80 years since Hiroshima – Nuclear Threat and Scientific Responsibility

Speech of the President of the Max-Planck-Gesellschaft

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Welcome to our first Hahn-Meitner-Forum! Last year, I could visit Hiroshima. It was a bright morning when I walked together with Vice President Christian Döller under the blooming cherry trees. We reached the stone arch of the memorial, which frames the haunting ruins of the Atomic Dome – the only building to endure the blast of August 6, 1945. In an instant, 70,000 lives were lost. When you enter the Peace Memorial Museum, the story of nuclear destruction unfolds – and at its beginning, we meet two familiar faces: Otto Hahn and Lise Meitner. You can see the famous photograph right in front of you.

Dear colleagues,

Let us remember: In the fall of 1938, just a few hundred meters from here, Otto Hahn and Fritz Straßmann made a groundbreaking discovery of nuclear fission. Lise Meitner, who had fled to Stockholm, was their close collaborator. All three of them worked at the Kaiser-Wilhelm-Gesellschaft, our predecessor organization. Otto Hahn would later become the first president of the Max Planck Society. This history binds all of us to the legacy of the atomic age – and also to Hiroshima.

In January 1939, Hahn and Straßmann reported that bombarding uranium with neutrons produced the lighter element barium. Soon afterwards, Meitner and her nephew Otto Frisch published their interpretation of this phenomenon that they named “nuclear fission”. They also pointed out that this process released enormous amounts of energy, which carried the risk of destructive use.

In the same year, on August 2, Albert Einstein signed a letter to U.S. President Roosevelt, pointing out the possible construction of a new type of weapon based on nuclear fission. Eventually, this letter led to the Manhattan Project, which pursued the development of an American atomic bomb. In December 1942, Vannevar Bush recommended that the U.S. government build industrial-scale facilities for isotope separation and plutonium production in order to overcome the key challenges involved in building an atomic bomb. On July 16, 1945, a bomb codenamed “The Gadget”

was tested in the New Mexico desert. A few weeks later, on August 6, “Little Boy,” a bomb based on uranium-235, was dropped on Hiroshima. Just three days later, the plutonium bomb “Fat Man” destroyed the city of Nagasaki.

During this time, ten German nuclear scientists were interned at Farm Hall near Cambridge in England. Among them was Otto Hahn who heard about the bombing on the BBC evening news. He was deeply shaken and felt responsible for the deaths of tens of thousands of people. At dinner, he told his colleagues that he was grateful that Germany had not succeeded in developing an atomic bomb. In his diary, he wrote: “I am now glad that we had no means of developing a bomb...”. The evaluation of the Farm Hall wiretap transcripts by Dieter Hoffmann shows that the German physicists knew how an atomic bomb could have been built. The reason this did not happen in Germany was that the construction of such a weapon was not considered realistic within the time frame that was decisive for the war.

After World War II, it was often emphasized that German scientists had only been working on a “uranium machine,” a reactor for energy production. Indeed, attempts were made to build such a model uranium reactor in 1940 and 1941, also just a few minutes' walk from here, at the Kaiser Wilhelm Institute for Physics. But U.S. historian Mark Walker has shown that this is only part of the truth. In Germany, there were indeed trials to enrich uranium-235 using centrifuges. Also, Carl Friedrich von Weizsäcker filed a patent in June 1941 describing a new transuranic element that was later named plutonium. And in June 1942 – here in the Harnack House – Heisenberg mentioned to Albert Speer and other Nazi leaders that plutonium could be obtained with a uranium machine. Otto Hahn investigated the decay products of nuclear fission and was thus involved indirectly in the German uranium project.

Of course, August 6, 1945, was a historic turning point. After the bomb was dropped on Hiroshima, scientists spoke out against nuclear weapons. Even Robert Oppenheimer, the head of the Manhattan Project, spoke of the most destructive, inhuman, and arbitrary of all weapons. And when the U.S. press celebrated Lise Meitner as the “mother of the atomic bomb,” she found this hurtful. Indeed, she refused to participate in the Manhattan Project. Throughout her life, Meitner advocated for the peaceful use of nuclear energy.

