

ABDUS SALAM

the Physicist and the Man

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Abdus Salam was a man with a vision. Two passions dominated his life - a hunger for creating and acquiring knowledge at the highest level, and a burning desire to see the developing world stand up on its feet through cultivation of knowledge. He was hemmed between two worlds - on the one hand he wanted to fire the dormant South, the disease ridden world of the poor, the ignorant, and the sluggish with a thirst for knowledge; on the other hand, he kept prodding the conscience of the relevant sections of the North, the world of great scientists and narrow minded politicians, of idealists and giant vested interests, of plenty and power. He once conveyed his torment to Robert Walgate by bursting out with these lines of Omar Khayyam.

*Ah love! could thou and I with fate conspire
To grasp this sorry scheme of things entire
Would we not shatter it to bits - and then
Remould it nearer to the heart's desire*

1 Salam as a Physicist

Given Salam's brilliance, his first passion enabled him to join the ranks of the greatest physicists of the twentieth century. Salam's distinguishing feature as a physicist was his uncanny knack for scenting out, from the plethora of confusing possibilities, the one idea that turns out to matter and leads to the deepest insight into the problem. It was a combination of this gift with his burning commitment that enabled him to stay, for four decades, in the forefront of research in High Energy Physics, an area in which even the most brilliant minds usually fade out after shinning for a few years.

In 1964, the journal *Nature* wrote of him:

There are very few physicists in the world who have maintained such a constant and fertile flow of brilliant ideas as Abdus Salam has achieved during the past thirteen years.

This sentence remained true for another three decades. In almost every significant development in High Energy Physics in the period 1950-1992 (he was forced by illness to give up working in 1993), be it renormalisation, elucidation of the behavior of the weak nuclear force, unitary symmetry, electro-weak unification, supersymmetry, string theory or grand unification, Salam played a significant role.

It has been said of Salam's scientific acumen that "His nose always points in the right direction". (The late Professor M.S.K. Razmi, to whom I owe this sentence could not recall whether it had been uttered by Glashow or

someone else). In summer 1990 I asked Salam what his “nose” told him about current ideas in his field. He said there was “definitely something” in supersymmetry. “It will always be there but may be at very high energies” he told me.

Mike Duff narrates that in the period 1969-72, when he was a graduate student at Imperial the Veneziano model was a hot topic. This model was used for strong nuclear interactions. He writes:¹

I distinctly remember Salam remarking on the apparent similarity between the mass and angular momentum of a Regge trajectory and that of an extreme black hole. Nowadays, of course, string theorists would juxtapose black holes and Regge slopes without batting an eyelid but to suggest that black holes could behave as elementary particles in the late sixties was considered preposterous by minds lesser than Salam.

Salam’s student Delbourgo has made an interesting observation about Salam’s ability to guess what would be right without having worked out the mathematics at all. He writes:²

¹M.J. Duff: in *SalamfestSchrift*, World Scientific, Editors: A. Ali, J. Ellis, Randjbar-Daemi, 1994, p 568

²R. Delbourgo: *Teacher, Colleague and Friend*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 569

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When standing up to argue with him on one of the finer points of the problem you had to be pretty darn sure of what you said because he had a wonderful intuition about the answer and was much more often right than wrong. When out of desperation you would confront him and ask him how he could be so certain, he would break into one of his wicked smiles, twiddle his thumbs, lean back in his chair, raise his finger and point upwards. Mind you if you stood your ground and (on the odd occasion) turned out to be correct, he did respect you for it.

Luciano Bertocchi, who worked as Deputy Director ICTP, has made interesting comments. He had, in Fall 1956, received a copy of hand written lecture notes on dispersion relations delivered by Salam at Rochester. He states that the lecture notes were “very typical of Salam’s style.” He then adds:³

Even for the formulae, although the beginning as well as the final result were correct, the intermediate passages were full of mistakes; but the final result was right. This was typical of Salam: to be able to pick up, in physics as well as in other domains, the most important

³L. Bertocchi: *My Association with Abdus Salam*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 554

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points, and to look at them very carefully, neglecting the less important details, provided the final result was correct.

The observations of Professor Gordon Feldman of John Hopkins University, regarding Salam's passion about physics are quite interesting. He had studied at Imperial College. He states:⁴

Abdus was not only excited about his own ideas but also excited when he read about something but he had not known before and thought was simply beautiful. I remember his bursting into the office once and on the blackboard he drew a short line segment with two little circles attached to the end and with his eyes glowing with excitement he said "that's SU(3)". Needless to say neither Paul (Matthews) nor I had a clue to what he was talking about. Abdus had just started reading the works of Dynkin and although he couldn't answer any of our halting questions he knew the work was very significant and his joy was very infectious. I could go on with many more such episodes which filled the days with joy, happiness and laughter.

