

A Discussion about Arms Control with Andrei D. Sakharov

(Talk given at the All-Russian Scientific Institute of Experimental Physics [Russia's counterpart to the Los Alamos National Laboratory] during a visit at the end of Sept. 2000)

I met Sakharov for the first time on approximately February 13, 1987. The meeting was in his apartment in Moscow. The meeting was arranged by Jeremy Stone, the President of the Federation of American Scientists, who had met Sakharov in 1975 and had helped catalyze a campaign by US scientists to free him from his internal exile in the city that was then called Gorky. We were accompanied by our wives and a translator.

Sakharov had been released from that exile and had been allowed to return to Moscow two months earlier (December 23).

I have a partial transcript of that meeting because the KGB recorded it. In fact, I have a copy of the copy that was sent by V.M.Chebrikov, then the head of the KGB, to Mikhail Gorbachev. This document was in Communist Party files that were made available to interested historians by the Yeltsin Administration.

I think that this conversation is worth discussing today for a number of reasons:

- Gorbachev's underlines reveal his level of understanding of nuclear weapons and what he was interested in knowing at a time when the debate over Star Wars, START I and their relationships were at their peak.
- At the time – as today -- there was a major debate going on about the dangers from the US Government's interest in deploying a National Missile Defense
- We were just beginning to discuss the question of how deeply it would be possible to cut US and Soviet strategic forces.

Gorbachev's underlines. My belief is that Chebrikov sent Gorbachev the transcript because there had been a bitter debate in the Politburo over the wisdom of allowing Sakharov to return to Moscow, where he would be able to speak to the foreign media again. Also, as I will discuss further below, our meeting was on the eve of two events:

1. Sakharov was going to speak out publicly on nuclear-weapons issues at an international scientists' forum on nuclear disarmament a few days later.

Sakharov had twice communicated on this subject from Gorki during 1983 when he urged the US arm-control community that it would be impossible to persuade the Soviet Union to give up its giant land-based missiles and its intermediate-range missiles aimed at Western Europe if the US did not deploy corresponding missiles: the MX and the Pershing II.

These communications were more welcome to the Reagan Administration than to the arms controllers to whom they were addressed.

The Soviet Government might have been anxious about what Sakharov would say now.

2. Sakharov was scheduled to meet with Gorbachev for the first time in the company of a group of foreigners including me. One might expect that Gorbachev could have been interested to learn what to expect from him.

Based on his underlines, it appears that Gorbachev found interesting statements comparing Soviet and U.S. nuclear forces:

- That the US believed Soviet warheads to be more powerful on average than those of the US
- That the US believed that its strategic warheads had about twice the explosive power per unit weight as Soviet warheads
- That most Soviet strategic warheads were on land-based missiles while most US strategic warheads were on submarines and bombers
- The fact that the US had begun to deploy the MX missile.

This was not sophisticated information. However, during my time in the US White House, I learned that most of what the President is told about the technical aspects of policy issues is presented at the same time that he is being asked to make a decision – and by a bureaucracy that is trying to influence that decision.

My interpretation is that Gorbachev was taking advantage of an opportunity to obtain information about the US-Soviet nuclear balance from outside of the bureaucracy.

With regard to these points that Gorbachev found of interest:

- Sakharov was sceptical that the US had any reliable basis for estimating the yields of Soviet warheads. I mentioned the seismic signals from underground tests but he responded that
"[I]t is quite possible...that the Soviet Union tested thermo-nuclear explosives with an incomplete load. It is very easy to recalculate. Simply for the sake of convenience, so that to be able to make holes less deep. It is a usual practice that tests are done with a smaller ... amount of thermo-nuclear fuel."¹
- Gorbachev also underlined a statement in which Sakharov said that he thought that foreign pressure could end a ban on Sakharov traveling abroad. However, Sakharov added that, in his view
"Such a concentrated effort [would be] disproportionate to the goal. There are numerous other issues in respect to which Soviet authorities should be pressured on."

The main parts of the discussion that the KGB thought worth passing on to Gorbachev concerned:

- The Soviet government's linkage of completion of the first Strategic Arms Reduction Treaty (START) to a Reagan Administration commitment to not proceed with the Strategic Defense Initiative; and
- The feasibility of much deeper cuts in the nuclear stockpiles.

As I have already noted, these issues are still central to our current debates over nuclear disarmament.

Sakharov, who had been isolated in Gorky for almost eight years, had developed clear views on these matters. His interest was to test these views out in private before laying them out in public.

