

BOOKS & ARTS

The Hungarian martians

Five of Budapest's finest changed the world in the twentieth century.

The Martians of Science

by István Hargittai

Oxford University Press: 2006. 376 pp.
£19.99, \$34.50**Arthur I. Miller**

The Martians of Science tells the gripping story of five brilliant and colourful Hungarian scientists — Theodore von Kármán, John von Neumann, Leó Szilárd, Edward Teller and Eugene Wigner — who had an extraordinary impact on their profession and on world events in the twentieth century. Fritz Houtermans, a physicist who knew them all in the 1930s, once quipped that they “were really visitors from Mars”, hence the book's title. István Hargittai, a fellow Hungarian, tells their collective story for the first time, basing his research on interviews and documentation.

All five were from Budapest. They all attended its excellent high school, went to its technical university, completed their studies in Germany and eventually emigrated to America. Von Kármán, the eldest, was born in 1881, Szilárd in 1898, Wigner in 1902, von Neumann in 1903 and Teller in 1908. All were raised in middle-class, highly intellectual Jewish households. In the years after the First World War there was a dramatic increase in anti-Semitism in Hungary. With the exception of Teller's, their families converted to Christianity, which offered them some protection until the rise of Nazism in the 1930s, when converted Jews were rudely reminded of their origins. By the early 1930s, all five men were well known in America.

Von Kármán was a world-renowned expert in aerodynamics. He worked for the German air force in the First World War and continued to work for them afterwards as a consultant, even though this contravened the Treaty of Versailles. In 1930 he became director of the Guggenheim Aeronautical Laboratory at the California Institute of Technology. Air Marshall Hermann Göring invited him back to Germany in 1934 to work as a consultant, telling German critics: “I decide who is a Jew.” In the Second World War and afterwards, von Kármán made important contributions to the development



High fliers: aerodynamics expert Theodore von Kármán (above, writing) and Presidential Medal of Freedom winner John von Neumann (left, seated).

of jet aircraft and ballistic missiles.

Von Neumann studied two different subjects at two universities, completing a degree in chemical engineering at the ETH in Zurich in 1925, and a PhD in mathematics at the University of Budapest for work on axiomatic set theory. “Endearing, a genius, but not a modest man,” as a colleague recalled, von Neumann ranged over the scientific landscape. With his bottomless supply of scatological jokes, he was the life of the party. Among his lasting achievements were the design of digital computers and the development of nuclear weapons, another of his passions. He effectively began the field of game theory and contributed to economics, mathematics and quantum physics.

When Szilárd was studying at the University of Berlin, the front row of the famous physics colloquia was reserved for the likes of Albert

Einstein, Max von Laue and Max Planck. Students were supposed to sit towards the rear, but Szilárd thought otherwise. He wanted to tell Einstein about some of his recent ideas. Einstein was impressed. Together they applied for patents on a silent refrigerator run by an electromagnetic pump operating a liquid metal coolant, thus avoiding the possibility of noxious fumes.

The day after Szilárd fled Germany in March 1933, the borders closed. He took this as a lesson in life: “If you want to succeed in this world you don't have to be much cleverer than other people; you just have to be one day earlier.” He became a peripatetic scientist and for the rest of his life always kept a packed suitcase ready. Among his discoveries were the principles of a nuclear chain reaction and its potential uses in both peace and war. In 1939 he persuaded Einstein to inform President Franklin D. Roosevelt about it. Einstein's letter — virtually dictated by Szilárd — was one factor leading to the Manhattan Project and the atomic bomb. Szilárd spent much of his life raising ethical issues about the postwar role of nuclear weapons, and Hargittai believes that for this he should have shared the 1962 Nobel peace prize with Linus Pauling.

Like Szilárd, Wigner did his PhD at the

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University of Berlin. He pioneered the use of group theory to explore the symmetry properties of atoms. For this he was awarded the Nobel Prize in Physics in 1963, the only one won by the martians. Strangely, Hargittai has the least to say on him — perhaps he was the least colourful.

Teller was one of Werner Heisenberg's students at the University of Leipzig and went on to make important contributions to molecular physics, astrophysics and nuclear physics. His period at Los Alamos was central to his political development. There he read Arthur Koestler's *Darkness at Noon*, which reminded him of the appalling treatment of his Russian friend and colleague Lev Landau at the hands of the NKVD, the Soviet Union's secret police, and he became a virulent anti-communist. Teller became a leading figure in the Manhattan Project and was obsessed with developing a nuclear weapon that would relegate the bombs dropped on Japan to mere firecrackers. The

result was a serious falling out with others in Los Alamos, notably Robert Oppenheimer, who had no interest in Teller's project to make a thermonuclear bomb and afterwards disagreed with its development.