Incidentally in the same talk Gordon Feldman mentioned how he had received from Salam, a copy of a cutting from

⁴Gordon Feldman: *Fun with Abdus Salam*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 573

a Swedish newspaper, that appeared one day before the award of the 1975 Nobel Prize. Feldman had the article translated with the help of a Danish colleague. The article speculated that Abdus Salam and Steven Weinberg were possible candidates for the 1975 Nobel Prize.⁵ The said article contained the following sentence in the very first paragraph: “Salam who is fifty, and Weinberg, forty two, are both theoretical physicists, the former (Salam) is considered the modern day Einstein.”

The well known theoretician GianCarlo Ghirardi was interested in the foundations of quantum theory, an area in which Salam, surprisingly, had little interest. He states that Salam had told him several times: “Do figures not come out all right when you use the theory - quantum mechanics - in its standard formulations, to calculate the outcomes of any actual experiment? Then what are you worried about?” However when Sir Karl Popper was to deliver a lecture at ICTP Salam called Ghirardi and asked him to make “a long, incisive comment on the speech of Popper, so that it will be clear to everybody that at the Center we have adequate competencies in all fields related to Science.” When Ghirardi told him that he was very critical of Popper’s views and that he could prove Popper wrong, Salam gave him the go ahead and Ghirardi duly went to the blackboard after Popper’s talk and proved that Popper’s gedanken experiment would imply a falsification of quantum mechanics or relativity. Salam called Ghirardi on the following day to thank him for clarifying

⁵The 1975 Nobel Prize was awarded to Aage Bohr, B. Mottleson and J. Rainwater.

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some interesting problems that had hitherto not caught his attention. He also told Akhtar Said, former Minister of Education, Government of the Punjab in a video recorded interview that he had no interest in the work on foundations of quantum theory.

Bertocchi has remarked that for Salam, “learning was as important as creating.” Referring to a discussion regarding physics that he had with him, when Salam’s illness was advanced, Bertocchi states:⁶

He was asking me whether I knew a paper in which corrections to the semiclassical Wentzel-Kramers-Brillouin (WKB) approximation were discussed, since he felt he would need higher order corrections to semiclassical calculations in what he was doing at the moment in biophysics. Since we - Fubini, Furlan and myself - had written a paper on the subject thirty years ago, I gave him a copy of that. The day after he called me again, to discuss details in our paper. One day for him was more than enough, and by that time he already knew more about the subject than I did.

In a video interview given to Akhtar Said at the end of 1987, Salam confirmed what Bertocchi has stated. He told the interviewer that he was studying a new type of mathematics⁷ which has not been used in physics before,

⁶*Ibid*, p 556

⁷He qualified this by saying that the mathematics was about 50 years old or 100 years old or 20 years old depending on which part of the book you look at.

that of Riemann surfaces. With a lovely smile full of pleasure he said:⁸

We are reading it Sir, we are studying it, and it is very hard because we are in competition at this time with 24 year olds. You see you are competing with boys who are 24 and have nothing else to do. They are young, their bodies are supple, and apart from this they have nothing else to do - this is very important. We have to do all kinds of things.

When the interviewer asked him whether he had not yet stopped his theoretical work he replied: “How can you finish? How can you stop? Stopping is like death. It is like writing poetry. Do poets die? Perhaps they do.” When Akhter Said asked him if he had “any disappointments in creative work?” he replied:

The biggest disappointment is that I do not get enough time to do work in physics. That is the biggest disappointment. Like all physicists from the Third World our biggest responsibility is to do something for our nation. That’s the biggest disappointment and that affects your work. You can’t be as fully discharging your duties to physics as a man from the rich countries is. This is a great disappointment.

⁸Akhtar Said has very kindly provided me with a CD of the interview.

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In the days when Salam was busy setting up and consolidating ICTP, he was in transit frequently. As Delbourgo put it: “The rumor that he did much of his research in transit or upon an aircraft is not far fetched.” Salam remained creative as long as his body supported him. He was stating his philosophy, by which he lived, when he said that to stop was to die. He never wanted to stop working, learning and creating.

Salam’s scientific stature and his pioneering contributions towards the spread of science in developing countries were recognized the world over. But Salam was not just a spokesman for science for developing countries. He played a leadership role in advancing the cause of physics research in the advanced world too. When he felt that the British Government was thinking of cutting Britain’s participation in CERN he spoke out. In an article titled *Particle Physics: Will Britain Kill Its Own Creation?*, that appeared in the *New Scientist* of 3 January 1985, he wrote:

I must say it comes as a great surprise to me that the British Government should have assembled a committee under the chairmanship of Sir John Kendrew to review British participation in high energy particle physics in general, and in the CERN enterprise in particular. The unkindest cut is the committee’s second term of reference, which asks it to reflect on re-allocation of the resources released, in whole or in part, to other areas of science. I am reminded of the Galahad story in P.G.

