books

The Hungarian influence in US physics

The Great Escape
Nine Jews Who Fled Hitler and Changed the World

Kati Marton
Simon and Schuster, New York, 2006. $27.00 (271 pp.). ISBN 978-0-7432-6115-9

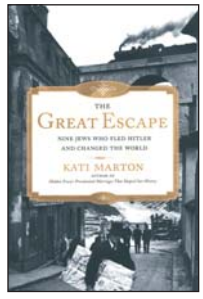
The Martians of Science
Five Physicists Who Changed the Twentieth Century

István Hargittai
Oxford U. Press, New York, 2006. $34.50 (313 pp.). ISBN 978-0-19-517845-6

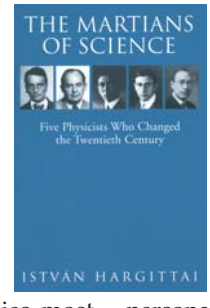
Reviewed by Barton J. Bernstein

Aeronautical engineer and physicist Theodore von Kármán (1881–1963); physicists Leo Szilard (1898–1964), Eugene Wigner (1902–95), and Edward Teller (1908–2003); and mathematician and physicist John von Neumann (1903–57) were a group of stunningly intelligent émigré scientists in the US. All were born Jewish, were reared in Budapest, received significant higher education in Germany, and faced substantial anti-Semitism in Europe. Because of their originality, they were sometimes playfully treated as though they were from another planet. By about the late 1940s, the five were respectfully and puckishly called Martians, a term that von Kármán himself may have first applied to them.

Today, not many laypeople know how the five Martians helped to shape science and technology in the modern world: von Kármán and his contributions to jet planes and rocketry; Teller, to thermonuclear weapons; von Neumann, to computers; Szilard, to nuclear chain reactions and fission; and Wigner, to nuclear reactors. In various ways, the Martians maintained an emotional distance difficult to bridge but not hard to discern. A biographer who wants to explore the accomplishments and personalities of each faces substantial interpretive problems. When the men are written about collectively, those problems increase.



Various essays and books have already dealt with each Martian. *The Universal Man: Theodore von Kármán's Life in Aeronautics* (Smithsonian Institution Press, 1992) by Michael Gorn is a brief, uncritical biography. *Genius in the Shadows: A Biography of Leo Szilard, the Man Behind the Bomb* (C. Scribner's Sons, 1992) is a thoughtful, admiring account by William Lanouette and Bela Silard, Leo's brother. Wigner has not been the subject of a book-length biography. His published recollections were largely written by an assistant and apparently finished when Wigner had dementia. Von Neumann evoked an unfriendly critical study in Steve Heims's *John von Neumann and Norbert Wiener: From Mathematics to the Technologies of Life and Death* (MIT Press, 1980), praise in Norman Macrae's *John von Neumann* (Pantheon, 1992), and a detailed volume in Herman Goldstine's *The Computer: From Pascal to von Neumann* (Princeton U. Press, 1972).



Shortly before his death, Teller produced a self-serving volume with his longtime, admiring aide, Judith Shoolery, *Memoirs: A Twentieth-Century Journey in Science and Politics* (Perseus, 2001). He has also been the subject of critical studies, most notably by Gregg Herken in *Brotherhood of the Bomb: The Tangled Lives and Loyalties of Robert Oppenheimer, Ernest Lawrence, and Edward Teller* (Henry Holt, 2002; see the review in PHYSICS TODAY, May 2003, page 59) and by journalists Peter Goodchild in *Edward Teller: The Real Dr. Strangelove* (Harvard U. Press, 2004) and William J. Broad in *Teller's War: The Top-Secret Story Behind the Star Wars Deception* (Simon and Schuster, 1992).

Two new books have contributed to the growing literature on the Martians. Kati Marton's *The Great Escape: Nine Jews Who Fled Hitler and Changed the World* discusses four of the scientists (excluding von Kármán) and five other Hungarian émigrés in an often glib but seldom deep volume. István Hargittai's *The Martians of Science: Five Physicists Who Changed the Twentieth Century* explores more deeply the lives and work of all five Martians.

Marton, a best-selling author and broadcast journalist, boldly decided to write a volume on nine émigré Hungarian Jews from Budapest, her native city. By various routes the members escaped Adolf Hitler's anti-Semitic bloodbath and carved out careers in the West. Marton's chosen group, in addition to the four Martians, includes author Arthur Koestler, film producer Alexander Korda, film director Michael Curtiz, and photographers Robert Capa and André Kertész.

Marton, also Jewish, did not discover her heritage until more than 20 years after she immigrated to the US in the late 1950s at about age 8. Her wide-ranging volume is evocative, poignant, and emotionally sensitive. Unfortunately, the book is slim on research, careless about evidence, and riddled with typographical errors. Nonetheless, she tells good stories and often perceptively recognizes the psychological bleakness beneath the surface in many of the émigrés.

Marton's book has the richness of a deeply moral and personal engagement by someone of a later generation who, by studying her subjects, still seems to be trying to come to grips with being Jewish from Budapest and immigrating to the US. Unfortunately, her work is often naive. She uncritically trusts interviews and most memoirs. Strangely, she also avoids using the key collections of papers by Szilard, Wigner, and Teller. And although she uses some materials from von Neumann's files from the Institute for Advanced Study in Princeton, New

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Jersey, she does not use his papers, which are at the Library of Congress in Washington, DC. Moreover, she misses some important books and articles.