Apart from Szilárd, the martians were fanatical about the cold war. Hargittai discusses this in detail while criticizing Teller's "reckless" testimony against Oppenheimer in 1953.

This is an important story that needs to be told, and Hargittai tells it well, although I would like to have learnt more about the martians' creativity. Their politics aside, they were brilliant thinkers who were able to spot connections among apparently unconnected disciplines and thus identify fundamental problems — and then solve them. ■

Arthur I. Miller is emeritus professor of history and philosophy of science at University College London. His latest book, *Empire of the Stars: Friendship, Obsession and Betrayal in the Quest for Black holes*, was shortlisted for the Aventis Prize.

Women or just good scientists?

Out of the Shadows: Contributions of Twentieth-Century Women to Physics

edited by Nina Byers & Gary Williams
Cambridge University Press: 2006.
498 pp. £30, \$35

Patricia Fara

"I do not agree with sex being brought into science at all. The idea of 'woman and science' is completely irrelevant. Either a woman is a good scientist, or she is not." Not the provocative statement of a modern feminist, but a plea for equality voiced a century ago by Hertha Ayrton, the electrical experimenter who, in 1904, became the first woman allowed to present her own paper at the Royal Society in

London. Ayrton would presumably be furious to find herself the opening entry in *Out of the Shadows*, a chronologically arranged set of essays on female physicists.

Like Ayrton, most eminent women prefer to be remembered for their achievements, rather than their X chromosomes, but US physicists Nina Byers and Gary Williams have made womanhood an essential criterion for inclusion in this edited collection. Perhaps to fend off accusations of transgressing political correctness, they whittled down their long list of potential entries by choosing the 40 candidates who had made the most notable contributions to scientific progress. As a result, several over-familiar icons, such as Marie Curie, Emmy

Noether and Dorothy Hodgkin (hardly a physicist), make yet another appearance, even though the sole factor that unites them — the gender that made it so hard for them to succeed — is deliberately scarcely mentioned.

The contributors were asked to submit short accounts divided into two sections: 'important contributions' and 'biography'. Many of the brisk summaries of scientific discoveries seem oddly redundant — anyone who can follow the boxed discussions of Ricci tensors, 4S or string theory does not need to read them. The editors' prescriptive format has resulted in a book packed with facts, occasionally relieved by a brief anecdote — ideal for diligent students preparing accurate but unreflective assignments.

Nevertheless, the index provides clues to more interesting stories about this book's subjects. The long list of 'firsts' reveals that it was not until 1962 that the French Academy of Science admitted a woman, Marguerite Perey, and that the first woman to receive an honorary doctorate from Princeton University was the physicist Chien-Shiung Wu in 1958. The entries under 'Nobel prize' are dominated by women said to have been unjustly passed over, including astrophysicist Jocelyn Bell Burnell, nuclear physicist Lise Meitner and chemist Agnes Pockels (strangely, Rosalind Franklin is absent, despite the presence of another X-ray crystallographer, Kathleen Lonsdale, one of the first two women elected to the Royal Society in 1945). The heading 'Nazis' — referring to the plight of Myriam Sarachik, Marietta Blau, Hertha Spöner and others — demonstrates that, contradicting the editors' desires, biographical accounts often demand discussions of discrimination.

As Byers' introduction points out, most of the contributors are practising scientists who are unused to writing history. Although they each provide a short bibliography, they have mostly omitted the many excellent books and articles written by professional historians of science. This collection would have been of more value for aspiring young women if it had provided a more nuanced appreciation of how individual scientists have been converted into exaggerated stereotypes. Curie, for instance, is often depicted as the laboratory equivalent of a domestic drudge, a selfless heroine who neglected her health and her appearance while she systematically processed tonnes of dirty pitchblende to isolate radium. Such presentations reinforce the view that female scientists are a substandard breed, neither normal women nor stellar intellects. In his foreword, Freeman Dyson perceptively criticizes the editors for not including younger physicists, who would have provided more relevant role models. He also pinpoints what remains, unfortunately, excellent advice for any ambitious woman: marry the right man. ■

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Chien-Shiung Wu was the first woman to receive an honorary doctorate from Princeton University.