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Wodehouse where, at a convivial party, one of the Wodehouse characters biffs another with a round of beef. The latter falls unconscious, and all the “undertakers present” start bidding for the body . . .

Thus to find Britain, of all the countries, should contemplate withdrawing from the international pursuit of a subject that constitutes one of the frontier areas of science, appears to me incredibly destructive for the morale of the scientific enterprise worldwide.

While addressing a colloquium at CERN in Salam’s memory, the Nobel Laureate Carlo Rubbia pointed out:⁹

Abdus had an important role in advising on the CERN programs in particular as a member of the SPC. In 1987, when LEP was not yet operational, CERN Council and then DG, Herwig Schopper, created the so-called “Long Range Planning Committee” to define the further steps for CERN, Abdus, together with Giorgio Brianti, Pierre Darriulat, Kjell Johnson, Sam Ting, and Simon Van der Meer, helped us in laying the foundation of what is today the present and future of CERN. It was in this small circle of seven people that the names LHC and CLIC were coined and

⁹Carlo Rubbia: *The Standard Model, Abdus Salam and CERN*; paper presented at the Special Colloquium in Memory of Abdus Salam at the European Organisation for Nuclear Research (CERN), Switzerland, September 23, 1997.

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the relative merits and potentialities of the hadron and linear colliders were elaborated and evaluated in depth. I still recall the vivid enthusiasm and clarity of Abdus' vision on the future of CERN: he used to insist on the relevance of concentrating primarily on key, strategic choices related to fundamental questions. I believe that he has contributed in a major way in defining the next twenty years of CERN strategy in its essentials . . .

I have no doubt that Abdus' influence has significantly motivated also the emergence of the modern field of non-accelerator, underground experiments.

Salam was elected honorary fellow of many prestigious scientific bodies from the (former) *USSR Academy of Science* to the *American Academy of Arts and Sciences*. He was a recipient of numerous prestigious prizes, including the highest prize to which a scientist may aspire, the Nobel Prize. Salam was awarded D.Sc. Honoris Cause by forty four institutions world wide. With the exception of Australia and Antarctica, he was awarded honorary doctorates from institutions in five continents viz. Asia, Africa, Europe, North America and South America. This may well be a world record of some sort. He was an author or co-author of about 275 research papers and several books.¹⁰

¹⁰see appendix A for details of his biodata.

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Salam was a very fascinating man who could relate with the highest and the lowest with the greatest of ease. The following introductory remarks by Salam before the lecture by Werner Heisenberg, the discoverer of Quantum Mechanics, give an idea of Salam's great subtlety and sense of nuance:¹¹

In 1748 the Shahinshah of Persia, invaded India and he marched on to Delhi. He inflicted a severe defeat on the great Mogul of India. Delhi submitted and the two kings met to negotiate peace. At the conclusion of these negotiations, which included the transfer of the famous Peacock Throne to Iran from Delhi, the Grand Vizier of the defeated Indian King, Asifjah, was summoned to present to the two monarchs some wine to pledge the peace. The Vizier was faced with a real dilemma of protocol. The dilemma was this; to whom should he present his first cup of wine? If he presented it first to his own master, the insulted Persian might draw his sword and slice the Vizier's head off. If he presented it to the Persian invader first, his own master might resent it. After a moment of reflection, the Grand Vizier hit on a brilliant solution. He

¹¹*From a Life of Physics: Evening Lectures at the International Center for Theoretical Physics; A special supplement of the IAEA Bulletin, printed 1969; p31*

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presented a golden tray with two cups on it to his own master and retired saying ‘Sire, it is not my station to present wine today. Only a King may serve a King.’ In this spirit I request one Grand Master of our subject, Professor Dirac, to introduce another Grand Master, Professor Werner Heisenberg.

Salam was remarkably free of complexes. He was pleasant to talk to and was easily accessible. Salam was an avid reader.¹² Even as a young student he used to read widely. Science, history, literature, philosophy and religion were his main interests. As a child he learnt Arabic and read the Quran which deeply influenced his thinking. The flow of his writings resulted from a combination of factors - his vision, wide reading, mastery over language and deep conviction.

Ram Prakash Bambah knew him from his student days at Government College. He has narrated an incident that throws light on Salam’s character even at that early age. He mentions that Salam became a member of an informal group of students who had topped in various examinations. Bambah writes:¹³

Soon after Salam joined us, one of us, Prem Luther, got an attack of appendicitis and had

¹²One of his close relatives told me that even the wash room in his London home would be stacked with reading material!

¹³Ram Prakash Bambah: *Together In Lahore and Cambridge in Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 576.

