

## obituaries / gazette

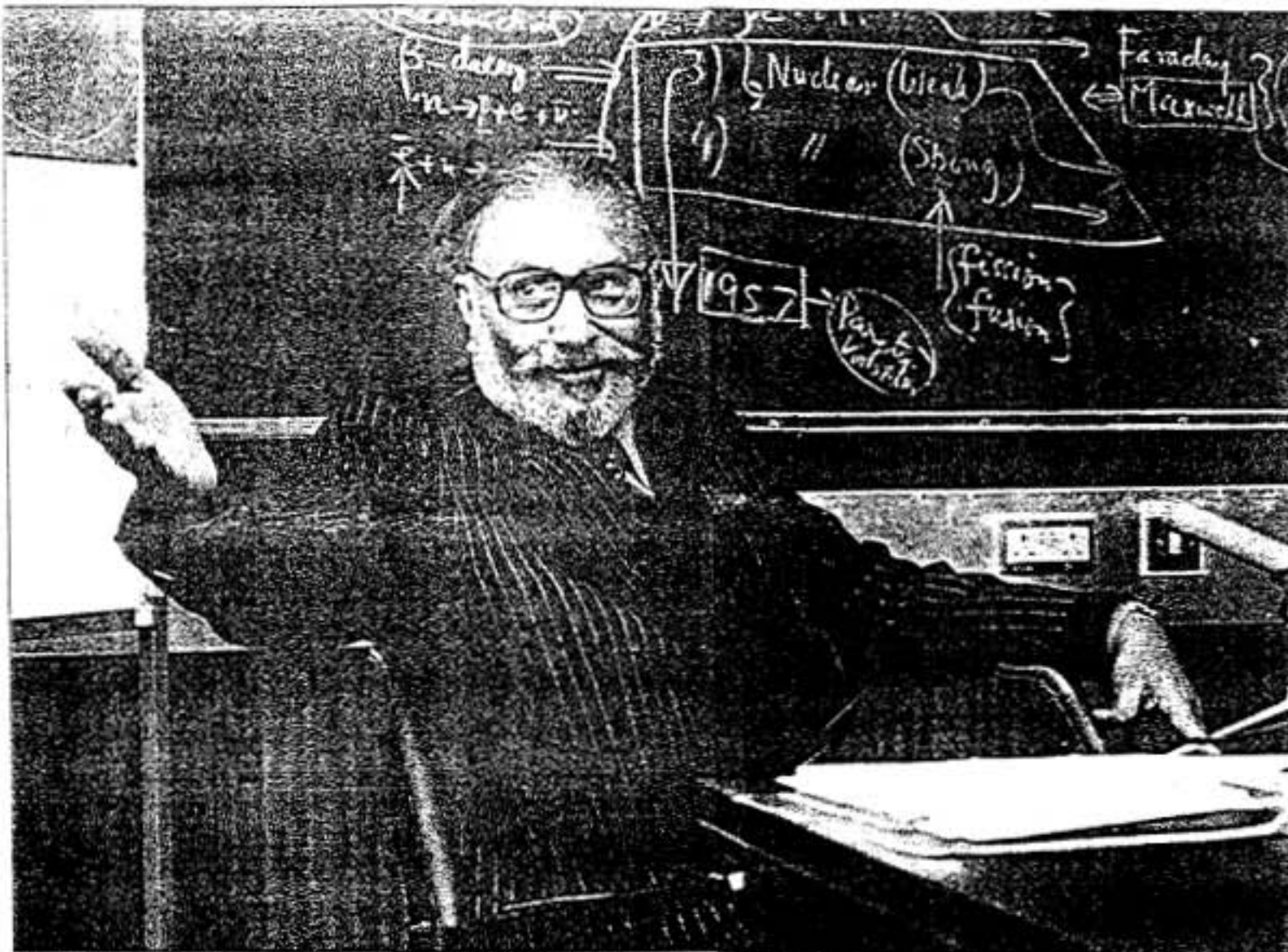
## Professor Abdus Salam

Abdus Salam was one of the foremost theoretical physicists of his generation and the first Muslim to win a Nobel Prize, in 1979. He was a warm and colourful personality, but often a controversial one in his native Pakistan.

Salam was born in 1926, in Jhang, a small town in the Punjab, the son of a minor educational official. His talents were clear from an early age. At 14, he became something of a local hero when he won a scholarship to Government College, Lahore, with the highest marks ever recorded. His first paper was published when he was 17 and a fourth-year student at the college. It was an ingenious improvement on the solution of an algebraic problem discussed earlier by the Indian mathematical genius Srinivasa Ramanujan.

In 1946, he won a scholarship to Cambridge, where he obtained a Double First in Physics and Mathematics. He briefly embarked on experimental research, but rapidly discovered that his talents lay in other directions and switched to theory. He started at just the right moment. Physicists had just learned how to get finite (and spectacularly confirmed) predictions out of quantum electrodynamics, the theory that describes interactions between charged particles and electromagnetic radiation, using the techniques of renormalisation theory devised by Julian Schwinger, Sin-itiro Tomonaga, Richard Feynman and Freeman Dyson. Salam and his research supervisor, Paul Matthews, later his lifelong friend and collaborator, showed how to extend these methods to other theories. Salam's very first paper on the subject attracted widespread interest and won him a place among the leaders of the field.

