

A COURAGEOUS ODYSSEY THROUGH SOVIET AND POST-SOVIET SCIENCE

The Making of a Soviet Scientist

Roald Z. Sagdeev
 Wiley, New York, 1994.
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Reviewed by Richard L. Garwin
 Roald Sagdeev's *The Making of a Soviet Scientist* is much more than the story of the author's life from his birth in Moscow in 1932 to his present post as Distinguished Professor of Physics and director of the East-West Center for Space Science at the University of Maryland. It is also a view of science in the Stalinist and post-Stalinist Soviet Union, during and beyond the cold war, by a scientist who grew up in, survived and outgrew the system, while making outstanding contributions to both science and international science policy.

Named by his Tatar-born parents after the Norwegian explorer Roald Amundsen, Sagdeev had a strong early interest in geography that changed to a passion for history and then to the pure intellectual challenge of mathematics, chess and, eventually, mathematical and theoretical physics. In 1956 Sagdeev received his degree from Moscow State University, where his father had taken his doctorate in mathematics. He also received an assignment at the Kurchatov Institute's Bureau of Electronic Equipment in Moscow. (In reality, the task of the bureau was magnetic confinement fusion. The theory division was led by theoretical physi-

cist Mikhail Leontovich, who spent long hours helping his group in physics rather than doing his own research. The fusion program's leader overall was Lev Artsimovich.)

Shortly after Sagdeev's arrival, Igor Kurchatov was invited by Khrushchev to go with him on a very early foreign trip to England, where Kurchatov was invited to Harwell, which "... had opened its doors only to Fuchs and Pontecorvo as foreigners." There Kurchatov shocked the British by revealing the advanced status of the Soviet effort in controlled fusion. Upon his return to Moscow, Kurchatov eliminated the code language and secrecy that had constrained the work in Moscow, and in 1958 Sagdeev himself was sent to Geneva for the scientific meetings associated with the Atoms for Peace Exhibition and Conference. By 1960 Sagdeev had been working productively and with great enjoyment with Evgeny Velikhov and Aleksander Vedenov and was asked by Andrei Budker to go with him to Akademgorodok, the new science city near Novosibirsk. In this free atmosphere, far from Moscow, Sagdeev appreciated not only the scientific opportunity but the freedom of spirit and the privileged food supply. Perhaps it was here that he perfected the skills of leadership that were to serve him so well in his years in Moscow as head of IKI, the Space Research Institute of the Soviet Academy of Sciences.

Readers will have to discover for themselves Sagdeev's humor and his continued technical accomplishments, even as director of IKI, which under his leadership became a model for international cooperation in science. But even in this brief review I would be remiss not to convey a sense of the conditions under which Sagdeev worked: the terror, repression and intimidation, the burden of bureaucracy, bossism and nepotism, the vicious power struggles and the honoring of false achievements that may persist to this day. Among the

frank and human accounts are those of the heroism of Peter Kapitsa, whose continued expression to Stalin of the unacceptability of Stalin's KGB chief Lavrenti Beria as coordinator of the Soviet atomic bomb program led to Kapitsa's house arrest from 1946 until 1954, when he was rehabilitated under Khrushchev after the arrest and trial of Beria.

I first met Sagdeev in 1982 when, on the advice of my friend Marshall Rosenbluth, I asked Velikhov to bring Sagdeev into the semiannual meetings the National Academy of Sciences Committee on International Security and Arms Control was holding with its counterpart of the Soviet Academy. Sagdeev was immediately prized for his competence, frankness and humor, and for some years he led the Soviet counterpart of CISAC—almost until his marriage to Susan Eisenhower, the granddaughter of President Dwight D. Eisenhower, and his subsequent move to the University of Maryland in 1990.

On the heels of our CISAC meeting in Washington in March 1983, at which we discussed aspects of systems for defense against ballistic missiles, the Soviet team was shocked by President Reagan's announcement of the Strategic Defense Initiative, but no more than were we, or even the US military. Sagdeev and his colleagues played an important and independent role in analysis of possible Soviet counters to SDI, and when Mikhail Gorbachev became Soviet leader in March 1985, he reached out for national security advice to the "Gang of Four"—Georgy Arbatov, Evgeny Primakov, Velikhov and Sagdeev. No stranger to brilliant and charismatic scientific leaders, Sagdeev was bowled over by Gorbachev's intelligence, competence and learning ability. For some two years the Gang of Four had a very substantial influence on Gorbachev and thus felt keenly his silence for more than two weeks after the Chernobyl disaster in April 1986. The flavor of Sagdeev's

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book and the surreal aspect of life in the Soviet Union are captured in this sentence: "In the Space Research Institute, while helping the authorities simulate the events leading to the disaster with the help of black market Western computers, we knew the attempt to make the (reactor operator) the scapegoat was a blatant lie."

Sagdeev's integrity and courage led him to refuse to join the academy leadership in the condemnation of Andrei Sakharov and then to refuse election to the academy's presidium, proposing Sakharov instead. Later they were elected together to the Congress of People's Deputies. At great risk to himself, Sagdeev publicly ridiculed official Soviet propaganda claiming the AIDS epidemic to be an American plot.