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to be rushed to the hospital. Salam looked up everything about appendicitis in the Encyclopedia Britannica and went to Prem's bedside to help nurse him. In the system, then and now, the hospital did rely on attention from friends and relatives to see people through their illness there. Salam spent forty eight sleepless hours attending to Prem after his surgery. This endeared him to all of us and made him a very close member of the group. Also his laughter, such vigorous laughter in such a small body, made sure that wherever Salam was, there was a lot of friendship.

Salam remained helpful to people, regardless of race, color or religion, throughout his life. He always helped people in a quiet way. He knew how to make and retain friends. This author met him in 1979 but before that Professor Kemmer had mentioned to him the hearty laughter of Abdus Salam. All these traits were present in him as early as sixteen, as is obvious from Bambah's description.

Salam had exceptional perseverance. The indifference of the world did not deter him from his goal. He pursued his goal with single minded determination - his staff would testify to this. A physicist once asked Salam to forget about science in Pakistan because of the lack of interest on the part of the authorities. He instantly replied, "Oh, but we cannot give up."

Salam had the remarkable ability to switch instantly from scientific research to administrative work and back

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again. As Bertocchi stated:¹⁴

What impressed me about Salam were two aspects.

1) The capacity of switching very rapidly, almost instantly, from scientific to managerial aspects, and especially vice versa, from managerial to scientific, always immediately identifying the key points.

2) His great enthusiasm: his will to try, to explore new avenues, to launch new projects, even when he was not sure of success.

In physics, as well as in managing and creating new things, he always preferred to do one hundred things, ten of which were wrong, eighty right but normal, and ten excellent, rather than carefully analyzing a new idea before trying, and in this way avoiding failures by doing only ten things, nine of which were right and normal, and only one excellent.

In an interview for a documentary film Bertocchi stated:¹⁵

I think he had two halves of his brain that were coexisting and one half was working in parallel with the other. He was able to switch

¹⁴L. Bertocchi: *My Association with Abdus Salam*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 556

¹⁵<http://vimeo.com/58447727>; the documentary is being made by two young men Zakir Thaver and Omar Vandal.

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from scientific administration, or administration, to science in a microsecond.

In his last years Salam was severely handicapped by an unidentified ailment that finally confined him to the wheel chair for all practical purposes. He resisted the onslaught of the disease with phenomenal strength. He would insist on walking on his own with the result that he fell many times hurting himself badly on several occasions. He suffered a fracture on at least one occasion but continued to work and to come to his office. He was a fighter and this was probably connected with his Rajput background as well as his religious spirit.

Referring to his illness, he once told me, "They don't understand it" - perhaps he did not want to accept the diagnosis, whatever it was. In a jointly written article his daughters Aziza Rahman and Bushra Salam Bajwa have pointed out that Salam suffered from PSP - para supranuclear palsy.¹⁶ It was a measure of his enormous prestige (and a reflection upon the character of the Chinese) that upon learning of his illness the Chinese embassy in Rome directed two Chinese experts in acupuncture to treat him. I learned about this from Salam in summer in 1990. In view of his illness he decided to relinquish charge as Director ICTP at the end of 1993, two years before the expiry of his term. He remained honorary President of ICTP until his last day.

One of Salam's most outstanding virtues was his fond-

¹⁶Aziza Rahman and Bushra Salam Bajwa: *My Father, Abdus Salam*; in Quarterly *Al-Nahl*, Special issue on Abdus Salam, Vol 8, Issue, Fall 1997, p 54

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ness for the younger generation. He encouraged younger people and if he saw any spark in them he encouraged and projected them immediately and whole-heartedly. This he did without asking for, or expecting anything in return. Salam instituted prizes to encourage younger scientists. From his share of the Nobel Prize money he has instituted the Salam Prize (US \$1000 plus certificate) to be awarded every year to outstanding Pakistani scientists under 35 years of age.

In the words of Sir John Ziman (FRS) “Abdus Salam is a man whose heart is as great as his mind.” He was very generous and magnanimous in praising and appreciating the work of others. He made it a point to reward those eminent scientists who have not been sufficiently rewarded despite the importance of their contribution. The prestigious Dirac Prize, instituted by the ICTP, is an example. It has been used to honor younger as well as senior physicists. Its recipients include young men like Witten and David Gross as well as people like Nambu (who, as Salam said at an award ceremony of the Dirac Prize, had been in the “wilderness for too long” - this author was present on the occasion) to whom we owe many deep ideas in physics.

What did Salam look like? His photographs of his younger days reveal him as a handsome young man. Even in old age, when he cared to dress up he sparkled. Glashow visited Salam around 1960. In 1988 he wrote of his impressions of Salam:¹⁷

¹⁷Sheldon L. Glashow with Ben Bova: *Interactions: A Journey Through the Mind of a Particle Physicist and the Matter of This World*; Warner Books, 1988.