In 1951, Salam returned, as he had always planned, to Pakistan. He spent three increasingly frustrating years as Professor of Mathematics at both Panjab University and his Alma Mater, Government College, where his duties apparently included coaching the college football team. He had hoped to continue his research, but found little time or stimulus and no official support. Finally, he took



A secure place among the great men of science: Salam, Professor of Theoretical Physics at Imperial College for 36 years, won a Nobel Prize in 1979. Photograph: Hulton Getty

leave of absence and returned to Cambridge as a lecturer in mathematics and Fellow of St John's College in 1954. Three years later, at the instigation of Patrick Blackett, then Head of Imperial College's rapidly expanding Physics Department, Salam was offered the chair of Theoretical Physics. He persuaded Matthews to join him as a Reader, and together they set up what soon became one of the world's leading centres for fundamental theoretical physics.

In 1959, at the age of 33, Salam became the youngest Fellow of the Royal Society. His research ranged widely, but the

dominant theme was unification – the search for a unified description of the different fundamental forces. It culminated in the discovery in 1967 of the electroweak theory, showing how the weak force manifested in radioactive decay can be seen as parts of a unified symmetric structure. For this achievement, Salam shared the 1979 Nobel Prize in Physics with Sheldon Glashow and Steven Weinberg, both of Harvard University.

It was with great reluctance that Salam had decided to move to Britain. He always hoped to be able to use his talents to pro-

mote the development of Pakistan. He was convinced that what the developing countries needed above all was rapid development of science and technology. In 1959, he eagerly accepted an appointment as a scientific adviser to President Ayub Khan. He began working on ambitious plans for all kinds of developments, and recommended that the government devoted at least 1 per cent of national income to this programme. For example, he brought in experts to study the severe problem of waterlogging and salinity of irrigated land. They recommended a

drastic programme of drainage, but the government was unwilling to devote the required resources and the project failed. Indeed, many of Salam's plans floundered on a similar lack of commitment. Only in the high-profile areas of nuclear energy and space research was the government willing to commit enough resources to make things happen.

Ironically, Salam was often criticised in the development community for directing all scientific manpower into these arcane areas that did little for the mass of people, though it was certainly not what he had

wanted. At the time of impending hostilities with India over Kashmir, Salam and the great Indian physicist Homi Bhabha, founder of the Tata Institute in Bombay, tried to mediate between Ayub Khan and the Indian leader Jawaharlal Nehru, but unfortunately without success.

One very positive thing did come out of Salam's appointment as a scientific adviser. He had felt frustrated at being unable to carry on his chosen career in his own country, and determined to help others with the same problem. He concluded that what was needed was a first-

class international research centre to which scientific associates from Third World countries would come for regular visits, so that they could keep up with international research, but still go home to work in their own countries. He conceived the idea of an International Centre for Theoretical Physics, and determined to use his position as Pakistani delegate to the International Atomic Energy Agency to win support for the idea.

Salam was a remarkable persuader, charismatic, with unbounded energy and enthusiasm, and a slightly irreverent, unorthodox approach that was much more effective than staid diplomacy would have been. Within three years, he had persuaded the IAEA to back the idea, though with very modest funding, and got the Italian government to foot most of the bill, provided the centre was sited in Trieste. In 1964, the ICTP opened its doors in temporary quarters, moving to a handsome new building in the suburbs of the city in 1968. It has been an astonishing success, and has indeed enabled large numbers of theoretical physicists to continue working effectively in Third World countries. Towards the end of his life, Salam was campaigning vigorously for the establishment of three similar centres in other scientific disciplines.

Salam played an important role in various UN bodies, for example as member and chairman of the Advisory Committee on Science and Technology. In Pakistan, his efforts were less successful. After the fall of Ayub Khan, his relations with the government became increasingly strained. Salam belonged to the Ahmadiyya sect of Islam, regarded by many orthodox Muslims as heretical; they believe that their 19th-century founder, Mirza Ghulam Ahmad, was the Mahdi, the true successor of Muhammad. In 1974, under Zulfikar Ali Bhutto, the Ahmadiyya were declared non-Muslim and effectively deprived of civil rights. There were anti-Ahmadiyya riots, with widespread loss of life and property. Salam, who saw himself as a devout Muslim, was outraged, and broke off all contact with the Pakistani gov-

ernment. The situation has perhaps eased slightly in recent years; in 1995, for example, there was a special summer school session in honour of Salam, addressed by the President of Pakistan. But Ahmadiyyas are still an oppressed minority.

The award of the Nobel Prize in 1979 made Salam famous throughout the Third World, especially in Islamic countries. He received a constant stream of prizes and honours, and spent much of his time travelling. This gave him the opportunity to promote the idea of the Third World Academy of Sciences. It was set up in 1983, and Salam became its first President. He used his influence to argue tirelessly for the need to invest in science – not for its own sake but as the only viable way of eliminating the curse of endemic poverty and the terrible divide between the rich countries and the poor.

Salam has a secure place among the great men of science. He was most stimulating colleague, a man of humanity and passion, with many friends and admirers, and some detractors, not least in his own country. In the mid-Eighties, he developed a degenerative neurological disorder, progressive supranuclear palsy (PSP), that made his life increasingly difficult. He bore the affliction with remarkable stoicism, continuing to work so long as he was physically able, on new ideas both in theoretical physics and for Third World development.

Tom Kibble

*Abdus Salam, physicist: born Jhang, Pakistan 29 January 1926; Professor of Mathematics, Government College, Lahore 1951-54; Professor of Mathematics, Cambridge University 1954-56; Fellow, St John's College, Cambridge 1951-56; Honorary Fellow 1972-96; Professor of Theoretical Physics, Imperial College, London 1957-93 (Emeritus), Fellow 1994-96; FRS 1959; Scientific Adviser to the President of Pakistan 1961-74; Director International Centre for Theoretical Physics, Trieste 1964-74; President 1994-96; Nobel Prize for Physics 1979; Hon KBE 1989; twice married (two sons, four daughters); died Oxford 21 November 1996.*