In 1987 Sagdeev wrote Gorbachev, "Dear Mikhail Sergeyeivich, Young computer experts in the country are bitterly complaining that even Gorbachev can be cheated . . ." Apparently, the Soviet Academy had contributed to the myth of creation of a supercomputer; Lenin Prizes were awarded, but there was "no supercomputer at all" as Yuli Khariton put it. Sagdeev presents with enthralling detail the loss in flight of the two Mars probes Phobos I and II, which were designed at IKI with his personal participation, as well as the continued unholy relationship between the Soviet military-industrial complex and some scientists even in IKI, supported for mutual benefit on topics that made no technical sense—a phenomenon that is not unknown but substantially rarer in the United States.

This book is written for the non-scientist, and the physics is described only briefly and qualitatively, but very lucidly and perhaps too modestly. However, for all who are interested in the interaction of science and society, and in the nature of the Soviet Union as seen by a keen observer who was at the same time an "insider" and a dedicated humanist, this book is highly recommended.

Recognizing the destructive "un-making of the Soviet scientist" in the destruction of the Soviet Union, Sagdeev notes in his autobiography that "many, despite the pressures of mundane life, stay firm in their selfless service to science. God help them to do so with the same grace, tenacity and integrity that distinguished that special breed of scientists, 'the keepers of the flame', that were Kapitsa and [Lev] Landau, Leontovich and Sakharov." I have no doubt that Sagdeev also belongs on this list. How many among us, in our favored land, can be said to do as much?

Einstein Lived Here

Abraham Pais

Oxford U. P., New York, 1994.

282 pp. \$25.00 hc

ISBN 0-19-853994-0

Wolfgang Pauli once addressed the author of *Einstein Lived Here*: "Dear $\pi\alpha\omega\rho$! (your [less] intimate friends use your pseudonym 'Bram')." To physicists Pais was "Mr. Quantum Field Theory" (Rudolf Haag) and the author of *Inward Bound* (Oxford, 1986). To Albert Einstein he was a friend and colleague at the Institute for Advanced Studies. To a larger public he is the author of the magisterial Einstein biography *Subtle is the Lord* (Oxford, 1982). Pais is professor of physics emeritus at the Rockefeller University and the chronicler of *Niels Bohr's Times, in Physics, Philosophy, and Polity* (Oxford, 1991).

Abraham Pais's book takes its title from the cosmic label that Herblock suggested for planet no. 3 in the solar system (see the cartoon). He informs the reader: "Since I have understood more about Einstein than many, not just because I am a physicist, but more so because I knew him well in his later years, I attempt in this book to bring the general public closer to Einstein the man. With this audience in mind, I have scrupulously avoided using any mathematics—with the exception of the inevitable formula $E = mc^2$ and a few equations in chapter 6." It remains to be seen whether this renunciation of a theorist's idiom will succeed in hawking the book onto the best-seller lists.

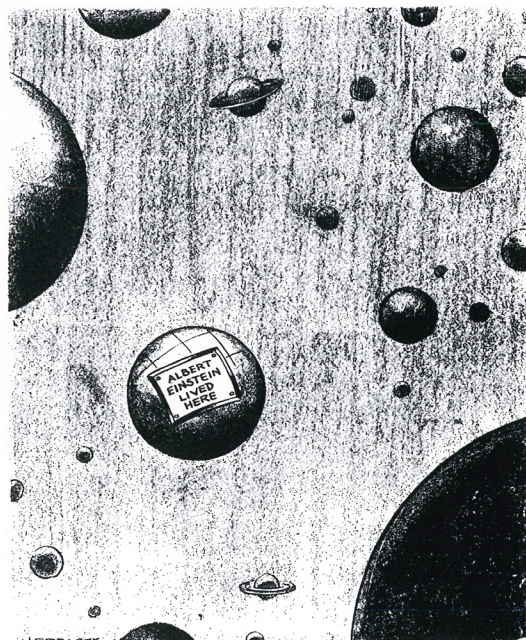
Anyhow, physicists should no longer promote a formula that wrongly equates a scalar with the fourth component of a four-vector.

Pais states in his preface: "This book is a companion volume to my *Subtle is the Lord*, but not its sequel. Earlier I had focused on Einstein's science and his life and had only occasionally included remarks about the way he was perceived by the outside world of non-scientists. The main purpose of the present volume is to enlarge on that last topic, which now becomes the central theme." In fact, "Einstein and the Press" is the last half of the book. The first

part contains, besides reprints of previous essays, a collection of crackpot letters written to Einstein (sample: "I must speak to you alone. I am the successor to Jesus Christ. Please hurry.") and a comparison of Einstein with Bohr that tries to find parallels in their diverse characters and lives ("Both chose to be cremated"). This essay reminds me of the anecdote: When asked what characteristic physics Nobelists had in common, Enrico Fermi said after a long pause, "I cannot think of a single one, not even intelligence."

The initial chapter of *Einstein Lived Here* deals with Einstein's first wife and family. Pais writes with tactful understanding about all that stuff that has been sensationalized in two recent biographies. But still, I doubt whether Einstein and the executors of his estate would have approved of airing what Einstein termed the "merely personal."

Pais described Einstein's relations with the press in the August 1994 PHYSICS TODAY. There Einstein comes alive as the sage whose wisdom, as well as his physics, has not yet been grasped by the world. When people think themselves unable to stop the horrors of genocide, the last words written 39 years ago by "the conscience of the world" should still stir us: "Not one statesman in a position of responsibility has dared to pursue the only course that holds out any promise of peace, the course of supranational security, since for a statesman to follow such a course would be



FROM HERBLOCK'S HERE AND NOW (SIMON & SCHUSTER, 1955)