¹ Translated by the KGB from English into Russian and back into English by one of my colleagues.

Linkage of Offensive Cuts to Continued Restraints on Defense. Stone discussed the linkage issue with Sakharov. They came in with the same view that the Soviet Union should drop this requirement. They therefore focused primarily on the question of how to persuade the Soviet government to change its position.

Sakharov described the Soviet position as follows:

"Imagine that strategic weapons have been reduced ten-fold, and that the United States has taken the SDI system into space. The SDI was ineffective against 100 per cent of Soviet ballistic missiles, but it is effective against 10 per cent. And the Soviet Union simply finds itself unarmed. Which leads to the thought that there must be guarantees that disarmament involving ballistic missiles will not be followed by the building of the SDI system. Where are such guarantees?"

Stone responded:

"When Reagan leaves office in two years, the U.S. interest in the SDI will start declining. If there is an agreement on disarmament, there will not be such expenditures."

That is, in fact, how things worked out during the Bush Administration.

Today we are in a similar situation: Russia insists that the US adhere to the ABM Treaty as a condition of implementing START II. The US – especially the leadership of the Republican majority in the Senate – insist that the US be free to build missile defenses against countries such as North Korea and Iran. Russia fears that the US will lay the basis for a much thicker defense which could reduce the credibility of a Russian retaliatory strike after a US first strike.

It is difficult to say how applicable to today's situation are the arguments that Sakharov and Stone made 13 years ago. Russian agreement to a US national missile defense would undercut domestic US opposition. This opposition is becoming stronger as the technical arguments about the ease of using light-weight decoys to deceive interceptors in space are understood by journalists and opinion makers. This parallels the process which led the Reagan Administration Strategic Defense Initiative to be ridiculed as a "Star Wars" fantasy.

I am not suggesting that Russia agree to a US National Missile Defense. However, I think the 1987 logic is applicable and Russia should seize the opportunity of US willingness to accept deep symmetric cuts while the opportunity exists. Somehow the linkage between the negotiations over missile defense and deep cuts must be broken.

National missile defense will inevitably be ineffective. The US public is once again beginning to understand this. I believe that enthusiasm for missile defense has peaked in the US.

Stability. Another subject that came up in the discussion was the impact of multiple-warhead land-based missiles on strategic stability.

Sakharov commented,

"Two circumstances - the emergence of multiple warheads and improved precision - caused a certain strategic instability."

He added in this connection that,

"The overwhelming preponderance of silo-based missiles in Soviet arsenal is of huge importance. I see the most realistic way of overcoming strategic instability in a preferential

reduction of silo-based missiles, maybe even in their replacement with mobile-launch missiles. In this case they can be mobile. And simultaneously with that what you are proposing can be done. There will be single-warhead missiles."

In fact, the START II Treaty involves a massive shift such as Sakharov envisioned away from multiple-warhead silo-based missiles.

However, START II also realized a concern that Sakharov voiced:

"[Replacing multiple-warhead land-based missiles] will require an enormous rearmament effort. This is not simply a reduction; this is a rearmament of the existing strategic forces. And rearmament will mean enormous expenditures for the Soviet Union and the U.S. Is it realistic?"

If fact, we have learned that, given Russia's current economic condition, a massive rearmament effort to START II levels is not realistic. Russia and the US have therefore agreed to make deeper cuts in a START III agreement (to 2500 warheads in the US version and 1500 in Russia's) that would be implemented on the same schedule as START II.²

However, here too, progress is frozen by Russia's linkage of US adherence to the ABM Treaty to Russian willingness to both implement the START II Treaty and conclude a START III Treaty.

Deep Cuts. We also discussed the feasibility of cuts to 2000-warhead levels (including tactical warheads.) Two Princeton colleagues and I had written an article on this possibility in *The Bulletin of the Atomic Scientists* two years before. We characterized this as a 90-percent reductions proposal because the US had approximately 20,000 warheads deployed at the time: about 10,000 short-range "tactical" warheads and about 11,000 long-range "strategic" warheads. We proposed to eliminate the tactical warheads entirely and reduce the strategic warheads to 2,000.

I described this "10-percent" proposal to Sakharov briefly and he began to ask some hard questions:

"How are estimates made for destruction that is going to take place in the Soviet Union and the U.S. for arsenals reduced ten-fold? What is going to happen next? What is considered acceptable? This is a question for political leadership. What do they consider acceptable? And it depends on what type of destruction can become an effective deterrent."

