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Issue 4

# Al-Nahl

Fall 97

**A Quarterly Publication of Majlis Ansarullah, USA**



**Prof. Dr Muhammad Abdus Salam (1926-1996)  
The Only Nobel Laureate Muslim Scientist**

Prof. Salam with Chaudhri Muhammad Zafrulla Khan on his right  
and Maulana Bashir Ahmad Rafiq on his left.



Left to right: Late Bashir Bajwa, Dr Abdus Salam, Maulana Sheikh Mubarak Ahmad, Dr Wajeeh Bajwah  
(Dr Abdus Salam's son-in-law), Commodore R.U. Bajwah and Late Maulvi Khalil-ur-Rahman.

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**Al-Nahl**

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## Abdus Salam

was the name suggested to Chaudhry Mohammad Hussain - Professor Salam's father - for his son before his birth in a vision. As he grew, Abdus Salam came to be more popularly known as

### Professor Salam.

According to the modern Arabic tradition, Abdus Salam is too short a name and must have a prefix before or a suffix after it. Thus the Moroccan Royal Academy took the liberty of calling him

### Abu Ahmad Abdus Salam

when they admitted him to their membership. In Kuwait, where he went in 1981, he was called

### Abdus Salam bin Hussain

after the name of his father. Later, when he visited Dubai for a Conference, he found himself designated as

### Muhammad Abdus Salam.

Deeply venerating the name of the Holy Prophet, he gratefully accepted this, though he could not change the name in Physics literature or in the Nobel archives. Thus, he has been variously called

Abdus Salam,

Professor Salam,

Abu Ahmad Muhammad Abdus Salam,  
and

Abu Ahmad Muhammad Abdus Salam bin  
Hussain.

(Muhammad Abdus Salam -  
Renaissance of Sciences in Islamic Countries,  
Ed: HR Dalafi and MHA Hassan, p. 341-342.)

# Ahmadiyya Gazette

and

# Al-Nahl

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# Salute to a Great Hero

Since the founding of Ahmadiyya Jama'at in March 1889 under a Divine plan, the members of Ahmadiyya community have witnessed many prophecies of Hazrat Promised Messiah, *alaihissalaam*, being fulfilled. One of the prophecies of Promised Messiah, *alaihissalaam*, relates to exceptional intellectual abilities provided by God Almighty to the members of the Jama'at.

The Promised Messiah, *alaihissalaam*, wrote in his book *Tajalliyat-i-Ilahiyya*:

***The members of my Jama'at will excel others in the fields of knowledge and wisdom.***

While this prophecy has been fulfilled through many members of the community, Professor Dr Abdus Salam held a unique status among them. Although, others became stars on the horizon of human quest for knowledge, Dr Salam outshined them all. He started his journey towards stardom at a very young age and continued to shine brighter and brighter until the end of his life. He secured himself a remarkable distinction in the field of secular sciences and ultimately received a Nobel Prize in Physics in 1979. Dr Salam is generally thought to be a scholar of Theoretical Physics only. In fact, he was a scholar of all the sciences of nature. He brought glory to the Muslim world by becoming the first and so far the only Muslim ever to have won a Nobel Prize in sciences.

Respected Sahibzada M. M. Ahmad Sahib, Amir Jama'at Ahmadiyya, USA, asked Sadr Majlis Ansarullah, USA, Dr Karimullah Zirvi, to publish a joint issue of the *Ahmadiyya Gazette* and the *Al-Nahl* about Dr Abdus Salam. This undoubtedly, is an honor for the Majlis Ansarullah and we humbly thank respected Amir Sahib, USA, for considering us worthy of this important service. That, however, has meant extra responsibility. We have tried our best, within our abilities, to make

this issue a memorable one.

This issue, therefore, is dedicated to the life, work and achievements of Professor Dr Abdus Salam who passed away on November 21, 1996, at the age of 70, *innaa lillaahi wa innaa ilaihi raajioon*. May Almighty Allah rest his soul in peace.

Dr Salam had an extremely balanced personality. While he remained occupied in unraveling the mysteries of nature, he displayed a deep love for his religion at the same time. His religious beliefs grew stronger the more he delved into the depths of scientific realms. He saw no contradiction between science and religion. This aspect of Dr Salam's personality was mentioned by Hazrat Khalifatul Masih IV, *ayyadahullaaho ta'ala benesrihil-aziz*, in his Friday Sermon on November 22, 1996, in the following words:

“In spite of achieving such a high status in the fields of science and technology, he had a true recognition of the existence and Unity of Allah the Almighty.”

Dr Salam, thus, was a great example for other scientists of coexistence of both scientific grandeur as well as strength of religious beliefs at the same time. He was a very hard working, God fearing and humble man and his whole life was dedicated to the service of mankind.

Professor Salam left behind a vast wealth of wisdom, research work, thoughts, and institutions that he founded primarily to give science back to the Muslims and the third world countries. This wealth, undoubtedly, will serve as a landmark and a towering monument to his personality. In this issue, we have neither included Professor Salam's research work, as that would require volumes, nor could we include everything that has been said about him. We have tried to include the thoughts that were expressed by those who had been close to him in life or were touched by his

accomplishments. However, despite our efforts to mention as little as possible about science, there are a couple of articles which touch, rather in detail, his involvement in science. Being a combined issue of the *Ahmadiyya Gazette* and the *Al-Nahl*, the readership is much wider and varied which includes scientists and youth aspiring to become scientists. We hope that this special issue will suit the taste of the varied readership and will be liked by all.

Jama'at Ahmadiyya, USA, humbly pays its tribute to Dr Abdus Salam, the great hero, by publishing this special issue in his honor. We trust Allah, that this issue will reflect, to some extent, the noble character of this great scholar and Dr Salam's life will serve as a beacon of light for the future generations.

In the end, we would like to thank the following for their assistance towards publication of this special issue of *Al-Nahl*:

- i. All the members of Dr Salam's family who contributed towards this issue. They were very cooperative and helpful in providing the necessary material.
- ii. Mrs A. Gatti, Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy for providing pertinent material about the Center and Professor Salam, some of which we have reproduced in this issue.
- iii. Mr Habibur Rehman Zirvi, Assistant Librarian, Khilafat Library, Rabwah and Maulana Naseer Ahmad Qamar, London for providing some historical pictures and other relevant material.

# Farewell Salam, Fare Well

*Majeed A. Mian, Boston, MA*

An embodiment of truth, the vision of heavens  
The looks of a martyr, the spirit of a warrior  
You had in you hues of colors, sweetness of  
honey

You had a place, in all the hearts  
For you are grieving, numerous souls  
Farewell Salam, Fare well

Dogmas of science, theories of Physics  
For you were these, matters of civics  
Resolving issues, spreading peace  
Unity of God, the central theme  
You stuck to it, with reason and goal  
Farewell Salam, Fare well

You had no country, to call a home  
As you transcended, geographical bounds  
Allah had made, the earth your home

The seats of learning, honored you  
Rewards and medals, filled a scroll  
Farewell Salam, Fare well

Noble were you and Nobel you got  
With Quran and Science, Islam you taught  
The secrets of heavens, discovered by you  
A sign of God, displayed in you  
A saint indeed, you killed the troll  
Farewell Salam, Fare well

The plight of Muslims, bothered you  
Their state of slumber, saddened you  
You waged the struggle, to honor them  
Their fate was sealed, you tried them  
You rest in peace, with God of all  
Farewell Salam, Fare well

# Dr Salam's Legacy is Precious and Worth Preserving.

The torch which he lit and carried so proudly for Pakistan will no doubt glow once we shed our prejudices and bring back the lost glory of Islam in knowledge and advancement of science and technology and above all its moral excellence.

*M. M. Ahmad, Ameer, Jama'at Ahmadiyya, USA*

It is a great privilege and honor to be asked to write a Foreword to a Special Issue of Al-Nahl in honor and memory of Dr Abdus Salam. That he was a genius in his own special field is not in any doubt. Besides the grant of Nobel Prize and host of other honors bestowed on Dr Salam by world renowned universities, what makes him so special is that he was the *first Muslim* in the world to receive this prized distinction.

It is sad that the honor acclaimed so generously by so many was stingily conceded by Pakistan in mortal fear of a small coterie of ignorant and mean spirited fanatics. Some of them had the audacity to falsely accuse Dr Salam of passing the secrets of Pakistan's nuclear program to the "ignorant" Jews who had no knowledge about anything nuclear!! This cruel accusation was leveled against a man

- ▷ who gave his all to see his country step into the modern world of Science and technology;
- ▷ who delayed response to invitations of visits from other countries before his own country invites him first;

- ▷ who refused offers of grant of citizenship by many as he resolutely insisted that this honor belongs and shall remain so for Pakistan as a humble gesture of his own loyalty and patriotism.

I have no doubt whatever that history's verdict will be loud and clear in favor of principles which Dr Salam advocated throughout his dedicated life.

A little known event relates to his plan in conjunction with Raja of Mahmoodabad to sponsor an Islamic Science Foundation jointly by Muslim countries, rich and poor, who would contribute a minimal percentage of their foreign exchange earnings to establish a Trust for advancement of higher learning and technology among Muslims. This was to be achieved through establishment of world class chairs on different subjects in universities in different Muslim countries which would be supported by the Trust which will award scholarships to bright Muslim students selected from every Muslim country. The plan was that Raja of Mahmoodabad will tour some Muslim countries in the Middle East and



start the ball rolling. Unfortunately his sudden death by heart failure prevented the fruition of this plan. My own humble attempt, in my capacity as Executive Director of the World Bank, representing Pakistan along with many Middle Eastern countries to excite interest among some oil-rich Muslim countries failed to ignite any favorable response. The pamphlet which Dr Salam drafted for this project is a testimony of his fervent desire to see the Muslim world flourish through acquiring knowledge and high technology to step out of their backwardness into the modern advanced world.

Another instance which is not known to many may be of some interest to the readers. The Prime Minister of UK (probably in his capacity as Chancellor of Cambridge University) addressed a letter to the Prime Minister of Pakistan requesting that Dr Salam may be deputed to UK as his potential cannot blossom without proper research facilities which do not exist in Pakistan and will be available to him in UK. The Prime Minister UK added that he had no doubt that a time will come when people from all over the world will come to him in Pakistan to benefit from his knowledge.

This letter was sent by the Prime Minister of Pakistan to Government of Punjab as Dr Salam, at that time, was working as Professor in Government College, Lahore. Dr Salam was happy and willing to go to Cambridge University but made a request that as he was supporting his parents it will ease his problem if for a short period he is given a monthly allowance of Rs 150 for support of his parents in Pakistan. The Education Department supported this request but in a typical bureaucratic approach, the Finance Department opposed the proposal on the ground that "it will be a bad precedent." I had no difficulty or hesitation in disregarding the advice of the Under Secretary of the Finance Department and added that Pakistan will be happy and fortunate to have many such precedents. The request must not be denied for fear of similar joyful precedents.

When Dr Salam was honored by Nobel Prize I sent him a cable stating that he is among the first

fruits of the Promised Messiah's prayers and prediction:

"Almighty Allah has revealed to me many times that He will bestow great honor upon me and will fill the hearts of people with my love and will cause my community to spread all over the world. He will cause my community to prevail over all other communities. *People of my community will excel in knowledge and wisdom.* Because of their light of truth, the arguments and the signs of Divine Support, all others will have no reply to them. Every nation will drink from this fountain. This community will spread with great force and will prosper till it encompasses the whole world."

*Tajalliyat-i-Ilahiyya*  
(Written in March 1906).

The fact, that among nearly a billion Muslims, the only one who qualified for a Nobel Prize was an Ahmadi Muslim, speaks for itself. His emergence on the world scene was no surprise to us. *Subhan Allah, Allah-o-Akbar.*

Dr Salam's legacy is precious and worth preserving. The torch which he lit and carried so proudly for Pakistan will no doubt glow once we shed our prejudices and bring back the lost glory of Islam in knowledge and advancement of science and technology and above all its moral excellence. But, first we have to decide whether we listen to ignorant mullahs who – believe it or not – proclaimed that US claim of landing on the moon was false "as crescent is too narrow to permit a man to step on it!!"

The choice is whether we blindly follow such notoriously ignorant and genetically allergic to light and knowledge – divine or otherwise – mullahs or enthusiastically engage in learning and promote whole-heartedly science and technology, as advocated indeed by Islam, and thus be counted among the advanced prosperous countries of the world.



# The Followers of the Promised Messiah will Excel in Every Field of Knowledge

*Prophecy of Hazrat Mirza Ghulam Ahmad,  
The Promised Messiah and Mahdi, alaihissalaam*

The Promised Messiah, alaihissalaam, made bold prophecy that his followers will be righteous and shall excel in every field of knowledge. Dr Salam was one such example of the fulfilment of this prophecy. Hazrat Aqdas wrote as follows in his famous book *Tajalliat-i-Ilahiyya (The Divine Manifestations)* written in 1906.

Therefore, O Mullahs! If you can fight with God, do. What was not done to poor Jesus, son of Mary, before me? In their fancy the Jews crucified him but God Almighty saved him from the cursed death on the cross. He was considered to be a liar and a false claimant at one time but now he is eulogized by four hundred million human beings and worshipped as god by ordinary people and kings. Although these people are wrong and mistaken in making a god of a humble human being yet this is the answer to the Jews who wanted to trample him under their feet.

I have prayed and I am confident that Allah will never make me the cause of *shirk* like Jesus son of Mary and my followers will not associate any partner with One and the only God Almighty. However, Allah has informed me many a times that He will bestow great honors upon me and hearts of the people will be filled with love for me. God will cause my Jama'at to spread all over the Earth and cause my people to be victorious over all other groups. **And the members of my Jama'at will advance in knowledge and understanding so much that they will render the enemies of True Islam speechless through the light of their truth and logical arguments.** Hosts of people will enter my Jama'at from all nations of the world to taste the spiritual water from my fountain and will become a dominant force. There will be many trials and obstacles on the way but God Almighty will fulfill His promise of final victory. And God addressed me in these words:

“I will give you blessings upon blessings so much so that kings will seek blessings from thy garments.”

(In the state of a vision, I was shown those kings riding on horses, and I was told that they will help spread my message and God will make them successful). So, listen carefully and remember always these glad tidings from Allah which are sure to be fulfilled one day.

(Roohani Khazaain, Vol. 20, Pp 408-9, London Edition)

“All fathers like to praise their sons and have high expectations.

Salam’s father had expressed similar hopes

but Salam fulfilled all his expectations.”

*Remarks made by*

*Hazrat Musleh Mau’ood, Khalifatul-Masih II, may Allah be pleased with him, at the nikah ceremony of Dr Abdus Salam*

Dr Salam’s father had limited income and large family to support. Salam was a brilliant student and he used to stand first in his class from his primary school days up to his master’s Degree in Mathematics. He won seven medals and Government scholarships throughout this period. He was also awarded Jama’at’s scholarship.

According to Dr Salam’s father, “Sir Chaudhri Muhammad Zafrulla Khan, in December 1939, at the eve of the Silver jubilee of the second Khilafat, initiated Jubilee Fund and contributed 3,00,000 Rupees. Hazrat Musleh Mau’ood, may Allah be pleased with him, made the following announcement at the time of Jalsa Salana:

- ☑ Any Ahmadi student who obtains First Position in his school in Matriculation Examination shall be awarded 30 Rupees monthly scholarship for two years.
- ☑ A student standing First in FA (Fellow of Arts)

Exam shall be awarded 45 Rupees monthly scholarship to complete his BA.

- ☑ And one who stands First in BA shall be awarded 60 Rupees a month for completion of his MA Degree.
- ☑ Any student pursuing higher degree after MA at any western university shall have half his expenses paid out of this Jubilee Fund.

I mentioned to Hazoor that Salam will win all these scholarships. And exactly that is what happened. Salam won all the Awards.”

Hazrat Khalifatul-Masih II stated at the time of nikah (marriage ceremony) of Dr Salam:

“All fathers like to praise their sons and have high expectations. Salam’s father had expressed similar hopes but Salam fulfilled all his expectations.”

(Translated from Urdu by Dr Rasheed Azam)

# Intellect, wisdom and insight were bestowed upon Dr Salam from Allah

*An Address by  
Sayyedenā Hazrat Mirza Nasir Ahmad,  
Khalifatul-Masih Thaalith  
(May Allah bless him)*

Addressing the Annual Ijtema of Lajna Imaillah in Rabwah on 20th October, 1979, Hazrat Aqdas, Khalifatul-Masih III, expressed his thoughts about Dr Abdus Salam, the world famous scientist and glorious son of Ahmadiyyat, with great affection and admiration. Dr Salam is awarded the highest award, Nobel Prize in Physics, Hazoor said, and God has given him great intellect, wisdom and insight and he is able to mold his life and character according to the teachings of Islam. From early childhood, he learnt to make the best use of his time and abilities to become the top scientist in the world, Hazoor added.

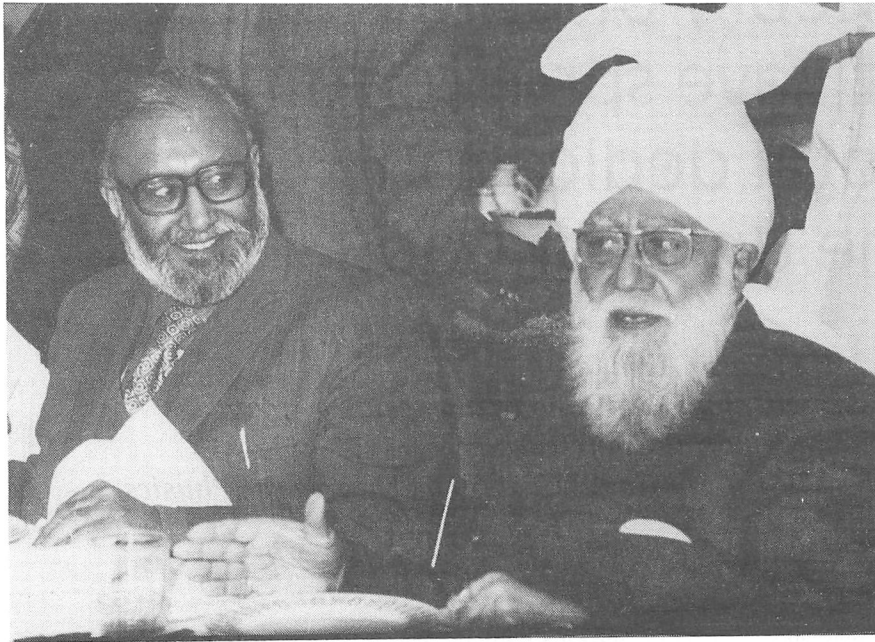
Dr Salam enjoys high status and is well respected among the community of world scientists. He is very unassuming and behaves like an ordinary human being when he meets others but others (including scientists from America and Russia) stand up to honor him as soon he enters any conference hall, Hazoor said. His life resembles the life of that great saint who was once invited to a royal feast but was turned away because he was poorly dressed. However, he was admitted when he came back dressed up in very expensive clothes and was highly entertained. He lowered the sleeves of his dress in the food and when asked as to what was he doing he replied that: “Am I not honored for my Cloak? So, it should enjoy the feast!” Dr Salam is not consciously bothered about his high status. Greatness is not awarded because of one has clothes or wealth, Hazoor remarked. As it is stated in the Holy Quran that the Holy Prophet (peace and blessings of Allah be upon him) is directed by God Almighty to say:

إِنَّمَا أَنَا بَشَرٌ مِّثْلُكُمْ

“I am only a man like yourselves” (The Holy Quran, 18:111).

All human beings are equal as humans but their righteousness (taqwa) makes the difference.

(Al-Fazl, Rabwah, October 21, 1979. Translation by Dr Rasheed Syed Azam)



Dr Salam with Hazrat Mirza Nasir Ahmad, Khalifatul-Masih III, rahemahollah.

# His theory of Unified Field must have sprung from his total dedication to the Unity of God.

*A Message*

*By Hazrat Mirza Tahir Ahmad,*

*Khalifatul-Masih, ayyadahollaho ta'ala*

*For The Salam Memorial Conference*

*Convened By The International Center For Theoretical Physics,*

*Trieste, Italy,*

*19-22 November 1997*

The following message was sent by Hazrat Khalifatul-Masih IV, ayyadahullaaho ta'ala benesrihil-aziz, on November 21, 1997, to the Abdus Salam Memorial Conference. Dr Wajeeh Bajwa.

## In The Name Of Allah, Most Gracious Ever Merciful

I take this opportunity to express my gratitude to the Administrators of the International Center for Theoretical Physics, to the conveners of this Conference and to all the delegates who took time to come for paying tribute to the cherished memory of Late Professor Dr Abdus Salam.

I express my gratitude once again to the organizing body for providing me the singular satisfaction of being associated with this auspicious occasion in the honor of a unique man of genius.

I knew him from my childhood but only in a way that a child would know of stars. There was nothing intimate and personal to our relationship which began in earnest as late as in 1978, during my holiday visit to North America and Europe. When he learnt of my arrival in London with my

wife and two elder daughters, he insisted to find time to visit his home. Perhaps he also had in his mind the intimacy and love with which my late mother always treated his wife when she was a young student at Qadian prior to partition of India and Pakistan. His wife, Amatul Hafeez Begum, was even more keen for me and my family to spend a few leisurely hours at their home with their family. While the ladies were busy chatting together in another room, Dr Salam and I were closeted together in his personal room. It was then for the first time that we developed a deep personal, intellectual, spiritual and cordial relationship which was to last till his death. His death left me mourning the departure of a most charming person whose interest was not confined to any single field of human inquiry.

During that meeting, I discovered him in the broadest perspective that he deserved to be discovered. He knew religion, he understood the philosophy of cryptic Sufism, his knowledge of history was wide and profound. Theoretical Physics was his subject but that was not the only subject of which he had a masterly command. His profound knowledge of chemistry, biology and the universe of sub-particles was amazing. His intimacy with cosmology was no less surprising. But when it came to the vastness of nature and its oneness with the attributes of God, it was there that he out-shone all other fields of his intellectual pursuits. His theory of Unified Field must have sprung from his total dedication to the Unity of God. He had a firm belief that everything began with Allah and will end up in Him. This might have motivated him to scientifically prove the hypothesis of the unification of fundamental forces of nature. During our discussions, he revealed to me that he had already advanced his research to demonstrate the Unity of two other fundamental forces. Had his life permitted, I am sure he could have received another Nobel Prize for his advanced work in this field.

This short tribute to the memory of his genius is not meant to dwell upon all his scientific achievements. I want to share with this august assembly today only a few glimpses of Dr Abdus Salam who did not hesitate to discuss immense complications of his advanced scientific knowledge with an uninitiated person like I was. He took pains to make me understand why the speed of light could not exceed beyond 186,000 miles per second. I continued, however, to argue that under certain hypothetical conditions, the speed of light could be enhanced beyond this limitation. His tolerance with me during the course of this discussion, while I was a mere novice to the subject of Theoretical Physics, was a great tribute to his patience and grand-heartedness. At the end, however, he cautiously conceded that if, as I suggested, the properties of the medium which facilitates maximum speed of light would correspondingly change even transcending the

present limitation. It was not his personal conviction, of course, his acceptance as conditional only to the big IF involved. He accepted my suggestion realizing perhaps that the real implication of my suggestion was related to the limitless attributes of God.

Among many questions I raised to quench my thirst for knowledge, was one regarding the incomprehensible nature of heat radiation. It could travel at the speed of light, as though riding its wings, yet it could also move so slowly as to take ages to reach the other end of a large room. If a fire is lit in one corner of a big hall, the people sitting in the other, would hardly feel any heat emitted by fire.

This and other intriguing questions were raised by me and answered by him in full earnest. To the question of heat radiation, he answered, as though in a confidential tone, that the one thing which even the scientists fail to understand is the true nature of heat. It was during that fascinating informal talk that I came to learn of the vastness of Dr Abdus Salam. It was in that unique vastness that his genius lay. Ever since that meeting, we were not really separated again. He continued to seek my interview to help him resolve various problems which confronted him from time to time and I never failed to make the best use of such meetings to enhance my personal knowledge.

His philanthropist attitude was boundless. It was truly universal without the least parochialism. No religious, political, ethnic or nationalistic boundaries were charted on his purely human heart. The Institute of Theoretical Physics at Trieste has always paid and will always pay a standing ovation to the humanist in Dr Abdus Salam.

Allah bless his soul in the hereafter and may He also bless the noble objectives he pursued in the vastness of the material world he has left behind.

(Signed)

Mirza Tahir Ahmad,  
Head of the Worldwide Ahmadiyya Community,  
London, UK.

When you ask for grandeur from Allah, always ask for the grandeur in humility and ask for the grandeur of Islam which comes down from the heavens.

Friday Sermon Delivered by Hazrat Khalifatul Masih IV (ayyadahollaaho benasrihil-azeez) on November 22, 1996

Translated by Dr Karimullah Zirvi

كُلُّ مَنْ عَلَيْهَا فَانٍ ۝  
 وَبِبقَىٰ وَجْهِ رَبِّكَ  
 ذُو الْجَلَالِ وَالْإِكْرَامِ ۝  
 فَنبِأِيَّ اللَّاءِ رَبِّكُمْ أَتُكذِّبُنِ ۝  
 يَسْأَلُهُ  
 مَنْ فِي السَّمٰوٰتِ وَ الْاَرْضِ ط  
 كُلَّ يَوْمٍ هُوَ فِي شَأْنٍ ۝  
 فَنبِأِيَّ اللَّاءِ رَبِّكُمْ أَتُكذِّبُنِ ۝

These are the verses of Sura Al-Rahman which I have recited and their translation is that all that is on it (earth) will pass away.

وَبِبقَىٰ وَجْهِ رَبِّكَ  
 ذُو الْجَلَالِ وَالْإِكْرَامِ ۝

And there will remain only the Person of thy Lord, Master of Glory and Honor. He is the Master of Glory and Honor.

فَنبِأِيَّ اللَّاءِ رَبِّكُمْ أَتُكذِّبُنِ ۝

Which, then, of the favors of your Lord will

you twain deny?

يَسْأَلُهُ  
 مَنْ فِي السَّمٰوٰتِ وَ الْاَرْضِ ط

Of Him do beg all that are in the heaven and the earth.

كُلَّ يَوْمٍ هُوَ فِي شَأْنٍ ۝

Every day, He reveals Himself in a different state. Now here the word *yaum* is used as a measure of time. Therefore, every moment is included in the meaning of the word *yaum*. Again Allah the Almighty says:

فَنبِأِيَّ اللَّاءِ رَبِّكُمْ أَتُكذِّبُنِ ۝

Which, then, of the favors of your Lord will you twain deny? Here the verse includes the word *twain* or both of you. When we say *you* in Urdu, it is not necessary to repeat the word *twain* or both of you. However, in the Holy Quran, whenever a question has been raised, it has been raised by saying *both of you*. That is, of which matters and of which glory and manifestation of Allah you twain deny or will deny?

These verses contain the subject matter which is very deep and full of wisdom. At present, it is



not the occasion to go into the long commentary of these verses. However, there are a couple of points about which I want to draw attention of the Jama'at. Every thing is mortal and will come to an end. Now, this is such a proclamation that everyone in his daily life sees it. Why has it been repeated and why so forcefully and in such a way that it is great challenge for both small and big people. It addresses the Jinn and the human beings, that is the big people and the small or the ordinary people, and it challenges magnificently to all of them:

كُلُّ مَنْ عَلَيْهَا فَانٍ ۝

All that is on the earth will pass away. This statement has a wisdom in it. In fact, every human being thinks that he is here for ever. This is a strange, contradictory life, that a person passes through. He does not have the consciousness that there is a contradiction within himself, within his thoughts. He observes and sees that everybody is dying and passing away. Everybody is gone and no one is left in the world. With the passage of every day, there are changes that occur, and with each death there is change in the world. After some time the whole world is changed. So, inheriting the world which has changed so many times, and living in such a world, he does not think about himself that he will have to leave the world one day. When he will be about to pass away from this world, at that time, realization that he was a mortal will not benefit him.

The same topic has been stated in the Holy Quran at several places in reference to Pharaoh. Especially, relating to the time when he begged Allah while he was downing: Now I have faith, I believe in the Lord of the Children of Israel. That prayer of the Pharaoh was then rejected, not totally, but from the central point of view. The reason it was rejected was that when a mortal human being sees death face to face, that is the time he realizes that he is about to die. He realizes that he is not eternal and feels that all of his life is going to go to waste; all efforts, all wealth, all

possessions, all the good name and the worldly glory are left behind. When one, all by himself, is ready for coming face to face with Allah the Almighty, then he makes such pledges that now he believes in Allah and asks Allah to protect him. However, Allah says that when you come face to face with death and then start praying for protection, these prayers will not benefit you. Even if physical life is granted, the extension of spiritual life is not possible. So, this is such a subject which is common to everyone in the world. In reality, a person does not believe in his own end as strongly as is essential to make changes in one's life. This is the reason that the people in the world, while knowing that they are destined to die, still do not make changes in themselves. So, when Quran expresses this subject in such a magnificent way, which apparently is well known to everyone in the world, it tells that you only think that you know that everything is mortal. In fact, you do not realize that *everything* is mortal. When Allah has talked about *everything*, then to announce after that by God Almighty:

وَيَبْقَىٰ وَجْهَ رَبِّكَ  
دَوَالِجَلِّ وَالْاَكْرَامِ ۝

Yes, it is only the Glory and Honor of your Lord that will remain. The other meaning of the word *wajh* is the 'Pleasure of Allah.' That will maintain. Whatever Allah wills to maintain, that He will maintain. Whatever will remain, will be only what He wills to remain. Whatever will remain will remain only by linking to Him and with His support. Nothing can survive without Him. So the manifestation of the Glory and Honor of Allah the Almighty will remain and also that being, that person, can survive with whom Allah is pleased from the beginning to the end and who is constantly in the sight of Allah. However, when Allah is pleased with someone, that person can not stay away from Allah.

The other point worthy of note here is the link between destruction of the things along with their

grandeur. Your honor, possessions, whatever you have earned in the world and for which things you were stuck with the world, remember, they are mortal, will end and nothing of it will remain. Yes, it is only the Glory of Allah the Almighty and his honor that will remain. So, if you strive for your honor and struggle to achieve worldly fame then remember, the time will come when all these will vanish. The question arises that fame and honor of some nations, some people and some big kings appears to remain in the world while they have passed away. Why did their fame remain behind? There are two responses to that. One is that this subject is concerned with the final destruction before the world is brought to a naught. So before mankind is completely annihilated from the world, even if the glory and fame of some people remains that does not have any significance, because, in the decree of Allah the time is not in the same concept as the human beings know it. Allah the Almighty is not restricted by any measure of time, present, past or future. He is eternal and He will continue to live on for eternity and this is the guarantee that besides Him everything else will come to a naught. Nothing else can claim to have eternity. The earlier false notions of the world which people had, like the one Arya Samaaj had, that the faith that the world has been from eternity, and even some European philosophers have said that since nothing can come out of non-entity thus the world has been from eternity. Dr Abdus Salam Sahib has done a great job in negating this concept completely. Earlier the people had the concept that proton can never be destroyed. Before that people held a view that atom can not be destroyed. This was considered to be a law, not a concept. They call it the law of indestructibility of atom. Whatever may happen atom can not be destroyed. However, scientists before the time of Dr Abdus Salam Sahib have proved that atom can be destroyed because the atom bomb could not have been formulated. But when they studied the universe deeply, then the concept of *black hole*

which has developed and the scientific estimates they have taken about its nature, all that have shown that the black hole only comes into existence when atoms are crushed by each other and the distances between electrons as a result of the gravitational pull come together in such a fashion as if a great and immense universe has constricted into a very small circle. And that small circle keeps shrinking in size till with its own force it commits suicide. As if the thing submits itself to the greatness of the force and enters into such a circle of destruction. The human beings do not know that what lies on its other end. This is called *Event Horizon*. So, this part which concerns with the past, the scientists have realized that this universe is not here from eternity, however, as far as the eternity is concerned they have been stuck for long time that proton is indestructible. Dr Abdus Salam Sahib, may Allah be pleased with him, has done a great job in this concept. Before his illness, when I had the chance to discuss it with him, he told me that mathematically he was able to prove that the protons have *this much age*. The scientists have accepted his point of view as a concept. However, there are two or three concepts. Some scientists say that it is one part less and some say that it is one part more but even that part is also a huge number, Therefore, I do not want to mix you up in huge numbers. It is the number raised to the power of thirty two or thirty three or thirty four. That is what the scientists are arguing about. And there is such an immense difference between power of 33 and 34. Although there is just the difference of one between 33 and 34, however, when you are talking in terms of powers, the ordinary human mind and untrained human mind can not even imagine what and how big the number is. However, by the grace of Allah, the scientists and mathematicians through their reasoning can determine subtle things. They can get information even about the corners of the universe through their reasoning. As far as I remember Dr Sahib had presented the concept of

raised to the power of 33. He told me on many occasions that right now in the world there are several great laboratories which are spending huge amount of money and are working on the project. One such lab is in America, one is in Italy and may be one more is somewhere else in the world. Until now the news that have been received are encouraging. If this point is proved with certainty, then it is not far from possible, that he would have received another Nobel prize. That is, as his right, he would have become such a Nobel Laureate who had the repeat award given to him. That is the honor given in the world, which was possible, but as far as the understanding and wisdom is concerned, by the grace of God, his superiority with respect to wisdom is well established and accepted all over the world. There is no scientist in the world who does not look upon him with honor. As a matter of fact, with respect to the moral values and the strength of character, he is the one scientist that even great kings in the world respected him. In fact, they bowed their head to him because of his respect. Dr Sahib spoke to me very informally and told me several times how the kings and heads of states treat him. They invite him: *You come to us so that we could serve you in a kingly manner and satisfy our heart and mind that we have also served some great man.* But in spite of that, there was not a single iota of arrogance in him and this was the real strength of character which is not related to any medal.

