

The suspected spy who might have won a Nobel

Half-Life

The Divided Life of Bruno Pontecorvo, Physicist or Spy

Frank Close

Basic Books, 2015. \$29.99 (384 pp.).

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Reviewed by Spencer Weart

Italian-born physicist Bruno Pontecorvo was the protagonist in one of the most fascinating and enigmatic tales of the atomic era. Handsome, charming, and ebullient, he worked in Canada and the UK on secret nuclear reactor projects before disappearing, along with his wife and children, in 1950. Most people supposed that Pontecorvo had been spying for the Soviet Union and defected before he could be arrested. Five years passed before the Soviets revealed that he had indeed fled into their arms. Had Pontecorvo lived a secret life as a spy since the mid 1940s? Or, as McCarthyism closed in, had he simply left the West for what he felt would be a better scientific environment? In *Half-Life: The Divided Life of Bruno Pontecorvo, Physicist or Spy*, physicist Frank Close can conclude only that the spying is likely but not proven.

The scion of a wealthy, liberal Jewish family, Pontecorvo studied physics at the Sapienza University of Rome. In 1934 he became the youngest member of Enrico Fermi's nuclear research team there. Fermi and his team discovered that slow-neutron bombardment can induce radioactivity; Pontecorvo, who had been part of the group for only a few months, shared some of the credit. In 1936 the young physicist moved to the research group led by Frédéric Joliot-Curie and Irène Joliot-Curie in Paris, and there he remained, probably in response to the Italian regime's growing anti-Semitism. The Joliot-Curies and their circle, like many European antifascists, were deeply engaged with

members of the Communist Party. Pontecorvo was swept along and in 1939 secretly joined the party.

In 1940 Pontecorvo and his family made their way out of France, one step ahead of the Germans. He wound up in Canada and became an important figure in the Anglo-Canadian project to build a heavy-water-moderated reactor. He then spent some time doing cutting-edge work on muon decay and related subjects before moving to the UK in 1949 to continue developing reactors.

The following year, in the wake of Klaus Fuchs's confession that he had spied for the Soviets, frantic US agencies began taking a closer look at atomic scientists. They started to uncover Pontecorvo's Communist sympathies. That came to the attention of Kim Philby, a double agent high in the British intelligence service. Close hypothesizes that Philby

informed his Soviet masters, who then took steps to extract Pontecorvo. But exactly what led to the physicist's defection remains obscure. If he did act as a spy, the information he possessed would have been useful but not of grave importance.

Pontecorvo and his family wound up in the Soviet nuclear research center in Dubna. Close suspects that Pontecorvo served as a consultant on the Soviet hydrogen bomb program, but evidently, the main thrust of the physicist's work was pure research on subnuclear particles. He had been fascinated by neutrinos ever since his days as Fermi's student, and in Dubna he made a number of significant theoretical contributions.

Among other discoveries, Pontecorvo is credited with recognizing the existence of two separate types of neutrinos, one associated with electrons and the other with muons; the concept was originally suggested by Gerald Feinberg. With Vladimir Gribov, he predicted the way neutrinos oscillate between the two different types. Close argues that had Pontecorvo been alive in 2002—he died in 1993—he might have received a share of that year's Nobel Prize in Physics for his theoretical work on neutrino oscillation.

Because of his confinement in the Soviet Union, where publishing and experimental opportunities were limited, his work was not widely disseminated.

There are also elements of the tragic in Pontecorvo's life. His wife, unable to adapt to life in Dubna, spent long periods in a sanatorium, and Pontecorvo eventually realized that his faith in Communism had been a miserable mistake.

In addition to covering Pontecorvo's career, Close does an excellent job of explaining the science and history of nuclear and particle physics at a level appropriate to the general reader. Most of the story has been told before, notably in Simone Turchetti's *The Pontecorvo Affair: A Cold War Defection and Nuclear Physics* (University of Chicago Press, 2012), which gives less attention to the physics and more to the machinations of spy agencies and governments. Close has brought several new source materials to bear, and his book now stands as the most complete and readable biography of a remarkable individual and his extraordinary response to extraordinary times.

Falling Behind?

Boom, Bust, and the Global Race for Scientific Talent

Michael S. Teitelbaum

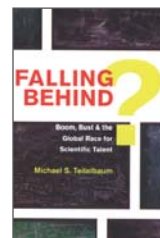
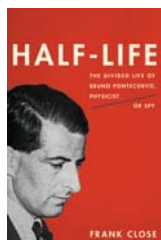
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The US will soon have a large oversupply of scientists. Or maybe it will have an undersupply. American graduate education is failing, and research accomplishment will soon decline. Or maybe the opposite is true. If you read any of the many reports whose distinguished panels of authors say one or another of those things, you had better also check the citations to determine whether the methodology behind the claim has any validity.

One recent and illuminating contribution to the discussion is *Falling Behind? Boom, Bust, and the Global Race for Scientific Talent* by Michael Teitelbaum, a senior research associate in the Labor and Worklife Program at Harvard Law School. The book provides a clear, documented, and readable account of the many booms and busts in the number



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