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In the early spring I was invited to speak about my work at Imperial College, the London haunt of Abdus Salam, with whom I was to share the Nobel Prize twenty years later. Then, as now, Salam had the presence of an oriental potentate with a Cambridge education and a gift for speaking perfect English.

However as noted by Delbourgo he did not, like Dirac, bother about material things.

Salam's eyes had a special shine which could be noticed even in his old age. Professor G.Murtaza, who was his student at Imperial has specifically mentioned this in an essay.¹⁸ He writes:

Salam's awe inspiring personality, his dominance and his august temperament, and on top of it the shine in his eyes - nobody could dare to look into his eyes and talk to him . . . There is an interesting incident regarding the dazzling brilliance of his eyes. Salam's secretary, who on account of her mannerism, could have belonged to the world of theater, complained to P.T. Matthews about Salam. With tears in her eyes she complained: "What kind of a person is Salam? He calls me in office, and without either saying hello or looking at me, starts dictating! P.T. Matthews (who was

¹⁸I have translated this from an Urdu article of his, a copy of which he kindly gave me. The article is titled: *Professor Abdus Salam - Ehad Saaz Shakhsiat aur Azeem Ustad*; (Epoch-making Personality and Great Teacher).

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a very kind person to whom everybody would air their grievances) consoled her and said: “You should be thankful that he did not look at you for you would have trembled out of fear!”

The stream of visitors in Salam’s Trieste office always gave one the feeling that Salam was a “People’s Emperor” loved and revered by his “people”, the scientific community of developing countries. They looked to him for guidance and sought his benevolence in sorting out their difficulties. They acknowledged him as their true leader on account of his deep contributions to physics and his deep understanding of their difficulties. He was always a “people’s” man. Delbourgo describes this side of his personality in the following words referring to the time when Salam was at Imperial College:¹⁹

Many of you will remember that Salam was a totally unpretentious person. Curiously he quite enjoyed English refectory food (can you imagine that?) and was at his happiest when mixing with the “plebeians” (as he called the student body) in contrast to the “patricians” (or staff). On one occasion when Bruno Zupmoro was visiting us from CERN and Salam insisted on taking him for lunch to the student cafeteria rather than the Staff Common

¹⁹R. Delbourgo: *Teacher, Colleague and Friend*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 569

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Room, as he preferred to rub shoulders with the “common man”. I think this tells us something about his personality.

In his heart Salam was a man who cared for the common people. His nephew Nasir Iqbal, who was employed at ICTP for some time, mentioned to this author that the well known physicist Luciano Fonda had told the Salam memorial meeting at Trieste in 1997 that Salam used to support, from his own pocket, students of Trieste University who faced financial difficulties. He never really cared for money for his own person. When he won the Catalunya Prize, he, subsequently, received a cheque worth U.S. \$200,000. Salam gave the cheque to his Secretary Anne Gatti and asked her to deposit the check in the ICTP account.

Professor Luciano Fonda writes:²⁰

And then I became aware of his great humanity, of his donations to the poor without making himself conspicuous. As a matter of fact, only a few people know that with the money he received from prizes conferred upon him, he constituted a fund for donations of instrumentation to the physics departments of developing countries. Together with Strathdee, I was incharge of endorsing his checks. These were extremely generous

²⁰Luciano Fonda: *From the Advanced School in Physics to the Synchrotron in Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 558.

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actions, which he carried out without showing off.

This author was told by a senior colleague that when he was doing his Ph.D. in London in the early 1970s, he, at some point, ran into financial difficulties and went to Salam for help. He told this author that Salam gave him some money that alleviated his difficulty.

Professor Bertocchi, a former Deputy Director of ICTP, narrates:²¹

To give you one example of his humanity, I will mention the following. A few years ago, a thief entered the villa where he was living and most of his medals were stolen. At the same time, he also entered the home of the caretaker, stealing his money. Salam's immediate preoccupation was to reimburse the caretaker what he had lost; and we had indeed to find a way within the rules to do exactly that.

There used to be a very interesting and revealing photograph of Salam in the ICTP corridors. It is probably still there but this author has not been to ICTP since 1995. In this photograph Salam is shaking hands with the French President (probably Mitterand). Everyone in the picture, including Salam, is dressed in the most elegant suits. But funnily enough, in the city which is the

²¹L. Bertocchi: *My Association with Abdus Salam*; in *Science for Peace and Progress: Life and Work of Abdus Salam* compiled by Anwar Dil, publishers Intercultural Forum, San Diego and Islamabad (iforum@aol.com), 2008, p 556

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very heart of elegance, and while shaking hands with the Head of State of a country which prides itself on elegance and sophistication, Salam is holding a plastic bag in his left hand! Why would he do that? Did he not care? But he was a man of great sense of nuance. Christiana Winter, one of the Secretaries at ICTP, burst out in laughter when she discussed it with this author, and laughingly commented: “I think he does it deliberately.” May be he did! As Professor Bertocchi stated:²² “He always dealt in the same way with heads of states and with the poorest and youngest scientists.” One is reminded of Lord Rutherford who had no deference for authority.