So, turning to this aspect of the subject, I will mention a few points about Dr Sahib. Before that I want to point out that in this verse of the Holy Quran there is a strange message for common people also who cannot attain any heights. For them the message is that you as well are either amongst the big people or the ordinary people, but the big people and the small people will come to a naught. Even the great and big men together with their honors and glory will be brought to a naught. Similarly, the lower ones as well, whatever pride they have, will be brought to an end along with their pride. Then why should you be jealous of anyone for this temporary thing? Why should you

suffer on this score that somebody has become big and somebody has got so much knowledge and someone is being granted so many honors by the world? The honors of the world and all the glories of the world will come to an end? Why don't you develop your relationship with the One Whose glory will never end, Whose honor will never end?

This is the subject mentioned here in these verses, which serves as a sort of ointment for the wounds of despair of every human being in a way that it becomes a cure for each discomfort, but only if one changes his *inclination*. So today, this morning, when I was praying for Dr Sahib, this subject appeared in my heart and mind, and gave another angle to my prayer. I said to myself that these honors of the world, if not today then tomorrow will come to an end. Nothing of these remains, however, the honor of the pleasure of Allah the Almighty, which has been mentioned in the words

وَجْهٌ رَبِّكَ

that is eternal. So for him, Dr Abdus Salam Sahib, in the words of the Holy Quran, I prayed for him

اِرْجِعِي إِلَىٰ رَبِّكَ  
رَاضِيَةً مَّرْضِيَةً ۝

that O the Satisfied soul! Return to your Lord as *raadiyah* that is in the way that you are pleased with your Lord and as *mardiyyah*, that your Lord is pleased with you. Thus, the eternal life and eternal good tiding that are associated with the words *wajho rabbeka* that becomes part of these two words of the Holy Quran *radiyatammardiyah*. A person who is not pleased with Allah cannot achieve eternal life. Similarly, a person with whom Allah is not pleased can not acquire eternal life. So with that thought, my attentions changed. Instead of saying that today such a person has left us as a result of which a big

vacuum has been created and the Jama'at will feel that vacuum, I thought, why shouldn't I say something which is an eternal theme and an everlasting theme. So with the good end my attention was drawn to the good beginning, and I thought that in reality people when they are looking at a good end they are so impressed with that often they do not even think of the beginning, while, there are a lot of only and righteous ends whose foundation is laid down even before their birth, Dr Abdus Salam Sahib is one of such persons. For example, Chaudhri Muhammad Zafrulla Khan Sahib, may Allah be pleased with him, the grandeur and heights which were granted to him, he reminded the world again and again that they were result of the acceptance of the prayers of his mother. Nothing more than that. Her attachment to the Unity of God and her firm, unshakable faith in the Unity of God, where she rejected every thing besides God, were the virtues which by the grace of Allah appeared to her as a blessing. So he used to say, *I am just a fruit of the acceptance of prayers of my righteous mother*, and this realization led him towards humbleness. He used to speak very freely about all these things. He was very open with me and used to tell me on many occasions that this is the gist of the whole story. What am I? What is my personality? I am just a fruit of the acceptance of prayers. The same way, Dr Abdus Salam Sahib as also a fruit of prayers. His father, Chaudhry Mohammad Hussain Sahib, and his mother probably her name was Hajira Begum Sahiba, both of them were very holy persons. Both were very righteous, very simple and clean, straightforward, and lived truly pious life. After acceptance of Ahmadiyyat, these qualities became ever more pronounced. Before the birth of Dr Abdus Salam Sahib, his father saw in a dream that a beautiful, pious son is being given to him and his name was *Abdus Salam*. So he wrote this dream to Hazrat Musleh Mau'ood, may Allah be pleased with him, and since he was a very humble person he did not name the child

himself based on his dream. Rather, he wrote the dream to Hazrat Musleh Mau'ood, may Allah be pleased with him, and asked, *what should I name the boy?* Hazrat Musleh Mau'ood, may Allah be pleased with him, said, "When Allah has named the baby already who am I to give him another name? Name him *Abdus Salam*." So the name, Abdus Salam was given to him in accordance to the decree of Allah which was a fruit of the acceptance of his parents' special prayers and this boy then throughout his life has proved the truth of that dream and acceptance of special prayers of his parents.

So, there is another lesson for us in it. A person has passed by and we can say with reference to his passing away that O Allah! grant more Nobel Laureates to the Jama'at, to the Community. Allah the Almighty says:

وَيَبْقَىٰ وَجْهٌ رَبِّكَ  
ذُو الْجَلَالِ وَالْإِكْرَامِ ۝

How many Nobel Laureates are there and how many Nobel Laureates Ahmadiyyat will encounter? There are thousands of Nobel Laureates and more will come. Even if four more are given to the Jama'at by begging Allah, what difference will that make? However, those award winners who have won the prizes granted by Allah the Almighty, even if he is unlettered, that prize winner can become such a high ranking award winner that even the top notch learned people and prize winners of the whole universe would take it as an honor to do menial service for him. They will feel an honor to serve him. So, why should we be satisfied with smaller things? Why should we ask for smaller things? Pray like Dr Abdus Salam Sahib's father did for his son. Allah the Almighty accepted the prayers in this way that He then granted him His acceptance and His pleasure. This has been borne out by every

moment of Dr Abdus Salam Sahib's life.

In spite of achieving such a high status in the fields of science and technology, he had a total recognition of the existence and Unity of Allah the Almighty. Once he told me, *when I go to scientific meetings, I sometime hear whispers that I am being pointed out, and people whisper to each other that this is the man who believes in God.* Now, some other scientists have also started doing that and have increased in number than before. However, the splendid way in which he has paid his dues with regards to belief in One God, and carried the flag of the Unity of God, is not found in any other scientist in this living world. And then the humility which develops in a person as a result of the faith in the glory of Allah the Almighty, that humility was always portrayed in his personality. He always undertook the service to the Jama'at. I am younger in age than him and with respect to worldly knowledge I have no comparison with him. However, whenever he met me or talked with me he was always so respectful that he fulfilled all the demands of respect which are due by being associated with Khalifat. He would fulfill those demands of respect in such a way that I was amazed. He would consult me and say exactly what I would say and he would do what I used to tell him to do. Either he would not ask my advice, but if he sought my advise then he will accept it. So, seeing how humble he was, I used to envy him that how learned he was in sciences and yet was so humble. Now, you think about it, that I was discussing science with him, he did not say that you do not know anything, you even do not know mathematics, what are you talking about with me? Rather, he would listen to me with deep attention and then he would try to convince me with arguments. I remember, once I was discussing with him about speed and told him that the scientists and particularly mathematicians have this rather fixed point of view that nothing can go beyond the speed of light. So, I said to him, *I can not accept this limitation which is being put, because, I believe that nobody can put a limitation upon Allah the Almighty, the creator.* He then took out his mathematical calculations and drew maps and

diagrams. Then he said look according to the mathematical calculations it is impossible and even through the concepts of Physics it is impossible. I understood what he told me and said that whatever you have said you have given me proper arguments for that and I can not deny the arguments you have given. However, there is one more point that I would like to say: *Can you tell me that all these things are not linked to and conditional with the concept of the universe that you have at present? Is it not true that matter is a medium for the waves? If there is no matter present even then there should be some medium; it is the qualities of the medium which determine the speed. So besides ether, can their be any other medium? If there is no ether then question arises how a thing keeps moving and how the waves are formed when the waves are quality of matter and not of the movement?* These were subtle points. Dr Sahib did not take a moment to understand these. He told me that Einstein believed that it is ether and it is the qualities of ether that are evident, however, the other scientists are not convinced yet and still no definite proof has been found. I asked if a definite proof could be found. He said that it is possible. I said: *If besides ether there is some other medium which has different qualities then can the speed increase?* He said, "Yes, it can increase." So I said, *then you tell me that if something doesn't need a physical medium and it is a spiritual thing then which law will restrict Him that His message can not travel and reach where He wants it to reach with much more greater speed than the speed of light?* As he believed in Allah the Almighty so it was not possible for him to deny that. After that he did not say anything. Only he said: "Yes, yes in principle I believe it, that it is true. It can happen like that. However, whatever is presently known in the known world, I can not deny that."

So, in this way, he had that humility, that courage, that a person who does not even know the ABC of science, and who had no status in comparison to his knowledge of science, he was discussing these complex issues with him and trying to make him understand the things; and

when an argument was given, which in accordance to his faith should have been accepted, he would accept it. So this, as well is a sign of greatness that is humility. There is no contradiction in these two, greatness and humility. As a matter of fact, they are linked with each other and they are dependent on each other. That is why, the prostration is related to grandeur and heights. The word *rif'at* in Arabic, is pronounced as *rif'at* but in Urdu some people say it as *raf'at*. So I also sometimes pronounce it as *raf'at*, but actual pronunciation is *rif'at*, which means heights. The grandeur or the heights granted to human beings are deeply linked to humility. That is why in prostration we have been taught to say the prayer, *rabbeyal-a'laa*, that is, our Lord is the highest. It means that when you have put your forehead on the ground in front of your Lord, you have stooped as low as you could physically, now if you realize that your Lord is the Greatest, then you will get blessings from your Lord, and the one who realizes the grandeur of his Lord, he keeps bowing down more and more in humility. Both the grandeur and humility are part and parcel of one another. The greatest humility in the world that was ever demonstrated was that by the Holy Prophet, Mohammad, peace and blessings of Allah be upon him, and he was the one who was accorded the greatest grandeur. So with that passing of a great person we should talk about those *themes* which make the people great and which are a common message for everyone. So, for the sake of knowledge even if I say that pray that may Allah grants us a hundred Nobel Laureates, what will be the end product of that? Would they increase in their grandeur than the Holy Prophet, peace and blessings of Allah be upon him, who did not have the chance to sit in a school? He was unlettered but he excelled in every respect from all those who were knowledgeable. His knowledge was the greatest and the highest. So, why not beg for those heights which all of us will share, that is, a small person or a big person, a poor person, a person from a third world country

or a citizen of a developed country, all they have a common message that the true source of knowledge, the true source of honor, whose knowledge and honor will remain forever, is Allah the Almighty and one should bow to Him. Establish your relationship with Him. And then every one of you can be granted such heights which you can not even think of. So may Allah give high status to Dr Abdus Salam Sahib in the Hereafter. May he be granted and continued to be granted highest status in paradise and the fruits of his acceptance of prayer may be granted to his children and the children's children, to his progeny. Some of his children have such a pious nature that you look up to them with expectations. Aziza is his daughter. Whenever I see the younger son of Hamidur Rahman and Aziza (his picture appearing elsewhere in this issue), I always tell them that I can see Dr Abdus Salam in him, another Dr Salam. When I say this I do not mean that at all that he will only become a Nobel Laureate some day. When I say that, I am explaining to them that it is my prayer that Allah may create those qualities in him which are the forebearers of spiritual heights. Compared to spiritual heights the worldly heights are nothing. However, as a result of the spiritual heights if he becomes a Nobel Laureate as well, then that is a twofold benefit. What an excellent thing that will be! Subhaanallaah (Glory be to Allah). Noorun 'alaa noor (Light upon light).

So, when God's pleasure will be associated with the Noble Prize then more blessings will descend over blessings. So for that child I always pray like that, you also remember him in your prayers and you should also pray for your own children that if from the worldly point of view the grandeur and heights are not decreed then O Allah we beg of you for only one thing that You look at them in the way that their birth is the birth of Salam, the birth of peace, and their death is also the death of Salam, the death of peace.

وَالسَّلَامُ عَلَيَّ يَوْمَ وُلِدْتُ  
 وَيَوْمَ أَمُوتُ وَيَوْمَ أُبْعَثُ حَيًّا ۝

And peace was on me the day I was born, and *peace there will be on me* the day I shall die, and the day I shall be raised up to life *again*. (The Holy Quran, 19[Maryam]:34)

I am drawing your attention to the *peace* mentioned in the prayer of the childhood of Hazrat Isa, peace be upon him, which has been spoken of in the Holy Quran. In his favor, Allah the Almighty had written down that peace which became for him the peace of death and also the peace of life. So, whenever, you ask Allah for heights for grandeur, ask for the heights of humility, the heights of the peace that descend from the Heaven. In whatever form it descends it appears most beautiful and attractive. However, to have expectations of somebody is one thing and for those expectations to be fulfilled is a different matter. So the prayer should be that Allah protect the person from all risks and dangers of each step which one comes across along the path and take him to the upper limit of the heights endowed to that person. So the children in whom I see high *promise*, superior qualities and their intelligence is apparent from their face, I always pray for them, "O Allah take him to the highest capacity decreed for him."

Now in the prophecy about Hazrat Musleh Mau'ood, may Allah be pleased with him, there is a very deep point of wisdom which has been described, that is, every human being has been endowed a highest point of achievement by God; it has been decreed that he can develop up to that point. He can not develop beyond that point. However, there is majority, rather there is such a vast majority, may be it can not be put into numbers and figures, who remain very much below that highest point of achievement fixed by Allah and die. Rather, there are many who instead of moving in the direction of that highest point they start moving in a different direction. This

subject has been explained by this verse of the Holy Quran which I have explained many times:

وَلَوْ شِئْنَا لَرَفَعْنَاهُ بِهَا  
 وَلَكِنَّهُ أَخْلَدَ إِلَى الْأَرْضِ وَاتَّبَعَ هَوَاهُ

And if We had so desired, We could have exalted him thereby; but he inclined to the earth... (The Holy Quran, 7[Al-A'raaf]:177)

The Holy Quran speaks of an unfortunate person that, if he had wanted, the capacities that We had given him as a result of that he could have raised himself to that highest point which was endowed to him from the Heavens. He could have that highest point which was decreed for him by Allah.

وَلَكِنَّهُ أَخْلَدَ إِلَى الْأَرْضِ

However, he bowed down towards the earth. So good beginning also reminds you of your responsibilities, your responsibilities concerning prayers and reminds you to think that those people for whom you have love, compassion and from whom you have expectations, for how long can you protect them, remain with them? Up to what time can you hold the belief that the worldly attractions will not pull them? So, this prayer is also so essential that O Allah take him to a righteous end. So, from that point of view the most loving prayer which is the soul of my life, about which I some times remind people very humbly in my letters before Ramadhan, that prayer is: "O Allah include us amongst those people for whom the call comes from the Heaven. Their welcome is given to them with this eternal message:

يَا أَيُّهَا النَّفْسُ الْمُطْمَئِنَّةُ ۝  
 ارْجِعِي إِلَىٰ رَبِّكِ رَاضِيَةً مَّرْضِيَّةً ۝

And thou, O soul at peace!

Return to thy Lord well pleased *with* Him *and* He well pleased *with thee*."  
 (The Holy Quran, 89:28-29)

Thus, for the one who achieves such a pious and good end, what better end one can imagine? So, for this holy spirit which has left us we pray, "O Allah include him amongst those people who when died would have received this message in their ears, and to whose soul God Almighty would have given this kind of message. May God Almighty grant his children as well that grandeur which has its basis in the relationship with Allah the Almighty." When, for a person the relationship with Allah the Almighty is the basis of grandeur, when the prostration is the signal of the grandeur, when they prostrate they realize that Allah is the Greatest then such a person cannot remain inferior. Rather, due to his relationship with God Almighty, he is definitely made a superior person. So, offer these prayers for yourself, for your progeny, for all those who have gone by and for the future generations as well, because, still there is time for reward as the last accounting takes place on the Day of Judgement. May Allah grant these grandeurs to the Jama'at, and as His sign may God Almighty grant the Jama'at worldly blessings also. Worldly eyes do not see the spiritual grandeur, however, when the grandeur of God appears in the form of worldly blessings, then these eyes open and start seeing these matters.

I have briefly presented the subject matter. As I have said, it is a vast subject and I could not explain all those points which were in my mind. However, I hope that the Jama'at must have understood the central point.

A brief description of the life of Dr Sahib is that he was born on 29th of January, 1926. Hazrat Chaudhry Mohammad Hussain Sahib was a very pious person and his *nikaah* was also pronounced by Hazrat Musleh Mau'ood, may Allah be pleased with him. His wife's name was Hajira Begum who was the sister of Hakim Fazlur Rahman Sahib. Hakim Fazlur Rahman Sahib was the person who, in his youth, preaching in Africa, remained separated for 23 years from his wife, and he did not ever complain. He passed his life in the jungles

of Africa. He was a very pious, good mannered and an attractive person. He was the uncle of our Hamidur Rahman Sahib of America. He was maternal uncle of Dr Abdus Salam Sahib, husband of the sister of Dr Hamidur Rahman Sahib's mother. Surayya Begum who recently has passed away I had led her Janaza prayer, her sister was the mother of Hamidur Rahman Sahib. So this way, this family is linked together very closely and there are many sacred traditions which are running through their blood. So, pray that may Allah continue those sacred traditions in these families in the future as well.

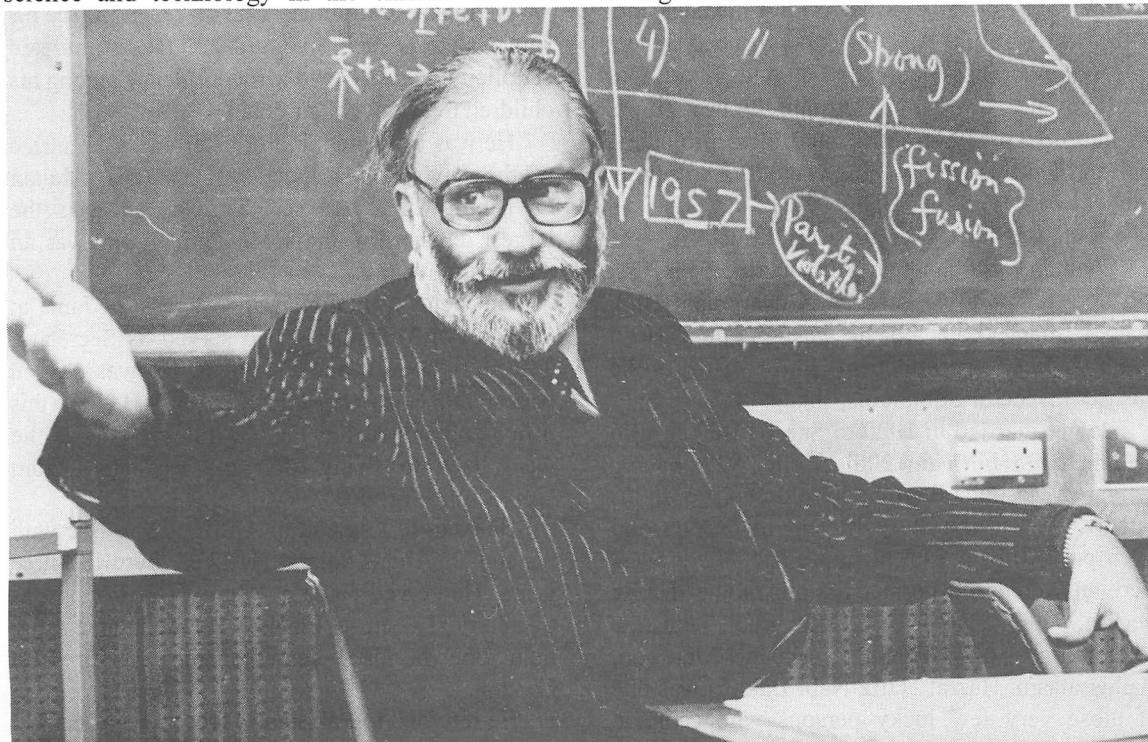
When I said that he saw in a dream, in fact, it was in a *kashf* (a vision while awake). According to my notes, it was on the 3rd of June, 1925, he was shown in a vision that an angel appeared who was holding an innocent baby. The angel handed that baby to Chaudhry Mohammad Hussain Sahib and said, *Allah has granted you the son*. He asked, what is his name? The reply came, "Abdus Salam." When he wrote this vision to Hazrat Musleh Mau'ood, my Allah be pleased with him, and requested a name for the baby, Hazrat Musleh Mau'ood wrote to him: "When Allah the Almighty Himself has named him then how can we interfere?" For Hazrat Musleh Mau'ood, may Allah be pleased with him, to have written that, shows and verifies that Hazrat Musleh Mau'ood, may Allah be pleased with him, fully believed in the truth of the visions of Chaudhry Mohammad Hussain Sahib. Of course, that is also expected due to the humility when one says that Allah the Almighty has named the child. However, I am sure that not because somebody has written so, rather, he knew that he (Chaudhry Mohammad Hussain Sahib) is a pious person to whom Allah the Almighty shows visions, that was the only logical reply that when Allah has named him then how can we interfere? And then he made progress with the grace of Allah, and with prayers, and it is not a coincident. You can see that there are other brothers and sisters as well and they are also



intelligent and smart, they have also risen to high stations but there is no comparison. It is as if something has shot across to the skies and all the rest in comparison to that appears tiny. There is no comparison.

In every field he started getting medal after medal. He kept breaking record after record and then there are such records that they cannot then be broken again. When one gets 100% marks then how the record can be broken? And then in Pakistan his abilities were not appreciated so he came to England. Either it is the generosity of the English Government or may be it is their quality of being appreciative rather than generosity that they honored him. He was granted a professorship of Imperial College and then continuously they accorded him great respect and honor. And then Italy honored him. When he proposed that there should be a center in Trieste for the promotion of science and technology. The Government of Italy bore a good part of the expenses and other organizations also participated. To promote science and technology in the children of the

developing countries, in the poor countries, to the best of their capabilities was the aim of his life and there was no element of any prejudice in that. Ahmadies, non-Ahmadies, Pakistanis, non-Pakistanis Polish students, Christians, atheists, anybody who wanted to study they all had equal opportunities. These were the blessings of Graciousness and by the grace of God, the whole mankind greatly benefited from the Center. Now there is not time to go through his medals and achievements. What matters I thought were important those I have mentioned. Now, this our most lovely treasure of knowledge who had excelled in the worldly knowledge and also in the spiritual knowledge, our dear companion and brother has left us. We entrust him to God Almighty and may Allah have mercy on him and continue to keep him in the highest orders in the Paradise. Pray also that may Allah continue showering his mercy upon his children so that those prayers that were accepted for him they will be accepted for his future progeny, generation after generation as well.



Dr Salam explaining his ideas.

# Hazrat Chaudhry Mohammad Hussain

*Chaudhry Abdul Hamid, Lahore, Pakistan*

He was born on September 3, 1891, at Jhang. In 1913, he joined Islamia College, Lahore, for his BA but somehow he could not succeed in getting the BA degree. While a student at Islamia College, he joined the fold of Ahmadiyyat about fourteen days before the death of Hazrat Hakeem Noorud-Din, Khalifatul-Masih I. He had accepted Ahmadiyyat on the basis of a dream. Our father's conversion to Ahmadiyyat indicated in his character a spirit of enterprise. He met a strong disapproval from most of his kinsmen, especially from his maternal uncle. He was engaged to the daughter of his maternal uncle, who broke this engagement and collected eighty two *fatawa-i-kufr* for him (verdicts declaring his infidelity). His uncle became his bitter enemy and started carrying out propaganda against Hazrat Masih-i-Mau'ood saying that he died in a toilet. At last his uncle met with Allah's wrath. He fell ill and was bed ridden. He could not pass stool and would vomit foul smelling undigested food. Despite the best efforts of the doctors to help him, his illness prolonged and he died miserably. (This was narrated by my cousin who is about eighty years old, he is a witness to this illness of our father's uncle.)

Chaudhry Mohammad Hussain took his first job as a temporary teacher in Government High School, Jhang. Later on, he was appointed Head Clerk (Office Superintendent) in the office of the District Inspector of Schools, Jhang.

He got married in 1920 to Saeeda Begum who died in child birth on 20th April, 1922, having delivered Masooda Begum, our eldest sister. In his sorrow, he became more fervent in prayers and often prayed for a fruitful future life. His prayers were answered and he married our mother Hajira Begum, daughter of Hazrat Hafiz Nabi Bakhsh, a companion of Hazrat Masih-i-Mau'ood, alaihissalaam. Hazrat Hafiz Nabi Bakhsh was one of those very few lucky persons who came in

contact with Hazrat Masih-i-Mau'ood, alaihissalam, almost ten years before his proclamation of messiahship. He had spent nights at Bait-ul-Fikr on several occasions. Only three persons used to sleep in Bait-ul-Fikr in those days, i.e., Hazrat Masih-i-Mau'ood, alaihissalam, Hazrat Hafiz Hamid Ali and our Grand Father Hazrat Hafiz Nabi Bakhsh.

After he married our mother, he prayed for a son in whom he could invest and work on to develop a great man to nullify his own image of failure in life. At last his prayers were granted and a son was born on 29th January, 1926, whom he had seen in a vision while offering Maghrib Prayer (about seven months before the birth) - an angel told him that the name of his son was *Abdus Salam*. He had six more sons and a daughter.

He took extraordinary care and pains to see his son Salam excel in studies. He stimulated simplicity, tenacity, and self confidence among his children to achieve their goals.

He was promoted and transferred to the office of the Divisional Inspector of Schools, Multan Division, which had six districts, and was the largest division in undivided Punjab. His was an administrative job.

He held a number of offices in Jama'at Ahmadiyya Multan. He had served as Secretary, Taleem-o-Tarbiat, and President. He was elected Ameer Zila (district) Multan in 1947. He held this office and served the Jama'at till 1954, when he went back to Jhang after his retirement from Government Service.

He went to England in April 1959 to live with his son Dr Abdus Salam. He lived there for three years. He served Jama'at Ahmadiyya London as Secretary Taleem-o-Tarbiat. He delivered more than one hundred lectures and speeches in London.

He returned to Pakistan in December 1962. He

performed Umra together with our mother, Prof. Salam and our one of brothers, M.A. Majid, before returning to Pakistan. He lived with me in Karachi and some times with his other sons at Multan and Sheikhpura.

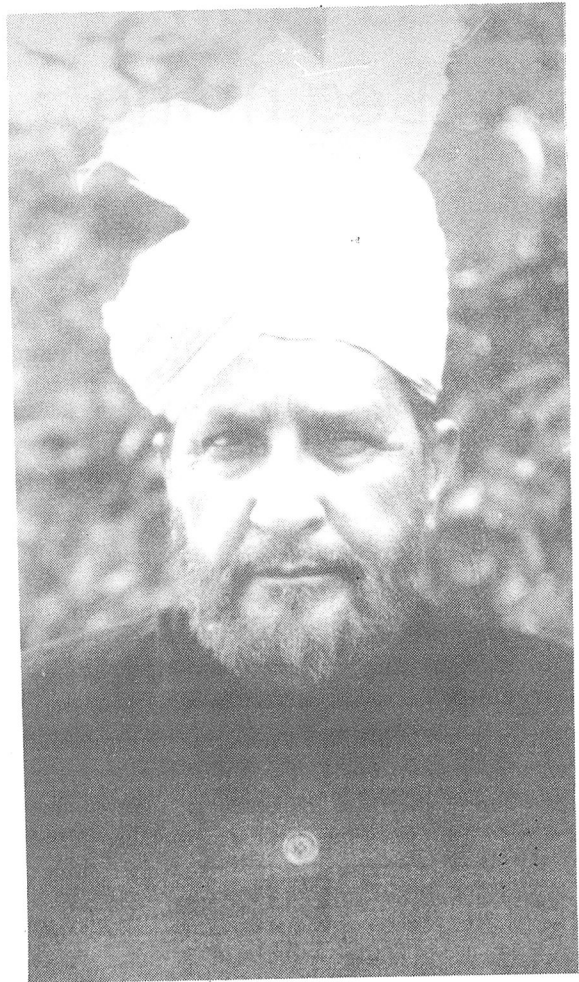
He took great care in developing the character of his children. He always acted upon the following saying of the Holy Prophet, Hazrat Mohammad (peace and blessings of Allah be upon him), "Respect your children." He never addressed any of us as *toon* and would say *toseen* or *aap*. He respected all his children and used to say, "No one will respect your children if you yourselves do not."

He always advised us to select friends with utmost care, as they influence the character of a person. To elaborate his point, he used to tell us, "If you tie a white colored bull with a black colored one, they will not change color but with the passage of time they will adapt each others habits."

He always advised us to keep our things in their proper places, so that if we were asked to fetch them in the darkness, we should be able to do so. I still remember his words, "Have a proper place for everything and keep everything in its proper place." We benefited from his advice during our lives and give the same advice to our children.

He was very outspoken as far as matters of Ahmadiyyat were concerned, that is why Hazrat Khalifatul-Masih, IV, said, "He was a naked sword."

He deeply venerated the name of the Holy Prophet, peace and blessings of Allah be upon him. He once wrote in his diary, "I read a hadith in which Abu Hurairah, may Allah be pleased with him, relates that the Holy Prophet, peace and blessings of Allah be upon him said: "May humiliation afflict the man in whose presence mention is made of me and he does not invoke blessings upon me." Since my first name is the same as the Holy Prophet's, I was afraid of Allah's wrath and as I have to sign my name a number of times every day, I made it compulsory upon myself to recite *darood sharif* whenever I signed my name. My colleagues, Hindu, Sikh, and Muslims,



would wonder what I muttered under my breath."

He had firm belief in prayers which were mostly granted by Allah, for which he always thanked the Almighty.

A few days before he died, I accompanied him to Karachi from Multan. We were traveling by PIA. He was semi-conscious, most of the time I found him rolling his sleeves as one does so before ablution. He died on April 7, 1969 at Karachi after a short illness. He was buried in a special tract in *Bahisti Maqbara, Qit'a-i-Mobashshireen*, for which Hazrat Khalifatul-Masih, III, had granted special permission in recognition of his service to Ahmadiyyat.

# Abdus Salam: The Beginning

This short note about the early life of Professor Dr Abdus Salam has been extracted from the book, "Abdus Salam" by Jagjit Singh, Penguin Books India (P) Ltd, 1992 — Dr Karimullah Zirvi.

There is nothing remarkable about Jhang, a small market town in Punjab. Nor is there anything special that its neighboring town of Maghiana can boast of. Nevertheless, both are famous all over Punjab because of their association with *Heer Ranjha*, an epic poem written by the celebrated Punjabi poet, Waris Shah. His epic is to the Punjabis what Shakespeare's *Romeo and Juliet* is to the British.

The picture Waris Shah depicts of the Jhang of his day is by and large as true and fascinating in our own times as it was in his. Buffaloes and cow herds, the ferry by which Ranjha crossed the river Chanab to meet Heer, the wandering minstrels and general pattern of life remained the same down the ages, at any rate until the early decades of this century. The ploughmen gathered together at the end of their day's toil in the city *dara* (circle) under the trees, to listen to a recitation of *Heer* even in the late 1930s as in the old days of Waris Shah two centuries ago. Indeed, such gatherings of city folks were more frequent and popular in the recent past because of the establishment of "law and order" in Punjab as a result of its annexation by the British in 1840. The province was in a state of turmoil in the time of Waris Shah (1740s) because of invasions like that of Nadir Shah in 1748.

Although British rule brought peace to the region, it did little towards the town's development. It had no electricity, piped water supply, roads, radio or telephone. Uneven dirt-tracks full of potholes were negotiated by bullock carts and one-horse contraptions which jolted along precariously.

It was in Jhang city with its romantic aura that Salam's ancestors settled many generations ago. Indeed, Salam's lineage can be traced to an Indian Rajput princeling named Buddahn who founded Jhang city as the capital of his kingdom around AD 1160. He was converted to Islam by an itinerant Muslim divine, Hazrat Ghaus Bahul-Haq Zakaria, who came to India to preach Islam. Obviously the family survived the great upheavals and turmoils that have afflicted Punjab in the wake of numerous invasions beginning with that of Mahmud of Ghazni and ending with its conquest by the British in 1840.

As Salam was too young for admission in a regular school, it was postponed till he was six years old. But when he was taken to the M.B.S. Middle School of Jhang for admission, the Head Master of the School, Mirza Ghulam Abid, found him too bright for admission to class one. He, therefore, admitted him directly to class four. Salam vindicated the Head Master's judgement by standing first in the fourth class examination held at the Jhang Center.

