H-BOMB PHYSICIST, RICHARD GARWIN, PREDICTS 'PROBABLE' DESTRUCTION OF A CITY BY NUCLEAR WEAPON

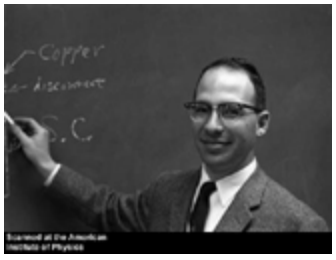
By Robert Kazel | November 8, 2012

For supporters of nuclear weapons abolition, there is irony that one of the darkest days in human history brought the brightest flash of light the Earth had ever seen. On Nov. 1, 1952, a blinding explosion and cloud ignited the South Pacific skies as America tested "Mike," the first hydrogen-fusion device and the prototype for subsequent H-bombs. Mike's detonation, equal to about 10.4 million tons of TNT, and more than 700 times the power of the atomic bomb dropped on Hiroshima, obliterated the mile-wide island of Elugelab, part of the Eniwetok Atoll in the Marshall Islands. The nuclear age suddenly became even more potentially cataclysmic.

One of the few physicists alive today who was instrumental in creating Mike, Dr. Richard Garwin, was only 23 in May 1951 when he traveled from his research job at the University of Chicago to do a summer stint at the Los Alamos Scientific Laboratory in New Mexico. A protégé of Enrico Fermi, Garwin eagerly began to puzzle out a problem that had eluded older, more seasoned researchers at Los Alamos: taking the theoretical formula for thermonuclear fusion and sketching out a practical blueprint for a reliable working device.

By July, Garwin showed his diagrams to colleague Edward Teller, the renowned World War II

none.



After the test of Mike, over the course of five decades as a professor and government consultant, Garwin built a world reputation as an expert on nuclear weaponry. Never easily categorized as a hawk or dove, he advised a long succession of Republican and Democratic administrations on technical issues. He ultimately became more outspoken about the need for arms control. Perhaps more than any other leading American scientist, he's also consistently spoken out against U.S. plans for missile defense programs that ostensibly would shoot down nuclear-armed missiles prior to impact. Such antimissile plans, Garwin has insisted for decades, are either wildly expensive, or can easily be defeated by fairly unsophisticated enemy technology, or both.

An IBM fellow emeritus, Garwin was a recipient of the 1996 Enrico Fermi Award given by the U.S. Department of Energy (with an accompanying $100,000 honorarium), and was awarded the National Medal of Science by President George W. Bush in 2003. A few months later, however, Garwin signed a letter with many other scientists accusing the Bush Administration of "systematically" eliminating scientific advisory committees and tinkering with scientific studies that conflicted with the Administration's views.

At 84, he still writes widely about weapons and arms control, and though retired from academia he continues to visit his lab at IBM in Yorktown Heights, N.Y.

Kazel: Dr. Garwin, some analysts are saying talks between the U.S. and China on nuclear relations haven't proceeded further because American military experts don't take China's No-First-Use (nuclear weapons) policy seriously – they don't think it's evidence that the Chinese would never use its weapons first in any circumstance. What do you think about the reliability of their No-First-Use policy?

Garwin: Well, I've been talking with Russians about nuclear weapons and No-First-Use since the 1960s, and with the Chinese since 1974. Russia used to have a No-First-Use policy. That was when they had enormous conventional superiority in Europe. With the collapse of the Warsaw Pact and the elimination of the Soviet Union, Russia rescinded its No-First-Use policy. So they have an explicit policy that they would use nuclear weapons to respond to a conventional attack, if necessary.

We talked with the Soviet Union in bilateral discussions in great detail for many years beginning in 1981, with a lot of people in the nuclear weapons business on both sides. We were never persuaded by the Soviets' No-First-Use statement. Since the collapse of the Soviet Union we know more about that, and we don't think the Russians were ever really serious about No-First-Use, because they didn't put into place a posture that was consistent with No-First-Use…

We don't challenge [China's stated policy], but the fact that their weapons for the most part

I've always been against a No-First-Use statement by the United States. But I've been in favor of a No-First-Use posture [e.g., actual measures to make first use more difficult, such as missile de-alerting].

We do have the April 2010 United States *Nuclear Posture Review* from the Defense Department, and there [former Secretary Robert] Gates said the United States is not prepared at the present time to adopt a universal policy that deterring nuclear attack is the sole purpose of nuclear weapons. But it will work to establish conditions under which such a policy could be safely adopted. There are some circumstances, he says, where you might have a conventional attack or biological or chemical weapon [attack] on the United States or our allies or partners, to which the United States might feel forced to respond with nuclear weapons.