Salam relished speaking in Punjabi, his mother tongue. The Secretary General of the Pakistan People’s Party, Jahangir Bader, told this author that on a visit to Pakistan in 1989, Professor Salam conveyed to him his desire to see Bader in his office as he was, at that time, a Federal Minister of Science and Technology (as well as Oil and Gas). Jahangir Bader told this author that instead of fixing a meeting in his office he decided to call on Professor Salam in his hotel room in Islamabad. After Bader introduced had himself in English and had uttered a few sentences, Salam interrupted him and asked him to speak in Punjabi instead of English. This author and many visitors to ICTP who spoke Punjabi, know that Salam always talked to them in Punjabi.

Salam was lonely in a deep way. The rejection by his government and the establishment, as well as by the orthodoxy, an orthodoxy that gained ground and momen-

²² *Ibid*, p 556

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tum during the era of Gen. Zia-ul-Haq and the Afghan war, pained him.²³ A Pakistani physicist, Professor Abdul Waheed, once told me that when he informed Salam that he had prayed for him at the Holy Kaabah²⁴ Salam's eyes turned wet. This author saw Salam's eyes turn wet on several occasions when it was pointed out to him that the ordinary people of Pakistan respected him.

K.K. Aziz has described an incident involving Salam that reflects the conflict between the orthodox and sane elements. Aziz was in Khartoum, Sudan for fifteen years and happened to be there when the incident took place in January 1983. Khartoum University had invited Salam to bestow upon him an honorary Ph.D. degree and the ceremony was to be held on January 9th. At the time General Ja'fer Nameri was the ruler of Sudan. Aziz narrates:²⁵

²³Salam once told Zia-ul-Haq that members of his community, working for the Pakistan Atomic Energy Commission, were being discriminated against. Zia-ul-Haq asked Salam that if he were to be provided with the list of their names he would ensure that they would not be discriminated against. When this list of all members of Salam's community was provided to Zia-ul-Haq, all of them were removed from work on the nuclear bomb project! When Zia-ul-Haq's plane crashed an Italian Secretary 'Loisa' (or Mariam) Durrani (she was married to a Pakistani) informed him in his office. Apparently Salam's reaction indicated his sense of satisfaction at the death of Zia-ul-Haq. He had cause to be bitter about Zia-ul-Haq.

²⁴Salam's community had been declared non-Muslim by an act of the Parliament during Z.A. Bhutto's regime and therefore he was not allowed to visit the Holy Kaabah.

²⁵K.K. Aziz: *The Coffee House of Lahore - A Memoir 1942-57*; Sang e Meel Publishers, 2008, pp 215-216

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On 7 January the Saudi ambassador met Nameri and asked him to cancel the university's special convocation where Salam was to be given an honorary degree. Nameri called the Vice Chancellor the same day and told him of the Saudi objection. The Vice Chancellor decided to take a stand and said he would consult the academic staff to find out their reaction on the crisis. An emergency meeting was held the same evening and after a short debate the entire Sudanese staff decided to confront the Chancellor and declared that it would resign if the convocation was canceled. Next morning the Vice Chancellor and all the deans and heads of departments and institutes met Nameri and conveyed to him the local staff's to flout the Saudi "orders", adding that the expatriate staff, though not involved in the crisis, had been informally consulted and they stood behind the decision to tender *en mass* resignations. It was an act of great courage to face the Saudi pressure and of a military ruler who enjoyed untrammelled authority. All the credit goes to Nameri for acceptance of the staff's decision, his respect for the autonomy of the university and his promise to attend the convocation and award the degree to Salam.

His illness added much more to his loneliness as he increasingly became physically incapacitated. This author

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owes much of his information on Salam's last days to Nasir Iqbal, son of the late Col. G.M. Iqbal, (Salam's first wife Amtul Hafeez was the real sister of Col. Iqbal.). Nasir Iqbal worked at ICTP for several years and since he was Salam's nephew he had access to Salam after office hours. Nasir has told this author many incidents which have probably not been penned down before. These incidents shed light on Salam's lonely life in its last phase and also on the wonderful attitude of the Italians, the Triestinos in particular, towards Salam.

Nasir Iqbal stated that Salam was much loved and admired by the people of Trieste as he had transformed Trieste into a science city. Nasir Iqbal narrated that he needed to buy some flowers on a particular St. Valentine's day. The florist, an old lady, asked Nasir where he came from. When Nasir mentioned that he was from Pakistan she said that there was a Pakistani Nobel Prize winner in Trieste. When Nasir pointed out he was Salam's nephew she refused to take any money for the flowers from him and said that it was an honor for her that he was Salam's nephew. She then gave him a flower for Salam and asked him to tell Salam that "We love him." Salam was so touched by this incident when he came to know of it that his "eyes became wet and tears rolled down his eyes." He was ill at that time and lay in bed.

