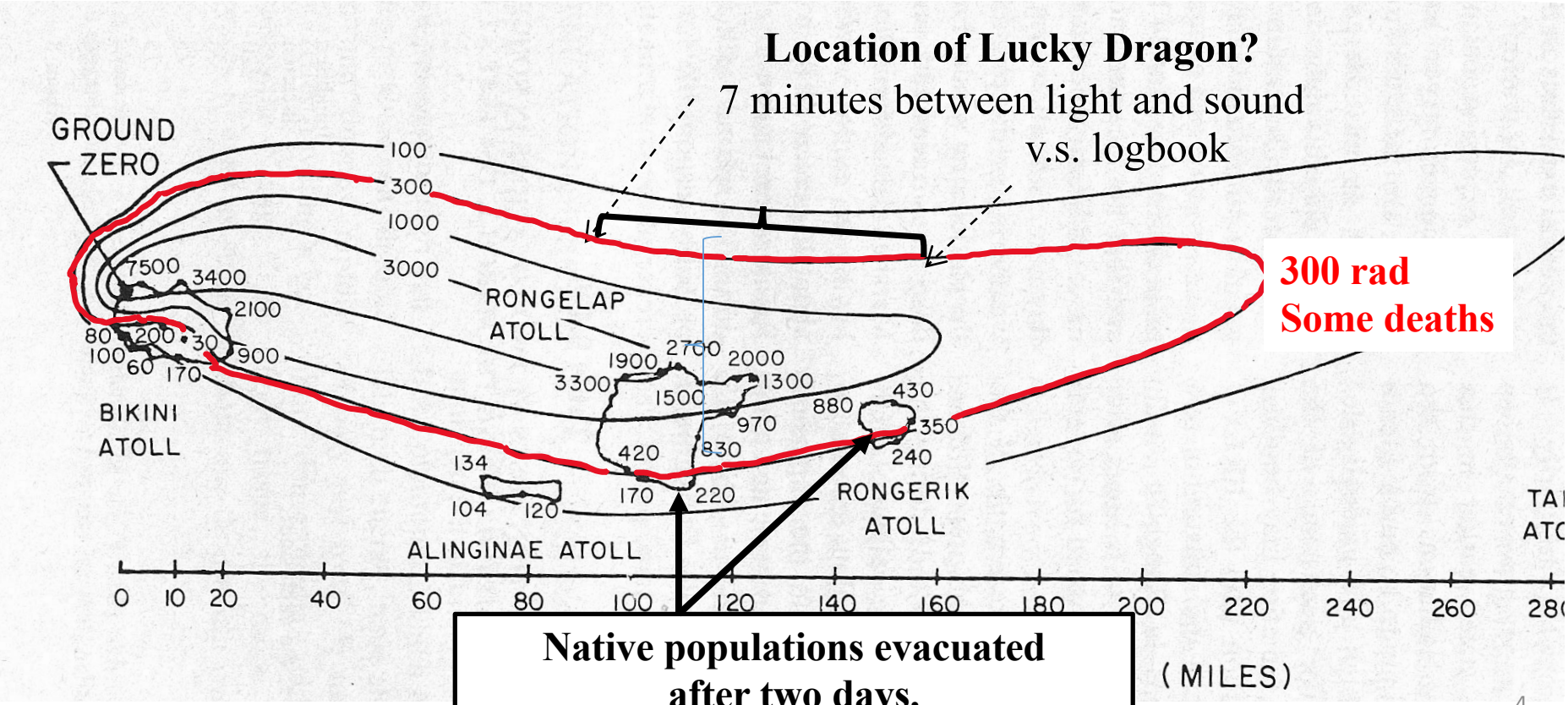
- Partial Test Ban Treaty of 1963
- The Anti-Ballistic Missile Treaty of 1972
- Comprehensive Test Ban Treaty of 1996
- INF Treaty of 1987, the START I Treaty of 1991…

Partial Nuclear Test Ban Treaty (1963)

1954: ”Bravo,” Bikini Atoll: **15 *million* tons TNT equivalent** (1000 Hiroshimas!),

Radioactive fallout on Japanese fishing boat, *Lucky Dragon 5.* One crew-member died.

