Abdus Salam

Nobel Prize in Physics, 1979

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"Scientific thought is the common heritage of mankind"

Abdus Salam, Nobel Lecture
December 8, 1979

1926 Abdus Salam is born on January 29 in the country town of Jhang, British India's Western Punjab (later Pakistan) the eldest of seven brothers and two sisters. His father, a teacher and official in the Department of Education; his mother, a housewife.


جھنگ سیال

جھنگ میگھیانہ میں اتحاد بورڈ قائم ہو گیا!

1940 At 14, scores the highest marks ever recorded for the Matriculation Examination at the University of the Punjab and wins a scholarship to join the Government College, Lahore.

1943 At the age of 17 publishes his first scientific paper, entitled: “A Problem of Ramanujam”.

1946 Graduates from the Government College obtaining a Master's degree in Mathematics.

Awarded a scholarship to St. John's College, Cambridge.

1949 Obtains a Bachelor of Arts degree with double first-class honours in mathematics and physics in only two years, instead of the normal three.

1950 Publishes an article in the influential journal "Physical Review" for the first time. [Phys. Rev. 79, 910-911, 1950]

Awarded Smith's Prize, St. John's College, Cambridge for the most outstanding pre-doctoral contribution to physics.

Completes Ph.D. in theoretical physics.

His thesis contains fundamental work in quantum electro dynamics, which earns him an international reputation. The work is published in 1951, but he formally obtains the degree only in 1952, as regulations require that it be awarded at least three years after admission.

1951 Invited to spend a year at the Institute for Advanced Study in Princeton, NJ, where Einstein works.

Returns to Pakistan as Professor of Mathematics at the Government College in Lahore.

1952 Receives Ph.D.

Becomes Head of the Mathematics Department of the University of Punjab.

Having returned home with the intent of continuing research, soon realizes that this will be impossible due to isolation. There is no tradition of doing postgraduate work or research, no updated scientific literature and hardly any contact with other scientists.

The principal of the College tells him to forget about research, as it is not the Institute's priority. He offers him a choice of three jobs for any spare time he may have after teaching: chief treasurer of the College, warden of a dormitory, or president of the football club. He chooses the football club, fully aware that he has no alternative but to leave the country and return to England to continue with his research.

"Gifted men from countries such as Pakistan, Brazil, Lebanon or Korea work in advanced countries in the West or the Soviet Union. They then go back to build their own indigenous schools. When these men go back to the universities in their home countries, they were perhaps completely alone; the groups of which they formed a part were too small to form a critical mass; there were no good libraries; there was no communication with groups abroad. There was no criticism of what they were doing; new ideas reached them too slowly; their work fell back within the grooves of what they were doing before they left the stimulating environments of the institutions at which they had studied in the West or the Soviet Union. These men were isolated, and isolation in theoretical physics - as in most fields of intellectual work - is death. This was the pattern when I became

associated with Lahore University!"
Ideals and Realities 3rd ed., World Scientific, 460, 1989.

1954 Returns to Cambridge as a lecturer in mathematics and Fellow of St. John's College.

Visits Pakistan occasionally as adviser on science policy to the Government.

1955 Attends and serves as scientific secretary at the first Atoms for Peace Conference convened by the United Nations in Geneva and helps set-up the United Nations Advisory Committee for Science and Technology.

1956 Develops the groundbreaking idea of neutrino parity violation, but postpones publication until next year, losing first claim rights.

Joins the Imperial College, London.

1957 Becomes Professor of Applied Mathematics at Imperial College.

1959 At only 33 years of age, becomes the youngest Fellow of the Royal Society of London.

1960 Becomes Professor of Theoretical Physics at Imperial College where, with Paul Matthews, creates the Theoretical Physics Group.

As delegate from Pakistan, proposes the creation of the International Centre for Theoretical Physics to the International Atomic Energy Agency (IAEA).

Frustrated from his own experience, is determined to offer scientists from poorer countries an alternative to migration.

"The notion of a Centre that should cater particularly to the needs of physicists from developing countries had lived with me from 1954, when I was forced to leave my own country because I realised that if I stayed there much longer, I would have to

leave physics, through sheer intellectual isolation" (Ideals and Realities 3rd ed., World Scientific, 392, 1989).

1961 Becomes Chief Scientific Adviser to the President of Pakistan.

At this time, and for all the decade, he has a strong influence on domestic scientific policy, being a leading figure in the Pakistan Atomic Energy Commission (PAEC), member of the Scientific Commission of Pakistan and founder of the space research agency SUPARCO.

1964 With the help of the IAEA, the Italian Government and the city of Trieste, the International Centre for Theoretical Physics (ICTP) is founded in Trieste, marking the successful end to a non-stop four-year journey characterized by intense planning, discussions and diplomatic negotiations.

As Director, presides over the Centre's inaugural workshop, the International Seminar on Plasma Physics, on 5 October.