Nasir told this author that one night Salam fell down in his Trieste residence where he resided all alone. He was hurt and bled and lay on the floor all night as he could not get up. He also was unable to call anyone or raise any kind of alarm. Pierre Agbedjro, who used to drive his official car, went inside his residence around 7.00 AM

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the next morning and saw him lying where he had fallen.

Apparently his Pakistani wife never wanted to live in Trieste as she felt lonely there. Salam had four children from her, three daughters (in order of their ages) named Aziza, Asifah and Bushra, and a son, the youngest of the four, named Ahmad Salam.²⁶ Ahmad Salam stated in an interview for a documentary being made on Salam that he saw so little of his father that when he was six or seven years old he would ask his mother if he could bring his bedding into Salam's bedroom and put it on the floor just to be close to him. "I wanted to be with him as much as possible."²⁷ Two of his daughters have given us valuable glimpses of his family life and his work habits. They write:²⁸

His travels took him all over the world ... Thus, his work left him little time for the family life. ... He was quite strict at home, especially where our studies were concerned. He would bring us each workbooks and before going to his college he would set us certain pages that we had to do. Whenever he returned from an overseas trip, he would call us into his room and check on our grades and progress. He encouraged us and gave us con-

²⁶ Aziza has a PhD in biochemistry, while Ahmad has a degree in Finance and works for a Kuwaiti company from London. All three daughters are housewives.

²⁷ <http://vimeo.com/58447727>

²⁸ Aziza Rahman and Bushra Salam Bajwa: *My Father, Abdus Salam*; in Quarterly *Al-Nahl*, Special issue on Abdus Salam, Vol 8, Issue, Fall 1997, p 51-52

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fidence by constantly reminding us of one of his favorite sayings, “Do your best and leave the rest to Allah.” . . .

He himself never stopped working. . . . My father maintained his meticulous work habits in an unflagging routine punctuated by “cat-naps” and endless supplies of sweets and hot tea . . . He would go to bed around eight or nine o’ clock in the evening, and arise a very few hours later to work in the silent hours before dawn when his level of concentration and creativity would perhaps reach its peak, sustained by a thermos of hot, sweet tea and some snacks that we would place by his bedside before sleeping.

Nasir sometimes cooked Pakistani food for Salam, food which Salam relished.²⁹ He used to wait for Nasir sometimes so that Nasir could cook something that he missed because he had lived in the West, mostly on his own. As a student his favorite dish was mutton-potato curry. One day Nasir cooked mincemeat-potato curry for him. Salam enjoyed the dish so much that he held Nasir’s hand and prayed for him. Nasir told me that one day Salam held his hand and would not let go - there were tears in his eyes. Nasir said that he could not bear to see that - the plight of such a great man made him very emotional. But Salam was to stay alone. He had devoted

²⁹When, in 1987, Salam was an official guest of the Government of the Punjab, he told this author in Lahore: “People here don’t even realize what one misses when abroad. They invited me to dinner in a Chinese restaurant. I have refused.”

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his life to physics and to ICTP and maybe his son felt neglected. In the absence of his eldest son Nasir had become a surrogate son. Thus even when he was ill he had no companion, no one to be with him at his home in Trieste. But, as Nasir Iqbal said: “Salam never wanted to surrender - he kept struggling to the very end, trying to stand up and walk.”

Nasir told me that Salam had a sweet tooth. He said: “He always used to have sweets and fruit by his bedside on the left and a lot of books on the right. He would take short naps. Between the naps he would get up and start reading.” This description of his last years is consistent with what his daughters have described about his habits during the Imperial College years before ICTP was set up. Because of his love of reading he never allowed a TV in his house during the Imperial College years despite the protestation of his kids. However his daughter wrote after his death that they were grateful that they had no TV since they “spent more time reading.” Salam almost never vacationed. He worked continuously throughout his life, as long as his body supported him. His son Umar Salam told interviewers for a documentary film:³⁰

He had three full time jobs at least. He was Professor of Physics at Imperial, he was setting up ICTP, and he was also Chief Scientific Adviser to the Government of Pakistan. And how he managed to combine these things I cannot even begin to imagine. It is superhu-

³⁰<http://vimeo.com/58447727>; the documentary is being made by two young men Zakir Thaver and Omar Vandal.

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man and yet I think that he was all the time subject to very human fears. He was always worried he wasn't doing enough.