He said the United States is prepared to strengthen its longstanding negative-security assurance by declaring that the United States will not use, or threaten to use, nuclear weapons against non-nuclear-weapon states that are party to the NPT [Nuclear Non-Proliferation Treaty] and are in compliance with their nuclear non-proliferation obligations. Now that's really a very strong statement. That says that if Iran gives up nuclear weapons and attacks the United States with chemical or biological weapons, we won't use nuclear weapons against them.

Kazel: What would be more terrible, Iran getting a nuclear weapon or us attacking them?

point in the 1998 Rumsfeld Commission study on the threat of missile attack on the United States…As soon as someone already has a nuclear weapon, they already have cruise missiles that are capable of carrying the nuclear weapon with a range of 100 or 200 kilometers, and they could strike any coastal city.

Kazel: Does that constrain our policy even more, and force us to destroy their nuclear facilities?

Garwin: We're not going to destroy all of Iran. You're not going to go in and have the government [replaced]. So, as the Israelis and other people say, it'll delay them for a year, or whatever, but it will strengthen their resolve to have nuclear weapons. So the right thing is to have a big effort to show Iran that the sanctions would be removed if they stopped work that could be considered as supporting the acquisition of a nuclear weapon. That's what has to be done. It would be a tragedy if they [Iran] didn't do that.

Kazel: So it sounds like you're saying you think a diplomatic solution is still possible?

Garwin: Yes, but you have to realize the sanctions have to be removed when the other side caves in. After the sinking of the Soviet Union…I was amazed…a lot of people were promoting the expansion of NATO. I said, I think this is a mistake. I thought we ought to have an expansion of the Partnership for Peace, which included Russia. [Many people felt] the Soviet Union had lost the Cold War and they deserved what they were getting: poverty. You know,

Kazel: What do you think the effect has been on China of current U.S. efforts to develop ballistic missile defense systems? You said several years ago that if we develop a BMD system, China would probably greatly increase the use of its mobile ICBMs and countermeasures, so the net effect of a BMD system would be no benefit. Do we already see this happening as a response to our BMD initiatives?

Garwin: The Chinese have been really very measured in their strategic weapon development and deployment. They…only have maybe 240 warheads…Of those maybe 180 are deployed, and only about 30 would be capable of reaching the United States.

Sure, the Chinese will employ countermeasures. They will defeat any of the systems that we are [now] building. You know the Chinese pay attention to what people say over here. [Former CIA Chief] Jim Woolsey and I were testifying on the same panel. Joe Biden in the Senate Foreign Affairs Committee asked Woolsey if he would endorse a system that is 100% effective against nations such as Iran and North Korea but didn't have any effectiveness against China. Woolsey said no, he would not. Of course the Chinese read this, and they see that Americans have that as a goal. You can be sure that they're going to develop countermeasures to the systems.

Kazel: You've said that the Chinese are afraid they won't have a second-strike capability, even though you also say our BMD system wouldn't work. The Chinese are unsure – they believe that our missile defenses might work.

Kazel: In 2002 during George W. Bush's first term, you did an interview with PBS in which you went so far as to say "the main purpose of the missile defense program is initially to counter China and to get a start on countering the missiles of Russia." You said the systems, in being presented to the public, were being "camouflaged" as solely for use against Iran and North Korea. Do you think that's still the case?

Garwin: Yes, I think many people in the "defense intellectual" community or in the Congress want to have the capability, as much as possible, to protect the United States against nuclear weapons. But they are wrongheaded in thinking that nuclear weapons are only delivered by long-range ballistic missiles, when in fact they could be delivered by short-range ballistic missiles against coastal cities, or cruise missiles, or even a few smuggled in.

Kazel: What parallels do you see between our efforts to try to head off a potential nuclear attack by the rogue states using limited ABM systems, compared with U.S. plans in 1968, which you criticized in *Scientific American* at the time? Defense Secretary Robert McNamara was proposing a rather limited ABM system against the Chinese.

Garwin: That was just an excuse by McNamara. He was really proposing a system against the Russians. He realized he couldn't devise a system that would really work to protect U.S. populations against a concerted Russian attack. So something that had a chance of working was against the Chinese….McNamara made this election-year announcement [in 1967], in San Francisco. Ninety-five percent of the speech was, we shouldn't build a missile defense and here's why — it won't work. And the other 5% was, we're going to go ahead and do it anyhow.

spoken out in favor of more sweeping goals advocated by nuclear abolition groups – for example, the phased, scheduled reduction and abolition of nuclear we Nuclear Weapons Convention where all nuclear powers come together to reach an agreement. Do you see a limit to the goals you want to support?

