

10/10/2006

HOW WILL THE NUCLEAR WEAPONS STORY END?

Remarks of Victor Gilinsky

prepared for

The 10th PIIC Beijing Seminar on International Security

Xiamen

September 24-29, 2006

Everyone here knows the story of nuclear weapons. The United States developed them to protect against a possible German program, then the Soviet Union built them to match America, then Britain, France and China, and Israel, South Africa, India, and Pakistan, and most recently North Korea.¹ A competitive spiral keeps nuclear countries locked in and attracts new members to the nuclear club, slowly perhaps, but nevertheless continually. Where this will end none of us here knows. It is something to which we should pay more attention.

CAN WE KEEP THE BOMBS ON THE SHELF INDEFINITELY?

We sometimes contemplate the possibility of a worldwide nuclear breakdown, but I think we do so only on an intellectual level. We don't really believe it can happen. If we did we would behave differently. Meanwhile, there is no sign that any of the current nuclear countries are ready to give up their arsenal, and the number of nuclear bombs in the world is still in the tens of thousands.²

The subtitle of this seminar is "Harmony Makes the World Stable and Secure." In a world of so many nuclear weapons can we count on harmony to restrain use *indefinitely*? Can we rely on so-called rational behavior (so-called because it isn't always

¹ South Africa built bombs but dismantled them and joined the Nonproliferation Treaty.

² The United States and Russia have reduced their stockpiles significantly, one should note, something for which they should get more credit than they do. But they both intend to hang on to these weapons indefinitely.

10/10/2006

clear what “rational” means)? And in any case people often don’t behave in their best interests, at least not in their collective best interests, and sometimes humanity displays a self-destructive streak. Did it make sense, for example, to build more than 100,000 nuclear weapons during the Cold War?

A pressing reason to look ahead more seriously than we do is that once one country breaks the taboo on nuclear weapons use it is likely that restraints against further use will weaken. At that point, the organizing principles of the world will have to change. Our cities, our economic systems, our civil societies, will all become anachronisms.

Of course, the numbers of warheads and the dangers of a worldwide catastrophe are now reduced from what they were during the Cold War. A great deal of writing is devoted explaining how to maintain nuclear “stability” in a world of many nuclear weapons. Optimists argue that since even at the most dangerous time of the Cold War the antagonists did not use nuclear bombs, the nuclear future is “manageable.”

But to me the Cold War experience suggests a different conclusion—that the non-use of nuclear weapons since 1945 had less to do with these theories and more to do with simple human awe that made everyone hesitate to open Pandora’s Box—an awe that will not last forever. (If you remember the story, Pandora couldn’t resist opening the Box and unleashed human misery.)

We were also just plain lucky, too, especially in the early years of the Cold War. Up to the mid-1950s there were many bombs that one person had the ability to explode, and some of them were small enough for one person to carry. Fortunately, none got into the wrong hands.

10/10/2006

We were very lucky in other ways. To protect against a Soviet surprise attack, the US Air Force took to keeping some bombers fully loaded with nuclear weapons in the air at all time. Some of these planes suffered accidents and dropped their bombs. Altogether about a dozen dropped thermonuclear bombs were never found. Fortunately, none exploded. I am sure other countries had similar accidents.

THE CUBAN MISSILE CRISIS

The great nuclear crisis of the Cold War was of course the 1962 Cuban missile crisis. At that time we experienced some scenes that could have come straight out of the movie *Dr. Strangelove*. We discovered since then that the situation during the crisis was even more dangerous than it seemed at the time. I don't think we should flatter ourselves to think that we are much smarter today and that we could not get into a similar dangerous situation. Basic human nature hasn't change much in the last 40 years. One thing that surely has not changed is the cult of toughness in high-level decision-making. It is always safer to be thought "hard" than "soft." This is a problem that has been with mankind since ancient times.

One of the experiences along these lines that affected me greatly was a talk after the Cuban crisis given by a SAC major general who had led US bombers during the crisis on what he believed at the time was an attack on the Soviet Union. The general, a kind and thoughtful man, told us how difficult it was to say goodbye to his wife before his mission. He described in detail the extensive planning, the long training, and the tremendous discipline it requires. During the initial stages of the flight he had time to reflect on his orders. The crews understood perfectly that each plane carried many

10/10/2006

megatons of nuclear explosives whose use would have awful consequences. When the bombers reached a certain point in the Arctic they were to continue to their targets if they got a coded “Go” signal, and to return home if they didn’t.

The expected signal didn’t come and at the last moment the general gave the order for the planes to turn around. (What a relief, I thought.) The general drew himself up, paused, looked out across the audience, and told us that having to give the order to turn around was the most disappointing moment of his entire life.

It didn’t change my opinion of him as a good person. It did, however, give me new insight into human nature. The point I want to make is that no one, no matter how decent, can spend a lifetime training for something and not have some part of them want to apply their training, no matter how awful the consequences.

I don’t want to leave you with the impression that this is a comment on the United States or the US Air Force. It is a comment on human nature. It sometimes pulls us in the wrong direction.

WHAT ABOUT THE SCIENTISTS?

Scientists are not immune from these dangerous tendencies, either.

Just like the military want to apply their training, scientists like to see their ideas work in the real world. When the Los Alamos scientists heard of the Hiroshima explosion, many cheered. In retrospect, of course, that was a dreadfully inappropriate reaction. But it was only human nature. They weren’t cheering the deaths; they were cheering the first successful uranium explosion.

10/10/2006

The lesson we need to remember is that most people can't work on something with all their heart, not even an awful bomb, and not want to see it work. But as we know, that tendency can have unfortunate consequences.

