

A Cold War Puzzle Persists¹

**Simone Turchetti, *The Pontecorvo Affair: A Cold War Defection and Nuclear Physics*
University of Chicago Press 2012, 292 pp**

Istvan Hargittai

I was a teenager in Hungary when I first heard that the nuclear physicist Bruno Pontecorvo had defected from the West to the Soviet Union. The communist press praised his defection as a testament to the superiority of Soviet science and Soviet life, but to us it was a great puzzle, and it has remained one for more than 60 years. His action was unique -- no other well-known scientist ever defected from the West to the East -- defections in the opposite direction were less extraordinary.

The latest attempt at fathoming his actions is *The Pontecorvo Affair*. Written by the University of Manchester historian Simone Turchetti, the book provides an informative account of Pontecorvo's life up to his defection. Although it does not offer an unambiguous explanation for the event itself, it does go some way towards satisfying the historian's curiosity about Pontecorvo's motivations. Curiosity about the second half of the physicist's life, however, is left entirely unsatisfied, as the book more or less avoids discussing how he adapted to life behind the Iron Curtain.

Pontecorvo's early years contained little indication of the turmoil that would befall him later in life. He was born on 22 August 1913, near Pisa in Italy. His was a large and well-to-do Jewish family, composed of entrepreneurs and intellectuals. Young Bruno was good at tennis and science, and he became a member of Enrico Fermi's exceptional team in the Physics Department of the University of Rome while still a teenager. He would remain in the group for five years, gaining experience in looking for applications of the fundamental discoveries being made there.

Perhaps the most remarkable event during his tenure in the Fermi group was the 1934 discovery of slow neutrons, which would have far-reaching consequences for world history and for Pontecorvo personally. The discovery yielded both a patent and a research paper by a stellar group of authors, including two future Nobel laureates, Fermi in 1939 and Emilio Segrè in 1959 (1935 E Fermi, E Amaldi, O D'Agostino, B Pontecorvo, F Rasetti, E Segrè, "Artificial Radioactivity Produced by Neutron Bombardment, Part II", *Proc. Royal. Soc. Lon. Series A* **149** 522-558), and it is unfortunate that Turchetti does not cite the paper in his book.

In the early 1930s, Italian Jews like Pontecorvo experienced relatively few problems from the country's fascist government. During the second half of the decade, however, Mussolini began to adopt Germany's anti-Semitic policies, which had previously been alien to Italian society. In 1936, Pontecorvo responded to the increased tensions by

¹ Physics World 2012, August: 44-45

moving to Paris. There he worked with Frédéric Joliot-Curie, and he also became politically aware for the first time, in concert with several of his relatives who were already card-carrying members of the communist movement.

In 1940 Pontecorvo and his family emigrated again, this time finding refuge in the US from the advancing Nazis. He got a job in Tulsa, Oklahoma, using his expertise in nuclear physics to develop novel technologies for oil exploration. Eventually, his acumen proved equally useful in prospecting uranium -- the crucial raw material for producing atomic bombs. His next move came in 1943, when he became a member of the British-Canadian efforts to build a nuclear reactor at Chalk River, Ontario. The reactor reached criticality in 1947, and in 1948 Pontecorvo moved for a fourth time, this time to Harwell, England, where he began working for the UK Atomic Energy Research Establishment.

By the time he arrived in Harwell, two developments were causing Pontecorvo increasing worries. One was an intensifying investigation by the US and UK security organs into his associations with friends and family members who were involved in communist politics. The other was an unsettled compensation claim that the holders of the slow neutron patent had lodged against the US government. As Turchetti describes, the complex legal proceedings of the patent dispute put Pontecorvo and his colleagues in the spotlight that made Pontecorvo increasingly uncomfortable.

His troubles culminated in the summer of 1950. It was in many ways a peculiar year, one that witnessed US President Harry Truman's decision to go ahead with the development of the hydrogen bomb; the unmasking of Klaus Fuchs as a Soviet atom spy in the UK; the start of the Korean War; and the development of McCarthyism in the US. All of these events conspired to make Pontecorvo's communist connections appear a considerably heavier burden than they had been just a few years before. Under pressure from these developments -- and maybe something else that we are still not aware of -- Pontecorvo cracked, and he fled, together with his family, to the Soviet Union.

Turchetti gives a meticulous account of Pontecorvo's movements, his excellence in nuclear science and its applications, and the fate of the patents filed by Fermi and colleagues in the US. He also offers some useful insights into what may have been Pontecorvo's value to the Soviet Union as a scientist. In addition, he demonstrates how both British and American authorities attempted to make Pontecorvo's flight appear to represent a next-to-negligible breach in national security.

Ultimately, however, we are still left with an uncertain picture of the motivations that led to Pontecorvo's decision to flee. There is also very little about Pontecorvo's life in the Soviet Union; it is not promised, to be sure, yet the absence of any real analysis of this period inevitably leaves the reader with a void. There are some hints that Pontecorvo was much appreciated by the Soviets, though Turchetti mistakenly states that Pontecorvo had an honorary membership in the Soviet Academy of Science (p. 180). The "honorary" designation would have implied being a foreigner, whereas Pontecorvo became a Soviet citizen, and in 1958 he was elected corresponding member of the Science Academy and in 1964, full member—the pinnacle in Soviet scientific life. He enjoyed the perks and privileges of the highest echelon of Soviet society to the end of his life. He died in 1993. His name does not figure prominently among the movers of the Soviet nuclear projects—the impression is that to the end he was to some extent kept in the shadow.

There are some trivial inaccuracies in the book that are disturbing. Here is a sampler: Brien McMahon was not a member of the US Atomic Energy Commission (p. 109); rather, he was a US senator much involved in legislation of nuclear matters. William Borden was not the prosecutor in the Oppenheimer case (p. 130), but the author of an accusatory letter against Oppenheimer. The US decision in 1950 to develop the hydrogen bomb did not impel the Soviets to follow suit (p. 185); they had already embarked on this path. The book *The Vavilov Affair* did not have two authors, Mark Popovski and Mark Aleksandrovich (p. 273); the author was Mark Popovsky and his patronymic was Aleksandrovich.

Readers of *The Pontecorvo Affair* will find that the book boosts their appreciation of the importance of Fermi's group and of Pontecorvo's work in applied nuclear physics. Turchetti offers a good account of Pontecorvo's later discoveries and contributions, including his work in prospecting, and vividly conveys the difficulties that he and other inventors encountered in their efforts to be compensated for patents that were amply utilized for defense purposes. His description of how Western security organizations attempted to belittle the significance of Pontecorvo's flight, hints that the Soviets were not the only experts in the art of propaganda. Turchetti shows meticulously Pontecorvo's movements leading to his flight to the Soviet Union, but much less his motivations. The result is that we are still not clear on the complete picture of Pontecorvo's defection, though, thanks to this book, our ignorance has now reached a higher level of sophistication than before.