His purpose is to provide scientists from developing countries with first-class research facilities, in an effort to stem the brain-drain and overcome the isolation gap that prevents them from doing active science in their home countries. Over the years, he becomes a charismatic figure among the international scientific and political communities, pairing prolific, innovative high-level scientific production (over 300 published papers on elementary particle physics) with relentless efforts to pursue research opportunities for scientists coming from poor countries.

1968 Presents the theory which shows how the electromagnetic and weak forces may be considered manifestations of a single more fundamental force, the electroweak force.
Organizes a cycle of evening lectures to inaugurate ICTP's new site, with the participation of some of the most outstanding

scientists of the time: Bethe, Dirac, Heisenberg, Klein, Lifshitz and Wigner.

1973 With Jogesh Pati, puts forward the idea of quark-lepton unification, which later develops into the widely investigated branch known as Grand Unified Theory (GUT).

1974 Again with Pati, publishes his most cited paper, which puts forward the evocative notion of lepton as the fourth "colour" quantum number. The same year, writes with John Strathdee his famous paper on the formalism of superspace in supersymmetric quantum field theories.

Pakistani Parliament declares Ahmadis non-Muslims. As a member of the Ahmadiyya Community, resigns from his position as Chief Scientific Adviser to the President, grows a beard in protest, and adopts the name Muhammad "to prove himself a Muslim".

Devout, while working at physics early each morning, plays recorded readings from the Quran quietly in the background.

Questioned on a fundamental contradiction between any religion which refers to one immutable text and the spirit of science which must allow hypothesis, testing and the admission of error and change, Salam replies that there is no contradiction, as science and religion refer to two different worlds; religion to the inner world of the human mind and science to the outer world of matter. Shifting the conflict between religion and science to that between faith and reason, Salam affirms the compatibility of religion and science, both of which fulfill the human demand for deeper understanding.

"To explore his inner world of "soul" and Allah one needs faith and to explore the outer world of matter, reason" (Abdus Salam: a Biography, by J. Singh, Penguin, 157, 1992).

1979 Shares the Nobel Prize for Physics with Steven Weinberg and Sheldon Glashow, Harvard University (USA), "for their

contribution to the theory of the unified weak and electromagnetic interaction between elementary particles, including, inter alia, the prediction of the weak neutral current".

Working independently, Salam, Weinberg and Glashow give a fundamental contribution to the advancement of elementary particle physics on the path towards the unification of fundamental forces of nature. Their electroweak theory is still considered the core of the "standard model" of high-energy physics. The existence of the W and Z bosons, predicted by the theory, is observed in experiments carried out at CERN, Geneva by a group led by Carlo Rubbia. The experiment is replicated later at the Fermi National Accelerator Laboratory, Batavia.

Salam is proud to be the first Muslim and Pakistani to win the Nobel Prize. He uses the authority conferred him by the award, and the funds connected to it, to foster various projects for the advancement of basic science in developing countries, with the aim of filling the gap between the North and the South, reducing conflicts and promoting peace.

1980-1981 Is conferred numerous honours and awards for his scientific work as well as receives recognition for his contribution to the progress of peace and international scientific co-operation.

1983 Creates, and serves as first president of the Third World Academy of Sciences (TWAS) in Trieste, with the purpose to recognize, support and promote excellence in scientific research and encourage the pursuit of the same in developing countries.

1984 Publishes the first edition of his collected essays "Ideals and Realities". It will be translated into ten different languages.

1988 Establishes the Third World Network of Scientific Organizations (TWNSO) in Trieste, in order to improve the status of science and technology in the South.

Conceives the setting-up of an International Centre for Science and High Technology (ICS) in Trieste, with the intention to extend the charter of ICTP from fundamental science to high technology and its industrial applications, for the benefit of developing countries.

1990-1994 Develops a project to set up a network on 20 international centres of excellence in various fields of applied science, technology and environment modelled on ICTP, to be located in the South.

Advised by the World Bank, he mobilizes the political leadership in developing countries under "a commission of heads of state or government in the South" to support the project. The Commission (COMSATS) is formed and 19 leaders agree to join.

Invited by the Prime Minister of Pakistan to chair and organize its first meeting, he is unable to attend as too ill to travel. His project of 20 centres is endorsed and it is agreed to establish the Commission's secretariat in Islamabad.

1994 Retires as Director and becomes President of ICTP.

1996 Dies in Oxford on 21 November 1996 after a long illness. He is buried next to his parents in Rabwah, Pakistan.

1997 On the occasion of a memorial meeting in November, ICTP is renamed "the Abdus Salam International Centre for Theoretical Physics".

Abdus Salam's belief in the universality of science inspired his scientific career as well as his strong commitment to the economical, political, environmental and moral issues of his time.

The Abdus Salam International Centre for Theoretical Physics

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