In contrast, Hargittai's *The Martians of Science* is much fuller and better researched. Hargittai is a Hungarian-born chemist and head of the chemistry and chemical engineering department at Budapest University of Technology and Economics. Although he also eschews using archival files, his book is subtle and thoughtful. He is more critical of the scientists—especially Wigner, von Neumann, and Teller. Hargittai has carefully read the published literature and weaves useful, analytical patterns that indicate knowledge of scientific communities while generally approving the relationship of postwar physics, mathematics, and engineering in the US with US cold war politics.

Hargittai chooses not to get too deeply into the science of his five subjects. He does contend very persuasively that von Neumann, had he lived into the era of Nobel Prizes in economics, would have received that prize for his pioneering work in game theory. Hargittai also reasonably thinks that Szilard's various efforts to "save the world" were at least as meritorious as chemist Linus Pauling's and that Szilard also deserved a Nobel Peace Prize, or at least could have shared one. Hargittai respects Teller's work on the science of molecules, and he thinks that Teller might have done enough important scientific work to be a serious contender for Nobel Prizes in physics and in chemistry. Wigner, of course, did win the Nobel Prize in Physics in 1963.

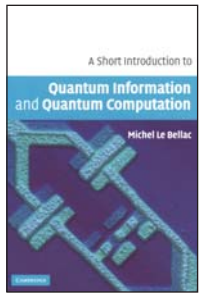
A rather surprising part of Hargittai's book is his thoughtful yet questionably harsh analysis of Wigner. Others have usually regarded Wigner as a quiet, courteous, and even self-effacing man. But Hargittai, building on the analytical insights of Abraham Pais and Freeman Dyson, proposes a rather negative interpretation of Wigner, of a man often passive-aggressive who seemed to retreat from conversation and intellectual engagement in person but contrived to minimize and ill serve others with indirect rebukes. Hargittai also notes an unsettling event that Marton, because of her inadequate research, apparently overlooked: When Wigner left Europe in the 1930s, he left behind an out-of-wedlock child. Fortunately, despite her Jewish background, she survived the Holocaust.

Perhaps the treatment of the Martians should end not on troubling stories involving Wigner but on an illuminating, poignant event of a different nature, one unknown to both Marton and Hargittai. Shortly before Teller's death in 2003, when he was the last surviving of the five Martians, I saw him as he stood uncomfortably in his black suit for about 20 minutes one hot summer day on the campus of Stanford University. Teller, who supported the Reagan administration's Strategic Defense Initiative, was not far from the conservative Hoover Institute, where he was a senior research fellow. He looked on irritably, waiting for his driver, as dozens of students busily walked, skateboarded, or biked past him. The old, stooped man was apparently of no interest to them. Not one student seemed to recognize the "father" of the hydrogen bomb.

A Short Introduction to Quantum Information and Quantum Computation

Michel Le Bellac (translated from French by Patricia de Forcrand-Millard)
Cambridge U. Press, New York, 2006. $60.00 (167 pp.). ISBN 978-0-521-86056-7

As a researcher in quantum-information science, I have been paying a considerable amount of attention to the growing literature on the subject and how the science is being introduced to the broader community of physicists and physics students. In the past few years, the majority of the monographs on quantum-information science that have appeared have been short introductions to the field. Most of those texts, like Michel Le Bellac's *A Short Introduction to Quantum Information and Quantum Computation*, are successful attempts to explain what physicists mean when they use the term "quantum information" and how information processing in quantum systems can be especially useful during an era in which nanotechnology is being developed.



The book introduces the qubit (quantum bit) and discusses the no-cloning theorem, the Bell inequalities, quantum teleportation, and dense coding. The author also sketches out a few of the genuinely quantum algorithms recently known to exist. About half of the recently published introductory texts provide fairly concrete examples of how quantum-information processing should be done in such settings as optics, nuclear magnetic resonance, ion traps, superconductors, and quantum dots. Le Bellac's book, which first appeared in French in 2005, is clear in its presentations. Although *A Short Introduction to Quantum Information and Quantum Computation* originated in a course for computer scientists, it is well suited for physicists who hold at least a bachelor's degree. For such readers, the book fully lives up to its name and is first-rate.

The key questions to be asked of an introductory text are whether a nonspecialist in quantum information could adopt it as an aid in research and whether an instructor could adopt it in the classroom. The benchmark text in this area is Michael Nielsen and Isaac Chuang's *Quantum Computation and Quantum Information* (Cambridge U. Press, 2000), which contains almost 700 pages. The two books—Nielsen and Chuang's and Le Bellac's—successfully serve researchers: They provide examples in a range of physical contexts, although Le Bellac's book does so more efficiently.

However, in the context of an introductory class for nonspecialist students, Nielsen and Chuang's excellent text can be a bit overwhelming. A majority of the recent monographs on quantum computing and quantum information, including Le Bellac's, have been much more modest in detail, replacing proof sketches with short, illuminating calculations. Those books typically leave out many of the subtler and foundational questions addressed by Nielsen and Chuang and by John Preskill's quantum-computation lecture notes (1997–2004), which are freely accessible online at http://www.theory.caltech.edu/people/preskill/ph229/#lecture.

Although Le Bellac's book does not delve much into foundational areas of the subject compared with the Nielson and Chuang or Preskill works, the text stands above other worthy introductory books, such as *Quantum Approach to Informatics* by Stig Stenholm and Kalle-Antti Suominen (Wiley-Interscience, 2005). Le Bellac accomplishes that by maintaining a close connection to physics as he covers most of the theoretical situations that are basic to quantum-information science instead of waiting until the end of the chapter to introduce physical examples. His