In 1955, initiated by Otto Hahn, sixteen Nobel Prize winners signed the “Mainauer Kundgebung” warning against the use of nuclear weapons. And Einstein, just a few days before his death, signed a declaration initiated by Bertrand Russell, which warned against the use of nuclear weapons. When the Nuclear Research Center in Karlsruhe was founded in 1956, it was given a civil clause. And when the Adenauer government thought about obtaining nuclear weapons for the Federal Republic of Germany in 1957, 18 leading physicists protested with the “Göttingen Declaration” stating they would not “participate in any way in the manufacture, testing, or use of nuclear weapons.” Among the signatories were Hahn, Heisenberg, and von Weizsäcker, who was a driving force behind this initiative.

Weizsäcker once said: “We have to live with the bomb.” Today, this seems harder than ever. Harvard professor Matthew Bunn even warns that the danger of nuclear war is nowadays higher than it has been since the Cuban Missile Crisis. Currently, nine countries possess nuclear weapons. Since 1955, the number of nuclear warheads has increased tenfold. China increases its number of nuclear warheads from 300 to 1,000 by 2030. Relying on the shield of nuclear

weapons, the Russian president continues to violate international law. And North Korea has threatened South Korea with nuclear weapons, provoking a response by former U.S. President Biden that North Korea could be “wiped out” if it launched a first strike.

All of this must worry us greatly, because research has shown that the use of these weapons can result in a nuclear winter, global famine, and ozone depletion, endangering the human race as a whole. And what is so scary: We are only a few decisions away from this apocalypse, decisions that will be made by individuals under enormous pressure and in a very short time. According to the strategy of “launch on warning”, a counterstrike is launched as soon as the early warning system reports an attack. This carries an extreme risk of escalation, as a misinterpretation may lead to global catastrophe within minutes.

Dear colleagues,

Hiroshima reveals the fundamental ethical dilemma of science. Hahn was engaged in basic research. He wanted to extend the periodic table and was searching for transuranic elements. But in doing so, he unexpectedly stumbled upon nuclear fission and thus the possibility for an atomic bomb. And once the idea of a bomb was out there, it was put into practice. It was military ambitions that motivated the enormous investments in the Manhattan Project. But it was also the same project that laid the foundation for the later civilian use of nuclear energy. In this respect, the example of nuclear fission illustrates in a dramatic way what is often referred to as “dual use.”

However, and this is very important to me: Scientific discoveries are neutral in value, even though they often open up both civilian and military possibilities. In hindsight, the intentions of those involved – whether the search for knowledge, military strategy, or economic interests – become irrelevant with respect to the actual results in the real world. Essentially every new piece of knowledge can be used in different ways. In view of this ambivalence, I suggest we abandon the term “dual use.” New knowledge will always enter the world – and will always be used in different ways. The crucial question is therefore not “dual use – yes or no?” but it rather is: How do we handle knowledge responsibly?

Today's event is intended as the start of a broader discussion that we should be having within the Max Planck Society and in the scientific community as a whole. Which role should science play with respect to our security nowadays? The question of “intentional” research into security-related matters arises anew today – and touches the very core of our identity. So how do we find answers to this question? On the one hand, we must preserve our autonomy and academic freedom. On the other hand, many of us feel a responsibility to contribute to security. In 2010, the Max Planck Society adopted guidelines for the responsible handling of research risks and freedom of research. In the spirit of these guidelines, we do not discriminate against colleagues who wish to carry out a project related to defense, but we also do not discriminate against those who refrain from it.

I would like to discuss what the so-called “Zeitenwende” means for us, what it means for science. Should we advance security-related research - for example, through spin-offs and industrial collaborations? Should we advocate for parts of the defense budget to be allocated to security-related research projects? Should we stay largely out of defense research? Should we establish new research groups in the fields of conflict research and ethics? What does this turning point mean for you, dear colleagues? I am looking forward to our discussion.

Before I hand over to the panel, I would like to briefly return to my visit to Hiroshima. What I saw there applies to all wars: behind the large numbers of victims are the fates of individual human beings. In Peace Park, a statue commemorates Sadako Sasaki, the most famous Hibakusha. The little girl survived August 6, 1945, but ten years later she developed leukemia. Inspired by an old legend, Sadako folded a thousand small paper cranes. Her wish for healing did not come true, but the crane became a symbol of Nihon Hidankyō, the Hibakusha peace movement, which tirelessly warns against nuclear weapons and received the Nobel Peace Prize last year. In this spirit, many Nobel Laureates signed the Lindau Declaration last year, calling on the international community to commit to never using nuclear weapons again. Thank you for your attention.