In an address delivered in December 1972 to the students of his Alma Mater, The Government Intermediate College, where he was admitted at the age of twelve, Salam attributed all his later accomplishments to the affection and diligence of the exceptionally talented as well as hard working teachers of this institution. In particular, he remembered his English teacher Sheikh Ijaz Ahmad, who thought that Salam used or, rather, abused certain words without fully understanding their meaning and nuances. Every new word added to his vocabulary became an obsession as if it were

a new toy to play with. He could not resist the temptation of using it as often as abusing it without context. Sheikh Ijaz Ahmad blunted his obsession one day by quoting a Persian couplet: "I fear O Arab; you'll never get to the Kaaba. For the path you are following leads to Turkistan."

Salam vividly recalls the day the matriculation results were announced. He relates: "I was sitting in my father's office in the Maghiana part of the district court office. The examination results were published in newspapers from Lahore and on that day newspaper arrived around lunch time at Jhang Sadar railway station. My father had instructed one of his subordinates to bring the newspaper to him. But before the messenger could return, telegraphic messages of congratulations began pouring in from Lahore. I started for home in the afternoon on my bicycle from Maghiana to Jhang city. The news of my standing first in the examination in the Province had already reached Jhang city. I had to pass through Police Gate district of Jhang city to reach my home in Buland Darwaza. I distinctly recall that those Hindu merchants who normally would have closed their shops due to the afternoon heat, were standing outside their shops to pay their homage to me. Their respect for me and their patronage of education has left an indelible impression on my mind."

His achievement is all the more remarkable when one considers the environment in which he lived. The large family consisting of seven brothers and two sisters, besides the parents, lived

in a house that is better described as a one-room tenement. Consisting as it did of a roof supported by wooden beams, a couple of *charpoy*s (beds) on each side of the room, a small table in the center and a few stools for eating meals. In such primitive environments and amid the noise of the squabbling children, Salam somehow learnt to switch his mind off so completely that he might as well have been in a solitary cell.

The environment at Jhang college where he continued his studies after matriculation was equally basic. Salam recalled it in 1988 when he delivered the first of the P. A. M. Dirac Memorial Lectures at Cambridge. He said, "I still remember the school of Jhang in Pakistan (Jhang is my birth town). Our teacher spoke of gravitational force. Of course gravity was well known and Newton's name had penetrated even to a place like Jhang. Our teacher then went on to speak of magnetism; he showed us a magnet. Then he said, "Electricity! Ah, that is a force which does not live in Jhang, it lives only in the capital city of the province, Lahore, 100 miles East." (And he was right. Electricity came to Jhang five years later.) And the nuclear force?" That was a force which lived only in Europe. It did not live in India (or Pakistan) and we were not to worry about it." But I still remember he was very keen to tell us about one more force – the capillary force. I always wondered why he was so insistent on calling the capillary force "a fundamental force of nature." I think I know now the reason. He was teaching us the force laws according to Avicenna..."

## Salam Award to be given in physics

ISLAMABAD, Dec 9:

The Quaid-i-Azam University has invited applications for the award of Salam Award to be given in physics this year. The award has been named after the only Pakistani Nobel prize laureate Prof Abdus Salam. The prize consists of US\$ 1,000.

Initially the age limit for the participation was 35 years but it has now been increased to 40 years. The prize is awarded on the basis of the collected research work or technical essay written especially for the prize. — APP

Dawn, Internet Edition, 10 December 1997, Wednesday, 09 Shaban 1418

# Professor Abdus Salam: Some Memories

*Maulana Sheikh Mubarak Ahmad,  
Amir and Missionary Incharge, USA (Retired)*

Translated by Dr Rasheed Syed Azam, Psychologist

I had heard many good things about Dr Salam before my arrival in London in 1979 as Missionary Incharge, United Kingdom. With Allah's gracious help, I completed my tour of duty in 1983 and during those four years there were occasions for exchanging ideas with Dr Salam Sahib in London. I will recollect some vivid memories of those years.

Dr Salam had great respect and love for the Jama'at's missionaries, the dedicated servants of Ahmadiyyat. During my stay in London, he was the first one to invite us for dinner. Chaudhri Zafrulla Khan Sahib was also present. He would visit Fazl Mosque regularly whenever he was staying in London.

He invited our missionary in Sweden to the Nobel Prize acceptance ceremony. Altaf Gauhar Sahib arranged the first celebration party in his honor when he arrived in London after receiving his Nobel Prize. I was also invited to that party along with Missionary Muniruddin Shams Sahib.

God had given him love for True Islam, Ahmadiyyat, and he had great courage for the expression of his beliefs. He resigned as chief scientific advisor to the Prime Minister of Pakistan when Bhutto's Assembly passed the legislation declaring Ahmadis as non-Muslims. He declined offers from the British and Italian Governments for citizenship and always felt proud to be a Pakistani.

When he met Zia-ul-Haq, he told him with great courage and conviction that as the President of Pakistan he is responsible for justice and welfare of all Pakistanis. When mullahs (clergy) had told him that Ahmadis have distorted the Holy

Quran, he should have verified the distortion through some knowledgeable and independent authority. When Zia was shown the translation of the term *Khatamannabiyyeen* in the Holy Quran published in Saudi Arabia, he was taken aback to see *The Seal of the Prophets*. At this he said, 'You are better Muslims than we are.'

He was well disciplined in principles and his faith. He always without fear or favor declared to be an Ahmadi Muslim. He was a great scientist of world fame and in the science community was recognized as 'the one who believes in One God.'

Another outstanding quality of his character was his love for humanity and his zeal to serve others. He put the name of Pakistan on the map of scientific community of the world and did every thing to help Pakistani poor. He told me once that he regularly sends his contribution for *Darweshaan-i-Qadian* (the dedicated servants of Ahmadiyyat who stayed behind in Qadian, India, for the sake of the Jama'at after at the division of the Indian subcontinent). He helped the students from all over the world irrespective of their religion or background.

He took special interest in religious matters and Islamic values. I was in London when he received his Nobel Prize. He visited the Mosque for special Prayer to express his thanks to God Almighty and for his elders.

I saw him once attending our Annual Jalsa in London. I was delivering my speech when he entered the hall. There were some empty seat in the last row and he quietly sat there and listened to my speech very attentively. At the end of the

meeting he congratulated me and said that he greatly enjoyed the Promised Messiah's commentary of the Holy Quran as presented in my speech that day. He had deep knowledge of the Holy Quran and often referred to it in his speeches and addresses.

With the grace of Allah, he had a special love for Pakistan and always wanted to serve his country and people. He used to remind the Government of Pakistan and its high officials for improving the quality of people's lives through higher science and other education. He guided the

nation for establishing higher learning and technical institutions.

Last but not the least of all, he was a simple, honest and humble person and used to meet everybody with great respect and humility. He was very obedient and highly respectful towards the Third and the Fourth Caliphs and other divines of the Community. Like a fruitful tree, he used to bend down in humility with his highest degree of education and knowledge. May Allah bless this great scientist and the lover of Ahmadiyyat, the True Islam. Ameen



Dr Salam with Pope John Paul II.

# Dr Abdus Salam — Some Memories

*Maulana B. A. Rafiq, Former Imam Fazl Mosque, London*

Translated from Urdu by Muhammad Aslam Nasir and Majeed A. Mian

My first arrival in England was in February of 1959. At that time, respected Dr Abdus Salam was permanently residing in the Putney area, which was about a mile away from the Fazl Mosque. He was a professor at the Imperial College and whenever he came to the mosque for Prayers, I had the honor of meeting with him. Although, I was no match to Dr Salam's intellectual status and his position, yet being a missionary of Jama'at Ahmadiyya, he used to treat me with love and affection. He used to invite me to his house quite frequently. He generally invited his friends to join him at the Sunday breakfast. The breakfast used to be so heavy that it used to be enough even for lunch. The table used to be full of all kinds of tasty dishes. Dr Salam's friends and admirers not only enjoyed the breakfast but were also amused by his good taste for poetry. Sometime later, when Hazrat Chaudhri Muhammad Zafrulla Khan Sahib also settled in London, it became a routine for Doctor Sahib, if he was in London, to invite Hazrat Chaudhry Sahib to the Sunday breakfast. I also attended those sessions.

As mentioned earlier, Doctor Sahib had the exclusive blessings in sciences but he was also blessed with a great taste for poetry, Urdu and English literature, and history. Among the Persian poets, Hafiz was his favorite poet. He had committed to memory hundreds of Hafiz's verses and would love to quote them at the appropriate occasions. He had also studied in depth, the poetry of Hazrat Promised Messiah, alaihissalaam. Hazrat Chaudhry Sahib was also in love with Hafiz among the Persian poets. From this angle, both

respected Doctor Sahib as well as Hazrat Chaudhri Sahib had a stark similarity. Among the Sufi poets, both of them greatly revered Maulana Rumi. They both had committed to memory many of Rumi's verses. Sometimes, Hafiz and Rumi would dominate the whole session. Hazrat Chaudhry Sahib had a great liking for the Persian poetry of Hazrat Promised Messiah, alaihissalaam. It would not be an exaggeration to say that the whole of Promised Messiah's Persian poetry was committed to his memory.

Respected Doctor Sahib intensely loved Hazrat Chaudhry Sahib's company. He often sought Hazrat Chaudhry Sahib's advice in his personal matters. Doctor Sahib followed whatever advice Hazrat Chaudhry Sahib gave him. Soon after my arrival in London, respected Doctor Sahib's father, respected Chaudhry Mohammad Hussain Sahib also came to London. Doctor Sahib deeply loved his parents and took extra care of them. Whenever someone among the elite, including scientist and politicians, came to visit him, he would have them also meet his father. Once, Hazrat Doctor Sahib was scheduled to meet with the Duke of Edinburgh, he brought his father along to meet with the Duke.

Respected Doctor Sahib once came to the mission house and said to me that staying in the house all day was boring to his father. He therefore desired that he would drop his father off at the mission house on his way to work and pick him up on his way back from the college. This way, he thought that his father would remain occupied and would also have an opportunity to meet with the



other members of the Jama'at. I submitted that it would be of great pleasure for me and that we could prepare a program to benefit from his presence. That is how Chaudhry Mohammad Hussain Sahib started to visit the mission house everyday. He often accompanied me in my office. He would often discuss intellectual subjects and matters of training and discipline.

During one of those days, Chaudhry Mohammad Hussain Sahib said, "Pray that Salam wins a Nobel Prize." I submitted that he himself was a pious person and that while I would definitely pray, he should pray as well. I assured him that I would also request some other friends for this special prayer. After some time, I saw in a dream a person, who was saying to me, "Dr Salam will receive the Nobel Prize but only after those scientists who are older than him and are still awaiting to receive that prize." The following day, I mentioned this dream to Hazrat Chaudhry Sahib and a day later, when Doctor Sahib came to the mission house, he expressed his desire to hear about my dream. On my narrating the dream to him, he exclaimed, "It is very strange that only a few days ago, a person close to the Nobel Prize Committee, told me the same thing!"

Respected Doctor Sahib usually was among the first ones to arrive for Jumua Prayers. He used to sit in the first row right behind the Imam. He used to wear an overcoat and a warm hat even in summer. I noticed that during my sermon, he would pull out a little notebook from his pocket and start scribbling down some notes. Once I jokingly told him that perhaps he liked my sermons so much that he had to take down notes. On this he burst out laughing and said that in reality, from time to time, he received those brain waves concerning some scientific issues. He tried to capture them by taking down notes just as they would occur. These, he said, later on became the bases for his research. He said that if he failed to do so, many valueable points could be lost. This practice of his was an ongoing one regardless of the time of day or night. Sometimes, even at the dinner table, he would suddenly pull out his

notebook from his pocket, quickly scribble something down and then join the discussion again.

Respected Doctor Sahib was fanatically in love with Ahmadiyyat and possessed a great sense of valor for its sake. In 1974, Pakistan's National Assembly passed a resolution declaring Ahmadis to be non-Muslims. Dr Salam was at that time the scientific advisor to the government of Pakistan. His rank was equal to that of a minister. No sooner did he receive that bad news than he came to the mission house. Hazrat Chuadhri Muhammad Zafrulla Khan Sahib was also present there. Doctor Sahib pulled out his resignation from his pocket and while showing it to Hazrat Chaudhri Sahib, said, "How can I cooperate with such a government that has declared us as non-Muslims."

At the time when General Zia promulgated his infamous ordinance that prohibited Ahmadis from using many of the Islamic epithets, Doctor Sahib was extremely shocked. Some time later, when I saw him, I asked him if he had happened to meet with the General since the promulgation of that ordinance. Doctor Sahib replied in affirmative and summarized the whole event as follows: "I have been repeatedly receiving messages from General Zia while I was in Trieste. He wanted me to visit Pakistan and meet with him. I tried to avoid this. However, I had to visit Pakistan. When General Zia came to know about it, he insisted on a meeting. I went to the President House for the meeting where some other scientists had also gathered. The General came out to open the door of my car himself. After having embraced me, he took me to the sitting room where other scientists were present. During the course of our talk, I made a mention of the ordinance and expressed my concern over it. The General at once held my hand and said that they could talk about it in the other room. He took me into the adjoining room. The then Minister of Scientific Affairs also accompanied us into this room. The General said that in fact, a delegation of the religious scholars had come to him who told him that the Ahmadis make changes in the Holy Quran and that is why

they are out of the pale of Islam. I informed the General that the protection of the Holy Quran has been promised by Allah himself and has taken upon Himself that responsibility. How could then Ahmadi make any changes in there. Upon this, the General proceeded towards the bookshelf and brought back a copy of Tafsir-i-Saghir. He said that the scholars had marked those verses where we have made changes. He showed me a marked page in the book. That was the verse of Khataman-Nabiyyeen. I looked at the verse and asked the General to explain where the change was as the complete verse was present as he showed me. The General said that we had changed the meanings of the verse and instead of the one who ends the prophethood, we had translated those words as the seal of prophets and that can not be tolerated. I humbly told him that the word khatam that is used in that verse is not a word of the Punjabi language but is instead a word of the Arabic language. In Arabic it meant the seal. I said I would not get involved in that discussion and asked him to just bring me a copy of the Holy Quran translated by another scholar. The General got up and brought me a copy translated by Allama Asad published at Mecca. I opened the book at the verse of Khatamann-Nabiyyeen. The translation appeared as the seal of prophets. The General was taken aback. I humbly asked him that Allama Asad was not an Ahmadi and the Saudi government published his translation; would he then blame him for making changes in the Quran. The General responded by saying that he himself was only an ignorant general and whatever the scholars told him, he accepted it. To this I said that it was not just a question of being an ignorant general but that as president of Pakistan, it was one of his duties to protect the rights of all Pakistanis. The Ahmadiyya missionary was present right there in Islamabad and it was his duty to have sent for the Ahmadi scholars and ask them about whatever the other scholars had told him. I said that he should have taken that decision only after having

discussed it with the Ahmadi. On this the General loudly recited the Kalima Shahada and suggested that I do the same. After I recited the Kalima Shahada, the General said to me, "Salam, I consider you a better Muslim than myself but these scholars have made me helpless." Thereupon he changed the subject.

Doctor Sahib was extremely in love with Pakistan. After I had acquired the British passport, I mentioned it to him over the breakfast table and humbly suggested to him that he should also do the same as that would make traveling very easy for him. I offered to help him in doing the necessary paperwork to obtain the British passport. Doctor Sahib became silent for a few moments and then said, "Imam Sahib, I will never give up the passport that shows my Pakistani nationality. I am hoping that soon I will be getting the Nobel Prize. I do not wish that this prize be listed under some other country. I will remain a Pakistani and will not face any difficulty in traveling either." He did not obtain the British citizenship until the end of his life, something that was undoubtedly, his right.

Doctor Sahib's reverence and love for his parents was exemplary. It seemed as if he considered them to be everything. The death of his father had terribly affected him. He started living in a remote room of his house all by himself and was clearly shocked. After a few days, respected Mrs Salam called Hazrat Chaudhri Sahib and requested him to come and help Doctor Sahib to get over his shock. I accompanied Hazrat Chaudhri Sahib to Doctor Sahib's house. Doctor Sahib seemed very badly affected by his situation. Hazrat Chaudhri Sahib advised to get over his grief as too much of it could also lead one towards shirk (setting up equals with the Almighty). Hazrat Chaudhri Sahib quoted his own example saying that in spite of mad love for his mother, he displayed patience at her death and submitted to Allah's will. Hazrat Chaudhri Sahib continued to console him for a long time. After that he got up and embraced Doctor Sahib who burst into tears.

He cried a lot and that is how he felt better. There was another reason for his being so intensely in love with his parents, as both of them were among Aulia Allah (the close ones of Allah) and were recipients of true dreams and visions. The object of their lives was to seek the pleasure of Allah. Hazrat Chaudhry Muhammad Hussein Sahib used to spend whole nights in praying to Allah. He had special fondness for prayers.

Respected Mrs. Salam remained the Sadr of Lajna Imaillah, Britain, for a long time. I, as an Imam and missionary in charge, had the privilege to have received her cooperation. She had occupied herself in working for the Jama'at and had kept herself busy in the training and education of Lajna. Respected Mrs Salam remained so busy working for the Jama'at on one hand, but on the other, she never let any deficiency to occur in the hospitality of dozens of guests of Doctor Sahib. That, however, was not an easy job. To accomplish that, it was necessary to have husband and wife's full cooperation. That, by the grace of Allah was available to them.

The good training of both Respected Doctor Sahib and his wife and their deceased pious parents' prayers have resulted by the grace of God, in all their children being sincere, dedicated to the Jama'at, and obedient to the Khilafat. They are all living successful lives. At the occasion of annual convention in Britain, Doctor Sahib's oldest son, Ahmad Salam, keeps himself busy in the kitchen. Once a non-Ahmadi guest came to witness the grand arrangements of the convention. He was very impressed by these arrangements and said that the Jama'at must be paying a lot of money for such arrangements. He was, however, completely shocked when he was told that all that work was done by the volunteers. The guest was then introduced to all the volunteers in the kitchen. Ahmad Salam was busy scrubbing the large cooking utensils inside the kitchen. When the guest was introduced to him, he seemed absolutely perplexed to see the son of such a famous man cleaning pots in the kitchen and taking pride in doing so, considering it to be a minor service in path of his religion.

How much did doctor Sahib love Islam? This can be illustrated by the following example: Many years ago, a movie about the Hajj was released through the assistance of the Saudi government. In addition to the Hajj, the holy shrines were also being displayed in that movie. I made arrangements for that movie to be shown in the mission house. I also invited Doctor Sahib to it. He excused himself by saying that he had intended to perform the 'umra and so did not want the movie to spoil his pleasure of performing the 'umra and visiting the holy shrines himself in person.

He often received cassettes of good qaris and used to listen to them with rapt attention. He also used to mention about those qaris to me. His comments used to be that such and such a qari can recite beautifully and another one had great pronunciation and continuity, and so on. Qari Abdul Basit especially impressed him. He had ordered a complete set of his cassettes from Egypt, which covered the whole of the Holy Quran. He not only enjoyed listening to them himself but also used to have Hazrat Chaudhry Sahib listen to them.

Dr Sahib secretly helped a dozens of widows, orphans and poor students. I had the knowledge of this as many a time that help was given through me to the deserving. He was also among the top chanda payers.

Another special quality of Doctor Sahib was that he always responded to a letter. Sometimes he wrote it himself and at other times he would have his secretary type it up and he himself would sign it. He had no formalities about him and that is why whatever piece of paper he could lay his hands on, he would use the same to write the letter. I received some three or four such letters written on ordinary pieces of paper. His object seemed to be to reply the letter and not depend on the formalities of expensive pads of paper.

To summarize, it would suffice to say that in Doctor Sahib was a beautiful collection of the flowers of high morals, the fragrance of which had spread all around the world.

Al-Fazl International, April 10, 14, 1997.

# One of the greatest scientists of this century

## *Air Marshal Zafar A. Chaudhry (Retired), Pakistan*

(This article was written at the occasion of seventieth birthday of Professor Dr. Salam, Ed.)

Dr Salam turned seventy on 29th January, 1996. Very few in our country have taken any notice of this milestone in the life of one of the greatest scientists of the century.

I had the good fortune of getting to know Dr Salam in 1942 when he arrived as a third year student at the Government College. The acquaintance was renewed time and again over the years as he continued his inexorable march towards the unravelling of many mysteries of nature, bringing him international acclaim.

I am sure there are many others who can do far greater justice than I to his many achievements in the field of science. Allow me to recall some personal glimpses of this remarkable man who never allowed his rare success to erode his exceptional human qualities.

During his stay in the New Hostel in Government College, Abdus Salam had worked out an arrangement whereby a padlock was placed on the door of his cubicle while he pored over his books inside. This ensured that he was not disturbed by other boys less inclined to devote themselves to study. His only relaxation was an almost daily game of chess in the Common Room with Khusia, the marker. Salam loved good food and could easily hold his own in the dining room which in those days served excellent *aaloo gosht* (potatoes and meat curry) for lunch and dinner, seven days a week.

In 1955, the late Ian Stephens invited me to King College, Cambridge, where he was a don. He asked me if I knew a scholar from Pakistan called Abdus Salam who had made a real mark at Cambridge, and who everyone felt was destined for great things in the realm of science. I told him I knew him quite well. I visited Salam in his modest lodging and, as he was about my size, was also able to borrow his black jacket for the formal dinner I had to attend that evening.

In 1958, my younger son had to be taken to England for treatment in the aftermath of a severe attack of polio. The boy and his mother had to stay in London for three or four weeks. I asked Salam if they could stay with him in his house in Putney. His answer was: "*Yaar, ay wee koe puchhan wali gull ay.* (Friend (buddy), is this something to enquire about?) They would be most welcome."

Salam lives in the same modest house in London to which he moved in 1956 after finishing his studies at Cambridge. His bed-cum-sitting room is austere, devoid of the many fittings and conveniences taken for granted these days. Its only distinguishing feature is a plethora of books spread all over, many of which pertain to metaphysics, history, literature, Urdu, Persian, and Punjabi poetry, and music.

Salam has a large family and has inherited little by way of property, as his father, being a minor functionary in the Education Department of the Punjab, was a man of strictly limited means. And yet, Salam has not kept for himself a single penny out of the hundreds of thousands of pounds he has received as rewards over the last forty years. All this money has been used for promoting the causes he believes in, most of all for helping students and young scientists, especially from Pakistan. Examples of such selfless devotion and sacrifice are very rare indeed.

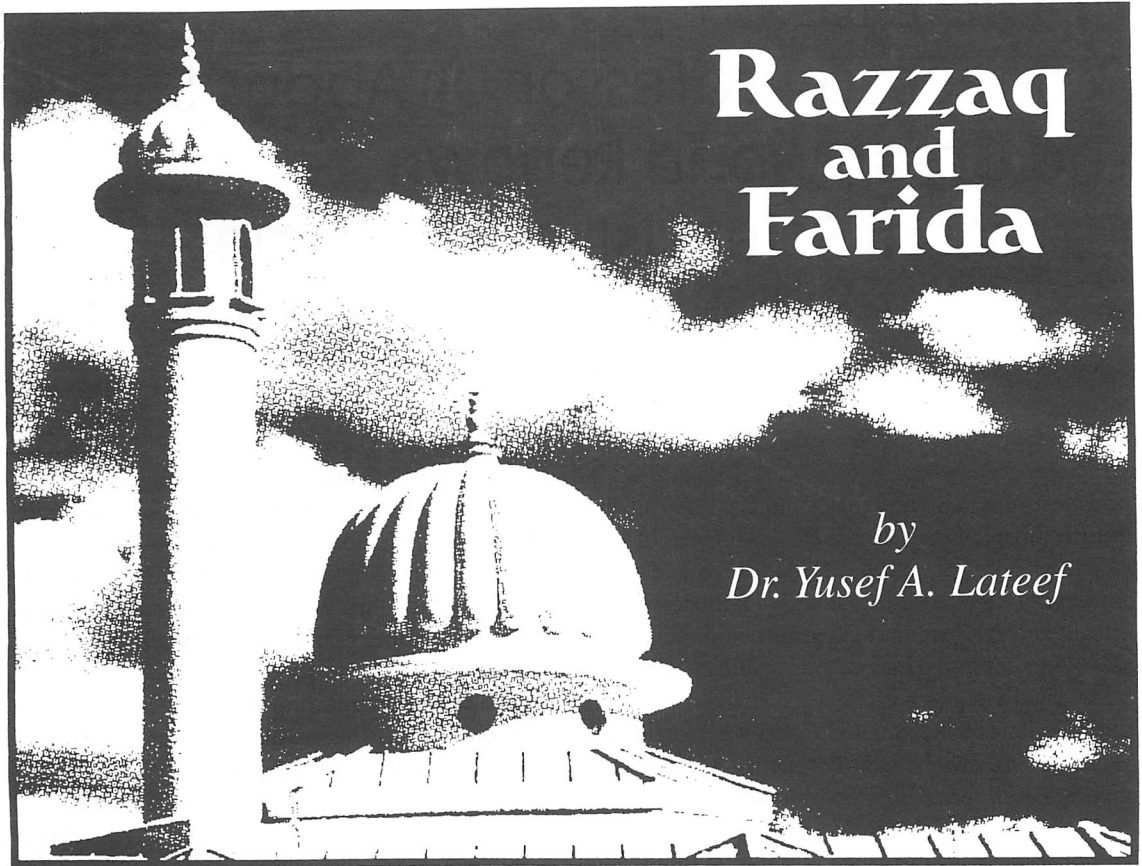
To my mind, a man cannot be great unless he has firm moorings, helps others and is not encumbered by any form of prejudice. Despite the despicable treatment he has received at the hands of his homeland, it speaks volumes for Salam's patriotism that the only passport he carries is the one issued by the country of his birth.

My last meeting with Dr Salam was some eighteen months ago on the occasion of the wedding of his son, Ahmad. He sat in a wheel chair and, holding my hand, talked of the days

spent at Government College and in the New Hostel. His voice was flat as it lacked modulation, making the speech indistinct. I had difficulty in following what he said and knew not how to respond. and this was the man who, only a few years ago, could hold his audience spellbound as

he expounded his profound postulations with unrivalled lucidity. It was a very sad spectacle indeed, and I had great difficulty in holding back the tears that were welling up in my eyes.

(TFT: June 27-July 3, 116)



# Razzaq and Farida

by  
*Dr. Yusef A. Lateef*

## **Razzaq and Farida**

A story for children written by Dr Yucef A. Lateef. Published by Majlis Ansarullah, U.S.A. Children and new Muslims, all can read and enjoy this story. It makes a great gift for the children of Ahmadi, Non-Ahmadi and Non-Muslim relatives, friends and acquaintances. Every page of the story is accompanied by a colorful drawing.

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# An Account of the Accomplishments and Excellent Character of the Late Respected Professor Dr Abdus Salam, the Great World Renown Pakistani Scientist of the Time

*Masood Ahmad Khan Dehlavi, (Ex-Editor, Daily Al-Fazl, Rabwah).*

Excerpts translated from Urdu by Syed Sajid Ahmad, Boise ID



Due to his love for the Almighty, love of the Quran, love of the Prophet, and love of the Promised Messiah, God listened to the earnest prayers of Dr Abdus Salam's father, Hadrat Chaudhary Mohammad Hussain, and bestowed him with extraordinary glad tidings through dreams and visions.

Chaudhry Mohammad Hussain was married on May 11, 1925. Right after his marriage, he started praying for pious, godly, and blessed progeny. He used to offer the Quranic prayer, "Our Lord, grant us spouses and children the delight of our eyes and make *each of us* a leader of the righteous" (Holy Quran, 25:75), fervently and often. On June 3, 1925, he was offering the same prayer during sunnah after the Maghrib Prayer at Ahmadiyya Mosque in Jhang City. He went into the state of a vision. He saw that an angel is holding a handsome and innocent child in his hands. The angel extended his hands towards Chaudhary Sahib and said, "here, Allah has given this child to you." Chaudhary Sahib asked the angel the name of the child. The angel said that his name was Abdus

Salam.

Hadrat Chaudhary Sahib continued praying for a long life of his progeny and their prosperity in worldly and spiritual realms. These prayers included the supplication that may this child be "honored in this world and in the next, and of those who are granted nearness to God" (Holy Quran, 3:46). One day during such prayers, his child was shown to him as a grown-up man. This vision filled his heart with praise and gratefulness. Why he would not have praised the Lord and why he would not have thanked him while he had been given the good news in the vision that this boy will be revered by the whole world and will attain nearness to the Almighty acting upon the teachings of Islam.

Allah ta'ala showed him a strange view in a dream, which surprised him. He saw a tall green tree towering towards the sky. His promised son climbed on the tree and continued ascending with agility despite his young age. Seeing him ascending fast, he became apprehensive that Salam may fall. He called on Salam loudly from the bottom to stop and to come down. The child looked back and replied smilingly, "Do not worry,

father,” and continued his ascent and ascended so far high that almost became invisible.

Abdus Salam was still a child when his father, Mohammad Hussain saw in a dream that Hadrat Chaudhry Muhammad Zafrulla Khan was attaching attractive and shiny silver buttons to a very beautiful and lavish robe. Sir Zafrulla Khan looked at him pleasingly and said that the robe was being prepared for Abdus Salam.



After completing his masters in Math at Government College Lahore he went to Cambridge for further studies on a three year scholarship. He earned his BA Honors degree tripos in two years in place of three. He wanted to come back home relinquishing the scholarship for the third year and requested the advice of Hadrat Khalifatul-Masih II, radi Allaho 'anho, in this regard. Hazur wrote graciously: “In my opinion, it will be cowardly to proceed home abandoning a year's scholarship.” Hazur also included prayers for Salam in the letter.

He had not studied physics after his FA, and it had been six years since then. He decided to complete the three-year course of BA Honors in physics in one year. Putting trust in the Almighty, and with acceptance of the prayers of the Hazur, he not only mastered the three-year course in one year and passed it but also obtained the first position.

He wanted to pursue doctorate in physics next. It was a three-year course but the scholarship could only be arranged for two years. Trusting Allah, he procured admission at Cambridge. He wrote a research paper on atomic particles during the first year and presented such theories concerning atomic research that astonished his teachers. They sent this research paper filled with novel theories to Einstein in the US.

Einstein gave the paper to his assistant, Professor Dodson, for review and asked him for his opinion. Professor Dodson was already involved in similar research. He was surprised to find that this paper written by an Asian contained the solution of the problem Professor Dodson

himself has not been able to solve. He praised the paper and said that, though an Asian, the writer of this paper possesses exceptional capabilities. Professor Dodson had been invited to Edinburgh for a lecture. After his arrival in Edinburgh, he summoned Salam there. He met him and understood salient features of the paper. He also had a lecture delivered by Salam. Dr Dodson presented his observations to Einstein after returning to the States. Einstein invited both Salam and his supervising teacher to spend the rest of the second year in his University in the States on university expense. This gave Salam a chance to work along the world's best renown scientist.



Abdur-Rasheed, a brother of Doctor Sahib living in London, once related to me that in 1969, after the demise of their father, Chaudhary Mohammad Hussain, they went to visit Hadrat Khalifatul-Masih III, rahemahollaah. During the mulaqat (visit), Doctor Sahib mentioned with regret that the departure of their father had deprived them of the fervent prayers of their father for them, and that he used to pray a lot for all brothers and sisters. Hazur, rahemahollah, responded, “I already pray for you all. I will pray with greater commitment from now on. One should always be hopeful of the blessings of the Living, Self-Subsisting and All-Sustaining God, and should always pray extensively before Him.” Hazur addressed respected Doctor Sahib, “Allah will certainly favor you in attaining the Nobel prize.”

Respected Doctor Sahib continued presenting new ideas and their proofs in the world of physics resulting in fame and glory until the year of 1978 arrived. During a meeting with Hazur, Sayyedina Hadrat Khalifatul-Masih III, rahemahollah, informed respected Doctor Sahib, “Allah has told me that you will not get the Nobel prize this year but you will get this prize for sure the next year, which is 1979.”

Next year, when, according to the divine tidings, he was declared the winner of the Nobel prize, after receiving proper information, the first

thing he did was that he proceeded directly to the Masjid Fazl, London, and prostrated before his Merciful Lord in gratitude.



Another bright aspect of Dr Salam's character was his strong feelings of love, his drive to serve, to obey, to provide comfort, for his parents. His brothers confirmed these observations during a meeting with them... Sheikh Ismael Panipatti has related the following incident which brings forth this aspect of his character...

After he was appointed professor at Imperial College, Dr Sahib decided to bring his parents to London and to keep them with him. He bought a home in Putney area for this purpose. This home was located afar from the Imperial College. A friend of his commented to him that he should have bought a home with convenient access to Imperial College. Lot of time will be spent in commuting between Putney and College. As a matter of fact, he could have acquired a residence in any of the prestigious suburbs of London and lived in pomp then why did he prefer Putney? His response to these comments was, "I have bought the home with the convenience of my parents in my mind. My parents strictly observe Prayers in my congregation. The spiritual satisfaction they attain from offering their Prayers in the mosque is not possible if they offer their Prayers at home. I have the home in an area that is in the vicinity of Masjid Fazl. It will be easy for them to visit the mosque from there. As it concerns me, I am not bothered by my long commute to College."