Herb York, a former director of the Livermore Laboratory, wrote in his 1970 book, *Race to Oblivion*, that the problem of controlling nuclear weapons activities was made more difficult because those devoted to pursuing them were mostly sincere persons acting in good faith. They really believe in what they are doing. At the same time, he writes, the real motives for this work are not necessarily what they are represented to be.

The line between genuine concern for the defense of one's country and unchecked personal ambition is often unclear. The real driving force is often the sense of importance, and sometimes real prominence, that comes from working on powerful weapons.

The US and Soviet weapons scientists became powerful figures. The same is certainly true in other weapons states. Last month, for example, the Indian Prime Minister had to publicly mollify the top scientists in the Indian weapons establishment to get support for his nuclear deal with the United States. Or consider the privileged status in Pakistan of A.Q. Khan, despite all his misdeeds.

As T. S. Eliot once said, "Most of the trouble in the world is caused by people wanting to be important."

10/10/2006

THERMONUCLEAR WEAPONS

Sometimes the irresistible attraction of the weapons is scientific. Physicists, especially, are enthralled with the idea that their scribbles on the blackboard can change the world, whether it is for better or for the worse.

Robert Oppenheimer, who initially opposed the US development of the thermonuclear bomb, was ultimately won over by the Teller-Ulam idea that made it work. Oppenheimer called the idea “technically sweet.” The phrase betrays the seduction of interesting scientific problems, even if they are associated with weapons for mass killing. The same pull operated among physicists in other countries, perhaps even more strongly.

I should say that not all were seduced by this or anxious at all costs to maintain their status with the powerful. Of the famous scientists who took part in the 1950 American debate over thermonuclear weapons I am most impressed with Enrico Fermi and I.I. Rabi. When the question first came up of building the thermonuclear bomb they took a firmer stance than Oppenheimer. They said, “The fact that no limit exists to the destructiveness of this weapon makes its very existence and the knowledge of its construction a danger to humanity as a whole.” Their advice was ignored and we now live with that danger.

By 1952 the United States exploded a many-megaton thermonuclear explosion, the so-called Mike shot, on an island in the Pacific. Eventually the scientists learned to make small thermonuclear devices, too. But the main thing was the possibility of powerful warheads. The military liked big bombs for use in massive attacks because in

10/10/2006

those days bombers and missiles were highly inaccurate. You had to have high yield in order to have a high probability of destroying a target a continent away. Years later, when the accuracy of weapons was reduced by orders of magnitude, there was no corresponding reduction in weapons yields. Warhead yields remain outrageously high in all countries.

SOVIET BIG BOMB

The Soviets, too, launched a crash program on thermonuclear weapons, and eventually overtook the United States in numbers. When Khrushchev wanted a huge bomb with which to intimidate the West, a Soviet team led by Andrei Sakharov produced a 100-megaton bomb—the largest bomb ever designed or used. The Soviets exploded it in 1961 with a reduced yield of 50 megatons because anything higher would have destroyed the plane that dropped it. Sakharov got a “Hero of Socialist Labor” award for it.

I mention this because we associate Sakharov’s name with human rights, not mass destruction. Of course his role as a heroic opponent of the Soviet government came later. But the interesting thing is that when he wrote his *Memoirs* in 1990, he was still proud of designing the Big Bomb, just as Robert Oppenheimer, for all his later reflections, remained proud of having built the first bomb.

I saw a copy of the Big Bomb in the bomb museum at Russia’s Chelyabinsk 70 weapons laboratory. An Italian woman in our group asked the old laboratory director, “How could you build such a horrible bomb?” He smiled and said, “When the orders come down from the Kremlin, for some funny reason, you do it.”

10/10/2006

What I am saying is that this is only part of the story, whether in the Soviet Union or anywhere else. From my own observation it is more often the scientists and the weapons laboratories that entice the powerful with new ideas for bombs, rather than the other way around.

WHAT SHOULD ONE DO?

What about individual scientists? How is one to act? Let me say a word especially to those whose careers are ahead of them.

We have to think of our country's defense because if we don't, who will? But—to paraphrase the ancient sage Hillel—if we think *only* of our own country, what are we? There are lines we should not cross.

Each person has ultimately to wrestle himself with what is legitimate defense and what crosses the line. The important thing, it seems to me, is to bring to your work your sense of what is right, and to ask yourself: What if everyone around the world did as I do? Is that acceptable behavior? And you need to ask this *during* your professional career, when your decisions matter, not to wait until they are merely of academic interest.

HOW LONG CAN WE TICKLE THE DRAGON'S TAIL?

I bring all this up because the importance of nuclear weapons seems again to be on the increase. The stated reasons for developing them or upgrading nuclear forces have supposedly to do with national defense, but I think the factors I have mentioned—the importance it gives to the participating individuals and weapons laboratories—also plays an important role in urging governments in this direction. The governments seem to hold

10/10/2006

to the optimistic notion that they can brandish the weapons and gain psychological and political advantage without risking that the weapons will actually be used. We assume we can do nuclear shadow boxing so carefully that no one gets hurt.

This reminds me of an experiment Los Alamos scientists conducted during World War II that was called “tickling the dragon’s tail.” The aim was to determine the critical masses of nuclear explosives by tapping two sub-critical masses with a screwdriver to bring them closer together and measure the neutron count. It seemed as if you could control the dangers by moving slowly and carefully by making only very small changes. One day the experimenter’s screwdriver slipped and the two pieces got knocked too close together, and before the physicist could knock the pieces apart he got a lethal dose and died a horrible death.

We may be underestimating the world-wide dangers in the same way.