I responded:

"After the reductions proposed by us, we still will be able to annihilate each other."

Sakharov asked:

"What does it mean 'to annihilate each other'?"

I responded:

"It means to annihilate cities."

² Russia withdrew its ratification of START II in 2002 after President George Bush Jr. withdrew the US from the 1972 ABM Treaty. Negotiations on a START III were not completed but, in 2010, the US and Russia did agree on New START, which did involve cuts to less than 2000 warheads on each side.

Sakharov was skeptical and suggested our approach was over-simplified:

"The conversation is about a certain war scenario at this level. It is an issue of competence for the General Staff. It is impossible to solve it without having colossal amount of information at one's disposal. To picture a war, one should have a very specific scenario of what is going on. These scenarios can be very diverse. If we want to estimate something with a precision to a factor or two, we should analyze several scenarios taking into consideration an actual anti-missile defense, the level of civil population's protection in each country, and, in general, a great number of details which, I think, are not available to private persons.

"I have the impression that an assessment of losses for a particular scenario or even an aggregate of scenarios is a very difficult thing. I want to know what data you relied on? Who did it [assessment]? My understanding is that in order to do that there should be a big institution with thousands of researchers, computers, etc. It is impossible to do it just on a piece of paper."

I should have told Sakharov that I had some experience in this area, which taught me that sometimes the intuitions of individuals are better than the calculations of General Staffs.

But since I can't tell Sakharov, I will tell you.

My first involvement in the US nuclear debate occurred in 1974. At that time, James Schlesinger was our Secretary of Defense, and he was watching the Soviet Union begin to deploy the huge 200-ton, multiple-warhead, land-based missile that the US calls the SS-18. He believed its purpose was to give the Soviet Union the ability to destroy the 1000 US Minuteman missile silos in a first strike. He therefore urged funding for the development of a new US missile, the MX, that could similarly threaten the Soviet Union's missile silos.

One of the arguments Schlesinger made was that what he called "limited nuclear war" was thinkable even if all-out nuclear war was not.

One of the Senators from my state of New Jersey heard Schlesinger make this argument in a hearing and was skeptical. He asked Schlesinger: "How many Americans would a "limited" Soviet nuclear attack on US nuclear forces kill?"

Schlesinger responded:

"I am talking here about casualties of 15,000, 20,000, 25,000 – a horrendous event, as we all recognize, but one far better than the alternative [of all-out nuclear war against cities]."

Senator Case was amazed that one could have a nuclear war with so few deaths and asked for more details about the calculations that had been done that had produced these numbers.

It turned out that no calculations had been done but the Department of Defense undertook to do them and six months later produced a new estimate: one million deaths from the radioactive fallout from a Soviet attack on US missile silos.

Senator Case still was not satisfied, however, and asked Congress's Office of Technology Assessment to bring together a panel of experts to review the Department of Defense's calculations.

I was one of the experts who was called on because I had just carried out a study of the consequences of a reactor accident and had concluded that the official estimates of the cancer deaths from radioactive fallout were in fact vast underestimates.

In any case, the panel identified assumptions the Department of Defense calculations that were obviously wrong. After they were corrected, the calculations went up again – to 16 million – almost one thousand times higher than Schlesinger's original estimates.

I did not tell Sakharov about this experience. Instead, I told him that, based on my experience, at the 2,000-warhead level and in the absence of an effective missile defense, it was possible with existing publicly-available information about missile accuracies and warhead yields to conclude that, even after absorbing a first strike, either country would still have enough destructive power to destroy the other's cities. I added that:

"If economic and social structures were destroyed, civil defense would not help."

Sakharov went on, however, to describe considerations he felt should be taken into account in any such analysis:

"[W]hen one talks about a single world thermonuclear war, the notion of maximum acceptable damage becomes vague... Because you have to count on an insane situation which will emerge in case of war where logic becomes, let's say, distorted. I think that the principle of maximum acceptable damage cannot be formulated if one proceeds from psychology of peacetime. There is a principle of guaranteed mutual destruction."

I now realize that Sakharov understood the military mind much better than I did.

I did not have the opportunity that Sakharov had had to talk directly with military people at the highest level of the US nuclear command structure until 1988, after two colleagues and I wrote an article in *Scientific American* arguing that the US and Russia should take off alert all the approximately 2000 warheads that each keeps constantly ready for launch on warning of an incoming attack. We argued that this was both unnecessary and dangerous.