A day or two before Salam died I began receiving calls from his cousin Col. G.M. Iqbal who said that Salam was not well and asked me to pray for him. Col. Iqbal called me as soon as Salam passed away to inform me of the sad event. He told me that although Salam had been almost unconscious for a while the doctors felt that he had a very stout heart. I was reminded of what one of the secretaries at ICTP, Mrs Ondina Turra once said to me - Salam had then been fairly confined - she said that it was very sad as, in the days when his health was good, "He was like a lion". He died in the early hours of November 21, 1996 at the residence of his English wife Professor Dame Louise Johnson.³¹ I think he preferred staying with Louise. There is no other apparent reason as to why he chose to spend his last days with her. This impression is confirmed by an obituary in the daily *The Telegraph*.³²

³¹Louise Johnson was an FRS and a Professor of Molecular Biophysics in Oxford. They had two children, a son and a daughter. The son is named Umar Salam and the daughter Saeeda Hajira. I am told that Umar has completed his Ph.D. in mathematics from Cambridge. I remember that it was during a summer of the mid 1980s, that Salam asked me to teach Urdu to Umar. I did so for a few days. When I asked Umar if he was really interested in learning Urdu, Umar said that he was doing it only because his father wanted him to learn Urdu. Interestingly, one day Salam checked the words I had taught him and their transliteration.

³²Daily Telegraph 8 October 2012; *Professor Dame Louise Johnson*:

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Iftikhar Ahmed, a physicist who worked very closely with Salam, recalled them as being “madly in love - it was always ‘my darling’ this, and ‘my darling’ that ... I never saw him happier than when he was with Louise”.

Salam and Louise Johnson were married in 1968.

When I first met Salam in 1979 he had come to Edinburgh to attend the retirement ceremony of his supervisor Professor Kemmer. He told me that when he checked into the hotel, the man at the counter discreetly asked how long had he been in Britain. When Salam said twenty five years, the receptionist said that he must then be a British citizen. When Salam replied in the negative the receptionist was very surprised and said that he would then have to ask for his passport. This says something about Salam’s loyalty and sense of identification with Pakistan. His body was brought to Pakistan and placed at the main center of his community in Lahore before being taken to what was once called Rabwah,³³ at one time the home of his community in Pakistan, where his parents lay buried. Everyone who knew him in his healthy days and saw the body was shocked at the transformation.³⁴ The news of his death hit headlines immediately. The President and

<http://www.telegraph.co.uk/news/obituaries/9594182/Professor-Dame-Louise-Johnson.html>

³³The city has been renamed Chenabnagar under pressure of some local religious leaders.

³⁴Salam used to weigh around 85 kg but by December 1995, almost a year before his death, he had lost so much weight that, according to Nasir Iqbal, who last saw him on December 5, 1995, he had become a “skeleton” weighing about 40-45 kg.

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the Prime Minister of Pakistan issued the usual statements but the news of the arrival of his dead body was practically blacked out by the official media. However people had lined the road to see the body being carried in a vehicle, the body of a man whose greatness appears to increase with time.

His son Ahmad Salam, who had accompanied the dead body,³⁵ said that the kind of huge reception they got on arrival of the dead body in Lahore was “absolutely unexpected”. It was dark and, he said, that the people who had lined the road were not just the people of his community. He said that: “The line of the people went so far back because they had been told that the body of Abdus Salam was coming through. These were ordinary people.” He was buried in former Rabwah (Chenabnagar) and his funeral was attended by about 35,000 people.

Those who knew Salam as a student remember that he was very obedient to his father. His daughters have also confirmed this in their article.³⁶ It was his will that he be buried near his parents in what was formerly called Rabwah (Chenabnagar). His daughters mention that among his papers, the following note was found:³⁷

If for any reason it is not possible to take me to Rabwah, then let my tombstone read: “He wished to lie at his mother’s feet.”

³⁵Dame Professor Louise Johnson also accompanied the body with their two children.

³⁶Aziza Rahman and Bushra Salam Bajwa: *My Father, Abdus Salam*; in Quarterly *Al-Nahl*, Special issue on Abdus Salam, Vol 8, Issue, Fall 1997, p 53.

³⁷Ibid, p 53.

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For many years Salam had a pet overcoat and a pet hat.³⁸ These would hang in the lobby outside his office if he were around. He carried them with him wherever he went, regardless of the season. Sometimes, when I used to see him from behind, trudging along in his hat and overcoat, he looked like a homeless tramp! Perhaps in a profound way he had no home, like Einstein. He reminded one of his counterpart in politics, Mao tse Tung, who once said that he felt like a lonely monk walking through a rainy world with a leaky umbrella. Thus he has passed into history along side the great unifiers of twentieth century physics - Einstein, Bohr, Heisenberg, Dirac, Schrodinger, Glashow and Weinberg - and as a crusader consumed by the quest for a great ideal.

³⁸It has been pointed out by Munir Ahmad Khan that Salam developed the habit of overdressing because during his studies at Cambridge there was no heating in classrooms and he would wear heavy coats during lectures.

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