

Abdus Salam: Missionary, visionary, luminary

Cosmic Anger

Abdus Salam—The First Muslim Nobel Scientist

Gordon Fraser

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Reviewed by Pervez Hoodbhoy

"There was no electricity in the town of Jhang in those days, so I would fill the oil in the lantern as *bhaijan* [elder brother] studied for his matriculation exams." So mused Abdus Salam's now-deceased younger brother as he recalled to me the humble semirural origins of Pakistan's greatest scientist. The studious Salam, who saw an electric light for the first time when he left home to study in Lahore, would later win the Nobel Prize in Physics and establish the International Centre for Theoretical Physics in Trieste, Italy.

By the early 1960s, Salam was already among the world's top authorities on particle physics. At 31 and the youngest-ever professor of theoretical physics at London's prestigious Imperial College, he began to push that school into the forefront of research. Under his prodding, his students applied group theory for the first time to classify existing particles and predict new ones. One of Salam's students, Yuval Ne'eman, proposed the "eightfold way" of classifying baryons, a method independently discovered (and named) by Murray Gell-Mann. Another student, Ronald Shaw, discovered the non-abelian gauge theory independently of C. N. Yang and Robert Mills. Salam's own research ranged far and wide, covering such topics as electroweak unification, proton decay, and supersymmetry.

Gordon Fraser's enigmatically titled biography, *Cosmic Anger: Abdus Salam—The First Muslim Nobel Scientist*, is

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immensely engaging, and its numerous anecdotes will titillate physicists. For example, the universally acknowledged "chief justice of physics," Wolfgang Pauli, peremptorily rejected Salam's proposal that parity could be violated and neutrinos were left-handed. Ultimately, Pauli retracted, too late, his condescending advice that Salam should "think of something better." We also learn that initially, Salam's Nobel-winning work—electroweak unification—barely caused a ripple. His talk at the 1968 Nobel Symposium was considered so unremarkable that Gell-Mann, acting as conference rapporteur, did not bother to refer to it. For essentially identical work in 1967, Steven Weinberg also received no immediate recognition, apart from a citation in 1970 by Salam.

Until a neurological motor disease put an end to his life in 1996, Salam was relentlessly driven by three passions: an urge to excel in physics, the desire to put Pakistan on the road to prosperity through science, and a missionary's zeal to revive science in Islam. With prizes, awards, seminars, and meetings, the world of physics immortalized Salam. But in his country, and in the world of Islam, things turned out quite differently.

At first, Salam was hugely influential in Pakistan, where he was seen as a kind of cultural amphibian—equally comfortable at home and in Western scientific circles. As chief scientific adviser to the president, Salam labored hard to move Pakistan down the road of scientific excellence. But 1974 marked a turning point when Pakistan's national assembly declared the Ahmadiyya sect of Islam heretical. Salam, a strong believer, resigned his official position. In subsequent years, Salam failed dismally in bringing science to Pakistan or to Islam. The Islamic Science Foundation, his grand scheme for scientific advancement with a projected endowment of \$1 billion from oil-rich Middle Eastern countries, came to nought after he was banned from ever setting foot in Saudi Arabia. Today, Salam is uncelebrated in Pakistan.

For all its marvelous anecdotes, Fraser's book has a definite hagiographic tinge and skips controversial issues. For example, the book does not explore Salam's role in the development of Pakistan's atom bomb. Although that role was deeply ambiguous, Salam did play a central part in setting Pakistan on its nuclear trajectory. His help extended even beyond his resignation in 1974, although it petered out a few years later. Still, he was viewed publicly as an internationalist and a man of peace. For that reason and because of his Ahmadiyya faith, many Pakistani fundamentalists

directed virulent propaganda against Salam, falsely alleging that he had actively subverted the making of the bomb.

Some future biography should take up the relationship between Salam as a scientist and as a believer. Certainly, Salam's integrity and intelligence did not permit his beliefs to determine the outcome of his scientific work. But some of

Salam's writings and speeches leave room for ambiguity. In a television interview, for example, he spoke of how he was inspired to think of $SU(2) \times U(1)$ symmetry by the stately minarets of Lahore's famous Badshahi Mosque. I can remember attending a lecture (circa 1987) in Pakistan in which he talked about the world being 11 dimensional, then hinted that 7 of those dimensions might belong to the *ghaib* (the mystical unknown). Time has effaced the exact words from my memory, but I do recall feeling quite uncomfortable.

Salam's religious beliefs and cultural background deeply influenced the course of his life as he grew older. Sometime in the 1980s he began signing himself as "Mohammed Abdus Salam," as he did in his preface to my book, *Islam and Science: Religious Orthodoxy and the Battle for Rationality* (Zed Books, 1992). He increasingly sought peace and tranquillity in contemplation and prayer. As his end approached, his faith grew stronger. But so did his distress and difficulty in coping with death. His former student Fayyazuddin later told me, "After seeing Salam, I had a feeling that somehow inner peace has eluded him."