Our article attracted a considerable amount of attention. The commander of the US Strategic Command therefore invited us out to his headquarters in Omaha, Nebraska to discuss our proposal.

We learned that he considered our proposal dangerous. If the US took its missiles off alert, then Russia might be able to mount a surprise attack.

I responded that, according to our proposal, the US would still have 10 submarines at sea at any one time carrying almost 2000 nuclear warheads – each with about ten times the destructive power of the Hiroshima bomb. Would that not be enough to stop any Russian leader from thinking that a first strike on US nuclear forces could be successful?

The answer in his view was "no." I feel free to report this conversation because shortly thereafter the General held a press conference in which he publicly denounced our idea as "dangerous" for this very reason.

I have had discussions with a senior General in Russia's Strategic Rocket Force and learned that his views were similar.

Of course, Russia has somewhat greater reason for concern. It typically only has two ballistic-missile submarines at sea – not ten – and only a regiment of nine mobile missiles deployed out of

their garrisons. And Russia knows that the US is trying to track its nuclear submarines and mobile missiles.

However, I still think that both countries would be far safer if they took their missiles off what we call "hair-trigger" alert.

Nuclear Glasnost. A number of things we discussed aren't in the transcript. One was provoked by an agreement on "nuclear glasnost" that we had made with Velikhov. This agreement later resulted in the first visit by Americans to the Soviet Union's first plutonium production city, Ozersk, a laser facility at the anti-missile test site in Sary Shagan, and the famous "Black Sea experiment" in which independent US scientists were permitted to measure the energy spectrum of gamma-rays from a sea-launched cruise-missile warhead – all in 1989. When Jeremy Stone showed Sakharov the agreement that we had signed with Velikhov, he commented something to the effect that "Hell will freeze over before you visit where I worked!"

Well here I am. Hell did freeze over. But the ice is still too thin. We still have a lot of work to do to make the world safe from nuclear weapons.

I would like to finish by telling you briefly about three other experiences I had with Sakharov:

- His meeting with Gorbachev
- A suggestion he made to the Board of the International Foundation
- And a meeting about Raoul Wallenberg with Sweden's ambassador.

Meeting with Gorbachev

As I have mentioned, I was present when Sakharov and Gorbachev first met a few days after our meeting in Sakharov's apartment. When they first shook hands, Sakharov said, "Thank you for giving me my freedom and social responsibility back." Gorbachev responded, "I am glad you have linked your freedom with social responsibility."

On the way over to the meeting, I sat with Sakharov on the bus, and he told me how he had been informed that he could come back to Moscow.

Sakharov had not been allowed a telephone but one day the KGB came and installed one. A few hours later it rang. It was Gorbachev calling.

Sakharov's immediate reaction was apparently that it was not enough to free him. There were many other political prisoners. Therefore, when the Board of the International Foundation for the Survival and Development was all sitting around a large table with Gorbachev in his office, and it was Sakharov's turn to make his statement, he started,

"Mikhail Sergeyeovich, to continue the conversation we began when you called me in Gorky, I have brought with me a list of 200 imprisoned dissidents who should be set free."

Gorbachev responded that it could be destabilizing to move too quickly. But he had an aide take the list and I think all the people on it were freed soon therefore.

The International Foundation

I met Sakharov several times thereafter because we were both on the Board of the International Foundation for the Survival and Development of Humanity. Unfortunately, the foundation did not grow to be worthy of its grand title and we eventually decided to shut it down.

I recall, however, that, at one of the Board meetings, Sakharov suggested that the individual board members pay out of their own pockets for half of their travel expenses to such meetings to show that they were committed and not just interested in free travel. The other members of the Board thought that this suggestion was crazy. But I have thought about it often since. Was he correct, or were we?

Raoul Wallenberg

I remember going with Sakharov to a lunch hosted by Sweden's Ambassador to Russia. Sakharov spent much of the lunch telling the Ambassador about his efforts to determine the fate of Raoul Wallenberg, a Swedish diplomat who saved thousands of Jews in Budapest from the Nazis during World War II and had then disappeared into the KGB gulag. I was amazed that Sakharov would put so much effort into trying to help one person. But that was perhaps the secret of his greatness.

As you have gathered, Sakharov made a tremendous impression on me. Sarov is therefore a special place for me. Not so much as the birthplace of Russia's bomb but the place where Andrei Sakharov developed into what the Nobel Peace Prize committee called "the spokesman for the conscience of mankind."