It was his strong desire that he be buried near his parents. This desire of his also tells of his overwhelming love for his parents. He had reserved a space in the section of the Bahishti Maqbara at Rabwah in Pakistan where his parents were buried. He was buried at the reserved spot after his death.

I had the first instance of face to face meeting and conversation with Dr Salam in 1949-50 period when he returned home after completing BA Honors in Math and BA Honors in Physics in half the usual time. I came to know that he was residing with his maternal uncle Hadrat Maulana Fazlur-Rahman Hakeem (who was a renown Ahmadiyya missionary in West Africa), at some street at Rabbani Road near the Old Anarkali and Nabh Rd area. After some search I arrived at the place... I knocked at the door. Hakeem Sahib's son whom I already knew opened the door. After hearing the purpose of my visit he seated me in a room used as a living area. In a moment, the young man who had surpassed the records established by Hindu students in matriculation, FA, BA, and MA examinations, and who had completed the BA Honors (Math) in two years in place of three and BSc (Physics) in one year in place of three from Cambridge with distinctions, entered the room with his brother Abdus Sami. I was surprised to find him simple, humble and quiet against my perception of such a distinguished young man.

I introduced myself to him as a reporter for the Al-Fazl and communicated the purpose of my visit. I heard the story of his astonishing feats in his own words. I had taken Mr Aziz, a free lance photographer, with me. I had a picture of this exceptional young man taken and returned. I published the news in the Al-Fazl, which I was to do anyhow. I also wrote a story in English and delivered it to the new section of the Pakistan Times along with a photograph. I waited for two days but the news did not appear (in the Pakistan Times). On the evening of the third day, I went to the offices of the Pakistan Times and met new editor, Kamal Sahib and communicated to him that I had delivered the new item and it has not been published yet. He explained that he had seen the news item but he could not believe that someone at such a tender age clears BA Honors (Math) in two years in place of three and BA Honors (Physics) in



one in place of three with distinctions over English students. He thought that if the news proved to be incorrect, it will be a shame for the newspaper. He had given the news to a reporter to confirm it. What happened was that the reporter had lost the news item and it never appeared in the Pakistan Times.

Irony of fate responded in a strange manner to this ingeniousness in tyranny of the news editor Kamal Sahib for not publishing the news because of his doubt and suspicion. The same young man was appointed professor in 1957 at the Imperial College in London after he had attained PhD from Cambridge in 1952 through his revolutionary theories in the realm of physics. His appointment established a new record. He was 31 at the time. No European, British or Asian had been able to attain such eminent status at such age until that time. Previously Kamal Sahib had not believed the completion of BA and BSc examinations with distinctions in a minimal time period, now the owner of the Pakistan Times, Mian Iftikharuddin, did not believe in his appointment as professor and head of the department of physics at Imperial

College. It was an incredible happening for him to realize. He used to travel to England. He met Dr Abdus Salam in England and had an article published in Pakistan Times about the scholarly achievements of Dr Salam after his return...



Mr Abdur Rasheed of London related to me that he, during the night Dr Abdus Salam expired, saw their revered father, Chaudhry Mohammad Hussain, in a dream... He was dressed in bright white clothes. He was wearing a very beautiful green sweater over white shirt. His happiness was obvious from his countenance. Mr Abdur Rasheed asked him, "What makes you so excited?" He responded, "Why should I not be happy? Salam has arrived! He came at 8:20." Hearing this, he woke up. The father who had prayed for the exaltation of his peaceable son in this world and in the hereafter, he came in a dream and told another son that the son who was peaceable in this world will also be in peace in the next world.

Al-Fazl International, London, May, 1997.



Masood Ahmad Dehlavi (at right) with Dr Abdus Salam (center).

# Abdus Salam Remembered

*Dr Yusef A. Lateef, Boston MA*

Through Allah's grace, Abdus Salaam found moral and spiritual direction in the Religion of Islam. And because he was intensely humble and worthy, Allah revealed to him some of the Fundamental forces that act between elementary particles.

He found that present, in Allah's creation, were four fundamental interactions: GRAVITONS, PHOTONS, WEAK NUCLEAR ( $W^+$ ,  $Z^0$ ,  $W^-$ ), and STRONG NUCLEAR (GLUONS), and forthright he was concerned with the behavior between all of them. And since his unveiling (Alhamdulillah) of "gluons" which is one of the fundamental forces that acts between elementary particles, there is speculation, in the scientific community, that strong interactions among gluons may lead to new structures that correspond to, as yet, undiscovered particles. Of course this is Insha-Allah.

Abdus Salam loved not science less, but Allah more.

Abdus Salam postulated that there must exist a new electrically neutral intermediate weak quantum  $Z^0$  besides the hypothetical  $W^+$  and  $W^-$ , and Allah made it come into being because: "When He decrees a thing, He says to it only, "Be!" and it is." (Holy Quran 40:69).

And as science continues to conceive, through Allah's light, more clearly, PROTONS transforming into LEPTONS and PIONS it will be remembered, Insha-Allah, that Abdus Salam was the first scientist to espouse this idea. Alhamdulillah.

Because his heart was at rest with Allah and united in peace with mankind, Allah, out of His grace, revealed some of the secrets of creation to him.

As the quantum oscillations of excited states of Allah's protons, through the grace of Allah, are permitted to exist and spin higher and higher, may it be remembered that Abdus Salam put his trust in Allah, and as well, he loved science, only for the good it could bring to all mankind.

## Grand Unification

### *A Tribute to Abdus Salam*

*Professor Frederick Reines,*

*University of California, Department of Physics, Irvine, CA*

(Presented in the closing ceremony of 25th anniversary of ICTP)

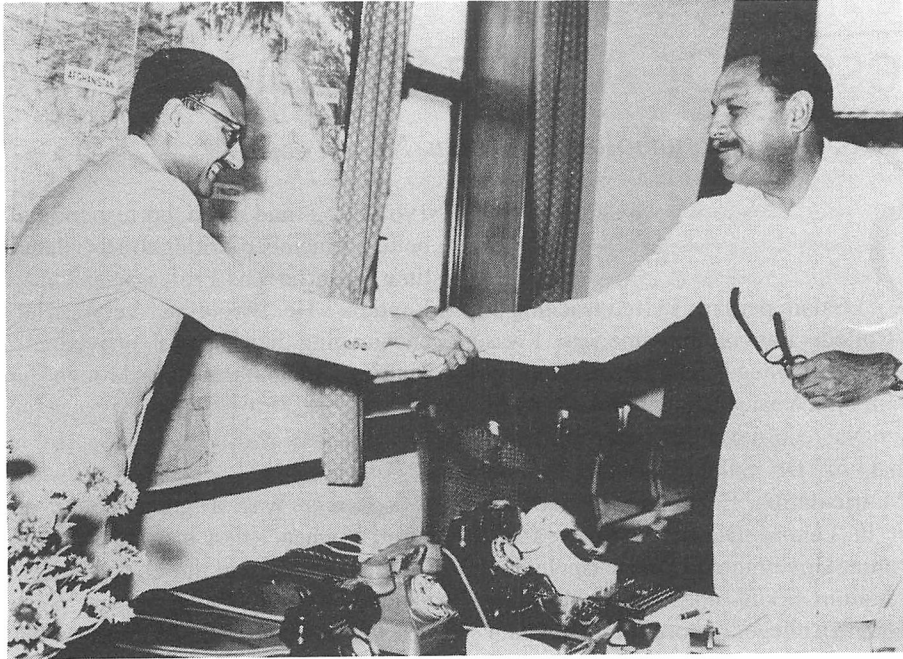
From out of the East there came a man  
Who thought to divine the cosmic plan  
To unify the hearts of man  
And make whole, concepts deep and grand.

From out of the West came Nobility  
To grace the deep insight, the unity  
Arising from diversity.  
From out of the East there came such a man

Whose heart and mind did most nobly span  
Man's highest hopes and dreams and plans  
Transcendent with love and humility.

From out of the depths of human soul  
Came this man so well crafted for his role  
Came this man who would make  
That which is fragmented whole.





Dr Salam meeting Mr Deng Xiaoping in China.

# Remembering Professor Dr Abdus Salam

*Dr Rasheed S. Azam, Psychologist, Staley, NC*

**D**r Salam perhaps started teaching at Government College, Lahore, the same year I was admitted to Islamia College, Lahore, on Monday June 2, 1951, in First Year. I had not broken any of pre-partition days record set by other students, including that of Dr Salam, of the Punjab University Matriculation Examination, but had first position in Lahore District. I knew some professors both at Government College (including Professor Sirajuddin, Soofi Tabassum, Qazi Aslam Sahib) and Islamia College, Lahore (Shiekh Aslam Sahib, Professor Hameed, Professor Sadiq), and latter was considered more stable place those days. Their rivalry in sporting competition was at its peak. However, my University Scholarship and special stipend at Islamia College extended much further and I got settled in the then most beautiful city of Lahore in Pakistan, the city of colleges.

**I** did not know Dr Salam at that time. Not only Lahore but also Pakistan were never ready to accept a brilliant young revolutionary like him. As it is said, even a Prophet is not honored in his own country! After my Masters in Psychology from the Punjab University in 1957, First Class First, I wasted some precious years in pursuit of idealistic political dreams. I joined Law College in 1961 while I was also teaching at Government College and got soon transferred to Government College Quetta for personal reasons but completed my LL.B., First Class in 1963. By that time I had come to know Dr Salam who was in London and Chaudhri Zafrulla Khan Sahib who was in New York as UNO's President during

1961-62. I had been corresponding with them both. I remember writing to Dr Salam in 1962 first time when he was Professor at Imperial College, London. He wrote a very brief but very encouraging letter and I arrived in London on January 28, 1964, traveling through Europe.

**I**t was a great honor and pleasant surprise when I first met Dr Salam at University College, London, in the library and we walked up to the University Cafeteria and had tea together. We talked about Pakistan and perhaps he knew more about politics than I thought he would. He was an Adviser to the President and at that time was very excited about the future of Science Education in Pakistan and his projects for the third world countries.

**I** knew very little about theoretical physics if anything but he knew more about law and politics, the two subjects I had on my mind. However, our common bond was Ahmadiyyat. He was one of my Referees (the other was Ch. Zafrulla Khan Sahib) for my admission to LL.M. class at University College, London. However, I had an offer to work as a Psychologist in Essex, without any training or education in England. The interview went very well but perhaps the reference letters were even better!

**I** started working full time and my wife arrived from Pakistan and had two children and postponed the study of law till later date. The next

time I visited Dr Salam at his family residence in London near the Fazl Mosque, in 1967. Dr Salam was sitting on the floor mat with his pencil and note book working on some tedious and lengthy theoretical formula.

**T**he ladies had met at the Mosque many times and were better acquainted with each other as compared to us men. He asked me: "Have you completed the study of your Law?" "No", I said, "but we have got two degrees!"

I had very easy life in Pakistan but in London I had to learn to do everything myself. And whatever twists and wrinkles were left in my life, were straightened after being married with two children. The conflict to study Law or Psychology; stay in England or go back to Pakistan (where that idealistic dream revolutionary council was still waiting to solve all our national problems) did not end till 1974. My original plan was to study law and return to Pakistan after two to three years.

**W**e also met each other on Eid Day in the Mosque and there were usual greetings after Prayer. However, Dr Salam came to our perhaps 6th annual Jalsa in Mahmood Hall, London Mosque, in 1971, lasting just half a day.

Zahoor Bajwa Sahib had come from Rabwah for one year as the Imam of London Mosque when Imam B.A. Rafiq Sahib was serving as private secretary to Hazoor, our third Caliph. Incidentally, Ataul Mujeeb Rashed Sahib, our current Imam in London had just arrived that year as the Na'ib Imam.

**R**ashed Sahib spoke first on Zikr-i-Habib. Then was my speech on Tarbiyyat-i-Aulad (Training of Children). But the main speaker was Hazrat Chaudhri Zafrulla Khan Sahib. That day Dr

Salam was there. During our conversation, Chaudhri Sahib remarked that he did not know that you had to study so much psychology for the training of children when we have the Excellent Exemplar, peace and blessings of Allah be on him. (Chaudhri Sahib spoke about this topic during the Jalsa).

**I** visited Pakistan in 1974 just before the tragic decision of the assembly of Mr Bhuto. I had heard from some high-up friends that some mischief is being cooked-up. What can one say, he is dead. I knew him to be highly inflammable as the foreign minister of Pakistan under General, later Field Marshall, Ayub Khan, one of the honest leaders who did something good for Pakistan. In 1976, the year Bhutto was hanged by the Dictator Zia, I moved to the United States. Dr Salam was very often in the news after his Nobel Prize in 1979. Incidentally, General Zia died when I was visiting Pakistan in 1988 and saw the drama of the burial of his American made denture!

**D**r Salam was a very hard working, God-fearing and humble man. He was very supportive and friendly and extremely busy man. He studied and taught theoretical physics but he, to me, was a very practical and pragmatic genius. He is hero and will remain so for many generations to come. So much has been written about his life and his achievements and much more will be written. He received highest awards and honors all over the world but in Pakistan because he was an Ahmadi Muslim. He was, without doubt, a loyal servant of his nation and humanity, and will remain Pakistan's best known hero. He was my elder brother, a father figure, larger than life, my hero.

May Allah grant us more Dr Salams to continue his good work. May Allah grant him nearness with highest awards of peace and bliss in paradise. Ameen.

# A Humble Tribute to Our Dear Brother Professor Dr Abdus Salam

*Dr Rasheed S. Azam, Psychologist, Staley, NC*

PROCLAIM! Proclaim with courage and conviction,  
To the world at large, the entire humanity,  
That there is no God but Allah and Muhammad is His Messenger,  
The khatamannabiyyeen, the best of all Noble Prophets of God,  
And the Law given to him, the Holy Quran is for ever,  
No change, not an iota of addition or subtraction,  
Will of Allah and His Command is Supreme:  
Only God will raise Prophets, as before, when needed  
Among humans from humans for humans but  
No Prophet will descend now who is not obedient to Allah  
And this Prophet, the Holy Prophet of Islam,  
(Peace and blessings of Allah be upon him for ever.)  
That there ought to be peace and prosperity and justice in the world  
Was not this the proclamation of our Brother Salam, a Nobel Laureate!

God is One and Him alone we worship,  
He is our Creator, the Creator of the Whole Universe,  
His Eternity, He was there in the beginning and He will be there for ever,  
His Knowledge encompasses known and unknown, including the mysterious black holes,  
His Design, His Law and His Creation are perfectly planned and not accidental,  
He creates life and guides it to perfection.  
Past and future are only for us mortals in

evolutionary stages,  
The Time and Measure in light-years are our crude estimates,  
To measure something that we can't measure!  
One Day of God Almighty, a thousand human years,  
And reckon now fifty thousand years of God's Time  
Imagine now in your tiny mind, more than eighteen billions years!  
My God Your Eternity is beyond our calculation!

Ask Salam Theoretical Physics: Elements in God's Universe,  
Particles in Quasars, Dimension upon Dimension beyond comprehension,  
Where Hell and Paradise can co-exist in the same space!  
A fertile field for thinking man of wisdom and knowledge,  
With guidance from God in the changing of day and night  
This life is nothing but a transitory phase  
And you must prepare for the journey ahead.  
Listen, believe and follow that our God is One,  
All that is on this Earth and all that is in Heavens,  
Belongs to Him Alone: He never tires or slumbers  
Nor He needs a son or wife; needs are our frailties,  
He is the Master, His is the Command and lo it is done.

Salam was human, a humble beginning in a noble family,  
Born with prayers as a gift from God,

And blessed with the blessings from Allah by our blessed Imam.

A high achiever in learning and life,

Overcoming his hurdles with hard work and dedication and prayers,

A gentle loving soul of humanity.

His was the passion for learning for all,

Empower children and men with learning , the light of knowledge

Ignorance is not your friend be ye the first or second or the third world!

Salam loved Islam and humanity ,

A proud national hero, but his nation knew him not,

In the muddled politics of mullah devoid of heart and soul groping in the dark.

Salam was sad to see his nation degrade towards ruin

Under the dishonest and corrupting leadership

By trampling basic human rights: I have a right to say and believe

That God is One and Him alone I worship: my religion is mine and yours is yours,

There is no compulsion and that is the beauty of Islam.

I mean no harm to you, my love is for all

I use no abuse for my enemies and I read the Holy Quran,

Dictators and despotic rulers lose their sense and think they are gods

But look what happened to the enemies of Islam and humanity

The ignorant should take heed from the Signs of God!

Salam, my brother, you were truly Salam, a peaceful soul,

May you rest in peace with new projects in new dimensions!

You won I don't know how many awards


May your position be exalted with highest award of nearness to God,

We all belong to Him and to Him we all return.

O Our beloved brother in faith, a faithful friend,

A blessed and humble servant of God, in service of humanity.

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# Dr Abdus Salam: Servant of the One God

*Dr Waseem A. Sayed, Los Angeles, CA*

From my early childhood, I recall my mother's accounts of Dr Salam's achievements and Dr Sahib's extreme efforts to attain the distinctions that decorated his illustrious life. Simultaneous to all this was the continuous emphasis on the attachment to Ahmadiyyat and the divine signs that were being fulfilled as Dr Sahib's life unfolded. All these accounts had the desired impact as they left a strong impress on my mind and heart.

When we moved to London in 1966, I learnt of Dr Sahib's love for books. Chaudhary Rashid Sahib used to be in charge of the books at the London Mosque in those days and I remember, mimicking Dr Sahib, I also started to visit the bookstall at the mosque and would purchase the books of the Promised Messiah, alaihissalaam, which in those days came in the shape of large thick black volumes and sold for about a pound each. I would purchase whichever volume became available and thus collected almost the entire set. During my BSc days I read all those volumes that I had and thereby saved myself from forgetting the little Urdu that I knew and learnt what I could from those treasures the Promised Messiah, alaihissalaam, had come to distribute to the world.

Later my decision to go into physics was in no little measure affected by all those early childhood accounts.

Another incident that happened during those days still stands very clearly in my mind. This was during the days that I used to have the distinction of taking dictation from Hazrat Chaudhri Muhammad Zafrulla Khan Sahib, may Allah be pleased with him. On one occasion as I sat in Hazrat Chaudhri Sahib's office, Dr Salam and Air Marshal Zafar Chaudhary, both came to meet him. I cannot forget the impact their schoolboy style of

Sahib. This impressed upon me the lofty status of Hazrat Chaudhri Sahib.

Then, in 1976, I became Dr Sahib's Ph.D. student. During this period of my life I learnt from close quarters of Dr Sahib's two all consuming loves: his love for science and his love, no, his infatuation, with service of the world's poor and neglected scientists. And in both these fields he rendered, most certainly, exemplary, if not peerless, service. He was the first in the field of science to suggest how a framework could be set up that would lead to the unification of the fundamental forces of nature.

In the field of serving the needs of the poor and neglected scientists of the world, he was perhaps the only scientist of world class stature to sacrifice every comfort and every worldly chance of getting all that comes from the kind of success and distinction he had gained in order to further this cause.

Even after he had won the Nobel prize, he only redoubled his efforts in this regard, and putting himself and all those he loved into great difficulties and trials, he forged ahead, trying desperately to get the governments and the scientists of the world to do something to help in this cause. And this work was not easy.

Even those whom he was trying to help became his greatest foes. The governments of the Muslim countries, for example, he had the greatest difficulties convincing that they ought to devote much greater energies to science and technology.

In his own country, the response often was indicative of a complete lack of any understanding of these matters. Yet, despite all these obstacles, nothing stopped or slowed him down from pushing onwards. If one thing or idea failed, he would try from another angle. All his writings on the subject



talk again and again of trying to drive home to the powers the need for devoting much greater energies, economic and human, to the development of science and technology in the developing countries – and he tried every which way he could of communicating and convincing his audience.

What was it that motivated and pushed Dr Sahib to make these almost superhuman efforts against such impossible odds? I believe it was his true and sincere and firm faith in God and in His Unity.

His certain faith in God's Unity was what led him to propound his unification of forces treatise and his certain belief in God's Unity was what was giving him the strength to pursue his universal goal of helping to improve the lot of the poor and neglected world scientists. His work made no distinction between where the scientists came from

extended to every part of the world. He was involved with China and Russia and India and South America – at times when many of these countries were being shunned by the authorities from some of the major powers that provided funding for the International Center for Theoretical Physics that he had set up in Trieste, Italy.

All that he did and achieved against the impossible odds and the success that he attained are ample proof that he was driven to these achievements by his firm, sincere and indeed well founded and true belief in the Unity of God and His Universal nature.

May Allah grant Dr Sahib a lofty status in paradise and may He enable many to follow in his footsteps. Aameen. If I was to select an epitaph for Dr Sahib it would be: Dr Abdus Salam, Servant of the One God.



Sir Salam with the then UN Secretary Javier Perez de Cuellar in July 1985.

# My Father, Abdus Salam

Dr Aziza Rahman, Los Angeles, CA

Bushra Salam Bajwa, Research Triangle Park, NC

One of the most frequent questions that I have been asked is, “What was your father really like?” It is not easy for any child to answer such a question about their father, but I think it is especially difficult for me and my sisters and brother. My father, Professor Abdus Salam, was a unique person, who was destined to fulfill one of the prophecies of the Promised Messiah (alaihissalaam). He was blessed to be one of the first fruits of the revelation given to the Promised Messiah (alaihissalaam) that his followers would reach great heights of knowledge and understanding and achieve high status in this world. Thus, my father was many things; a scientist, a teacher, an international figure, a champion for the future of the Third World and of course, a father.

My father’s extraordinary story began when my grandfather was given the news of his birth in a vision. On June 2, 1925, my grandfather, Chaudhry Mohammad Hussain, was offering his Maghreb prayer in the Ahmadiyya Mosque in Jhang. He had just recited the prayer:

“Our Lord, grant us of our spouses and children the delight of our eyes, and make *each of us* a leader of the righteous.” (Holy Qur’an, 25:75)

when he saw a vision in which he was handed a baby boy. He asked, “Who is this?” And was told, “This is Abdus Salam.”

Consequently, my father was born on January 29th, 1926, in Jhang and was named Abdus Salam, which means “Servant of Peace.” Jhang is a small village in the Punjab; actually no more than a *pind* (hamlet) at that time there was no electricity there. His family was not wealthy, but had rich traditions

of piety, scholarship and religious learning.

From his early years, he showed signs of great intelligence. He actually won his first prize at the age of two for being the healthiest baby in Jhang. My grandfather, who was the superintendent of the school district, carefully nurtured his genius and encouraged his love of learning. My father started school at the age of 6, and was immediately put into the fourth grade. Soon he was breaking records in every examination, and by the age of 20 had earned his Masters degree from Government College, Lahore.

My grandmother used to tell the story that my father would be so engrossed in studying that once, when he was very young he was having lunch and reading at the same time, when he looked up and found the plate empty. He had been so engrossed in the book that unknown to him a pet chicken that was kept in the house had picked all the meat from his plate and departed!

In 1946, Allah, the Almighty, provided the means for my father to travel to Cambridge University on a scholarship. There, he completed a double Tripos in Mathematics and Physics and proceeded to work on his Ph.D., which he completed in a record five months. He was awarded the Smith’s prize for the best predoctoral work. He was then invited to Princeton University in the US, where he worked with Albert Einstein for a year.

After this, he returned to Pakistan, hoping to teach and conduct research in his own country. But it was soon very obvious that there was no future there for someone of his talents. Most reluctantly, therefore, he made the move back to Cambridge in 1953, this time accompanied by my

mother and myself.

Thereafter his achievements in physics knew no bounds. He published over 250 research papers. He received recognition after recognition, honor after honor, award after award. These included many firsts. He was the first Pakistani and the youngest person ever to be elected to be a Fellow of the prestigious Royal Society and the youngest ever to be made full professor at London University. He was the first recipient of the James Maxwell Medal. He received the Atoms for Peace prize and many, many more, culminating in 1979 with the Nobel Prize, the first Muslim and the first Pakistani to achieve the world's highest honor in science. He received 24 awards and medals, was elected member of Academies of Science in 25 countries and received 36 honorary degrees from countries all over the world. In 1989 he was given an honorary knighthood by the Queen.

**M**y earliest memories of my father date back to when my mother and I moved to Cambridge with him. I was three years old at the time. Cambridge is a beautiful university town on the edge of the river Cam. We lived in a small apartment near St John's College, where my father was working. He had chosen to work at St John's, turning down an offer from the more prestigious Trinity College, because the gardens of St John's were prettiest in Cambridge. One of his favorite pastimes was to take us "punting" on the river. A punt is a small boat which is pushed along by one person standing in the back with a long pole, rather like a gondola. My mother and I would sit in the front, while my father would manage the pole. Sometimes the pole would fall into the water, and we would use a small paddle to reach the shore.

A few years later, we moved to London. My father had been appointed Professor at Imperial College, and now became very busy with his work. His travels took him all over the world, sometimes he would lecture in four or five countries within one week. Thus, his work left him little time for

family life. Nevertheless, he always made time to supervise and direct our education and *tarbiyyat* (training). 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 confidence by constantly reminding us of one of his favorite sayings, "Do your best and leave the rest to Allah." He certainly expected nothing but the best from us, and frequently admonished us to work harder.

**H**e himself never stopped working. After the opening of the International Center for Theoretical Physics in Trieste, Italy, in 1965, he was continually commuting between London and Trieste. Even when at home he would spend hours engrossed in study in his room, some days only coming out at meal times. My father had created his own very personal atmosphere of warmth tinged with an air of mystery in his room. The room temperature was kept extremely high, even in warmer months, and incense sticks (*agarbatti*) would be lit in strategic positions around him sending spirals of heavily perfumed smoke in all directions. A cassette of recitation of the Holy Qur'an would often be playing softly in the background. Hence, the Word of God was never far from his thoughts, a fact strongly reflected in his writings. The heavy velvet drapes would frequently be drawn closed against the noise of the street outside. From an early age, we all knew not to raise our voices or run around inside at these times; even the phone was taken off the hook if it rang once too often.

My father maintained his meticulous work habits in an unflagging routine punctuated by brief "catnaps" and endless supplies of sweet, hot tea. He adhered strongly to the maxim: "Early to bed, early to rise, makes a man healthy, wealthy and

wise.” 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.

A great legacy my father has left us is a treasure of books and a love for reading. It sometimes seemed that reading was second only to breathing to him. He read about every topic and his knowledge about all kinds of subjects was vast. He loved to buy books, old and new. There was no room in our house, including the bathroom, that did not have bookshelves in it filled with books on every subject. My father would come home from traveling the globe with his suitcases splitting from the weight of the books he had bought, and my mother would worry about where to put them.

One of the most important things that my father taught us was the value of time. To him time was the most precious gift, and to waste it was a sin. My grandmother used to tell us that even as a child, my father had his day planned; so many hours for study, so many hours for sleep, so many hours for play, etc. In fact, he would take his clock with him when he went to play, and when his allotted time was over, he would return to his studies no matter how enjoyable the game.

My father did not tolerate anything that he considered a waste of time. An example of this was television, so there was no TV in our home when we were growing up. Of course, as children we used to complain about this, but now I am truly thankful to him because in the end we benefitted as we spent more time reading.

He would often take us on educational trips, such as to museums, institutes and places of historical interest. On Sunday mornings he would usually go to his College to work and would often

take us along. Sometimes he would leave us in the Science Museum which is next to the College, while he worked.

One day, to our surprise and delight, he decided to take us to see the film *Lawrence of Arabia*. It was the first time we had ever been to a movie theater. However, half way through the movie he decided enough time had been spent on it and we should go home. Terribly disappointed, we begged him to let us see the rest. He agreed, but he himself went and sat in the car outside, and when we came out we found him deeply engrossed in his theories. When we got home we had to write essays about TE Lawrence to show what we had learnt.

On other occasions he would decide to take a break from work and take us to Richmond Park (a vast expanse of natural beauty near our home) just for the drive or a walk. Never one for completely “switching off,” my father would use these occasions to try and teach us something of value. For example, during a favorite ride down a fairly steep hill in the Park, he would turn the car engine off at the top of the hill and let the car roll slowly down. He would explain the mechanics behind the working of the clutch and gears so that we could understand how the mass of the car moved itself down the slope of the hill if no resistance was applied by the gear. We would be required to repeat the physics of the lesson during the next trip. The fun part of this was waiting to see if he would remember to apply the brakes, since he got so involved in his explanations!

My father had great love for three things; the Holy Quran, his parents and his country.

He studied Arabic as a child and in college and was well-versed in the meanings of the Holy Book. He pondered deeply over it, especially those verses pertaining to science, and drew inspiration from them for his work. He would always begin

his speeches with the prayer:

Our Lord, give us what Thou hast promised to us through Thy Messengers; and disgrace us not on the Day of Resurrection. Surely, Thou breakest not Thy promise. (Holy Qur'an, 3:195)

At home he would listen to the recitation of the Holy Quran on audio tapes. He would always quote from it in his speeches. After the Nobel ceremony, my father was given the honor of presenting the address at the Nobel Banquet. In it he spoke of faith and science and quoted one of his favorite verses:

No incongruity canst thou see in the creation of the Gracious *God*. Then look again: Seest thou any flaw? Aye, look again, and yet again, your sight will *only* return to you frustrated and fatigued. (Holy Quran, 67:4, 5)

**M**y father's devotion to his parents, and theirs to him was exemplary. My grandfather, Chaudhry Mohammad Hussain was himself a very remarkable person. He had deep love for Allah and devotion to Islam from a very early age, and was guided by prayers and dreams to accept Ahmadiyyat at the hand of Hazrat Khalifatul Masih I (may Allah be Pleased with him) in 1914, when he was 23 years old. After my father's birth, my grandfather devoted his life to developing my father's gifts and furthering his career. It was he who cultivated my father's passion for learning and instilled in him the discipline of hard work. I remember that one of my grandfather's favorite sayings was:

"Time and tide wait for no man."

My father was utterly obedient to his father, and followed his guidance without question. My grandmother's name was Hajira Begum, and she was the daughter of Hafiz Nabi Bakhsh. She was a gentle, loving and simple person. Whenever my

father was taking an exam, she would spread her prayer mat and offer *nawafil* (voluntary formal worship) for his success. She had great respect for my father, as he did for her. When my father won the Nobel prize, he used all the money to set up a scholarship fund for needy students and named it the Muhammad and Hajira Hussain Foundation.

It was in my father's will that he should be buried next to his parents, and was one of Allah's favors that a place had been reserved for him there. After his death, my brother and I were going through some of his papers. We found that in his will, he had added a note which said:

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."

**M**y father's love for his homeland was well known, even though his country did not appreciate him. In 1953, he had made the painful decision to move to England, but he still served the country under President Ayub Khan as his Chief Scientific Advisor. I remember how happy and proud he was when he was awarded the Sitara-i-Pakistan in 1959. When persecution of Ahmadies increased, he resigned from all official positions, but continued in his efforts to bring science and technology to Pakistan. He made a point of helping Pakistani scholars and especially Ahmadies in whichever way he could. My father never changed his nationality, choosing to remain Pakistani in spite of offers of citizenship from other countries. When he went to Sweden to receive the Nobel Prize, he wore his National dress of turban and *atchkan* (jacket) in honor of his country.

It was his own experience of having to leave his homeland that led him to found the International Center for Theoretical Physics, so that students from the developing countries could have the opportunity to learn from the greatest minds in science, and not feel isolated as he had

done. The center was set up in 1964, and thousands of students from poor countries have benefitted. More recently, he established the Third World Academy of Sciences to promote science and technology in developing nations. One of his dreams was to set up a World University and for Islamic nations to regain their former status in learning and science.

**I**n spite of all the honors and successes he achieved, my father never showed any signs of pride in himself. He never thought of himself as a great man, and he never forgot his humble beginnings. Most of all, he never forgot that all he achieved was due to the Favor and Grace of Allah.

My father shared this quality with another great Ahmadi, Chaudhri Zafrulla Khan Sahib. These two men, both fulfillments of the prophecy of the Promised Messiah, alaihissalam, shared a lifelong association and friendship, which began in a remarkable way. In 1946, my father sailed to England for the first time, and his ship docked at Liverpool. By an incredible coincidence, Chaudhri Sahib, then Judge at the Supreme Court of India, had come to the docks to receive his nephew. My father's suitcase full of heavy books was lying in the customs shed, and there were no porters. Seeing my father's predicament, Chaudhri Sahib took one side of the suitcase and helped him to the train. Then seeing how my father was shivering from the cold wind, he gave my father one of his own overcoats. My father wore it for many years, and it is now in the possession of one of his brothers.

Whenever my father was in London, Chaudhri Sahib came to our house for breakfast every Sunday morning. It was always so interesting to hear the conversations at those breakfasts, when those two exceptional minds came together to discuss religion, politics and many other topics.