Half of radioactivity went into global fallout. **Triggered a global anti-testing movement.**



1963: **Partial (everywhere but underground) Test Ban Treaty**

Linus Pauling (outsider)
(Nobel Peace Prize, 1963)

1962, outside White House

Andrei Sakharov (then an insider)
(Nobel Peace Prize, 1975)


1958, discussing with Kurchatov

Global Fallout Effects engaged the public

Public focused on 30-year half-life Strontium-90 – especially after St. Louis baby teeth survey.

Pauling and Sakharov both focused on 5600-year half-life carbon-14. They estimated millions of genetic defects & cancers from C-14.

Sakharov took responsibility for the consequences of his actions as an H-bomb designer thousands of years in the future. He became a dissident after Khrushchev ignored his pleas for fewer high-yield tests

But Partial Test Ban was an environmental, not an arms-control Treaty.

Nuclear testing continued underground because the Soviet Politburo was paranoid about the U.S. demand to be allowed at least eight on-site inspections per year in Soviet Union.

Comprehensive Test Ban Treaty had to wait for three more decades.

Treaty Limiting Anti-ballistic Missiles (1972)

1962-3: **Soviet Union started deploying missile interceptors around Moscow**. **64 were built**.

In response, the US developed multiple-warhead missiles with **thousands of additional US warheads to** overwhelm the Soviet system.

["**Offense-defense arms race**."]

1967, Nixon made "the **ballistic-missile defense gap**" into a political campaign issue, President Johnson surrendered and launched a national BMD system.

But US Army decided to deploy the interceptors in suburbs of big cities.

Interceptors were nuclear armed (up to 5 MT or 300 Hiroshimas).

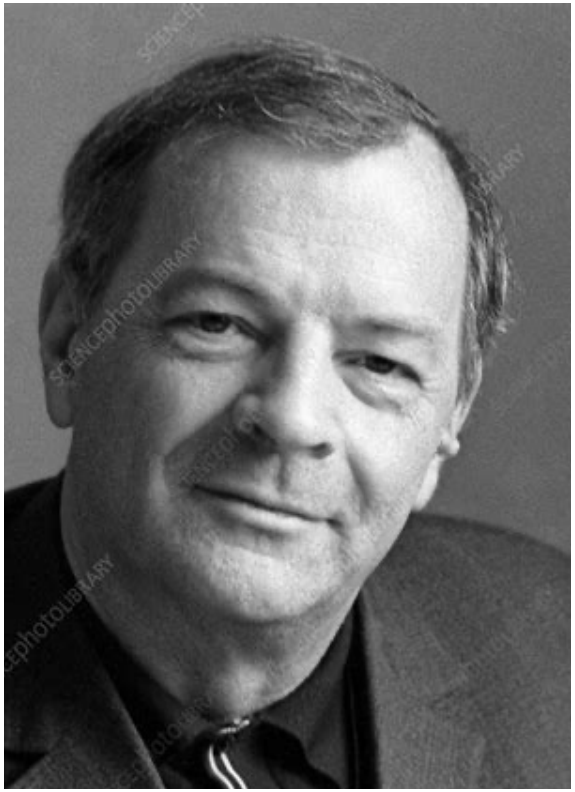
Suburbanites: "Not in my backyard!"

After public engaged, Congress started listening to the scientist critics and eventually turned against the system as too easy to neutralize.

1961-75: Soviet-American Disarmament Group met after Pugwash meetings. American scientists convinced Soviet scientists that BMD systems would be counterproductive and the Soviet scientists convinced their leadership.

In 1972, **Nixon was forced to cash in the US system as a bargaining chip to get limits on the Soviet ABM system**.

