Cold War particle-physics collaborations FREE

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them to the train station in Madison for shipment.

We were ready at Pukapuka, but the weather wasn't. Clouds prevented most of the observers from getting data, although the rocket launches from the ship deck were successful.

Later on, in the 1960s, I served as the program director for Solar Terrestrial Research at NSF while on leave from Los Alamos National Laboratory. And in 1973 NSF approved a grant for my study of the total solar eclipse over Africa aboard a prototype Concorde, whose supersonic speed allowed 74 minutes of observing the Sun's corona.

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Milutin Milanković's time in Serbia

In their article "Physics in the former Yugoslavia: From socialist dreams to capitalist realities" (PHYSICS TODAY, August 2019, page 30), authors Mićo Tatalović and Nenad Jarić Dauenhauer wrote that "Although the region gave the world these eminent physicists"—referring to Jožef Stefan, Andrija Mohorovičić, Milutin Milanković, Nikola Tesla, and others—"all of them worked abroad." For Milanković, at least, that statement may mislead readers: Although he did work abroad, he spent most of his scientific career in Serbia.

Milanković (1879–1958) is best known for discovering the Milankovitch cycles, changes in climate driven by variations in insolation at midlatitudes caused by changes in Earth's orbit over tens of thousands of years. He studied engineering at the Technical University of Vienna and earned his doctorate there in 1904 with a thesis on reinforced concrete, a new material at the time. He worked in Vienna until 1909, when he accepted the chair in applied mathematics at the University of Belgrade. There he taught mechanics, celestial mechanics, and theoretical physics and developed his astronomical theory of climate.

Milanković was on his honeymoon in 1914 in his hometown of Dalj, in Croatia, part of the Austro-Hungarian Empire, when the empire declared war on Serbia in July. A Serbian citizen, Milanković became a prisoner of war. Due to pressure from Austrian scientists, he was released on Christmas Eve 1914, and he was offered two choices, to live in Vienna or in Budapest. He chose Budapest because, as he noted, "in Vienna everybody was starving." He returned to Belgrade in March 1919 and remained there until his death in 1958.

Milanković vividly recorded the above details in his extensive diaries, which the Serbian Academy of Sciences published in the 1950s. A small part was translated from Serbian into English by his son, Vasko, in *Milutin Milanković 1879–1958*, published in 1995 by the European Geophysical Society.

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Gerson Sher's book *From Pugwash to Putin*, reviewed by Rebecca Charbonneau in PHYSICS TODAY's May 2020 issue (page 56), captures his experience as an NSF coordinator and sometime participant in US–Soviet scientific collaborations. But his telling omits significant other Cold War–era US–Soviet collaborations and participants—in particular, the entire area of particle physics.

One major participant was Wolfgang Panofsky, the force behind the creation of SLAC and its first director, an internationally known leader in particle physics, and a highly regarded adviser to policymakers in Washington, DC. Panofsky wrote of his role in international collaborations in his memoir, *Panofsky on Physics, Politics and Peace: Pief Remembers*, published in 2007, the year in which he passed away. In his book, Panofsky describes a trip to the Soviet Union in 1956—a year before the first Pugwash conference—when he and 14 other scientists were invited to tour a number of high-energy-physics laboratories. He writes that the visit initiated "a new era of communications in high-energy physics." It was during that trip that he met Gersh Budker, which initiated years of scientific collaboration between the two.

The next major step in particle-physics collaboration came in 1970: a joint high-energy-physics experiment at the Institute for High Energy Physics (IHEP) in Protvino, about 100 km south of Moscow. Darrell Drickey of UCLA and Edouard Tsyganov of the Joint Institute for Nuclear Research (JINR) led the project (see PHYSICS TODAY, September 1970, page 18). I was a young postdoc in the UCLA contingent, which included six scientists and their families, several with young children. The Soviet group included Russians, Uzbeks, Poles, and a Romanian. We Americans lived in Protvino for six months, working through the long Russian winter, forming friendships, and creating indelible memories. Some of the participants got together a few years later at Fermilab to repeat the experiment.

The joint scientific endeavor was in the spirit of détente a full two years before Richard Nixon's 1972 meeting with Leonid Brezhnev, which Sher refers to as the start of détente. At the time, the IHEP proton accelerator was the highest-energy machine in the world, and the Soviets were keen to provide visibility for their scientific achievement and the science city constructed to house workers and guests.

As a junior member of the US group, I was not party to the behind-the-scenes negotiations to create the collaboration, which the 1970 PHYSICS TODAY report describes as a years-long effort between the US Atomic Energy Commission and the USSR State Committee for the Utilization of Atomic Energy. I was told at Panofsky's memorial symposium at Stanford University in 2010 that he also was involved.

The story behind the UCLA–JINR partnership and the topic of US–USSR particle-physics collaborations would have added an important piece to the history that Sher endeavors to cover in his book.

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