My father loved to invite people to our house,

which he called the "best restaurant in the city," a tribute to my mother's cooking. His guests included ministers, diplomats and foreign dignitaries, professors and quite often his students.

During the last few years of his life, my father suffered from PSP, para supranuclear palsy, a very rare disease about which very little is known. Although his mind and intellect were unaffected to the end, his muscles gradually weakened and wasted away. Such was my father's faith that he accepted his condition without question. Although he knew the prognosis from the beginning, we never heard him complain or bemoan his fate at any time during his illness.

**A**lmighty Allah bestowed countless favors and blessings on his servant Abdus Salam. He lived a fruitful and good life, and his passing was with great dignity and respect. He himself would have been overwhelmed by the send-off that he received. I shall never forget the last journey that we made with him from London to the Bahisti Maqbara in Rabwah. The sight of the thousands of people that lined the road to Rabwah waiting to pay their respects was overwhelming. Over 30,000 people joined in his *janaza* (funeral) Prayers. He was laid to rest next to his father, and at the feet of his mother, as he had wished.

Allah gave the news of his coming into the world, and of his going from this world. On the night that my father passed away, 2:45 am on Nov 21<sup>st</sup> 1996, my uncle Muhammad Abdur Rasheed, my father's younger brother saw a dream. My Grandfather appeared to him, wearing beautiful clothes, looking very happy and said, as if making an announcement — "*Salam pohanch geya hai,*" that is, Salam has arrived.

May Allah grant his soul the highest rewards, and may He bless the Ahmadiyya Jama'at with many, many more Abdus Salams. Ameen.

# Timeless Lessons

*Ahmad Salam, London, England*

Teaching life lessons is not an easy task for any parent. I have been blessed to be the child of exceptional parents who led me with consistent examples born out of their humility as Muslims, always striving to live a worthwhile life, completely obedient to God, entirely dedicated to achieving their goals.

Of all the innumerable lessons I had the good fortune to be taught by my Father, the one that he was perhaps the most vocal in, was his abhorrence of laziness and of wasting time. Time cannot be a stream upon whose banks we can sit and watch its flowing. Time is our most precious commodity; each moment must be highly valued and accounted for. It was his own Father, Chaudhry Mohammad Hussain, who so energetically encouraged his son's early adoption of the remarkable work ethic that would dominate his life and accelerate his rise to seemingly unattainable heights.

My Father's ardent desire to use each moment to the fullest extended, itself, of course, to how the rest of the family spent their waking hours. He was not one of those who in the morning "wait for the evening," or, who in the evening, "wait for the morning," and it was not his intention to allow us to be so either. The word "vacation" did not seem to exist in his vocabulary. For me, any day off from school was a day to review and revise old lessons or to research and learn the next topic on the syllabus. My sisters and I would make timetables for work assignments to be completed on a daily basis. We would all sit and study together in his room, breaking only for meals and Prayers. If he was having a conference over the phone, which he frequently did, we would try really hard not to be distracted because we knew even then his eye was on us! He impressed upon us the importance of setting goals to strive for and always tried to introduce us to a variety of subjects. To encourage a keener interest in mathematics and physics that were his own

would sometimes take me to his college at weekends and leave me under the tutelage of one of his Ph. D. students while he did his own work. I do not know who was more nervous in these situations, though I suspect it would have been the unfortunate student in light of the awesome responsibility he had just been given. This would also happen when we went away with him to Trieste, Italy, during our long summer "holiday" from school. At least a portion of each day there, too, would be spent with some poor, unsuspecting student who probably shuddered each time the "boss" marched his unenthusiastic son in for extra tuition.

There was no television for a long time in our home because my Father considered that particular activity to be the ultimate in time-wasting. Any time that was spent away from intensive studying, he told us, should be spent reading. Just as his own Father had required from him, I was expected to summarize books that I had read for an overall deeper understanding of the material. As arduous as this all might have seemed at the time to a child who would rather have been amusing himself elsewhere, in retrospect, of course, I see the true value of it all. My Father knew well that if we felt ourselves valuable, we would feel our time to be valuable and if we felt our time to be valuable, then naturally we would use it well.

My Father's undying thirst for knowledge is well-illustrated by his magnificent book collection comprising a vast array of subjects. One of his greatest pleasures was to spend time browsing in bookshops; he was well-known in many around London. I enjoyed these trips immensely as one of the rare occasions when I could take my time and truly share in his delight of finding new material to ingest. Not only was time not a limiting factor here (for a change), but also the number of books I could choose was never questioned. No one could accuse my Father of being extravagant, indeed, he

was frugal in his spending on himself, but never so on anything that would encourage learning, learning and more learning. No expense was ever spared. The same applied to extracurricular activities such as driving lessons or typing lessons. He always said that two of the skills that every single person should acquire as early in life as possible were typing and driving.

Unfortunately for me (or so it seemed at the time), his generosity did not extend to the vehicle of one's choice. As a young adult I quickly learned that he did not believe in "hand-outs." When I asked him to lend me some money to buy my first car, he flatly refused. He said if I wanted the responsibility of owning a car, then I should be responsible enough to save my own money to buy it. Happily, I eventually did just that and I cannot thank him enough for the timeless advice. On more than one occasion, rather than bid me enter blindly into his house of wisdom, he would try to lead me to the threshold of my own mind. And as hard a taskmaster as he was, I always knew he would be there to catch me if I stumbled or fell.

Throughout his life, no opportunity was ever wasted that could be used to enhance his own intellectual prowess still further. The seemingly endless hours spent in airports and airplanes were not idled away watching the world go by. As stated, he was a truly voracious reader and his choice of reading matter did not confine itself solely to physics or to science in the Third World. Of course, the Holy Quran was always with him; he carried a pocket-size version in the breast pocket of his jacket to have at hand at all times. Audio tapes of the Quran were almost always playing in his room when he worked at home. For much lighter reading, he thoroughly enjoyed the wit and skillful detective work of P. G. Wodehouse's famous character, Bertie Wooster, as well as Agatha Christie's equally famous "Hercule Poirot." Even when not theorizing on physics, then, his mind was always "working something out."

As I said before, my Father did not care to see us wasting our time watching television. It was only when his beloved Mother, Ammajee, came to live with us that he relented on the subject of having a television set in the house. Even then, the purpose was twofold. First of all, the set had to be installed in Ammajee's room. Secondly, we would be required to translate everything we watched from English to Punjabi for her. It was a measure of his deep concern for his mother's ease and comfort in our home as well as his perceptive as a parent which is now apparent in the wisdom of this arrangement. It also served to reinforce another of his favorite lessons to us: there is a natural order in the way things work. If we wanted to be treated well in our old age, we must begin by doing the same for our own elders whenever the opportunity arose. As often as he could, he would make an exception in his routine and find time to sit with Ammajee, sometimes to chat, sometimes simply in the silence of mutual contentment, occasionally to watch television as well. He would lovingly introduce her to his favorite comedians – I seem to recall him only watching the "news" or a comedy program. I remember him enraptured by the hilarious antics of silent movie actors, particularly Charlie Chaplin. His laughter at times was truly hale and hearty and so infectious, we would often spend more time laughing with him than at whatever was happening on the black and white screen! We never wanted the show to be over because that would mean switching the television off and everyone trudging back to work... No question, "time and tide wait for no man."

Although he could not be faulted for his proficiency in the art of fine conversation, my Father was never one for indulging in small talk. Indeed, to him, one of the weaknesses of the Pakistani psyche that irritated and also saddened him immensely was the "gup-shup" habit, namely, the over-fondness for sitting around and wasting time in useless chatter. Even at social gatherings he did not really care to prolong an evening with



what he considered to be unnecessary conversation. He would politely excuse himself, even in his own home, and return to work. Similarly on trips to the Mosque, if the purpose of his visit was to offer his Prayers then that is exactly and solely what he would do. True, he never overlooked the importance of paying his respects to elders, such as Chaudhri Zafrulla Khan Sahib during his lifetime, but immediately thereafter he would take his leave – even if it meant leaving a trail of baffled or disappointed admirers behind him. I am certain he hoped that they would learn from his example of using each moment to the utmost; of living a routine, well-ordered life influenced, first and foremost, by an ever-present Supreme Being and steered skillfully by an unstinting commitment to one's goals.

This very brief glimpse into some of the lessons I learnt from my Father is just that: a momentary glance into a small part of the life of an exceptional man. He was a master at finding ways to impart that timeless wisdom apparent in each of life's experiences. Above all, to be mentally stagnant or to waste the potential of learning something of value from each God-given moment was, in his view, to step out of life's procession that marches in majesty and proud submission toward the infinite. I know without doubt that he would appreciate the aptness of this ode by Samuel Johnson:

“Catch then, oh catch the transient hour;  
Improve each moment as it flies!  
Life's a short summer, man a flower;  
He dies – alas! how soon he dies.”



Dr Salam meeting Hazrat Khalifatul-Masih III.

# My Glorious and Beloved Brother: Professor Dr Abdus Salam

*Hameeda Bashir Ahmad, Karachi, Pakistan*

Translated from Urdu By Dr Rasheed Syed Azam, Staley, NC

It is impossible to express my true feelings according to the status of my brother whose life was dedicated to goodness for the sake of God Almighty. According to a poet, "everybody has to die but we really miss the one for whom the whole world mourns." I cannot forget the childhood our brother spent with us. At that time no one could possibly imagine that he will become such a great personality in the world and our father's vision will be thus fulfilled. He was handed over to our father by an angel and his name "Abdus Salam" was foretold .

## Best Parents

Parents' self example always serves as a best model for the training and development (tarbiyyat) of children. Our parents were the best teachers for us who introduced us to the Holy Prophet, peace and blessings of Allah be upon him, and the Promised Messiah, alaihissalaam, and his Khulafa. Our father, may Allah be pleased with him, used to say, "If the first child is brought up properly then he becomes a model for his younger siblings."

Our father's uncle, Ahmad Bakhsh Sahib, a Punjabi poet, wrote the following verses when he heard the news of Salam's birth:

A letter has come from Santokh Dass  
Bearing the glad tiding  
Of Abdus Salam's birth  
Brother, Friday is a blessed day,  
The day of Abdus Salam's birth.

A thousand nay a millions thanks  
Praise do we render to Allah  
On the birth of Abdus Salam.  
May Allah give him long life  
And best of luck.

## Organization

Our brother was well organized from his childhood and all his things were placed at the right place. His books could be easily located where he had placed them when needed. He was a guiding light for us. He was taught by our father to do his work on time, sleep on time and offer his Prayers on time.

Our father always used to bring seasonal fruit on his way home from his office. All of us were given the equal share but unobserved we used to put a portion of our share in his plate. He would smile but would also say, "Everybody should eat their share." I also remember that we used to catch fish from a stream near our house in Multan which was specially cooked for our brother.

## Years of Early Education

Education was Salam's life. He never wasted time. He would get up early and sleep early. In the morning, he would read the Holy Quran after Prayer. He would dress-up after breakfast and walk to school. He would learn arithmetic tables on his way to school, walking with friends sometimes. He was a humble, obedient, very simple and studious student. He was helpful to his younger siblings but encouraged them to do their own homework. We played and enjoyed many children's games together including building clay soldiers and arranging our armies on the battlefield.

## Matriculation and Later Years

Salam passed the Matriculation Examination (High School Equivalency Certificate) with distinction setting a new record in the Punjab

University grades. This was a great honor for a Muslim boy and he was admired even by Hindus of Jhang District. His photographs appeared in the Press and the Punjab Book House had it printed on their bags (along with the photos of four runner-ups) for all customers.

After college Education and further studies in England, Salam settled in London. Whenever he came to Pakistan he would always visit us (two of his sisters and one brother) in Multan.

He was once visiting Pakistan and Singapore before his illness. One of his boxes was misplaced in Lahore while traveling to Singapore via Karachi. The airline told Dr Salam that he should buy new clothes and they will pay for it. "I don't need the clothes," he said, "I need the papers which were in my box." He was very forgiving in spite of this difficulty. When traveling, Salam used to carry with him in his coat's pockets a copy of the Holy Quran with translation, a prayer book, and also his passport and other necessary documents to save time at the airports.

He would always meet Hazoor in Rabwah when visiting Pakistan and go for du'a (supplication) to Bahishti Maqbara, the grave-sites of revered personage of the Jama'at.

He had a special love for books and used to buy copies of the Holy Quran wherever he visited. He was also fond of Pakistani perfume and bought it not only for himself but also as a gift for others.

## Nobel Prize

Dr Salam was awarded the Nobel Prize in Physics in 1979. He visited Pakistan with his wife and showed us his Medal. I was about to put a garland of roses around his neck when he remarked "give it first to your sister-in-law." It was a memorable visit and my brother was happy to write about it after he returned to England.

Nobel Prize brought with it a lot more travel and hard work to stimulate the peoples in the third world for improving their lot through science education. He was very happy to concentrate all efforts in this direction.

## Righteousness: A Gift of God

Dr Salam was a very righteous person. He loved God, the Holy Prophet, peace and blessings of Allah be upon him, and the Promised Messiah, alaihissalaam, and their Khulafa. Hazoor has mentioned Dr Salam many times in his addresses. He was always eager to act upon the advice of Hazrat Mirza Tahir Ahmad, Khalifatul Masih IV, may Allah be his support. His piety was Allah's gift, a fruit of his parents' prayers. He loved his parents and dare not speak before them in a loud voice. His last resting place is near his parents.

He always tried to use his God-given gifts to the fullest and considered every moment of his life as a trust. He was a fast reader and had excellent memory. He was a deep scientific thinker and used to study the Holy Quran with insight. He was helpful and kind to others, but above all he was a humble human being.

## Concluding Remarks

The Promised Messiah, alaihissalaam, had made this bold prophecy that his followers will be righteous and shall excel in every field of knowledge and Salam was one such example in Ahmadiyyat. Hazrat Aqdas wrote as follows in his famous book *Tajalliyyat-i-Ilahiyya (The Divine Manifestations)* written in 1906 but first published in 1922:

"Therefore, O Mullahs! If you can fight with God, do. What was not done to poor Jesus, son of Mary, before me? In their fancy the Jews crucified him but God Almighty saved him from the cursed death on the cross. He was considered to be a liar and a false claimant at one time but now he is eulogized by four hundred million human beings and worshipped as god by ordinary people and kings. Although these people are wrong and mistaken in making a god of a humble human being yet this is the answer to the Jews who wanted to trample him under their feet."

"I have prayed and I am confident that Allah will never make me the cause of *shirk* like Jesus, son of Mary, and my followers will not associate any partner with One and the only God Almighty.

However, Allah has informed me many a times that He will bestow great honors upon me and hearts of people will be filled with love for me. God will cause my Jama'at to spread all over the earth and cause my people to be victorious over all other groups. And the members of my Jama'at will advance in knowledge and understanding so much that they will render the enemies of True Islam speechless through the light of their truth and logical arguments. Hosts of people will enter my Jama'at from all nations of the world to taste the spiritual water from my fountain and will become a dominant force. There will be many trials and

obstacles on the way but God Almighty will fulfill His promise of final victory. And God addressed me in these words: "I will give you blessings upon blessings, so much so that the kings will seek blessings from your garments." (In my vision I saw kings riding on horses and I was told, *They will help spread your message, and God will make them successful*). So listen carefully and remember always these glad tidings from Allah which are sure to be fulfilled one day."

(Roohaani Khazain, Vol. 20, Pp 408-9,  
London Edition)



Dr Salam meeting the Ameer of Kuwait.

# Prof. Abdus Salam, My Brother

*Chaudhry Abdul Hamid, Lahore, Pakistan*

“Men like Abdus Salam do not belong to any community or country. Their place is amongst the most brilliant in the world and therefore they belong to the entire humanity. In my opinion, wherever Abdus Salam has the facilities for work he should stay there and Pakistan should help him to stay there. His personal gain or the gain to his family or to his county would be insignificant as compared to the gain to science to which he is devoted and the advancement he makes will benefit all human beings whichever country they may be living in.”

Truly prophetic! Addressed to our father, Chaudhry Mohammad Hussain, in June 1951 by Mian Afzal Hussain. He was younger brother of Sir Fazal Hussain, a member of the Viceroy Council (Viceroy of India), which place after his death was filled by the appointment of Hazrat Chaudhri Muhammad Zafrulla Khan.

Mian Afzal Hussain was one of the three persons whom our father consulted regarding the educational career of his son. The other two were:

1. Hazrat Sir Muhammad Zafrulla Khan.
2. Hafiz Abdul Majid, an ICS Officer, who stood first in the Punjab University.

Mian Afzal Hussain, who was Vice Chancellor of the Punjab University when Salam had first become famous in 1940 with his Matriculation Examination result, had kept in touch with our father all this time. He was the one who advised Salam to go to Cambridge for Part II Mathematics Tripos and not to get direct admission in Ph.D. course in England as was usually done by majority of Indian students holding MA degrees from the Subcontinent. He emphasized that before one started working for a Ph.D. on the frontiers of knowledge where theory sometimes becomes

doubtful guide, it was essential and indispensable to take a clear sighted look at the frontiers to become aware and to identify the problems one was expected to tackle.

Once Salam talked of three “incidents” in his life that turned him into a research scientist. And this is the explanation of *incidents* which diverted all great men to service for humanity, while there were many others who got lost in the absence of coincidences of incidences in their lives.

## The First Incident

Our father wanted Salam to join the prestigious Indian Civil Services, but the annual competitive examination of this Civil Service was suspended for an indefinite period because of the second world war. Therefore, he was advised to complete his MA which he passed in 1946. The British Government of India had decided to hold the competitive examination in 1947. This situation made Salam unhappy. He was, however, advised by his mentor to go to Cambridge for higher studies, but our father could not afford to send him abroad for further education.

The turning point came in Salam’s life in 1946 with the help of Malik Khizar Hayat Tiwana, a feudal landlord and Chief Minister of the Punjab. He had collected hundreds of thousands of rupees to support the British war efforts, but the war has ended in 1945. As these funds were left unutilized, Mr Tiwana was advised by Sir Chotu Ram, one of his cabinet Minister, to institute scholarships for small farmers’ sons for study abroad. The condition imposed was that the farmer’s land revenue (*malia*) must not exceed rupees twenty five a year. Our uncle Chaudhri Ghulam Hussain who later on become Salam’s father-in-law owned some agricultural land in district Gurdaspur. He very kindly transferred a small piece of his land to our father, who obtained a certificate to that effect from the office of Deputy Commissioner,

Gurdaspur, through the good offices of Hazrat Mirza Abdul Haq, Advocate, and thus fulfilled the condition for the award of scholarship. Salam was awarded the scholarship on the condition of getting admission in a British University. Salam, on the advice of one of his teachers, had already applied for admission to Cambridge University, while our father was battling with the government officials for the scholarship. It so happened that the day he was awarded scholarship, i.e., on 3rd September 1946, he received a telegram from Cambridge University that an unexpected vacancy had come up at St John's College. Four other boys were also awarded the scholarship but they could not avail as they had no admission in any of the UK Universities. Their scholarship was canceled as India won freedom next year.

### The Second Incident

Salam was asked to join the college in October. The next hurdle was to get a passage at a time when most English families were hurrying back to England in anticipation of India's freedom. Salam went to Delhi for booking the passage, but he was mistreated by an Anglo-Indian officer of the Shipping Lines, who refused to book a passage for him. As he was coming out of the Shipping Lines office someone (an angel, I suppose) called him and said, "I listened to your conversation with so and so, he is a very ill mannered person. As I understand that you are a Muslim, I am also a Muslim and I will like to help you." So Salam was handed over a letter of introduction by that *angel* to someone in the Bombay office of the Shipping Lines. He was further told that a ship was leaving for Liverpool on Sep. 9, 1946. He was advised to go to Bombay and try his luck. So, Salam immediately returned to Multan, where we were living. He left for Bombay after a day, after collecting his books, clothes and other belongings. He met the other "Angel" at Bombay who very kindly booked a passage for him to Liverpool on the ship that was sailing on the 9th September.

### The Third Incident

The night before the ship sailed, Salam had a nightmare. In the middle of the night, there was a knock on the door of his hotel room. When Salam opened the door, he found two Tommies from the Royal Indian Army standing outside his room. They said to Salam that according to their information he was a deserter from the Royal Indian Navy and that they have come to arrest him. (In those days Indian Crew of a Naval Ship had revolted). Poor Salam was so perplexed that he could not believe what the soldiers were saying. However, after the first shock, he composed himself and showed them his passport and documents from Cambridge University to prove that he was a student and not a deserter from the Royal Indian Navy. Had he been arrested that fateful night, the world especially Islamic and the Third World would have been deprived of a great Scientist and a future Nobel Laureate.

Salam arrived one bitter cold morning at Liverpool. To his surprise he found Hazrat Chaudhri Muhammad Zafulla Khan on the dock. He had come to receive one of his nephews who had arrived there by the same ship. Chaudhri Sahib helped Salam to carry his heavy trunk to the train as during those days no porters were available.

Salam passed BA in Mathematics and Physics, a six years course in just three years, obtaining first class in both the examinations. He returned to Pakistan in the summer of 1949. He got married to Amtul Hafeez Begum, daughter of our uncle Hazrat Chaudhri Ghulam Hussain on 19th August, 1949.

He wanted to study for Ph.D. degree. Luckily some funds were still left over from the "war fund." Therefore, he was awarded another scholarship for two years. He left for Cambridge in October 1949. Normally, Ph.D. degree is awarded after three years research work, but the scholarship was for only two years. Now let us see how the Providence helped him in this regard. It was a tradition in Cambridge since Rutherford's time

(from 1920) that a student with a first class in his BA was admitted to Cavendish Laboratory for his Ph.D., while students with third class were asked to conduct research in Theoretical Physics. Salam was not good at practical, as he had no temperament for such work. He once said that, "When you are in the hands of apparatus, which you have to design yourself and if it does not work, you are frustrated and hit it with your fists, therefore, I approached my supervisor and asked for his permission to switch over to Theoretical Physics. My Supervisor was kind enough to grant me such permission provided I could find another supervisor. Luckily I found Paul Matthews who was just completing his Ph.D. I went to him and asked if he had any crumbs left to carry on with the research work. Matthews at that time was working on the Renormalization of Meson Theory and he had solved the problem upto 2nd order. He told me that he was going on vacation for a few months, and I could work on that problem."

He further said, "If I could not find a solution to the problem, when he returns from his vacation in October (1950) he will take back the problem from me. So I started working on that problem and just in five months I solved it (before the return of Matthews). My solution of theory was a major break through in the Renormalization Theory. This five months research work of mine was accepted as my thesis for the Ph.D. degree." This work also brought immediate fame to Salam and brought him in the folds of the top Physicists of that time. Because of this work Prof. Dyson of Princeton Institute, USA, who was considered to be one of the top scientist in this field, recommended him to Princeton Institute of Advanced Study at Princeton, NJ, USA, for a Fellowship. He went to Princeton in late 1951 for carrying on his research work further. He was once asked if he had the opportunity of working with Einstein, Salam replied, "Princeton was established by a toilet paper manufacturer who appointed Einstein as its first Director. When I went to Princeton, Einstein was there but he was too old to carry on with any creative work. He was living very close to the

Institute. He would go there for half an hour or so. We stood outside his home, and when he came out, we used to walk him to the Institute and then walk him back. One day when I was standing outside his home, he came out and looked at me, and asked, "What are you doing?" I told him, "I am working on the Renormalization Theory." He said, "I am not interested in that." Then he enquired if I have read his theory, since I was not interested in that so I kept quiet. Then he gave us a lecture for about half an hour on his theory. That is my experience with Einstein."

Salam returned to Pakistan in the summer of 1951. He as a special case was allowed by Cambridge University to submit his Ph.D. thesis from Pakistan, which he did and he was awarded Ph.D. in 1952. He was appointed Professor and Head of the Mathematics Department at Govt. College Lahore. He was also made Honorary Head of Mathematics Department, Punjab University. Unfortunately, the Principal of Government College, who was Salam's teacher in BA, treated him very shabbily. In his annual confidential report of Salam for 1951, he recorded, "Salam is not fit for Government College Lahore. He may be excellent for research but he is not a good College man."

Salam was invited by Dr Bhaba, Chairman Indian Atomic Energy Commission, to meet Professor Pauli, who was awarded Nobel Prize for Physics in 1945, in Bombay, during Christmas holidays. When Salam returned from this trip he was charge sheeted by the Principal of the College as he should have asked for an official leave even during the vacation if he was going out of Pakistan. All these incidents saddened Salam. Apart from these incidences, atmosphere for research work at Lahore was non existent. Cambridge University offered him lectureship at St John's College which he accepted and finally left Pakistan to join St John's on January 1, 1954. He was also made a Fellow at St John's College, where he taught for about three years.

He was appointed Professor of Theoretical Physics at Imperial College of Science and

Technology, London, on 1st January 1957. He was the second Asian to be appointed Professor in a British University. The first one was Dr Radha Krishnan who was Professor of Indian Philosophy at Oxford. According to Salam, "Pakistan rediscovered him after this appointment at the Imperial College."

With his untiring efforts and hard work, the Imperial College soon became the best institution for Theoretical Physics in Europe and America. He retired from the Imperial College in 1993 due to ill health. He, with the help of IAEA, Vienna, established International Center for Theoretical Physics at Trieste, Italy, which he very much wanted to set up in Pakistan. But the Government of Pakistan thought that Prof. Salam wanted to set up a five star hotel for scientists. Thus, the country lost the opportunity of setting a center of excellence. More than fifty thousand scientists from all over the world especially from the Third World and Islamic countries have benefited from this center since its creation in 1964. This center will be remembered generation after generation. He should have been awarded a Nobel Prize for this noble work, which surely had saved thousands of Scientists from the Third World, who otherwise would have met a sure death of obscurity as scientists.

In 1983 he founded Third World Academy of Sciences for the benefit of scientists from the Third World and Islamic countries.

He had served Pakistan to the best of his ability. On his advice, *PINSTECH* (Pakistan Institute of Nuclear Research and Technology), *SUPARCO* (Pakistan Upper Space Research Committee) of which he was the Founder Director from 1961 to 1964, were established. He was also instrumental in establishing *KANUP* (Karachi Nuclear Power Project). He remained member of the Pakistan Atomic Energy Commission for many years. He was mainly responsible for obtaining scholarships for the training of more than 500 scientist of the Pakistan Atomic Energy

Commission.

He served two Presidents and one Prime Minister of Pakistan as their Honorary Chief Scientific Advisor. He had resigned from this post when the National Assembly of Pakistan during Z.A. Bhutto's regime had declared Ahmadis to be Non-Muslims. On 10th September 1974, Salam offered his resignation with deepest sorrow and regret to Z. A. Bhutto stating the following as the principal reason:

"You are aware that I am a member of the Ahmadiyya Community in Islam. I believe that the recent decision of the National Assembly in respect of this Community is contradictory to the spirit of Islam because Islam does not give any segment of the Islamic Community the right to pronounce on the faith of any other segment, faith being a matter between man and his Creator."

Further elaborating on his resignation, Salam explained:

"I cannot accept such a decision in any way whatsoever, and the only honorable thing left to do is to break away from the government which has made such an amazing order."

Z. A. Bhutto accepted Salam's resignation, but asked him to keep giving advice on scientific matters on an informal basis. To this Salam agreed.

Mian Afzal Hussain's words quoted at the beginning of this article came true not much later. As a physicist, Salam moved "ahead of the wave, embedding half a dozen notions in omnibus papers..." to win the Nobel Prize in Physics. The Prize signified much more than a personal triumph as the only developing country with a Nobel Prize in the science, he symbolized the upsurge of scientific enquiry in the Third World.

Prof. Abdus Salam as a son was most obedient, respectful and strictly adhered to the teachings of the Holy Quran regarding parents and always



prayed for them in Quranic verse,

And lower to them the wing of humility out of tenderness. And say 'My Lord, have mercy on them even as they nourished me in my childhood.' (Holy Quran, 17:25)

Once he wrote to me saying that I should pray for our parents regularly. Then he wrote that in a year he twice completes reading holy Quran for the benefit of his mother and father.

As a brother he was loving, affectionate and considerate. He was always concerned about the well being of his brothers. He guided us in our educational activities. I was very close to him as I

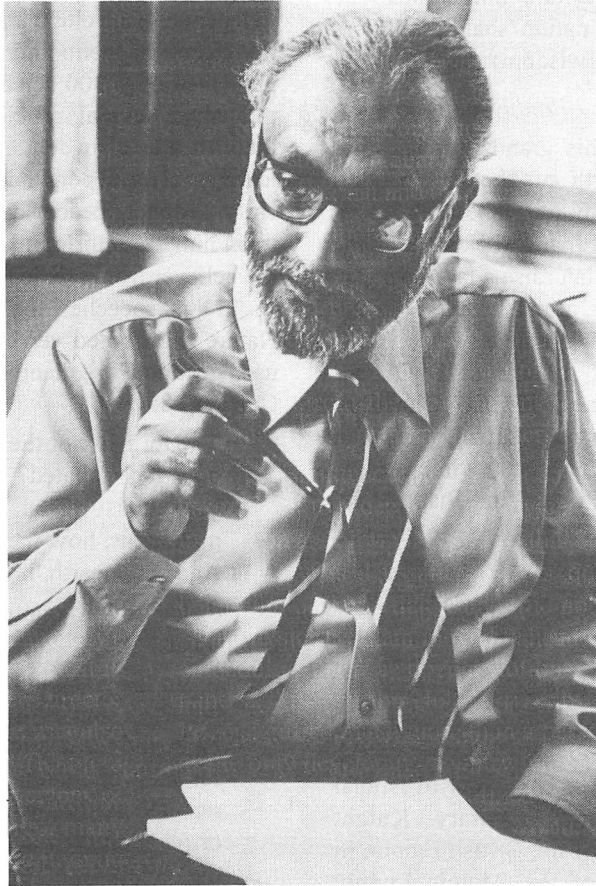
had lived in UK for three years. As a matter of fact he lived with me in a flat at Old Brompton Road, London, for a few months when he was appointed Professor of Theoretical Physics at Imperial College. I always took him to Rabwah in my car whenever he visited Pakistan after 1979. I even shared light jokes with him en route to Rabwah and discussed family matters with him.

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Personal recollection.

From Prof. Salam's interview on 7-12-1987.



Prof. Salam explaining a point,

# In the Memory of Professor Dr Abdus Salam

*Chaudhry Muhammad Abdur Rasheed, London, England*

Nearly a hundred years ago a grand prophecy was made by the Promised Messiah (alaihissalaam), Hazrat Mirza Ghulam Ahmad of Qadian, India:

The people of my dispensation shall attain such perfection in knowledge and learning that they will silence everyone with the light of truth and their conclusive arguments and miraculous findings, and every nation shall drink from the fountain (of wisdom).

*(Tajalliyyat-i-Ilaahiyya, p 21).*

All praise to Allah, this grand prophecy has been fulfilled by the birth of Hazrat Chaudhry Muhammad Zafrulla Khan of Sialkot, Pakistan, and Dr Abdus Salam of Jhang, Pakistan in the twentieth century. May Allah raise a large party in Islam that can fulfill this grand prophecy many times. Ameen.

Just before the seven months of Dr Abdus Salam's birth, his father Hazrat Chaudhry Mohammad Hussain, a very pious man, was given tidings of a boy in a vision (kashf) while he was offering his Maghrib Prayer in Jhang City Mosque. When Hazrat Chaudhry Mohammad Hussain asked the name of the boy, he was told, "Abdus Salam." Accordingly, a son was born who was named Abdus Salam.

Abdus Salam, throughout his career, stood first in all his examinations. He was so successful in his career that he had a long list of various awards and assignments. Besides, being FRS (Fellow of the Royal Society), he was given the Order of Istiqlal in Jordan in 1980 and Honorary Knight Commander of the Order of the British Empire in 1989. He was member of the Atomic Energy Commission, Pakistan, from 1958 to 1974; Chief Scientific Advisor to the President of Pakistan

from 1956-1974. He was given Sitara-i-Pakistan in 1959 and Nishan-i-Imtiaz (highest civilian award) in 1979 at the time when he won the Nobel Prize in Physics. Dr Abdus Salam proved what Einstein could not: unifying two forces of nature. He was given honorary degrees in 36 different countries.

Professor Salam shared the 1979 Nobel Prize for Physics with two American scientists, Sheldon Glashow and Steven Weinberg for their independent development of the theory unifying the electromagnetic and weak nuclear forces. He published over 300 scientific research papers. He published several articles on various scientific theories and also delivered several lectures. His lectures always concluded by the saying of the Holy Prophet, peace and blessings of Allah be upon him, "Acquiring of knowledge is the duty of the believer from cradle to the grave."

In his speeches, he mentioned the laws of Nature and quoted verses of the Holy Quran. He used to quote frequently the verses 18 to 21 of Chapter 88:

Do they not then look at the camel,  
how it is created? And at the heaven,  
how it is raised high? And at the  
mountains, how they are firmly rooted?  
And at the earth, how it is spread out?