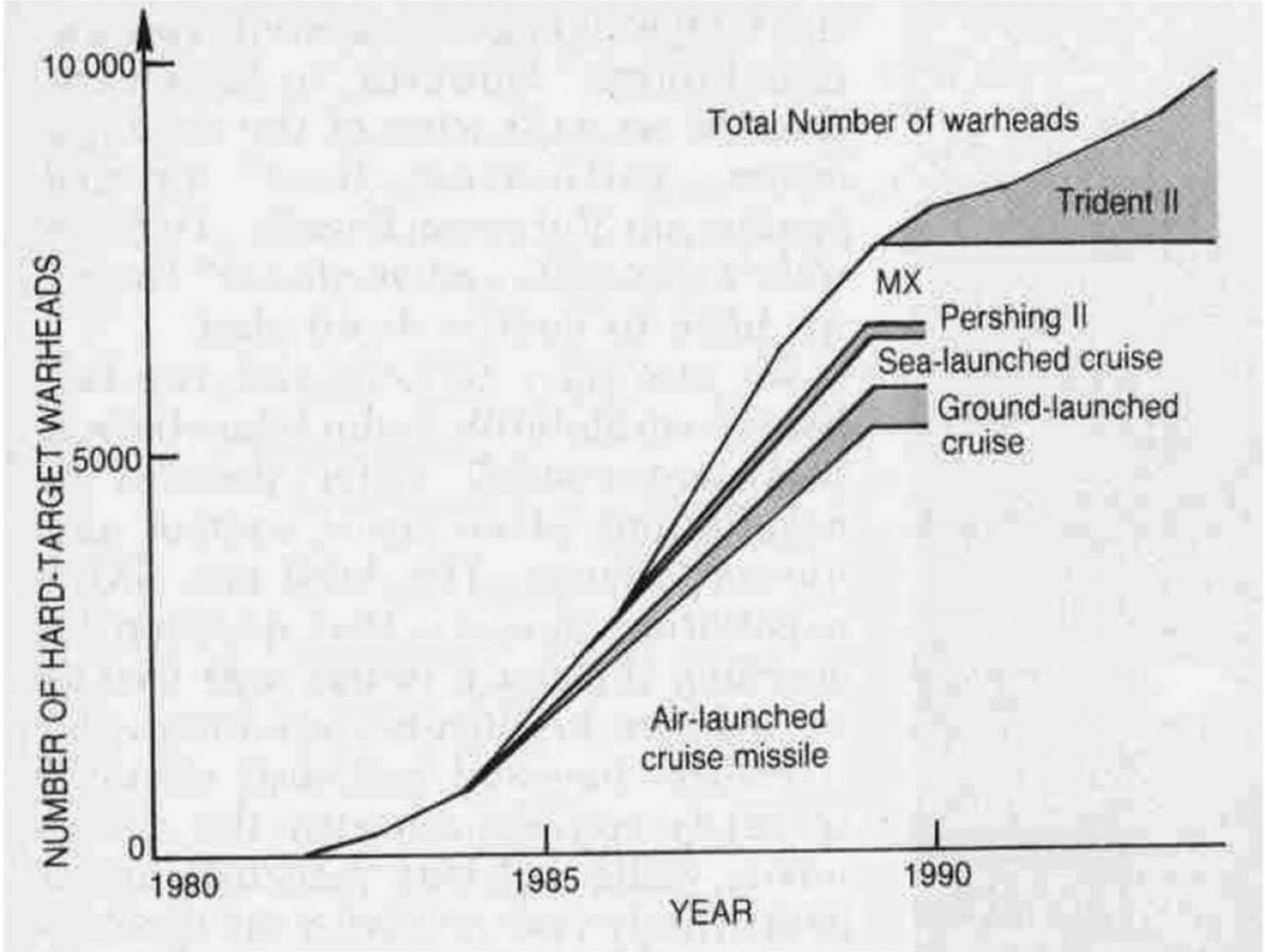
Co-chairs: Paul Doty,
American Academy of Arts and Sciences



Mikhail Millionshchikov,
Soviet Academy of Sciences

Matthew Evangelista,
Unarmed Forces: The Transnational Movement to End the Cold War
(Cornell University Press, 1999)

1991: Reagan Administration came into office convinced it had to prepare to fight and win a nuclear war with Soviet Union. Proposed 10,000 new accurate missile warheads.

