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This session is on Sakharov the physicist, and it's clear that being a physicist was an extremely important part of Sakharov's life and work and indeed, the way in which he thought about things. We have three distinguished physicists to talk about Sakharov's work in physics. So I feel a little bit like Daniel in the lion's den, or a lion in a den of Daniels, to be chairing this session. I have been asked to make also a contribution of my own, but I will be brief. The question I want to raise before we turn to the other speakers is the relationship between science and politics in Andrei Sakharov's thinking about politics.

1968 was a turning point for Sakharov, when his essay *Reflections* was published abroad. He was required to quit secret research and to leave Arzamas-16, the nuclear weapons institute where he had worked for eighteen years and Sarov, the town where Arzamas-16 was located 400 kilometers to the east of Moscow, near Gorky (now renamed Nizhny Novgorod). In fact, Sakharov had begun to work on thermonuclear weapons in 1948, two years before moving to Arzamas-16. He was drawn into a group that was created in Moscow to investigate the possibility of the hydrogen bomb, in response to information that Klaus Fuchs had passed to Soviet intelligence. The group was headed by Igor Tamm, Sakharov's mentor. There was another group that had access to the secret material out of Arzamas-16, and that was headed by Yakov Zeldovich.

In 1968, after publication abroad of *Reflections*, Sakharov is told that he cannot continue to work or live in Arzamas-16. 1968 is a break in his life, but Sakharov doesn't repudiate what he had done earlier. He maintained until the end of his life that the work on nuclear weapons had been justified by the need to create a counterbalance to American nuclear might. 1968 was an important date in his life, but it wasn't a conversion on the road to Damascus; it wasn't some blinding light which led him to repudiate what he had done earlier.

In the 1950s and 1960s, even when he was working on nuclear weapons, Sakharov had shown considerable independence of mind and civic courage on matters to do with science, education, and nuclear testing. He lobbied within the government for a cessation of atmospheric testing. A turning point was his reaction to the 1955 first test of a two-stage thermonuclear weapon, which he had played a key role in designing. In one of the accounts he gives of his reaction to that test, he said, "I experienced a range of contradictory sentiments, perhaps chief among them a fear that this newly released force could slip out of control and lead to unimaginable disasters. The deaths

of the little girl and the soldier heightened my sense of foreboding. I did not hold myself personally responsible for their deaths, but I could not escape a feeling of complicity.”¹

In the mid-1960s, Sakharov expanded the scope of his activities, signing a collective letter opposing the rehabilitation of Stalin and Stalinism, another collective letter protesting a new law against dissidents that was being drafted, and writing the first of many letters to Brezhnev on behalf of those suffering from political repression.

Of course, after 1968, Sakharov becomes a public figure; he expands the range of his concerns still farther, directing increasing attention to the support of individuals who are facing trial and imprisonment for exercising their rights. And he recognized, as he later put it, that human rights and an open society are fundamental to international confidence, security and progress. Their new importance in Sakharov's thinking was reflected not only in the help he tried to give to particular individuals but also in his public statements. The concerns that are dominant in *Reflections* -- environmental degradation, nuclear danger, the problems created by the scientific-technical revolution -- are increasingly complemented by his concern about human rights. The title of his Nobel Prize speech, "Peace, Progress, and Human Rights" is an obvious reference to the 1968 essay but also indicative of some broadening of concern.

This raises a question about Sakharov's life. There is continuity here, but can one point to a deeper continuity between building nuclear weapons capable of killing millions of people and the struggle to defend the rights of individuals, between creating weapons to sustain the Soviet state and then espousing and advocating principles that lead to the dismantlement of that state. Of course, there are a number of answers but one important element of continuity is provided by Sakharov's conception of science, and the relationship between science and politics. I think in that respect, the opening lines of his 1968 essay are revealing. Sakharov writes that “My views were formed in the milieu of the scientific and scientific-technical intelligentsia, who were very concerned about the future of mankind. Their concern is all the stronger because the scientific method of directing politics, the economy, art, education and military affairs has not yet become a reality.”² What does Sakharov mean by "scientific method" in this context? His answer was, "We consider scientific that method which is based on a profound analysis of facts, theories and views, presupposing unprejudiced and open discussion and which is dispassionate in its conclusions.”³ In other words, Sakharov is invoking science, the scientific community really, as a model of politics, of a politics grounded in reason.

¹ Andrei Sakharov, *Memoirs*, Alfred Knopf, 1990 pp. 193-194.

² Andrei Sakharov, *Sakharov Speaks*, Alfred Knopf, 1974, pp. 56.

³ Ibid

Of course, it was natural for someone in the Soviet Union to appeal to science as a model for politics since the Communist Party claimed authority to rule by virtue of the fact that it was guided by a scientific theory. One could argue also Sakharov's approach was a reflection of, or continuation of, the struggle against Lysenkoism, in which Sakharov played a very important part in the 1960s.

An article published in 1965 or 1966 asserted that with Lysenko gone what was needed was the argument of power to be replaced by the power of argument, the reason of power to be replaced by the power of reason. Maybe politics can become a more reasoned politics.

I think it's also not surprising that a Russian physicist made the argument most forcefully, given the prestige and relative intellectual freedom that physicists enjoyed in the Soviet Union, thanks in large measure to their work on nuclear weapons. But Sakharov's idea of scientific politics was of course very different from the Communist Party's conception of scientific communism. It's not a matter of devising instruments for controlling society; it's rather an invocation of science as a model for civil society. So the model of politics Sakharov draws from science, is eventually that of a state guided in its policies by civil society -- or more specifically, by a public opinion formed in the process of reasoned debate and discussion. This, of course, is linked to democracy, but it's also actually rather a particular vision of democracy. It's a classic conception of politics, the argument that the exercise of power in these circumstances is no longer the mere expression of the sovereign's will, or in the Soviet case, the Party leadership's will, but is grounded, like science, in reason.

I find it striking that Sakharov comes to this idea of civil society, which was so important in Eastern Europe in the 1970s and 1980s as a concept for thinking about strategies to weaken the state or to bring the state under popular control, and Sakharov derives this idea from his science. This conception of politics is, I believe, central to Sakharov's activities. In his Nobel lecture he wrote, "Progress is possible and innocuous only when it is subject to the control of reason."⁴ The important problems involving environmental protection exemplify the role of public opinion, the open society, and freedom of conscience. Similarly, disarmament requires trust between states, and trust is possible only with openness in public life.

In this context, human rights were a key issue, because only if free speech, freedom of assembly, and freedom of conscience are guaranteed do you have the conditions needed for the kind of open debate and discussion that you need to devise sensible policies to deal with the great challenges facing the human race.

Human rights are, of course, important and valuable in themselves for reasons of justice and morality, but in his writings, Sakharov also showed that they are linked with the great issues that

⁴ Andrei Sakharov, *Alarm and Hope*, Alfred Knopf, 1978, p. 9.

face the human race -- peace, progress, sustainability and so on. In fact, the effective protection of human rights is a precondition for addressing those issues.

So that's the link that I see between Sakharov's defense of individual victims of repression, his stress on the importance and value of human rights, and his concern about our capacity to deal with the enormous challenges that face us, some of those challenges themselves being the product of scientific and technical progress.