He also used to quote Quranic verses 191-192 of Chapter 3:

In the creation of the heavens and of the earth and in the alternation of the night and the day there are indeed Signs for men of understanding; Those who remember Allah while standing, sitting, or *lying* on their sides, and ponder over the creation of the heavens and the earth: "Our Lord, Thou hast not created this in vain..."

The Holy Quran emphasizes the superiority of knowledge, by asking, how can those who possess knowledge ever be equals of those who do not possess the knowledge? (39:10).

Dr Abdus Salam quoted about 750 verses of the Holy Quran in his lectures at different occasions, which is almost 1/8th of the Holy Book, exhorting believers to study and ponder over Nature to reflect and to make the best use of reason in their search for the ultimate, and to make acquiring of knowledge and scientific comprehension part of their life. He often used to quote the following verses of the Holy Quran in his lectures: Sura Al-Jathiya, verse 14; Sura Al-Mulk, verses 1-5; Sura Al-Talaq, verse 13; Sura Ya Sin, verses 82-84; Sura Al-Ra'd, verse 12, Sura Bani Israil, verse 24, 25; Sura Al-Baqarah, verse 256 (Aayatul-Kursi); Sura Al-Baqarah, verse 3.

Throughout his successful life he tried to prove the Unity of God. He never believed that there is any conflict between science and religion. In physics, his work emphasized the symmetries, the oneness of Allah. The Holy Quran has placed a lot of emphasis on the Natural Law. He often mentioned that not a single verse in the Holy Quran describing natural phenomena contradicts what we know for certain from the discoveries in sciences. In 1979, at Jalsa Salana in Rabwah, Pakistan, he delivered a speech on proving Oneness of Allah by scientific means.

Wherever he went to lecture, he highlighted the saying of the Holy Prophet, peace and blessings of Allah be upon him, that pursuit of knowledge is a duty of every Muslim, man and woman. Many times, before Muslim audience he would make very sincere and passionate exhortations that Muslims should re-enter the world of science and technology before they become utterly marginalized. Nothing hurt him more than strong barrenness of the intellect in Islamic countries today.

Professor Abdus Salam was born in Pakistan, remained a proud citizen of Pakistan throughout his life. By his death, the World, especially, the underdeveloped countries, lost one of the mightiest intellectual ever born in the land of

Pakistan. Although, the Government of Pakistan and some religious factions of the country always tried to disown him due to his belief in Ahmadiyya Movement in Islam, he was still a hero and a role model for a great number of Pakistanis. Dr Abdus Salam's great desire was to set up an International Center for Theoretical Physics in Pakistan, but the then Government of Pakistan did not cooperate with him. However, his efforts bore him the fruit and he became Founder Director of the International Center for Theoretical Physics (ICTP) in Trieste, Italy, in 1964. The Center helps thousands of scientists each year throughout the world to enhance their scientific knowledge. In 1983, Professor Abdus Salam founded the Third World Academy of Sciences (TWAS). Both TWAS and ICTP provided rare opportunity to physicists and other scientists of exposure to the international scientific achievements. His greatness lies in helping the poor countries to come forward in the field of Science and Technology. He always emphasized the tremendous need for science for the underdeveloped countries. He traveled vastly to spread his zest for knowledge in the underdeveloped countries.

He was the most powerful and influential advocate of science for the underdeveloped countries. He used to say, "Scientific thought is the common heritage of mankind." I am hundred percent sure that he was right in this statement. Therefore, throughout his life, his plea was that science is universal and like the blessings of Allah, is beyond the bonds of religion, race and color. His pursuit of science for peace capable of filling the gap between the North and South of the planet shall remain as an example for those who endeavor to achieve the cultural and social development of the Third World countries.

Dr Abdus Salam was strong, forceful, assertive, enthusiastic, vibrant, authoritarian and with a mind as sharp as a razor's edge. He was a very hard working person and used to work 15 to 16 hours a day. He had a very critical mind. He read widely and avidly. He was fond of literature, history, medicine, religion, philosophy, science

and learning Arabic and Persian languages besides Urdu. He also loved poetry, especially in Persian. He was a very humble, simple, intelligent, graceful and handsome man. He was a most memorable person. Above all his main quality was that he respected his parents. He was very fond of them and they always sacrificed their lives for him and prayed for him.

During his last years of life, he was victim of a mysterious neurological disease. At home, he talked very little, he was always thinking and reading. He helped the poor students throughout the world. He led a very simple but remarkable life. At home he was never proud, he offered his five daily Prayers regularly and read the Holy Quran while understanding its meanings. He used to ponder over Quranic verses for hours.

From 1964 to 1993, he used to spend one week of every month in London where he was a Professor of Theoretical Physics at Imperial College, three weeks in Trieste, Italy, where he was Founder and Director of the International Center for Theoretical Physics. Throughout my life in England, I found him God fearing, humble, honest, well spoken, and well dressed. He used to ask every member of his family what he or she is doing and what their goals are. He used to write letters to his father and Huzur on a regular basis. He was a firm believer in prayers and acceptance of prayers by Allah. When the Prime Minister of Pakistan, Zulfikar Ali Bhutto declared Ahmadi Muslims as Non-Muslims, Professor Salam grew full beard. He used to say, "Who is Bhutto to call us non-Muslims?"

He was born through his father's prayers. When he died, Huzur praised him and his work. May Allah rest his soul in peace and his name always remain fresh in the generations to come as "Abdus Salam," servant of peace. Ameen. He left behind two wives, six children and many thousands of other mourners. May Allah give strength to these mourners to follow his footsteps and to become shining examples for their

countries.

His name will live as long as Ahmadiyyat lives. He had great attachment with Khilafat and Ahmadiyyat. He respected the system of Jama'at and was a true believer of Islam. He used to read Al-Fazl regularly. He has proved to the world that one does not necessarily have to leave his religion and detach himself from the community to become a great personality. He was never ashamed of his poor background. He was proud to be an Ahmadi Muslim and a Pakistani. The Western society did not impress him. He went to sleep early and woke up early. When he learnt about the winning of the Nobel prize, the first thing he did was that he offered *Nawafil* (voluntary Prayer) thanking Almighty Allah in Fazal Mosque, where he sat for I'tikaaf in 1947 during the month of fasting. When he went to receive the Nobel Prize he was dressed in Pakistani style white *pagree* (turban), white *shalwar* (leg cover), black *sherwani* (overcoat) and *Jhangvi khussa* (Jhang-style shoes). The world saw on TV a first well contented Ahmadi Muslim.

He used to have long discussions with Chaudhri Muhammad Zafrulla Khan. Once in 1979, the Governor of Punjab, Pakistan, Mr Sawar Khan asked Professor Salam, "Who is your ideal at present?" Dr Salam replied: Chaudhri Zafrulla Khan. The Governor became quiet.

Dr Salam was a Moosi and his Namaz-i-Janaza (funeral Prayer) was led by Hazrat Khalifatul Masih IV in London. He was buried in Bahishti Maqbara, Rabwah, Pakistan. I have met him in dreams several times. He seems to be happy. Once he advised me to recite the following: Darood Sharif; Aayatul Kursi, verse 256 of Al-Baqara; Sura Al-Furqan; Sura Luqman; Sura Ya Sin; Sura Al-Rahman; Sura Al-Mulk; Sura Al-Duha and the four Suras starting with the word *qul* (Sura Al-Kafirun, Sura Al-Ikhlās, Sura Al-Falaq and Sura Al-Nas). May Allah bless his soul and give him a superb reward for what he did for the mankind. Ameen.

Color Salat Poster containing 18 panels of salat postures: Aman, Qad qadima, Salam, Takbir, Saoo, Taawuz, Tauwas, Ruku, Qaada, Daood, Tasbeeh, Tashahhud, Sajdah, and Tasleem. Each panel includes Arabic text, English translation, and a photograph of a man performing the specific prayer movement.

Color Salat Poster

Published by Majlis Ansarullah, U.S.A. The poster has the text of salat in Arabic, along with its transliteration and translation in English. Arabic text, English transliteration and English translation are set in different colors for easy identification. Color pictures are included to identify different postures. Children, adults, and new Muslims, all can learn, revise and refresh their knowledge of salat. It makes a great gift for Ahmadi, Non-Ahmadi and Non-Muslim relatives, friends and acquaintances.

The poster is on 18"x24" cardboard paper. It can be framed or displayed as is in mosques, homes, and in public buildings where appropriate. This color salat poster is the second edition of the black and white poster published earlier. The black and white poster was soon all sold out. This color edition has been published to fulfill large demand from all over the States.

Please send \$2 per copy to Sajid, 5539 Firehorn, Boise ID 83716 with your mailing address and phone number. Majlis Ansarullah U.S.A. will pay the postage within the continental U.S.

# Professor Abdus Salam – Some Reminiscences

*Dr Tahira Nasreen Arshed, University of Tennessee at Martin*

I was an undergraduate student when I first heard Professor Abdus Salam give a lecture on his theory at the Pakistan Atomic Energy Agency in Lahore. His excitement about his work was obvious but what impressed me most at the time was a genuine feeling on his part to infuse a love of knowledge, learning and hard work in his audience. His life was a perfect example of these qualities.

As I went to study physics at the University of Liverpool in UK, I found it very hard to cope initially. My uncle spoke to Dr Salam in London and expressed his desire to arrange a transfer to Imperial College, London. Dr Sahib advised against doing so. He said that as I was on a Commonwealth Scholarship, it would create a bad impression and it might jeopardize such awards to other Pakistani students in future. Dr Salam loved Pakistan and always had the welfare of the country and its people on his mind.

Dr Salam's personal experiences with the west enabled him to feel first hand how isolated the scientists in the developing countries were and the hurdles they faced in trying to receive any recognition of their work in the west. While Dr Salam saw plenty of creative talent among the scientists around the world, the western scientific community held the monopoly in science and its refereed journals were skeptical of any good research coming out of obscure little universities in the third world.

The idea of establishing an International Center of Theoretical Physics for research was proposed by Dr Salam about forty years ago. It was basically meant to provide an opportunity for isolated research scientists in developing countries

to get together, exchange ideas, interact and learn from each other, and most importantly, be able to publish the results of their research while working at the center, an establishment of repute recognized in the west. His conviction in this cause led him into relentless efforts with world organizations and governments to obtain approval and funds for the establishment of the center at Trieste, Italy. It is amazing that, in spite of the huge demands on his time, he continued to produce excellent research work.

For about 20 years, I was a regular visitor to the International Center in Trieste. I accompanied my ex-husband who was a theoretical physicist. The shorter visits were generally in the months when universities closed for summer vacation. At those times, the center was bustling with activity. Scientists worked day and night but also enjoyed the beauty of the place and meeting their counterparts from east and west. They had the opportunity to present their research results at seminars and publish it through the center's publication services.

There are a few personal experiences which I would like to mention briefly. These occurred during our stay from 1983-86 at Trieste. While at Trieste, Dr Salam regularly attended and often led Friday Prayers in a small room which was set aside for the purpose. Many Muslim scientists joined him in Prayers. Whenever an older Ahmadi member was present, he insisted that the Prayers be led by the person. My father-in-law who visited us in Italy, felt greatly honored when he was asked to lead the Prayer. Dr Salam was, however, very careful that the center should not be used for proselytizing and should only serve the

purpose for which it was sanctioned.

When his family came from London for visits, we too had the pleasure of their company. My son, Bilal, about the same age as Umar Salam was happy to have a friend with similar interests and they got along very well. Dr Salam assigned a set of algebra problems for Umar every morning and Umar and Bilal both tackled the problems. Not surprisingly, my boy is now in graduate school studying mathematics. Dr Salam also asked me if I could supervise Umar's reading of the Holy Quran whenever he was in Trieste for a visit. He did not want Umar to forget to read Arabic. While I offered my services gladly, he insisted that I should be paid for my time and simply would not agree to have it otherwise.

Like us, some scientists came to the center for longer periods of time and had their families with them. Our children had to attend the only English medium school (The International School) in Trieste. The fees were exorbitant and it created a lot of hardship for the families. Dr Salam was approached by the scientists for help. He intervened and after a lot of meetings with school officials, the school gave a special fee rebate to the children of visiting scientists at the center. The reduced fees were then paid entirely by the center.

Dr Salam realized that with the changing times, new scientists had to choose applied research fields rather than theoretical particle physics in which jobs were becoming very scarce. He also encouraged particle physicists to diversify and move to other branches. Many did. An Indian couple from Zambia were at the center for summer. They had no children. The lady was expecting a child but was desperate as she had lost several times before. The Italian doctors diagnosed the problem and the couple wished to stay further. The husband's stipend period was over and there was no money available to support them and the hospital costs involved. Dr Salam went all out to find some way of helping them. The only source of money available was in the field of research in Solar Energy. Dr Salam persuaded the scientist to switch his field to Solar Energy as this was the

only possibility. He was glad to do so. They stayed a further period of one year and had a healthy son. They were forever grateful to Dr Salam for getting them into an applied field and for the blessing of a healthy child.

Another scientist at the center over-worked long hours to make the best of the available opportunity. This led to serious health problems. He approached Dr Salam and explained to him how he was feeling. Dr Salam gave him a week off, authorized immediate payment of \$200 to him and told him to go to the Austrian mountains with his family to relax. He did so and came back feeling much better.

Although I spent much of my time at the center and attended seminars and lectures, I was there basically because of my family. I had attended an extended workshop in Medical Physics at the center and Dr Salam knew about it. As soon as a grant became available to the center in this branch, I was informed. I applied for it and received support for two years to work at the local hospital with a team of medical physicists. I learnt a lot about radiation therapy from this experience.

If all scientists who came to the center could tell their stories, each will have something unique in his personal relationship with Dr Salam. He was a man of great sensitivity and one could not help but feel his great love for humanity. He was a champion of science education for noble causes. He wished to go to any length to let talent, wherever it existed, flourish. He wished to see the Muslim world come up in science as it used to be in the old days and he recognized a potential for it all over the Muslim world. Now it is for all of us to strive to fulfill his dream. We must work hard as he did, excel in our fields of specialization, make a place for Muslims in the scientific world just as Dr Salam wished and set a personal example for us. His work in science will live forever in voluminous books on the subject, but it is Dr Salam as a person, the private benefactor, whose memory will be cherished by those whose lives he touched and enriched. May his station be exalted with Allah. Ameen.

# Abdus Salam, the Servant of Peace

*Belal Khalid, Saddle Brook, New Jersey*

Most people know Dr Abdus Salam as a great Physicist, and the first Muslim scientist ever to get a Nobel Prize. His contributions towards Theoretical Physics make him stand in the line of Copernicus, Galileo, Newton, Maxwell, Faraday, and Einstein, but his conviction in the unity of the Creator, and his passion for religion, distinct him from the rest. There are many other aspects of his personality which generally escape the eyes of common people.

Dr Salam believed that science is the shared creation and joint heritage of all mankind. It is not a product of the North. Its benefits, and usage should be shared by the whole world alike. This was the second biggest passion of his life after physics. Dr Salam says, “The second (passion) has been to stress the importance of science transfer for developing countries. After building up the Theoretical Physics Department at Imperial College, London, I have spent 20 years fighting the battle of stressing the necessity of science transfer for developing countries.”

People usually describe him as a Man of Science, or a Man of two worlds, referring to his passion for science, and his heart of a poet. However, his love for Islam can be well judged by the fact that none of his speeches, addresses, or essays were ever without quotes from the Holy Quran. He longed to bring back the past traditions and glory of the Islamic world when they led the world in the fields of science and

technology.

He dedicated his life to the principle of unity – the unity of Nature and the unity of Mankind. The disparity between North and South – referring to those regions of the globe roughly representing the developed and developing nations – haunted him. He traveled extensively between continents, convincing the developed nations to help eradicate hunger and poverty in the poor countries by uplifting them with the transfer of technology and science. He would visit the poor countries convincing them to give the deserving attention towards science and technology to come out of the vicious circle of poverty and subjugation. This was the valiant struggle he fought all his life.

Dr Salam, often referred to as the lonely scientist of the South, achieved many distinctions in his early life. He was born in Jhang, Pakistan in 1926. At the age of 14 he scored highest marks ever recorded in the matriculation examination of the Punjab University in Pakistan. Though Dr Salam was always noted for his deep seriousness and devotion, however, his sense of humor could also be well noted from the following description of his early school days and the state of science in Pakistan, “When I was at school in about 1936, I remember the teacher giving us a lecture on the basic forces in nature. He began with *gravity*. Of course we had all heard of gravity. Then he went on to say, *electricity*. Now there is a force called electricity, but it does not live in our town Jhang, it lives in the capital town of Lahore, a hundred miles to the east. He had just heard of



the nuclear force, and he said, *That only exists in Europe.*”

Dr Salam’s father, himself a civil servant, wanted him to become a civil servant too, since it was a very respectable job. However, an accident happened which turned the threads of Dr Salam’s life in a different direction, the accident of the second world war. The civil service examination was discontinued because of war. Having completed his MA in mathematics, Dr Salam was offered a unique scholarship to study mathematics further at Cambridge.

In Cambridge, Dr Salam took the part II mathematical tripos and part II physics and came out a Wrangler – a first class degree. The Cambridge tradition was that those with first class continued in experimental work, while seconds and thirds were transferred to theory. “But for experimental work you need qualities I totally lack – patience, an ability to make things work – I knew I couldn’t do it. Impossible. I just hadn’t got the patience.”

Dr Salam found his way into some problems in quantum electrodynamics, then a subject in the throes of birth (now the most accurate theory known). His supervisor gave him an important problem to solve. Dr Salam took the challenge and solved it, getting rid of infinities from meson theories. This was his Ph.D. thesis.

**D**r Salam returned to what was now Pakistan and to his old university of the Punjab in Lahore as a professor. There was no tradition of conducting any research work, there were no journals. Dr Salam’s salary was GB£700 a year, not enough to subscribe any periodicals. There were no conferences. The nearest physicist to Dr Salam was in Bombay, which was in another country.

The head of Dr Salam’s institution told him that though he knew he had conducted some research, he could forget about it. He offered Dr Salam a choice of three jobs: bursar; warden of a hall of residence, or president of the football (soccer) club. He chose the football club.

Dr Salam was totally devastated by the attitude

of the society against research work. All Dr Salam aspired was a conducive environment where scientists could share their views, discuss them, talk about them. Dr Salam feared, if he stayed in Lahore, his work will deteriorate. Dr Salam had to make a choice, physics or Pakistan. He returned to Cambridge. He started as a lecturer at Cambridge, soon he was offered a professorship at Imperial College, London, where he started the department of theoretical physics. He was also elected the youngest Fellow of Britain’s most select association of scientists, the Royal Society.

In the late 50s, Dr Salam began to work on a theory in physics, which is called the unification theory. Maxwell and Faraday had done similar work on electricity and magnetism a century ago and came up with their unification in the form of electromagnetic force. Einstein tried until the end of his life to unify electromagnetism with gravitation, but, like everyone since, failed to do so. Dr Salam started working on a different aspect of the same problem. He addressed the problem of unifying the weak nuclear force and the electromagnetic force. Dr Salam succeeded. In 1979, together with Steven Weinberg and Sheldon Glashow, he was awarded the Nobel Prize for Physics. Their work was mathematical and theoretical, but predicted that certain, as yet undiscovered, particles should exist. It was only in 1983, under the cosmic conditions created in the huge particle accelerator at Centre for European Nuclear Research (CERN) that these particles were detected, and the theory was finally confirmed. Since then, Dr Salam made a huge contribution to science and physics. He wrote around 250 research papers. The awards and the recognition awarded to him need several pages just to be listed. Many countries have awarded him special awards in recognition of his endeavors to bring science and technology to the poor countries.

**I**n 1955, he was asked to serve as a scientific secretary at the first Atoms for Peace Conference convened by the UN in Geneva, Switzerland. This was a very important event for Dr Salam. He sensed that the united scientific

community of the world has the potential to work great wonders for the benefit of mankind. The same realization led Dr Salam to conceive the International Center for Theoretical Physics (ICTP) in Trieste as a place where men from all countries could work alongside some of the most distinguished minds of physics. This was an attempt to remove the loneliness of the scientists of the developing countries, to which, he himself once became a victim. As a delegate from Pakistan, he proposed its creation to the International Atomic Energy Agency (IAEA) in 1960, and he was himself appointed its first director in 1964. Advanced countries, such as France, Great Britain, the Soviet Union, and the United States, were cool to the idea at first, but they could not resist the enthusiastic support from developing countries that rallied behind Dr Salam. The Italian government provided the greater share of the money for the center's first four years, donated temporary premises and began work on a fine new building at the coastal resort of Miramare.

**T**he success of ICTP can be estimated from the fact that more than 2,500 physicist come annually both from developing and developed countries, including some from Italy, the host country. As an anti-brain-drain device, it receives of the order of 150 associates a year (these are first-class men and women from developing countries who are given six-year appointments and who come to the Center (at its expense) three times, for periods of up to three months, during these six years). There are additionally 264 institutions in the developing world which are federated to the Center and are empowered to send their members to the Center.

Initially, ICTP was established only to focus on Theoretical Physics, but soon, it shifted away from fundamental physics to physics which was more relevant to the needs of the developing countries – for example physics of the condensed matter with

the hope that if there are teachers in the universities who have worked, for example, in solid state physics, then the next generation at least will have an orientation which is much more industrial. Thus, the Center started stressing research in physics of solids, plasma physics, physics of oceans and the Earth, applicable mathematics; physics of technology, of natural resources, together with physics on the frontier.

**D**r Salam, now an international figure, struggled to revive the past Islamic excellency and leadership in the field of science and technology. The attitude of Islamic world towards science bemoaned him. He again and again reminded them of the importance of acquiring scientific knowledge. In a speech delivered by Dr Salam at a symposium in Istanbul in 1986, Dr Salam said, “I have asked the question why 1/8th of the Auqaf Funds in our countries should not be devoted to sciences, in keeping with the emphasis on sciences in the Holy Book of Islam. Let us make no mistake about it; in contrast to 250 verses which are legislative, some 750 verses of the Holy Quran – almost one eighth of it – exhort the believers to study Nature – to reflect, to make the best use of reason and to make the scientific enterprise an integral part of the community's life. I have been asking Muslim divines in India and Pakistan if they were devoting one out of every eight of their Friday sermons to stressing these aspects of sciences.”

**D**r Salam's interest in physics and science was not confined to the modern age alone. He had done extensive study of the past history of the Islamic world and the role played by Muslim scientists in the development of science. Dr Salam would often remind Muslims of the supremacy of Islamic sciences from AD 750 to AD 1100. He would often quote George Sarton in this context. “George Sarton, in his monumental five-volume *A History of Science*, chose to divide

his story of achievement in sciences into ages, each age lasting half a century. With each half century, he associated one central figure. From AD 750 to AD 1100 – 350 years continuously – it is the unbroken succession of the Ages of Jabir, Khwarizmi, Razi, Masudi, Wafa, Biruni, and Avicenna, and then Omar Khayam – Arabs, Turks, Afghans, and Persians.”

**D**r Salam was very much cognizant of the relationship between faith and poverty as depicted by Islam. In 1961, addressing a conference in Dacca on technology, Dr Salam said that poverty raised not merely material but also spiritual issues. He reminded them the saying of the Holy Prophet, may peace and blessings of Allah be upon him, “It is near that poverty may become synonymous with *kufr* (infidelity).” He addressed them with all the vehemence at his command and wanted to see this saying of the Prophet Muhammad, peace be upon him, on the door of every religious seminary in Pakistan. He said that there may be other criteria of *kufr* as well, but in the conditions of the twentieth century, in his opinion the most relevant criterion of *kufr* was the passive toleration of poverty without the national will to eradicate it. Dr Salam’s lectures to the Islamic world did not comprise of only exhortation based on Islamic teachings. He would also present extensive research on the economies of many recently modernized countries and the strategies they adapted. His lectures and essays would be full of charts, tables, comparisons of the allocation of funds for science, number of scientists, number of students, expenditures in the fields of education, defense, health, natural resources, and other topics in Muslim countries as compared to the developed countries.

**T**his, “Servant of Peace,” which is also the literal translation of his name, Dr Salam, fought all his life to bring peace to the world by the removal of poverty, and unjust distribution of wealth. He believed this disparity was a cause of great turmoil and unrest of the past

and the present. For achieving this goal, he used all the faculties given to him by God Almighty including his excellency in physics.

At the end, I would like to quote a few passages, which give us some more glimpses into his beliefs, and his love for religion, which he often referred to as a very personal thing.

Once asked, if he finds the same sublimity in music, which he finds in the theories of physics, Dr Salam said, “I would not say that I find the same sublimity. I find the same sublimity in reading or listening to the Quran, because there I find, for example, after you have been listening to it for half an hour, you suddenly get caught in an elevating fashion.”

**E**instein was Jew only because he subscribed to the ostensibly “cultural aspects” of the Jewish faith, rather than any “fundamentalist” belief in the teachings. Unlike Einstein, Dr Salam was a firm believer in God and Islam. His dedication to science did not cause any revulsion to religion or to God. In his own words, “I have myself never seen any dichotomy between my faith and my science – since faith was predicated for me by the timeless spiritual message of Islam, on matters on which physics is silent and will remain so... There are other good reasons why I am a believer. May be Einstein was oblivious to such a need, but personally I do have faith in the efficacy of prayer at times of distress. My greatest desire before I die is that Allah in His Bounty may grant me the mystical vision – so that I too can partake first hand of what was vouched to the Seers in the past.”

This servant of peace departed from us in November 1996 after a long illness in London. May God have mercy on his soul.

#### **Reference:**

Ideals and Realities, Selected Essays of Abdus Salam, edited by Z. Hassan and C.H. Lai (World Scientific Publishing Co. Pte. Ltd., Singapore), 1984.

# Professor Salam in the Eyes of a Humble One

*Dr Muhammad Aslam Nasir, Westfield, NJ*

Hazrat Promised Messiah, alaihissalaam, extensively prayed for the prosperity of the members of his Jama'at. As a response to those prayers, he received glad tidings from Allah, which he summarized in his book, *Tajalliyyat-il-lahiyya*, in these words: *Members of my Jama'at will excel in all fields of learning and knowledge.* Since the establishment of the Ahmadiyya Jama'at, fruits of those prayers have been witnessed by many friends and foe alike. Professor Salam was one of those fruits who not only brought glory to the world of Islam but also to the mankind at large.

Hazrat Chaudhry Mohammad Hussain embraced Ahmadiyyat at the hands of Hazrat Hafiz Hakim Nuruddin, Khalifatul-Masih I, raziallahoh 'anhu. In or around 1925, Hazrat Chaudhry Sahib saw in a vision that Allah had blessed him with a son. Upon his inquiry as to the name of the child, he was told that the name of the child was Abdus Salam. Accordingly, a son was born to him on January 29, 1926. Hazrat Chaudhry Sahib requested Hazrat Khalifatul-Masih II, raziallahoh 'anhu to name the child but Huzur replied that the Almighty Allah had already named him and that he was no one to interfere with Allah's decision.

The world of Islam, in spite of all its wealth, manpower, and natural resources, miserably lagged behind in modern technological progress. The Muslims were labeled as the parasites of the world. Under these circumstances, in a remote part of united India, in the small town of Jhang, Dr Salam began the journey of his life. His parents looked after him with special devotion and care. He moved fast on the road to maturity. He learned the Holy Quran and its translation at a very early age. Soon he found himself in the school where success seemed to go hand in hand with him,

always with distinction.

In 1957, at the age of 31, Dr Salam became the youngest ever professor of Theoretical Physics at Imperial College, London, where soon he proved to his associates that Islam was not a backward religion. The insight into the Holy Quran helped him develop new ideas. When his astonished colleagues would ask him as to where he got those ideas from, his response used to be a silent gaze up into the heavens with his finger pointing in that direction.

These ideas did not just rest in his mind. As with his hard research work, he started to prove these ideas one by one. As his name was becoming known around the world, so was Islam and the world of Islam gaining back some of its lost luster. His hard work brought him the highest recognition in 1979 when he became the first Muslim scientist to win a Nobel Prize. This award was widely considered to be an honor for the whole of the third world.

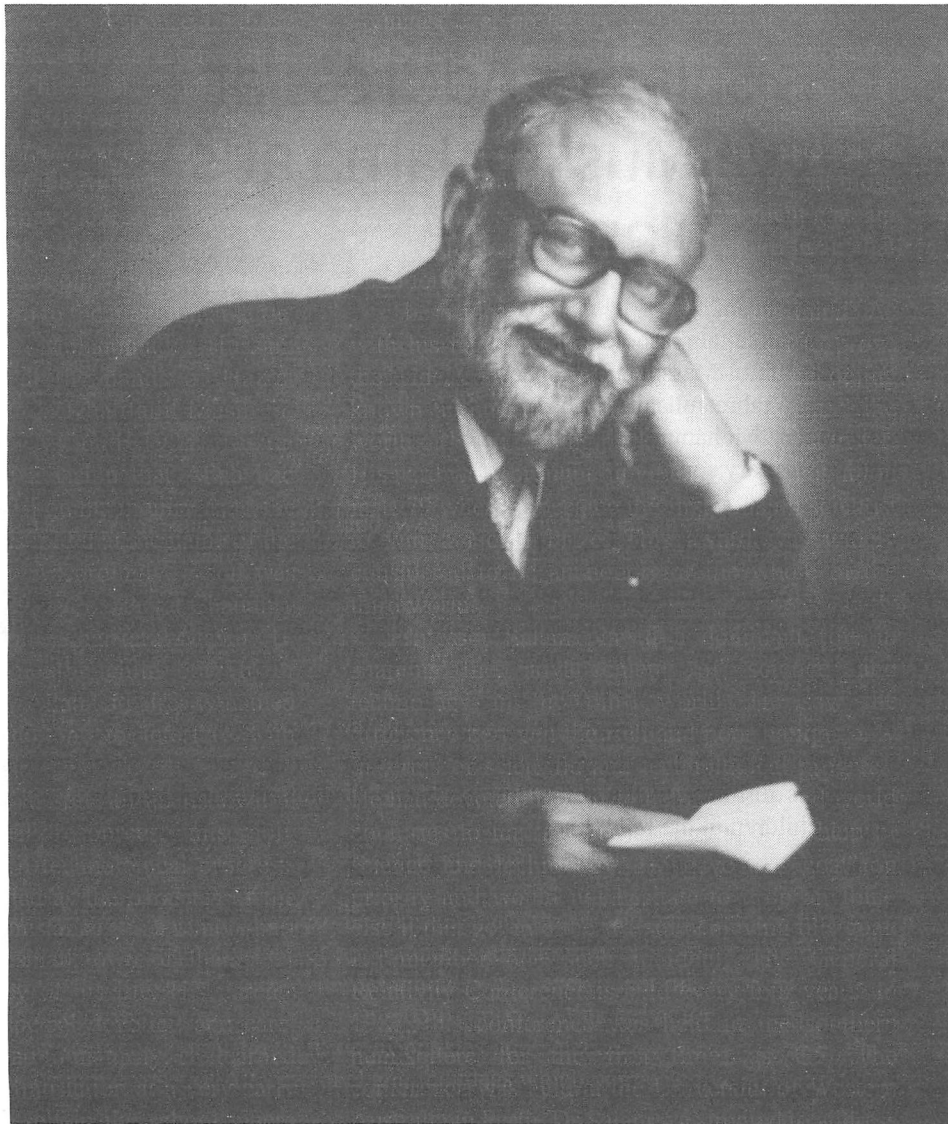
Professor Salam played a dominant role in shaping the advancement of science and technology in the third world. He saw the difference between the rich and poor nations only in terms of scientific and technological progress. He had devoted himself to helping the third world countries to improve their lives with the help of science and technology. He gave this goal top priority and would not hesitate to drop anything else if that got into the way of achieving this goal. I remember one such incident: The General Relativity Conference is held every four years. In 1987, this conference was held in the southern hemisphere for the first time, as G5. The conference was held at the University of Western Australia in Perth. Dr Salam was invited to address the conference. There were only two Ahmadi

families residing in Perth, at that time. They were delighted to hear about Dr Salam's proposed visit. However, we suddenly heard that Dr Salam had canceled his visit to G5 in favor of an invitation from Brunei and Indonesia requesting him to assist them with shaping of their future scientific institutions.

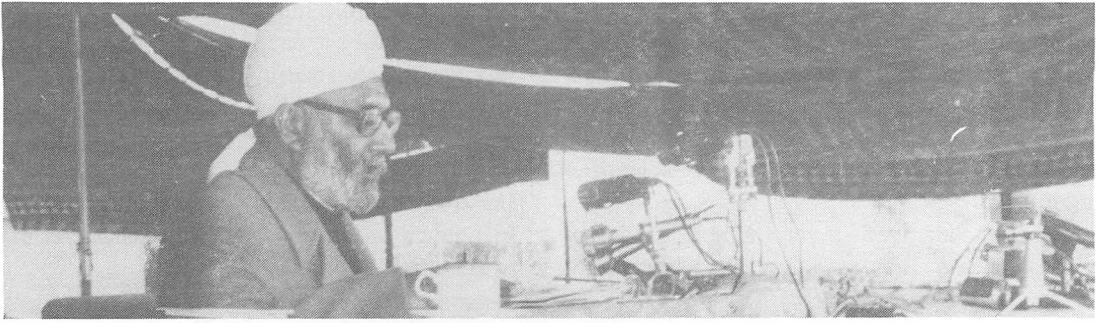
Professor Salam was a very humble, kind and dedicated person. He always replied to a letter, no

matter who wrote him. His advice always turned out to be the best one. I often wrote him letters seeking his guidance to which he always replied promptly with valuable pieces of advice.