Garwin: Nobody has shown how we [can] have a stable world with states still in conflict and no nuclear weapons. In the United States there are two main efforts, Global Zero with Bruce Blair and his colleagues, including General [James] Cartwright, and the other is the "Gang of Four" – [former Secretary of State] George Shultz, [former Georgia Senator] Sam Nunn, [former Secretary of State] Henry Kissinger and [former Secretary of Defense] William Perry. You'd have to add [physicist and arms expert] Sid Drell as well. They're persuaded that massive reductions in nuclear weapons and more cooperative effort to get rid of them will pay off, even if not in the [short-term] elimination of nuclear weapons…

Nuclear weapons…can't be disinvented. I think the nuclear threat can be eliminated or reduced more effectively by going to a very small number of nuclear weapons, by following the [2010] *Nuclear Posture Review*, and reducing the saliency of nuclear weapons – the importance of nuclear weapons.

President Obama has said he's in favor of the elimination of nuclear weapons but it [might not happen] in his lifetime…That's what the Gang of Four really says, that they can't see the top of the mountain – which is the elimination of nuclear weapons – from where they are. But as they get closer to that goal, they'll have a better view. And so will I, except most of the Gang of

antinuclear projects such as the Bulletin of the Atomic Scientists. At the time you didn't have much sympathy for what you then viewed as "disarmer-type people." But you said you developed the respect for them that they deserved, later on. What caused the change in how you see abolition supporters?

Garwin: It was education. I really didn't know them very well. I hadn't listened to their arguments. When I got to know them, for example Joseph Rotblat of the Pugwash Movement, and others, I saw that some of these people were extremely capable and thoughtful. They had things to say. I was on the governing board of Pugwash for a short time. I worked in Pugwash workshops on nuclear weapons in Europe. I worked closely with the Soviet and eventually Russian people there, and in 1988 came up with the proposal to have 1,000 nuclear weapons on each side. That was really a big change from the 45,000 nuclear weapons the Soviets had about that time and the 35,000 nuclear weapons that the United States had deployed at its peak in 1967.

If a few nuclear weapons are good for world peace and security, that doesn't mean that 10,000 of them are better…I'm convinced there is no need for these large numbers of nuclear weapons and that the world would be a different place if we had only a relatively few – and eventually can think of some way in which we get rid of national ownership [of nuclear weapons]. I do see that the national ownership of nuclear weapons is a substantial barrier to getting to extremely low levels.

Kazel: Has the world become safer over your lifetime?

estimated that [danger] at 50% per decade, and probably I've done that for 20 years. We've worked very hard to keep this from happening. The Obama Administration has a policy, ratified at the April 2010 Nuclear Security Summit [in Washington], and in Seoul in March, to protect weapons-usable materials throughout the world within four years. That's highly enriched uranium and plutonium. I don't think we'll make that four-year goal.

Even a Hiroshima-type improvised nuclear weapon detonated at ground level in a city would kill hundreds of thousands of people. There would be a large number of people who would die from radioactive fallout within days who would otherwise be untouched by the blast and the fire.

Kazel: It sounds like you're almost resigned to the inevitability that someday this will happen to a city.

Garwin: Yes, I think it's quite probable.

Kazel: A few years ago, you wrote that America's nuclear development program was making us look bad in the eyes of non-nuclear nations and that we needed to show more "morality and consistency" to be an example to non-nuclear states. How can the U.S. show more morality and consistency?

Garwin: By greatly reducing the cost of our nuclear-weapons activity and reducing the

We need to put our nuclear reactors and enrichment plants under IAEA [International Atomic Energy Agency] safeguards – even though we have so much military-useful material, nobody in his right mind would make any more. What we ought to do is work hard on the technical means to make that inspection less expensive and less burdensome.

I think New Start, ratified [by the U.S.] in December 2010, was a good thing to do. I think working with the Russians on ballistic missile defense would be a good thing to do, to try to dispel the idea that we are building missile defense against Russia.

The Russians certainly are threatened by Jihadist groups and others. If they, too, are worried about missile attack then we ought to join with them with joint missile defense systems, work on the technology together, have some common basing and common control – but with limited goals, and not with the expectation that we will be able to defeat 100% of these threats.

Although history has assigned the nickname "father of the H-bomb" to Teller, some nuclear experts have said Garwin may be more deserving of the title. In fact, when recounting his memories of Los Alamos years later, Teller stressed that Garwin had achieved a functional design when others couldn't.

Looking back with knowledge of the nuclear age, would Garwin change his actions of 1951? If he could warn his younger self about the consequences of his groundbreaking blueprint in an effort to deter him, would he? Garwin says no. He has no regrets. He says the eventual invention of an

Moreover, if he hadn't been part of the inner circle that charted the course to Mike, Garwin says he would have had no key role in arms control debates for the rest of the century and beyond – no opportunity to help try to seal the thermonuclear Pandora's box after the U.S. had opened it.

"Scientists were of the utmost importance in achieving the various arms control agreements, including the Limited Test Ban Treaty, the Comprehensive Test Ban Treaty, and the role of the President's Science Advisory Committee under Presidents Kennedy and Johnson was particularly important," Garwin says. "Not only did scientists from the weapons programs…help to inform the public, but PSAC helped to guide the government to make decisions that were far from unanimous or obvious."

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