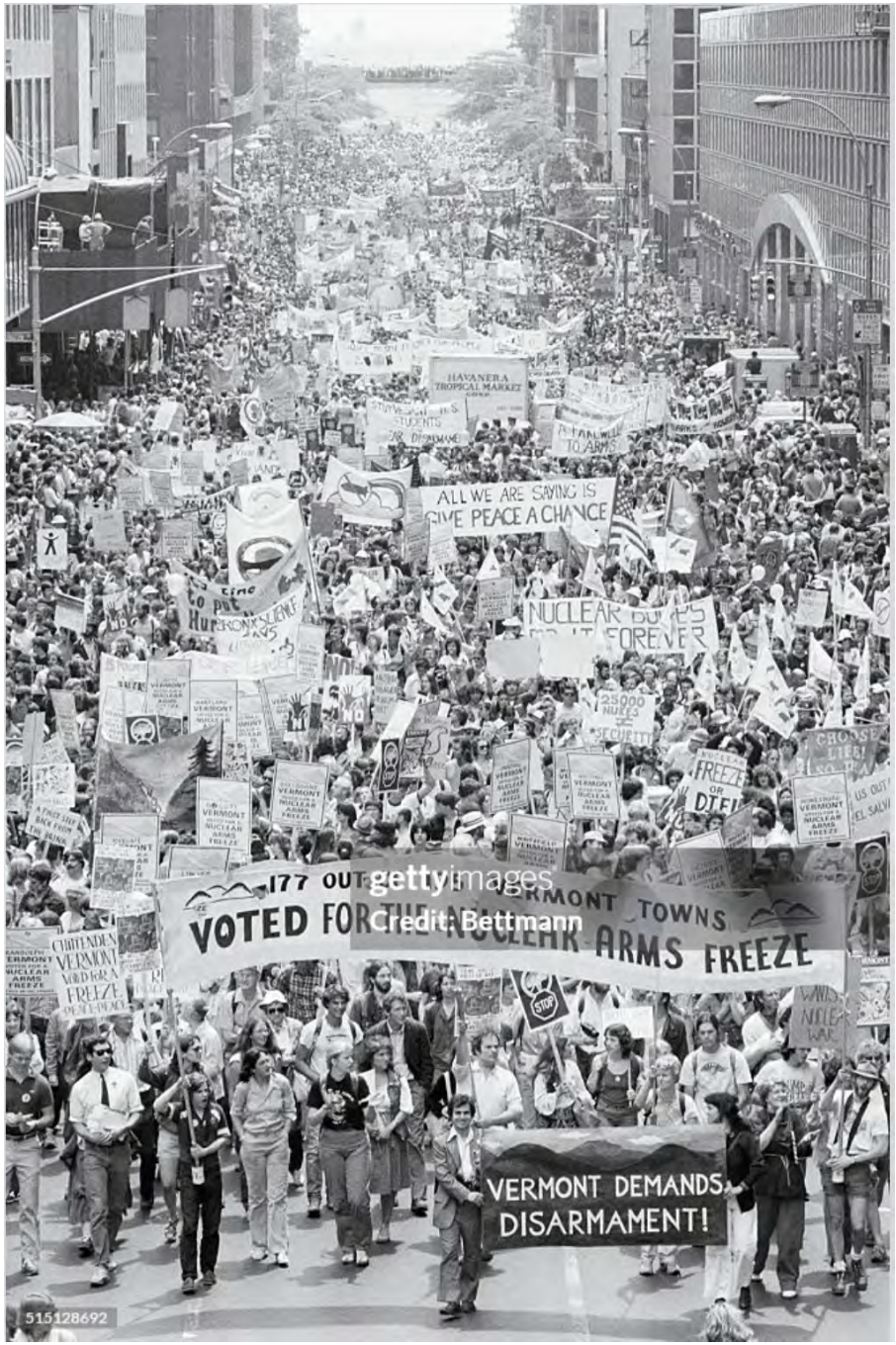


***Public was frightened*: Movement to "freeze" the nuclear arms race..**

Gorbachev saw military-industrial complexes as child-eating "Molochs" dominating nuclear policy in both the US and USSR but saw US and West European anti-nuclear-weapon movements as allies.

Reagan, taken aback, proposed his **"Strategic Defense Initiative,"** which the critics labeled "Star Wars," and scientists explained would be ineffective and counterproductive.

Finally, in 1986-7, **Reagan decided to try nuclear disarmament.**



42nd St, NY, 12 June 1982

Gorbachev started his effort at nuclear arms control on August 6, 1985 (Hiroshima Day) with a unilateral test moratorium.
One of his advisors, physicist Evgeny Velikhov, a leader in the *international* fusion-energy program,
decided to try Gorbachev's "glasnost" (openness) approach to get a Comprehensive Test Ban

In May 1986, Velikhov invited a U.S. NGO to come in and verify the Soviet test moratorium

US academic seismologists setting up 200 km from test site in Kazakhstan

Tom Cochran (NRDC US project leader) & **Evgeny Velikhov** in Kazakhstan.

Rep. (now Senator) **Edward Markey** holding up first seismogram in US House of Representatives.

July 1986: US House of Representatives voted to join Soviet moratorium.
1992: Senate stopped US testing
1996: CTBT opened for signing at UN.
Since 1998, only DPRK has tested (but not since 2017).

Global nuclear-warhead stocks have been reduced by 85% but **Russia and U.S. have stopped reducing and China is increasing**.

We still have much work to do.