On the sad demise of Professor Abdus Salam, one of his close associates, Professor Glashow of Harvard University, said, "We have lost a beloved friend who was the most delightful character in the world of physics."



Dr Salam, a portrait.



# Dr Abdus Salam's Address at Ahmadiyya Muslim Jama'at's 87th Jalsa Salana

Bismillahirrahmanirraheem.

Nahmadohoo wa nosallee 'ala rasoolehil-kareem.

Syedena Hazrat Khalifatul-Massih and Respected Members of the Jama'at,  
Asslaamo alaikum wa rahmatullaaha wa barakaatohoo.

Late Hazrat Chaudhry Mohammad Hussain Sahib (I request your prayers for Allah's mercy for my father) had written in his diary some 15 years ago:

I received a letter in London from Late Hazrat Mirza Bashir Ahmad Sahib stating: 'I see in your son the fulfillment of the prophecy of the Promised Messiah, alaihissalaam:

"The members of my Jama'at shall excel in knowledge and wisdom, and through the high degree of their learning and understanding, they shall render the opponents speechless. Therefore, remember what you have heard today that Allah's revelation will certainly be fulfilled." (Tajalliyyat-i- Ilahiyya, Pp 17-18)

I submit to Allah in humility (as all praise belongs to Him) Who has shown me this day of rejoicing for Pakistan and the World of Islam and the prophecy of the Imam of our time with your prayers and the prayers of my parents is fulfilled. In the Holy Quran, Hadrat Ibrahim, alaihissalaam, has prayed for his physical and spiritual children in the following words:

So make men's hearts incline towards them. (Holy Quran, 14:38)

I am grateful to the people and the President of Pakistan for the honor they have given me during the last few days. May their hearts be also turned towards Allah as the hearts of the people of Abraham, alaihissalaam, were turned to Allah. I request for your prayers and I thank God Almighty for His bounties as all honor comes from God.

إِنَّ الْعِزَّةَ لِلَّهِ جَمِيعًا ۝

All honor belongs to Allah. (Holy Quran, 4:140) Assalamo 'alaikum.

(Source: "Ansarullah," Rabwah, Pakistan, January/February 1980)

St. Patrick's Day

حضرت میرزا بشیر احمد صاحب اہم رہے اور حوسلی نے بندہ کو اندر خط لکھا  
 جس میں درج تھا کہ "اس بندہ کو رفس ڈاکٹر محمد السلام کے متعلق  
 دور آفتق میں حضرت مسیح موعود علیہ السلام کی پشتگونی کو پورا  
 ہونے دیکھنا ہوں۔" نشاط پشتگونی ذیل میں نقل لے جاتے ہیں۔

میں نے فریقے کے لوگ اس قدر علم و معرفت میں کمالی

حاصل کر چکے تھے کہ دینی سچائی کے نورا اور اسے دلائل اور نشانوں  
 کی روش سے سب کا ہونہ بند کر دینگے اور سوائے قوم و مسلمان  
 سے باقی شکی اور یہ کہ کلمہ زور سے پڑھنا اور پورا لکھنا  
 یہاں تک کہ زمین پر محیط ہو جائیگا۔

... ہے سننے والوں! رانے باتوں کو یاد رکھو اور ان باتوں  
 جیوں کو اپنے ہندوقوں میں محفوظ رکھ لو کہ یہ خدا کا کلمہ ہے  
 جو ایک دن پورا ہوگا۔ (تجلیات الہیہ) حضرت مسیح موعود

خاکسار محمد حسین علی نقوی

Copy of the page of the diary of Hazrat Mohammad Hussain mentioned in Dr Salam's speech.

“Thou seest not  
in the creation of the All-merciful  
any imperfection.  
Return thy gaze, again and again.  
Thy gaze, comes back to thee  
dazzled, weary.”

*Speech at the Nobel Banquet  
Delivered By Professor Dr Abdus Salam on 19 December 1979*

Your Majesties, Excellencies, Ladies and Gentlemen, On behalf of my colleagues, Professors Glashow and Weinberg, I thank the Nobel Foundation and the Royal Academy of Sciences for the great honor and the courtesies extended to us, including the courtesy to me of being allowed to address in my language Urdu.

Pakistan is deeply indebted to you for this.

The creation of physics is the shared heritage of all mankind. East and West, North and South have equally participated in it. In the Holy Book of Islam, Allah says:

ما ترى في خلق الرحمن من تفاوت فارجع البصر هل ترى من فطور

ثم ارجع البصر كرتين ينقلب اليك البصر خاسئاً وهو حسير

“Thou seest not in the creation of the All-merciful any imperfection. Return thy gaze, again and again. Thy gaze, comes back to thee dazzled, weary.”

This in effect is, the faith of all physicists. The deeper we seek, the more is our wonder excited, the more is the dazzlement for our gaze.

I am saying this not only to remind those here tonight of this, but also for those in the Third World, who feel they have lost out in the pursuit of scientific knowledge, for lack of opportunity and resource.

Alfred Nobel stipulated that no distinction of race or color will determine who received of his generosity. On this occasion, let me say this to those whom God has given His Bounty. Let us strive to provide equal opportunities to all so that they can engage in the creation of physics and science for the benefit of all mankind. This would exactly be in the spirit of Alfred Nobel and the ideas which permeated his life.

Bless You!



# The Holy Quran and Science

*Dr Abdus Salam*

The paper has three parts. We are presenting here the first part which is entitled, "The Holy Quran and Science." The other two parts are entitled, "The Present Picture of Sciences in the Islamic Countries" and "Steps Needed for Building Up Sciences in the Islamic Countries." The paper is published in the book, *Ideals and Realities: Selected Essays of Abdus Salam*, Ed. C.H. Lai, World Scientific Publishing Co. Pte Ltd., Singapore, 1989, Second Edition, pp 179-187.

While reproducing the article here, translation of the verses of the Holy Quran quoted by Dr Abdus Salam in the paper has been given from Late Maulawi Sher Ali Sahib's translation of the Holy Quran instead of the translation given by the editor of the book and references also have been corrected. (Editors)

Dedicated to the memory of my father who taught me Islam.

## 1. The Holy Quran and Science

Let me say at the outset that I am both a believer as well as a practicing Muslim. I am a Muslim because I believe in the spiritual message of the Holy Quran. As a scientist, the Quran speaks to me in that it emphasizes reflection on the Laws of Nature, with examples drawn from cosmology, physics, biology and medicine, as signs for all men. Thus,

"Do they not then look at the camel, how it is created? And at the heaven, how it is raised high? And at the mountains, how they are set up? And at the earth, how it is spread out?" (Holy Quran, 88:18 -21)

and again,

"In the creation of the heavens and the earth, and in the alternation of the night and the day there are indeed Signs for men of understanding." (Holy Quran, 3:191)

Seven hundred and fifty verses of the Quran (almost one eighth of the Book) exhort believers to study Nature, to reflect, to make the best use of reason in their search for the ultimate and to make the acquiring of knowledge and scientific comprehension part of the community's life.

The Holy Prophet of Islam, peace and

blessings of Allah be upon him, emphasized that the quest for knowledge and sciences is obligatory upon every Muslim man and woman.

This is the first premise on scientific knowledge with which any fundamentalist thinking in Islam must begin. Add to this the second premise – eloquently reinforced by Maurice Bucaille in his essay on "The Bible, the Quran and Science." There is not a single verse in the Quran where natural phenomena are described and which contradicts what we know for certain from our discoveries in Sciences.

Add to this the third premise: in Islamic history there has been no incident like that of Galileo. Persecution, excommunication (takfeer), which unfortunately continues even today over doctrinal differences, but not, to my knowledge, directly for scientific beliefs [1].

## 2. Modern Science, a Greco-Islamic Legacy

How seriously did the early Muslims take these injunctions in the Holy Quran and of the Holy Prophet?

Barely a hundred years after the Prophet's death, the Muslims had made it their task to master the then-known sciences. Funding institutes of advanced study (Bait-ul-Hikmas, i.e., houses of

wisdom), they acquired absolute ascendancy in the sciences that lasted for next 350 years.

An aspect of reverence of the sciences in Islam was the patronage they enjoyed in the Islamic Commonwealth. The paraphrase what H.A.R. Gibb has written in the context of literature: "To a greater extent than elsewhere, the flowering of the sciences in Islam was conditional... on the liberality and patronage of those in high positions. So long as, in one capital or another, princes and ministers found pleasure, profit or reputation in patronizing the sciences, the torch was kept burning."

The Golden Age of Science in Islam was doubtless the Age around the year 1000 CE, the Age of Ibn-i-Sina (Avicenna), the last of the medievalists, and of his contemporaries, the first of the moderns, Ibn-al-Haitham and Al Biruni.

Ibn-al-Haitham (Alhazen, 965-1039 CE) was one of the greatest physicists of all times. He made experimental contributions of the highest order in optics. He "enunciated that a ray of light, in passing through a medium, take the path which is the easier and quicker [2]. In this he was anticipating Fermat's Principle of Least Time by many centuries. He enunciated the law of inertia, later to become Newton's first law of motion. Part V of Roger Bacon's "Opus Majus" is practically an annotation to Ibn-al-Haitham's Optics [3].

Al Biruni (973-1048 CE), Ibn-i-Sina's second illustrious contemporary, worked in today's Afghanistan. He was an empirical scientist like Ibn-al-Haitham, as modern and unmedieval in outlook as Galileo, six centuries later.

There is no question that western science is a *Greco-Islamic* legacy. However, it is commonly alleged that Islamic Science was a derived science: the Muslim scientists followed the Greek theoretical tradition blindly and added nothing to the scientific method.

This statement is false. Listen to this assessment of Aristotle by Al Biruni:

"The trouble with most people is

their extravagance in respect of Aristotle's opinions, they believe that there is no possibility of mistakes in his views, though they know that he was only theorizing to the best of his capacity."

Or Al Biruni on medieval superstition:

"People say that on the 6th (of January) there is an hour during which all salt water of the earth gets sweet. Since all the qualities occurring in the water depend exclusively upon the nature of the soil... these qualities are of a stable nature... Therefore, this statement... is entirely unfounded. Continual and leisurely experimentation will show to anyone the futility of this expression."

And finally, Al Biruni on geology, with this instance on observation:

"... But if you see the soil of India with your own eyes and meditate on its nature, if you consider the rounded stones found in earth however deeply you dig, stones that are huge near the mountains and where the rivers have a violent current, stones that are of smaller size at a greater distance from the mountains and where the streams flow more slowly, stones that appear pulverized in the shape of sand where the streams begin to stagnate near their mouths and near the sea – if you consider all this you can scarcely help thinking that India was once a sea, which by degrees has been filled up by the alluvium of the streams."

In Briffault's words [3]: "The Greeks systematized, generalized, and theorized, but the patient ways of detailed and prolonged observation and experimental inquiry were altogether alien to the Greek temperament... What we call science

arose as a result of new methods of experiment, observation, and measurement, which were introduced into Europe by the Arabs... (Modern) science is the most momentous contribution of the Islamic civilization..."

These thoughts are echoed by George Sarton, the great historian of science. "The main, as well as the least obvious, achievement of the Middle Ages was the creation of the experimental spirit and this was primarily due to the Muslims down to the 12th century."

One of the tragedies of history is that this dawning of the modern spirit in sciences was interrupted. It did not lead to a permanent change of direction in scientific methodology. Barely a hundred years after Al Biruni and Ibn-al-Hitham worked, creation of high sciences in Islam effectively came to a halt. Mankind had to wait 500 years before the same level of maturity and the same insistence on observation and experimentation was reached once again with Tycho Brahe, Galileo and their contemporaries.

### 3. The Decline of Science in Islam

Why did creative science die out in Islamic civilization? This decline, which began around 1100 CE was nearly complete two hundred and fifty years later.

No one knows for certain why this happened. There were indeed external causes, like the devastation caused by the Mongol invasion. In my view, however, the demise of living science within the Islamic commonwealth had started much earlier. It was due much more to internal cause – firstly, the inward-turning and the isolation of our scientific enterprise, and secondly – and in the main – of active *discouragement of innovation* (taqlid). The later parts of the eleventh and early twelfth centuries in Islam (when this decline began) were periods of intense politically-motivated, sectarian, and religious strife. Even though a man like Imam Ghazali, writing around 1100 CE, could say, "A grievous crime indeed against religion has been committed by a man who imagines that Islam is defended by the denial of the mathematical sciences, seeing that there is

nothing in these sciences opposed to the truth of religion." The temper of the age had turned away from creative science, either to Sufism with its other worldliness or to a rigid orthodoxy with a lack of tolerance (taqlid) for innovation (ijtihad), in all fields of learning – including the sciences.

Does this situation persists today? Are we encouraging scientific research and inquiry?

Of the major civilizations on this planet, science is the weakest in the Islamic Commonwealth. Unfortunately, some of the Muslims believe that while technology is basically neutral, and that its excesses can be tempered through an adherence to the moral precepts of Islam, science – on the contrary – is value-loaded. It is believed that modern science must lead to "rationalism," and eventually apostasy; that scientifically trained men among us will "deny the metaphysical presuppositions of our culture." Leaving aside the fact that high technology can not flourish without high science and also leaving aside the insult to the "presuppositions of our culture" for implied fragility, I believe that such an attitude towards science is a legacy of the battles of yesterday when the so-called "rational philosophers," with their irrational and dogmatic belief in the cosmological doctrines they had inherited from Aristotle found difficulties in reconciling these with their faith.

One must remind oneself that such battles were waged even more fiercely among the Christian schoolmen of the Middle Ages. The problems which concerned the schoolmen were mainly problems of cosmology and metaphysics: "Is the world located in an immobile place? Does God move the primum mobile directly and actively as an efficient cause, or only as a final and ultimate cause? Are all the heavens moved by one mover or several? Do celestial movers experience exhaustion or fatigue?" When Galileo tried, first to classify those among the problems, which legitimately belonged to the domain of physics, and then to find answers only to those through physical experimentation, he was persecuted.

This persecution damaged the progress of science in Italy at least till the eighteenth century.

Ideological restitution for this, however, is being made now, three hundred and fifty years later. As a special ceremony in the Vatican on 9 May 1983, His Holiness the Pope John Paul II, declared:

“The Church’s experience, during the Galileo affair and after it, has led to a more mature attitude... The Church herself learns by experience and reflection and she now understands better the meaning that must be given to freedom of research... It is through research that man attains to truth... This is why the Church is convinced that there can be no real contradiction between science and faith... (However), it is only through humble and assiduous study that (the Church) learns to dissociate the essential of the faith from systems of a given age.”

#### 4. The Limitations of Science

In the remarks I have quoted, the Pope stressed the maturity which the Church had reached in dealing with science. He could equally have emphasized the converse – the recognition by the scientists from Galileo’s time onwards, of the limitations of their disciplines – the recognition that there are questions which are beyond the ken of present or even future sciences and that “Science has achieved its success by restricting itself to a certain type of inquiry.” And even in this restricted area the scientist of today knows when and where he is speculating; he would claim no finality for the associated modes of thought. In physics, this happened twice in the beginning of this century, first with the discovery of relativity of time and space, and secondly with quantum theory. It could happen again.

Take Einstein’s discovery of relativity of time. It appears incredible that the length of a time interval – the age one lives – depends on one’s speed – that the faster we move the longer we appear to live to someone who is not moving with us. And this is not a figment of one’s fancy. Come to the particle physics laboratories of CERN at Geneva which produce short-lived particles like muons, and make record of the intervals of time

which elapse before muons of different speeds decay into electrons and neutrinos. The faster muons take longer to die, the slower ones die early. Incredible but true.

Einstein’s ideas on time and space brought about revolution in the physicist’s thinking. We had to abandon our earlier modes of thought in physics. In this context, it always surprises me that the professional philosopher who in the nineteenth century and earlier used to consider space and time as his special preserve has somehow failed to erect any philosophical systems based on Einstein’s notions so far!

The second and potentially the more explosive revolution in thought came in 1926 with Heisenberg’s discovery of limitation on our knowledge. Heisenberg’s Uncertainty Principle affirms that while experiments can be made to discover where the electron is, these experiments will then destroy any possibility of finding simultaneously whether the electron is moving and if so at what speed. There is an inherent limitation in our knowledge, which appears to have been decreed “in the nature of things.” I shudder to think that what might have happened to Heisenberg if he was born in the Middle Ages – just what theological battles might have raged on the question whether there was a like limitation on the knowledge possessed by God.

As it was, battles were fought, but within the twentieth century physics community. Heisenberg’s revolutionary thinking – supported by all known experiments – has not been accepted by all physicists. The most illustrious physicists of all times, Einstein, spent the best part of his life trying to find flaws in Heisenberg’s arguments. He could not gainsay the experimental evidence – but hope was entertained that such evidence may perhaps be explained within a different theoretical framework – would say that this is the end.

#### 5. Faith and Science

But is the science of today really on a collision course with metaphysical thinking? Again the

problem – if any – is not peculiar to Islam; the problem is one of science and faith in general. Can science and faith at the least, live together in “harmonious complementarity?” Let us consider some relevant examples of modern scientific thinking.

My first example concerns the metaphysical doctrine of creation from nothing. Today a growing number of cosmologists believe that the most likely value of the density of matter and energy in the Universe is such that the “mass” of the Universe adds up to zero, precisely. If the mass of the Universe is indeed zero – and this is an empirically determinable quantity – the Universe shares with the vacuum state the property of masslessness. A bold extrapolation, made ten years ago, then treated the Universe as a quantum fluctuation of the vacuum – of the state of nothingness in a space and time created *ex nihilo*... What distinguishes physics from metaphysics, however, is that by measuring the density of matter in the Universe we shall know empirically whether the idea can be sustained in the physicist’s sense. If it cannot be, we shall discard it.

My second example concerns the recent experiment in Physics – which follows on our success in unifying and establishing the identity of two of the fundamental forces of nature, the electric and the weak nuclear. We are now considering the possibility that space-time may have ten dimensions. Within this context we hope to unify the electroweak force with the remaining of the two basic forces – the force of gravity and the strong nuclear force. Of the ten, four are the familiar dimensions of space and time. The curvature of these familiar space and time dimensions determines the size and life-span of our present Universe, according to Einstein’s ideas. The curvature of the extra six dimensions one has newly postulated gives the electric and the nuclear charges we are familiar with.

But why don’t we apprehend these extra dimensions directly? Why only indirectly through the existence of the electric and the nuclear charges? Why the difference between the four familiar space-time dimensions and the extra

internal dimensions which, according to our present thinking, have sizes no larger than  $10^{-33}$  cms?

At present, we make this plausible by postulating a self-consistency principle. The theory works if and only if the number of extra dimensions is six. However, there will be subtle physical consequences; for example remnants, like the recently discovered three degree black-body radiation which fills the Universe and which we know was a remnant of an early era in the evolution of the Universe. We shall search for these signs. If we do not find them, we shall abandon the idea:

Creation from nothing, extra dimensions – strange topics, for late twentieth century physics – which appear no different from the metaphysical; preoccupations of earlier times. But so far as science is concerned, mark the provisional nature of the conceptual edifice, the insistence on empirical verification at each stage and the concept of driving self-consistency [a].

For the agnostic, self-consistency (if successful) may connote irrelevance of a deity:

مَنْ يُضِلِّ اللَّهُ فَلَا هَادِيَ لَهُ ط

(Whomsoever Allah adjudges astray, there can be no guide for him. The Holy Quran, 7:187)

for the believer, it is part of the Lord’s design – its profundity, in the areas it illuminates, only enhances his reverence for the beauty of the design itself.

As I said before, personally for me, my own faith was predicated by the timeless spiritual message of Islam, on matters on which physics is silent, and will remain so. It was given meaning to by the very first verse of the Holy Quran after the opening:

“This is a perfect Book; there is no doubt in it; *it is* a guidance for the righteous, Who believe in the Unseen...” (Holy Quran, 2:3-4)

“The Unseen” – “Beyond the reach of human ken” – “The Unknowable” – the original Arabic

words are:

يَوْمِنُونَ بِالْغَيْبِ

## References

1. A.J. Arberry, *Revelation and Reason in Islam* (George Allen and Unwin, London, 1957), p. 19.
  2. H.J.J. Winter, *Eastern Science* (John Murray, London, 1952), p. 72-73.
  3. Briffault, *Making of Humanity*, pp. 190-202 quote taken from Muhammad Iqbal, *The Reconstruction of Religious Thought in Islam* (M. Ashraf, Lahore, 1971), pp. 129-130.
- a) Heinz Pagels recounts the following story

about Feynman, one of the great physicists of our time, perhaps the greatest physicists alive. "He was in sensory-deprivation tank and had an exosomatic experience – he felt that he came "out of the body" and saw the body lying before him. To test the reality of his experience he tried moving his arm, and indeed he saw his arm on his body move. As he described this, he said that he then became concerned that he might remain out of his body and decided to return to it. After he concluded his story, I asked him what he made of his unusual experience. Feynman replied with the observational precision of a true scientist: *I didn't see no laws of physics getting violated.*"

– April 1984



Sir Abdus Salam at his parents' graves in Bahishti Maqbara at Rabwah, Pakistan.

# Liberty of Scientific Belief in Islam

*Prof. Dr Muhammad Abdus Salam*

(Excerpts from Prof. Salam's speech published in the book "Muhammad Abdus Salam: Renaissance of Sciences in Islamic Countries," Scientific Publishing Co., Pte. Ltd. Editors: MHA Hassan and HR Dalafi. – Chaudhry Abdul Hamid, Lahore, Pakistan)

Let me say at the outset that I speak as a Muslim natural scientist. As a Muslim, liberty of religious belief and practice is dear to me since tolerance is a vital part of my Islamic faith. As a physicist, it is important to me in that religious liberty practiced in any society guarantees also liberty of scientific discussion within it and a tolerance of rival views, so crucial to the growth of science.

I shall illustrate tonight the insistence on religious liberty as expressed in our Holy Book, the Holy Quran. I shall further illustrate this from the practice of the founder of our religion, the Holy Prophet of Islam, peace and blessings of Allah be upon him. I shall then follow through with a brief description of actual Islamic practice over the centuries, particularly in so far as it has affected liberty of scientific discussion in Islam and freedom of concourse with scientists from other cultures and other faiths.

## 1. The Principle of Religious Liberty and the Holy Quran

First, the teachings of the Holy Book in respect of religious liberty: I shall read out six quotations. The first one declares as a fundamental principle of Islamic faith that:

"There should be no compulsion in religion." (The Holy Quran, 2:257)

The Quran clearly states that the ultimate choice of belief is the concern of an individual:

"And say, 'It is the truth from your Lord; wherefore let him who will, believe, and let him who will, disbelieve.'" (The Holy Quran, 18:30)

The next quotation makes the principle of

freedom of individual belief or disbelief even more explicit:

In the name of Allah, the Gracious, the Merciful.

Say, 'O ye disbelievers! I worship not what you worship; Nor worship you what I worship. And I am not *going* to worship that which you worship; Nor will you worship what I worship. For you your religion, and for me my religion.' (The Holy Quran, 109:1-7)

This concept of tolerance towards other beliefs is carried further, with the Holy Book defining clearly the role and the limits of the ministry of the Holy Prophet in the following words:

"Admonish, therefore, for thou art but an admonisher. Thou hast no authority to *compel* them." (The Holy Quran, 88:22-23)

And again:

Say, O ye men, now has the truth come to you from your Lord. So whosoever follows the guidance, follows it only for the good of his own soul, and whosoever errs, errs only against it. And I am not a keeper over you.' (The Holy Quran, 10:109)

And yet again:

"And we have not made thee a keeper over them nor art thou over them a guardian." (The Holy Quran, 6:108)

This verse is immediately followed by the next which clearly states another basic principle:

"And revile not those whom they

call upon beside Allah.” (The Holy Quran, 6:109)

This tolerant injunction in respect of even those which Islam believed were false deities, turns to an injunction of positive reverence so far as the leaders of other revealed faiths are concerned, with the enunciated principle:

“And there is a Guide for every people.” (The Holy Quran, 13:8)

and the clear injunction:

“We make no distinction between any of His Messengers.” (The Holy Quran, 2:286)

To summarize then, the Holy Book, in the clearest possible terms, makes religious liberty a fundamental part of a Muslim’s faith. It states that the role of the prophet is to convey Allah’s message. He has no authority to compel anyone nor has he a responsibility regarding the acceptance of the faith he preaches. And finally, at the very least, an attitude of respect is due to leaders of all Faiths.

## 2. The Holy Prophet’s Example

What was the Prophet’s own example? Let me recount three incidents from his life.

i. As you are all aware, the Prophet and his followers were terribly tortured and persecuted – some being martyred – during his thirteen years of ministry in Mecca before his emigration to Medina. In Medina, his first act was to draw up a charter with the Jewish community. Its major provision was the guarantee of religious liberty and worship to all denominations.

ii. In Mecca itself, the Prophet’s bitterest enemy had been Abu Jahl, Commander of Mecca’s army who was killed by the Muslims during the Battle of Badr, the first Meccan invasion of Medina. His son, Ikramah, another bitter enemy of Islam, was one of the Meccan commanders at the Battle of Uhud during the second invasion of Medina. Eventually, when Allah gave the Prophet

victory over the Meccans, Ikramah left Mecca and proceeded to the coast, intending to cross over to Abyssinia. His wife approached the Holy Prophet and asked whether Ikramah could return to Mecca while still professing his idolatrous beliefs. The Prophet replied that faith was a matter of conscience and conscience was free. If Ikramah returned to Mecca he would not be molested, and could live there in security professing whatever he chose to believe in. On this assurance, she followed Ikramah and persuaded him to return to Mecca. On arrival there, Ikramah repaired to the Holy Prophet and personally received the assurance which the Prophet had already given to his wife. After listening to the Prophet, the Prophet’s magnanimity and his sincerity in upholding religious freedom and toleration so struck him that Ikramah announced his acceptance of Islam. The Holy Prophet asked him if there was anything he wished for. Ikramah replied that he could wish for no greater bounty than God had already bestowed upon him in opening his heart to the acceptance of Islam, but he did desire that the Holy Prophet should pray to God to forgive him all the enmity that he had borne towards the Prophet and the Muslims. Ikramah’s desire was granted by Allah and he was soon after martyred in the service of Islam.

iii. The third instance is that of a delegation of Christians from Najran who came to Medina and had extensive discussions in the mosque with the Holy Prophet. The Prophet gave firm orders that the Christian institutions of Najran would be preserved. During the course of their meeting, the Christians wanted an interlude of prayers. The visitors felt somewhat uneasy as to where to go for their services. The Prophet understood their anxiety and invited them to hold the services right there in his mosque – one of the holiest places of Islam. This set a precedent of tolerance, generosity and understanding, even unto the sharing of places of worship which became the norm of future Islamic conduct.

The famous Farewell Sermon of the Holy



Prophet summarized Islamic teachings on fair and just dealings with mankind and provided an unmatched charter for human rights. On the occasion of the performance of his last Hajj before he died, the Holy Prophet said:

I do not think, O people, that we shall be gathered together here again. Your belongings, your honor and your lives are sanctified, like the sanctity of this day, this month and this city. O people! All of you have one Creator. You are all descendants of one ancestor. No division among you on the basis of inferior or superior is acceptable. An Arab does not enjoy any superiority over a non-Arab, nor does a non-Arab over an Arab on the basis of his ethnicity. A white is no better than a black nor black over the white on the basis of color. All that counts is fear of God and personal qualities. Color or creed do not play any role whatsoever... All human beings are descendants of Adam and Adam indeed was the ancestor of all of them.

Such was the example of brotherhood, equality and tolerance which the Holy Prophet showed the World. Such was the respect that he established for human values regardless of color, creed or place of origin as a basis of peace among mankind.

### 3. The Early Islamic Practice

Next we may ask: What was the response of the followers of the Prophet to the injunctions of the Holy Book and to the example that he had set? An instance is provided by a typical peace agreement signed by the Prophet's second Caliph, Umar bin al-Khattab, may Allah be pleased with him, with the Christian community of Ailiya:

In the name of God, the Merciful, the Compassionate. This is the security which Umar, the servant of God, the commander of the Faithful, stipulates for the people of Ailiya. He stipulates to all, whether sick or sound, security for their lives, their possessions, their

churches and their crosses, and for all that concerns their religion. Their churches shall not be changed into dwelling places, nor destroyed, neither shall they nor their appurtenances be in any way diminished, nor the crosses of the inhabitants nor aught of their possessions, nor shall any constraint be put upon them in the matter of their faith, nor shall any one of them be harmed.

This tolerance continued when Tariq bin Ziyad entered Spain in the early eighth century, eighty years after the Prophet's death. History cannot ignore his memorable instructions to his soldiers at the time:

We offer protection and safety to those who raised their swords against us. No revenge will be taken against anybody. Not even the smallest portion of anyone's property or possessions will be taken away from anybody, nor will anybody's land or crops be confiscated. The inhabitants of Spain will be completely free to follow their religious beliefs and practices. Any Muslim soldier who damages their churches and other places of worship will be severely punished.

This was the eighth century. In the ninth century, we come to the living example of Caliph Mamun-ur-Rashid who was very zealous in his pursuit of truth. He sent invitations to people of other faiths in the most distant parts of his dominions – Transoxania and Farghanah – to come and debate on religious doctrine with his scholars. A leader of the Manichaeian religion, Yazdanbakht, accepted this invitation and came to Baghdad. In the disputation with the Muslim theologians, he was utterly silenced. The Caliph said: "Why don't you now accept Islam?" As T. W. Arnold in his comprehensive work, "The Preachings of Islam," first published in 1886, relates, Yazdanbakht refused, saying significantly, "Commander of the faithful, your advice is heard and your words have been listened to. But you are

one of those who do not force men to abandon their religion.”

This takes us to the time of the Crusades. The history of the ill-fated second Crusade presents us with a very remarkable incident of a similar character. The story, as told by Odo of Deuil, a monk of St Denis, who, in the capacity of private chaplain to Louis VII, accompanied him on this Crusade and wrote a graphic account of it, which runs as follows.

“While endeavoring to make their way overland through Asia Minor to Jerusalem the Crusaders sustained a disastrous defeat in the mountain passes of Phrygia in the year 1148. With difficulty they reached the seaport town of Attalia. Here, all who could afford to satisfy the exorbitant demands of the Greek merchants, took ship for Antioch, while the sick and wounded and the mass of the pilgrims were left behind at the mercy of their treacherous allies, the Greeks, who received five hundred marks from Louis, on condition that they provided an escort for the pilgrims and took care of the sick until they were strong enough to be sent on after the others. But no sooner had the army left, than the Greeks informed the Muslims of the helpless condition of the pilgrims, and quietly looked on while famine, disease and the arrows of the enemy carried havoc and destruction through the camp of these unfortunates. Driven to desperation, a party of three or four thousand attempted to escape, but to no avail. The situation of the survivors would have been utterly hopeless, had not the sight of their misery melted the hearts of the Muslims to pity. They tended the sick and relieved the poor and starving with open-handed liberality. So great was

the contrast between the kind treatment the pilgrims received from the unbelievers and the cruelty of their fellow-Christians, that many of them voluntarily embraced the faith of their deliverers.

And now comes the point of the story: the old chronicler concludes by saying, “Avoiding their co-religionists who had been so cruel to them, they went in safety among the infidels who had compassion upon them. More than three thousand joined themselves to the Muslims when they retired. Oh, kindness more cruel than all treachery! They gave them bread but robbed them of their faith, though it is certain that contented with the services they performed, they compelled no one among them to renounce his religion.”

And finally let us come to the 13th and 14th centuries, back to Spain. I do not have to tell this audience what a magnificent example of toleration and religious liberty was shown by the Islamic rulers in Spain, particularly to their Jewish subjects. This period is known as the Golden Period in Jewish religious and cultural history, when they were accorded courtesies, some rising to ministerial positions in running the Islamic state. You may recall that Moses Bin Maimoun – called the second Moses – who was born in Cordova, wrote his famous text on Jewish theology *Guide to the Perplexed*, in Arabic. This was subsequently translated by one of his pupils into Hebrew.

To underline this tolerance, let me recount the lament of one of the Spanish Muslims who was driven out of his native country in the last expulsion of the Moriscoes in 1610. Speaking of the Spanish Inquisition, he makes the following vindication of the toleration of his co-religionists, and I quote again from T. W. Arnold: “Did our ancestors ever once attempt to extirpate Christianity out of Spain when it was in their power? Did they not suffer your forefathers to enjoy the free use of their rites...? Is it not the

absolute injunction of our Prophet, that whatever nation is conquered by Muslims should be permitted to persevere in its own pristine persuasion... You can never produce, among us, any blood-thirsty, formal tribunal, on account of different persuasions in points of faith...”

This spirit of toleration was made one of the main articles in an account of the Apostasies and Treasons of the Moriscoes drawn up by the Archbishop of Valencia in 1602 when recommending their expulsion to Philip III, as follows: “That they (the Moriscoes) commended nothing so much as liberty of conscience in all matters of religion, which the Turks, and all other Muhammadans, suffer their subjects to enjoy.”

#### 4. The Later Islamic Practice

I have given you what I believe is general picture. Was there no persecution, ever, of non-Muslims in Islamic lands? Regretfully there was, and particularly from after the period I have reported on. This was either motivated for reasons of political domination or came as a result of the fanaticism from the learned theologians concerned with what they thought was purity of Islamic religious tradition. It is a tragedy in most religions that whatever the teachings of their founders, these get usually perverted by the generations.

However, in the case of Islam, fortunately, there is no official clergy and any suggested repressive measures cannot always be taken as a criterion of the actual practice. As Arnold remarks, “It is the failure to realize this fact that accounts for the highly-colored pictures of the sufferings of the non-Muslims under Islamic rule, drawn by writers who have assumed that the prescriptions of certain Muslim theologians represented an invariable practice.”

An example of this is provided by the so-called Ordinance of Caliph Umar bin al-Khattab – following, apparently, on a missive to Caliph Umar which reads:

“In the name of God, the Merciful, the Compassionate. This is a writing to Umar bin al-Khattab from the Christians of such and such a city. When you marched against us, we asked of

your protection for ourselves, our posterity, our possessions and our co-religionists; and we made this stipulation with you that we will not erect in our city or the suburbs any new monastery, church, cell or hermitage... That we will not teach our children the Quran; that we will not make a show of the Christian religion nor invite to embrace it... That we will honor the Muslims and rise up in our assemblies when they wish to take their seats; that we will not imitate them in our dress, ...or engrave Arabic inscriptions on our rings; ...that we will wear girdles round our waists; that we will not display crosses upon our churches... that we will strike the bells in our churches lightly; that we will not recite our services in a loud voice when a Muslim is present, that we will not carry palm-branches or our images in procession in the streets... All this we promise to observe, on behalf of ourselves and our co-religionists, and receive protection from you in exchange; and if we violate any of the conditions of this agreement, then we forfeit your protection and you are at liberty to treat us as enemies and rebels.”

The earliest mention of such a missive is made by Ibn Hazm, who died towards the end of the 12th century. According to Arnold, de Geoeje and Caetani have shown without doubt that this and similar documents are the inventions of a later age. Umar's practice was in accordance with the historically authentic charter of religious liberty which he signed for the people of Ailiya and which I have cited earlier.

But whatever the history of such writings, the provisions mentioned therein may represent the intolerant practice of a later age, which may have been put into force at some places (but) with no sort of regularity. (T. W. Arnold)

To illustrate the attitude of civil authority, let me end this part of my recount, by quoting an incident (around 1690 CE) during the reign of Aurangzeb Alamgir, the last in the line of the great Indian Mughal Emperors.

A state functionary made an application to the

Emperor suggesting that two of his assistants who were unbelievers should be dismissed since they were fire-worshipping Parsis while Allah enjoins in the Holy Book:

O ye who believe! take not My enemy and your enemy for friends, offering them love. (The Holy Quran, 60:2)

Upon receiving this, Emperor noted on the file: "I have read your submission. No fire-worshipper or Hindu can be deprived of his state position because he is an unbeliever. You have only half-quoted the verse which in full read:

O ye who believe! take not My enemy and your enemy for friends, offering them love, while they disbelieve in the truth which has come to you *and* drive out the Messenger and yourselves *from your homes merely* because you believe in Allah, your Lord. (The Holy Quran, 60:2)

Thus, a Muslim is enjoined not to take as friend only those unbelievers who transgressed against the Muslims and expelled the Prophet and the community from Mecca. In fact, if you had read on, quite contrary to what you infer, Allah explicitly commands the Muslims in the same chapter:

Allah forbids you not, respecting those who have not fought against you on account of *your* religion, and who have not driven you forth from your homes, that you be kind to them and act equitably towards them; surely Allah loves those who are equitable. (The Holy Quran, 60:9)

Your request is forthwith rejected."

##### 5. Science and Belief: Accord or Discord

Of all the major civilizations on this planet, the Islamic Commonwealth is the weakest in science.

Some of us Muslims believe that while technology is basically neutral, and that its excesses can be tempered through an adherence to the moral precepts of Islam, science – on the contrary – is value-loaded, that modern science must lead to "rationalism," and eventually apostasy; that scientifically trained men among us will "deny the metaphysical presuppositions of our culture."

Leaving aside the fact that high technology cannot flourish without high science and also leaving aside the insult to the "presuppositions of our culture" for implied fragility, I suspect that such an attitude towards Science is a legacy of the battles of yesterday when the so-called "rational philosophers." with their irrational and dogmatic faith in the cosmological doctrines they had inherited from Aristotle, found difficulties in reconciling these with their faith.

One must remind oneself that such battles were even more fiercely waged among the Christian schoolmen of the Middle Ages. The problems which concerned the schoolmen were mainly problems of cosmology and metaphysics: "Is the world located in an immobile place; does anything lie beyond it; does God move the *primum mobile* directly and actively as an efficient cause, or only as a final or ultimate cause? Are all the heavens moved by one mover or several? Do celestial movers experience exhaustion or fatigue? What was the nature of celestial matter? Was it like terrestrial matter in possessing inherent qualities such as being hot, cold, moist and dry?" When Galileo tried, first, to classify those among the problems which legitimately belonged to the domain of physics, and then to find answers only to those through physical experimentation, he was persecuted. Restitution for this is, however, being made now, three hundred and fifty years later.

At a special ceremony in the Vatican on 9 May, 1983, His Holiness the Pope declared: "The Church's experience, during the Galileo affair and after it, has led to more mature attitude... The Church herself learns by experience and reflection

and she now understands better the meaning that must be given to freedom of research, one of the most noble attributes of man... It is through research that man attains to Truth... This is why the Church is convinced that there can be no real contradiction between science and faith... (However), it is only through humble and assiduous study that (the Church) learns to dissociate the essential of the faith from the scientific systems of a given age, especially when a culturally influenced reading of the Bible seemed to be linked to an obligatory cosmogony.”

In the remarks I have quoted, the Pope stressed the maturity which the Church had reached in dealing with science; he could equally have emphasized the converse – the recognition by the scientists from Galileo’s times onwards, of the limitations of their disciplines – the recognition that there are questions which are beyond the ken of present or even future Sciences and that “Science has achieved its success by restricting itself to a certain type of inquiry.”

We may speculate about some of the scientific problems, but there may be no way to verify empirically our speculations. And it is this empirical verification that is the essence of modern science. We are humbler today than, for example, Ibn Rushd (Averroes) was. Ibn Rushd was a physician of great originality with major contributions in the study of fevers and of the retina; this is one of his claims to scientific immortality. However in a different discipline – cosmology – he accepted the speculations of Aristotle, without recognizing that these were speculations, and that future experiments may prove them false. The scientist of today knows when he is speculating; he would claim no finality for the associated modes of thought. And even about accepted facts, we recognize that newer facts may be discovered which, without falsifying the earlier discoveries, may lead to generalizations; in turn, necessitating revolutionary changes in our concept and our “world-view.” In physics, this happened twice in the beginning of this century, first with discovery

of relativity of time and space, and secondly with quantum theory. It could again, with our present constructs appearing as limiting cases of the newer concepts, still more comprehensive, still more embracing.

I am emphasizing this to stress that we must not fight yesterday’s philosophical battles today. I have myself never seen any dichotomy between my faith and my science – since faith was predicated for me by the timeless spiritual message of Islam, on matters of which physics is silent. It was given meaning to by the very first verse of the Holy Quran after the opening:

ذٰلِكَ الْكِتٰبُ لَا رَيْبَ فِيْهِ  
هُدًى لِّلْمُتَّقِيْنَ  
الَّذِيْنَ يُؤْمِنُوْنَ بِالْغَيْبِ

This is a perfect Book, there is no doubt in it, *it is* a guidance for the righteous,

Who believe in the unseen...

“The Unseen,” “Beyond the reach of human ken,” The Unknowable.” The original Arabic words are:

الَّذِيْنَ يُؤْمِنُوْنَ بِالْغَيْبِ

“Yomenoona bilghaibe.”

To conclude, so long the Quranic and the Prophetic tradition of religious liberty and tolerance prevails, science in Islam will also flourish, for the two are closely linked, so far as our Faith is concerned.

#### **Quoted from:**

1. Whenever no reference is given, the quotation is from T. W. Arnold (The Preaching of Islam, (1886), Reprinted by Sh. Muhammad Ashraf, Lahore, (1979)
2. Quoted from Muhammad, Seal of Prophet by Muhammad Zafrulla Khan, Routledge and Kegan Paul, London, 1980.

# The Faiz Ahmad Faiz Memorial Lecture

*Delivered by Prof. Sir Muhammad Abdus Salam*

Translated by Wajeeh Bajwa and A. Bushra Salam Bajwa

This lecture was delivered in Urdu in Lahore, Pakistan, in February 1988. We have made every effort to provide the essence of a very lengthy address and have included only those parts of the lecture which would be of interest to both scientists and non-scientists. We are thankful to Maulana Sheikh Mubarak Ahmad Sahib for providing us this previously unpublished address of Professor Dr Abdus Salam.

It is an honor for me to be invited to give the "Faiz Memorial Lecture." I am grateful to Mrs Hashmi for this invitation. I cannot find words to thank her. I am here because of Allah's Grace and Mercy and because of a permanent relationship between you and I.

Some of my friends in Europe were surprised when they learnt that I was going to Lahore to deliver the "Faiz Memorial Lecture." Two reasons for this expression of surprise were: Faiz was a poet and I am a scientist. He dreamt of beauty and love while I live in the world of the "atom." He loved gaudiness and ostentation while I am a dry and devoted being who offers Prayers five times a day. He subscribed to socialism and I am a defendant of Islam. He felt oppressed by those in power while I, in spite of my individuality, am a seeker of cooperation, trying to get work done by the governments. In this regard one should remember that a scientist is not against beauty and elegance. Professor Chandar Shekhar, a Nobel Laureate, who was born in Lahore, wrote in his book, "Truth and Beauty," repeating what John Keats had also said that: "*truth is beauty and beauty is truth.*" There are several examples that also show that many "weak-looking" ideas proposed by scientists, who supposedly lack a love of beauty and glamour, were proven correct.

The way I have looked at Faiz's life, I have no hesitation in saying that even though we had ideological differences, we nevertheless had several things in common. Allah has mentioned in the Holy Qur'an that the followers of the Holy

Prophet have been given the responsibility to ponder over His creations:

*This is guidance. And for those who disbelieve in the Signs of their Lord is the torture of a painful punishment. Allah it is Who has subjected the sea to you that ships may sail thereon by His command, and that you may seek of His bounty, and that you may be grateful*" (Holy Quran, 45: 12-13).

Allah is He who enabled you to grasp the power of the rivers so that you can sail in them and so that you can seek His bounties from all the things that He has created to serve you. He has ordained all this for your benefit through His Divine command. These are signs of Allah's power and authority for those who ponder on these things. There are seven hundred and fifty verses, that is one-eighth of the Holy Quran, in which man has been invited to ponder over Allah's creations and take control of means provided by Allah. This is science and technology. I have devoted my entire scientific life to follow the light shown in these verses of the Holy Quran. Basically, Faiz was also a follower and seeker of the same light. His reflection takes him to this astonishment:

For him we have explored heart of every particle

but the curious eye cannot get rid of its curiosity.

Here Faiz talks about "the curious eye." This curiosity is the basis of higher science, the kind of curiosity that keeps providing thought-provoking

ideas which then in themselves continue to enhance the curiosity. Faiz wanted to use this scientific curiosity for improving the living conditions of man. He believed that there should not be a monopoly of only a few on these technological advances; rather, all of humanity should benefit from these technological advances. At the ceremony of the Lenin Prize he said, "Bury these bombs, rockets, artillery, and guns deep in the sea and instead of trying to conquer each other, let's conquer the universe where there is no shortage of space." He also said: "Humanity has never managed to gain satisfactory control over natural resources in order to provide for the needs of each and every group of people. That is why there was always a reason for the desire to control and take possession of these resources. It is an entirely different situation now due to the advances made in the field of science and technology. Now there are enough resources to satisfy the hunger of the whole of humanity, provided these resources really are used for all of humanity and not just for a select group of people. These scientific advancements should be used for the benefit of humanity and not for its destruction. This will be possible only when human society and cultures are based on justice, equality, and freedom, not greed, acquisition, and monopoly."

After this long introduction, I come to the actual topic and I will cover three main subjects during my address:

- 1) the diversity and vastness of the universe,
- 2) the deplorable situation of education and research in the field of science in Pakistan and how this situation can be improved, and
- 3) the formation of a scientific society in Pakistan.

### **Vastness of the Universe**

The moon, the sun, the stars, and the sky have been at the center of focus for a long time. Historical records show that interest in these objects is as old as Egyptian history. Initial attempts to understand the skies is more mythological in nature and in these myths these

heavenly bodies were rendered as various gods and goddesses. These attempts, however basic and rudimentary they may be, do reflect an attempt to understand the universe. After these myths comes the time of Ptolemy, where the earth is the center of the universe and other planets like the sun, the moon, and the stars are revolving around the earth. This concept was accepted for centuries and then challenged by Giordano Bruno. He proposed that the earth is not the center of the universe and that the universe has an unlimited spread. Poor Bruno was burnt alive by Catholic religious fanatics due to his ideology. This extreme opposition to Bruno's ideas was due to the fact that this theory eliminated the earth's central position in the universe. The killing of Bruno was not the first incident of this kind. In Italy, Galileo also suffered at the hands of religious fanatics. The result of this persecution was so devastating for Italian scientists that science made no further progress till the late eighteenth century. It is only now, after three hundred and fifty years, that the Catholic church is willing to accept the ideas presented by Galileo. His Holiness Pope John Paul II has said in a special meeting held on May 9, 1983 that "The Church has learnt a lesson from Galileo and events taking place after him ... The Church itself learns from experiments and now it understands the need of freedom of research ... It is research that leads to true understanding and that is why the Church has reached this conclusion that there is no conflict between the religion and science."

### **Science, Technology and Life**

Now the question is what does science and technology teach us about life? Science takes us from imitation to earnest effort, removes national and racial differences, and teaches us tolerance. The Secretary General of the United Nations, U Thant has been quoted as saying: "I, as a Buddhist, have learnt one thing from my religion (and that is) to be tolerant of everything but of the intolerant."

Technology teaches that consensus is an essential part of advancement. Nations like Japan, Taiwan, Hong Kong, that have made

advancements in technology, believe in a consensus of opinion, as it is said in Punjabi, "*Ik aakhey, duja munnay; oda aakha rab ve na bhunne.*" (If one asks and the other agrees then even Allah does not deny his request).

Most scientists think that the universe started with a "Big Bang" that took place 15 to 20 billion ( $10^9$ ) years ago. As a result of this "bang," the universe started to expand and this resulted in the cooling of the universe. Matter started to form as a result of this cooling effect. Stars were formed approximately one hundred million ( $10^8$ ) years after the "big bang." During this time, cosmic radiation temperature continued to fall. It is interesting to note here that the formation of bodies that can be formed due to the gravitational binding are formed. These bodies include "White Dwarf," "Neutron Star," and "Black Hole." The "black hole" has "uber alle" gravity. This is mass's densest form and this gravity swallows everything, including light.

### Unity in the Natural Forces

It has been man's desire to find simple explanations and principles working behind complex chemical reactions. In this regard, the name of a Muslim scientist Al-Biruni comes to mind who lived in the times of Sultan Mahmood Ghazni and his son. Al-Biruni, and later on Galileo, proposed that the laws of physics working in the earth and in the universe are the same. This principle is the basis of science and without it science would not exist. Newton furthered Al-Biruni's and Galileo's theory with the help of mathematics. Newton demonstrated that it is the same "force of gravity" that controls the fall of bodies with mass towards the earth and the revolution of stars around the sun.

Another force beside the force of gravity that has been discovered is the electromagnetic force. Two forces, namely electric and magnetic forces, are combined in the electromagnetic force. It was discovered first by Faraday and Ampere's

experiments and then later on by Maxwell that electric and magnetic forces are in reality only one force but one that has two faces. Thus the first milestone was reached where two apparently diverse forces were shown to be unified. It is this electromagnetic force that keeps the negatively charged electron tied to the positively charged nucleus. In our everyday life we see the wonders of this force (electromagnetic) in the form of electricity, radio, television, etc. Quantum physics has also shown us that the chemical force that plays a part in sustaining life on the earth is a specific form of the electromagnetic force.

At the beginning of this century Einstein presented a revolutionary four-dimensional theory about time and space. He showed that by not keeping separate identity, time and space are tied to each other. He showed that in reality, gravity around the bodies with mass is a manifestation of the curvature of time. He spent most of his remaining life trying to find something about the unification of the forces found in nature but all his efforts proved to be futile.

The gist of my research is that the electro-magnetic and weak nuclear forces are in reality two faces of one force. I have called this force the electro-weak force. This revelation is the same as one made by Faraday and Maxwell about the unification of the electric and magnetic forces. My two peers, Weinberg and Glashow, independently made the same revelation. Our hypothesis has been proven by the experiments carried out at CERN that there are two particles by which the "electroweak force" is manifested in the atom. The discovery of these particles was made by the teams led by Van der Meer and Carlo Rubia and they were awarded the Nobel Prize for their work.

The next stage after the discovery of the electro-weak forces was to show the grand unification of electro-weak and strong nuclear forces. Dr Pati and I have made this important prediction that the proton whose life is considered



to be infinite, in reality decays over time. Although the proton's life is very long ( $10^{32}$  years) still it is not infinite. There have been several attempts made to prove this hypothesis by experiments but so far without any success. The last step is to prove that the electro-weak, strong nuclear, and the gravitational forces fit in the grand unification theory.

Now I will explain some events that resulted in the creation of an intelligent life on this universe. There would have been a dramatic effect on the history of this universe if a slight variation had taken place in the strength and ratio of the nuclear and electromagnetic forces. For example, a phenomenon that cannot happen under the current ratios of these forces, it could happen if this ratio had increased slightly. The result of this accelerated reaction would have been that hydrogen would not have formed. Having no hydrogen means no water, which in turn means no primeval water, and without primeval water no cellular life can exist. This would have resulted in none of the biological and biochemical life-sustaining reactions. The second incident is that stars can only form if there in some space where heat and light generated by them can be dumped and if the universe had not expanded by a "big bang" then there would not have been any space for the formation of stars.

The above-mentioned events are cosmic events and I have already elaborated on the local events that show how nuclei are formed by the electro-magnetic and nuclear forces after the expulsion of the gravitational force. How are atoms, stars, and galaxies formed? One must remember that the root of these events is that great explosion which took place fifteen billion years ago.

### **Science in Pakistan**

The Third World countries in general have realized that the success and high standard of living in Western countries is due to science and technology. They have also realized that this huge gap that exists between the economies and

political life of the Western and Eastern worlds is due to the advancement or lack of science. Let there be no misconception that there are two kinds of people who live on this planet. One group is those who realize the importance of science and technology and use these powers to gain control over their economic and political destinies. The other group, however, has not made science and technology part of their lives; that is why they lack political and economic powers and are generally poor.

In the past, Muslims have played a significant role in the development and public exposure of science. It is very sad to note that some people, including some Muslims, are trying to damage the glorious contributions made by Muslims by saying that it was just a continuation of the work done by the great Greek scientists. No one can deny the fact that it was the Muslims who showed the world that science is, from beginning to end, result of practical and experimental knowledge. A famous historian said: "The Greeks presented some very interesting ideas and principles; they performed long and detailed analysis but it was totally against their temperament, nor did they possess the patience to provide experimental evidence. Science is an art of learning by observation, experimentation, and measurement and was introduced in Europe by Muslims. Modern science is an important, significant, and magnificent result of Islamic culture." This historian's views have been supported by a great scientific writer, George Martin, "The great achievement of the Middle Ages is the development of experimental spirit and that was developed by Muslims and continued till the 12th century."

It was this knowledge that gave the Muslims of Pakistan, India, and Bangladesh excellence in traditional workmanship and skillfulness. Unfortunately, Muslim leaders of the Indian sub-continent were not interested in educational institutions, science academies, and universities. They were interested in building monuments in the form of great tombs and unfortunately their tradition is continuing today in one form or

another.

I will now provide some facts about this pitiful condition of science and technology in Pakistan.

1. India, whose population is only eight times more than Pakistan, produces two hundred students with a doctoral degree (Ph. D.) in physics. On the other hand the largest university in Pakistan, the Punjab University, has produced only three Ph. D. students in physics and none in mathematics.
2. Dr Mujahid Kamran writes in "Concept" that, "There are only 86 teachers in Pakistani universities to teach physics and only 46 hold a Ph. D. degree." He also writes "India has 150 scientists in the field of plasma physics while Pakistan has only three. Pakistan has only 15 scientists in laser physics while India and China have 200 and 2000, respectively. The number of scientists in India is 80 times more than the scientists in Pakistan while difference in the population is eight-fold".
3. Professor Michael Moore writes, "Pakistan is one of the few Third World countries where the number of scientific publications is declining very rapidly while this number is increasing by 40% in other developing countries." Recently he wrote to me and mentioned that he has been corresponding with the President of Pakistan for a long time and that the President has informed him that: "There is no research being carried out in Pakistani universities and students are gaining no new knowledge. So, science in Pakistan is declining very rapidly."

### **Why is Pakistani Science so Backward?**

Advancement in science and technology is dependent upon contemporary education. In Pakistan, at the primary school level, boys and girls of ages between 6 to 11 are not even familiar with the A, B, C's of the education. At the secondary level, i.e., between the ages of 13 to 17,

only 13% get an education, while the average in this age group in the developing countries is 39% and in developed countries it is 86%. When we look at education at the university level (age 18 to 23) this number in Pakistan is only 3%, while it is 9% in developing countries and 30% in developed countries. In other words, students who get a university education in developed countries is 10 times more than the students in Pakistan and to make the situation even worse, in Pakistan, there are more students in the liberal arts than in science.

There is no national goal set for education in science. There is no concept that people benefit from science and science can help alleviate economic and other problems. King Meiji of Japan revised the Japanese constitution to include five new items and one of these items said, "For the glory of Japan, we will make every effort to obtain education, by any mean or source."

This lack of national goals has created a sort of hatred and dislike for scientists by the elite community of Pakistan. I am an eyewitness to this hatred. I remember one former chairman of the planning commission to whom I had made a request to resolve the accommodation problems faced by the scientists. He replied, "Half of the population of Karachi sleeps on the footpath (street), why can scientists not sleep there?" At another time when I requested him to consult scientists in making a decision about the industries that use scientific knowledge, he cynically replied, "Why should I consult scientists? I do not consult my cook to run my house!"

None of the governments in Pakistan that came into power one after the other paid any attention to the self-reliance in technology, not even to defense technology. There is no government policy as far as science and technology is concerned nor has there been any attempt made to encourage development of scientific knowledge that could help Pakistan in technical areas. There is no awareness that transfer of knowledge from science to technology should take place continuously and

regularly.

## How can science be strengthened in Pakistan

Now I will discuss the steps that can be taken to improve the condition of science and technology in Pakistan.

1. It is essential that the number of scientists and laboratories should be increased. In this regard we should follow the footsteps of China. China had only 500 scientists in 1949 and today this number is more than 300,000. This is a 600% increase in only 40 years.
2. Every effort should be made to provide basic education to each and everyone. Students should be encouraged to study the Holy Quran and study of other books, especially scientific books, should also be emphasized.
3. There is a need for a change in the entire education system. There should be only one authority for technical, agricultural, commercial, and vocational education. The level of education and training in any of these fields should be of the same high caliber. Only one authority should issue certificates and degrees for Matriculation, Intermediate, B. A., and B. Sc. in all fields.
4. The time has come that mature industries like textile, paper, sugar, cement, gas, fertilizer, telecommunication, and steel, etc., support their own research and development programs. Research and development in these institutes should be supported by the funds provided by the government and industry. The important thing to remember is that these institutes should be established within these industries.
5. So far our discussion has been limited to the initial steps and stages of industrial research, development, and training centers. In reality the real source of revenue is high technology. In this regard we can look at Japan, North Korea, Taiwan, and Singapore. At this time Singapore is making around US\$ 1.7 billion a year from other nations just because they have

manpower and training in science and technology. Similarly, Israel is racking up revenues close to US\$ 1.2 billion a year by exporting technology, including defense-related technology, to other countries.

6. To eradicate scientific illiteracy, it is essential that Urdu should be the medium of instruction. A separate institute should be established to translate scientific literature like “Scientific American” and “New Scientist.”
7. The Third World Academy of Sciences has proposed that 4% of the national education budget of a given country should be allocated for basic research, 4% on applied science, and 8% on high technology. That translates to US\$ 240 million in Pakistan which is only 0.64% of the Gross National Product (GNP). I become very emotional when I think about the fact that one-eighth (1/8) of the Holy Quran deals with science and technology. Why can we not spend one-eighth (1/8th) of Alms (*Zakat*) on science that will remove poverty?

It is not irrelevant to present a Hadith of the Holy Prophet (*peace and blessings of Allah be upon him*) in relation to Dawn’s editorial:

“The time is near when the poor-man and infidel are synonymous.”

My proposal to improve science and technology depends on society’s and the nation’s trend. We can only succeed if the educated people are given due respect; and if freedom of thinking and expression are encouraged. Instead of narrow-mindedness, there should be brotherly love and cooperation. Despite our differences in language, way of living, and opinions, we, as a nation, should be united and have a desire to move forward. I get very disappointed when I look at the country from this point of view. Instead of becoming one nation, there is a growing trend to be recognized as Punjabi, Sindhi, Pathan, Baluchi, and Mahajer rather than being a Pakistani. Is this the trend towards advancement?

Unfortunately we have forgotten the formula for success as presented by Quaid-i-Azam and I

cannot understand the reason for this. At the time of the independence of Pakistan, our nation was very backward in education and there was a reason for that. Religious groups were dead against Western education and the English language. In 1835, a petition carrying eight thousand signatures was presented to the government that said that "Muslims do not need education in English." When our famous leader Sir Syed Ahmad Khan started the "Aligarh Movement," he faced all kinds of opposition. He was labeled as an infidel and considered out of the fold of the religion (Islam). At one time Sir Syed said, "You can consider me an infidel or whatever makes you happy, but for God's sake let me build the children's future. Please let me work for the future of children." Why did he face this hardship? Just because he had said, "We should have the Holy Quran in our right hand, science in our left hand, and the *Kalima*: "*La ilaaha illallaaho*" on our foreheads." Due to this extreme opposition by religious groups, his movement had limited success and modern education did not spread in the Muslim nation. Our nation cannot succeed until and unless we eliminate narrow-mindedness, prejudice, and create a society with brotherhood and tolerance. This concept of brotherhood and tolerance is not new to us. All we have to do is to follow the guidance given by the Holy Quran and the Holy Prophet of Islam. The Holy Quran teaches us that there is no compulsion in religion.

"There should be no compulsion in religion."

and in Chapter 109, Allah says:

*In the name of Allah, the Gracious, the Merciful. Say, 'O ye disbelievers! I worship not that which you worship; Nor worship you what, I worship. And I am not going to worship that which you worship; Nor will you worship what I worship. For you your religion, and for me my religion.'*

Now I will present some examples of religious tolerance from the life of the Holy Prophet Muhammad (*peace and blessing of Allah be upon him*). The first example is of the time when the Holy Prophet (*peace and blessing of Allah be upon him*) migrated to Medina. The very first thing done by the Holy Prophet (*peace and blessings of Allah be upon him*) when he reached Medina after his migration was to have an accord with the Jews that provided religious freedom.

The second example is of the time when the Holy Prophet (*peace and blessings of Allah be upon him*) and his followers conquered Mecca. A staunch enemy of Islam, Ikrama, fled Mecca. His wife asked the Holy Prophet (*peace and blessings of Allah be upon him*), "Can Ikrama come back to Mecca and continue to worship idols?" The reply given by the Holy Prophet (*peace and blessings of Allah be upon him*) is a guiding light for humanity. The Holy Prophet (*peace and blessings of Allah be upon him*) said, "Faith and belief are a matter of man's conscience and man's conscience is free. There will be no oppression if Ikrama comes back to Mecca, He will be free to practice his faith and beliefs."

The third example is of the time when a Christian delegate from Nijran was visiting the Holy Prophet (*peace and blessings of Allah be upon him*). During one of the meetings, members of the delegates requested a break to offer their prayers. They could not find a suitable place to worship. The Holy Prophet (*peace and blessings of Allah be upon him*) realized their calamity and asked them to use the Mosque for their worship.

It was the teachings of the Holy Quran and the Holy Prophet (*peace and blessings of Allah be upon him*) that Muslims of 7th and 8th centuries followed and provided religious tolerance and brotherhood. At this time I would like to present only one example that took place in A. D. 1690 in the court of a Muslim king, Aurengzaib Alamgeer. One officer of the court requested the king to dismiss two members of the court because they

followed the Zoroaster religion and worshiped fire. He presented part of Verse 1 of Chapter 60 in favor of his request.

*O ye who believe! Take not My enemy and your enemy for friends, offering them love; while they disbelieve in the truth which has come to you and drive out the Messenger and yourselves from your homes merely because you believe in Allah, your Lord.*

Aurengzaib rejected his request by saying that they had not read and understood the entire verse, because in the same verse Allah says:

*"If you go forth, to strive in My cause and seek My pleasure, take them not for friends, sending them messages of love in secret, while I know best what you conceal and what you reveal. And whoever of you does so, has, surely, lost the right path."*

Aurengzeb also pointed out Verse 9 of Chapter 60 which says:

*Allah forbids you not, respecting those who have not fought against you on account of your religion, and who have not driven you forth from your homes, that you be kind to them and act equitably towards them; surely Allah loves those who are equitable.*

I would like to emphasize that we should not get disheartened by the present condition of science and technology in Pakistan. We should not lose hope that Allah's Grace will befall on us. We should continue to strive to improve conditions in Pakistan and increase knowledge. We have seen from the examples of America, Russia, Japan and lately from China, Brazil, India and Korea that in most cases only two generations are required to make remarkable advances in science and technology.

### **Significance of Science for Pakistan**

Why am I so emotional about getting education in science? It is not only because Allah has

instructed us to obtain knowledge or because of the fact that science is power and leads to economic welfare, it is also because as a country having some self-respect, it should fulfill its responsibilities. For a long time we have been benefitting from the research and knowledge of others. This is a loan on us and as an honorable nation we must return this debt. A few years ago a European Nobel Laureate asked me a question and this question goads me immensely. He asked, "Salam, do you think it is really our responsibility to keep feeding, providing funds, and help those stay alive who have not contributed even a fraction of knowledge to humanity?" Even if he had not asked this question, my conscience constantly reprehends me. Whenever I visit any hospital, I realize Pakistani scientists have made no contribution to all the life-saving medicines being used there.

At the end I would like to say that our nation has potential and is a great nation. The tragedy is that we have not realized this greatness and we act as a small nation. Our people have tremendous potential; all we have to do is to nurture this potential. I am saying this without any hesitation or reservation, and this observation is based on my life-long experience that I have gained by teaching and guiding scientists in the world. Similarly, I have no doubt that our nation has great potential in technology as well. Allah has promised that He will not let your efforts go to waste. I am sure once we have energized our younger generation, an unstoppable process of progress in the field of science and technology will occur. I would like to say to my younger generation what Gamal Abdel Nasser said, "Keep your head high, my brother, with pride and dignity." At the end I leave you with few couplets from Faiz:

Everything is your gift, all happiness, all sadness,  
Sometimes we are together, sometimes we are  
separated;  
All these words I have written are in your  
memory,  
A moment of togetherness and long hours of  
separation.

# Why Pakistan is Poor as a Nation?

*Professor Dr Abdus Salam*

Translated from Al-Fazl, Rabwah, September 2, 1997, by Dr Karimullah Zirvi

(First published in the Ravi, the Government College, Lahore, magazine, at the occasion of 125th Anniversary Celebration of Government College, Lahore)

I am delighted to know that Government College, Lahore at the turn of its 125th year of existence is celebrating a festival and at this happy occasion, the college magazine, *Ravi*, is publishing its special issue. Like other Old Ravians, I would like to say a few words as recollection of the old days and also something concerning the present day problems. The talk about the old days will be mostly concerning things which happened forty to fifty years ago. Our dear country is not in a good condition which is mainly the result of our failures. This situation can be improved and most of what I will say will be in this regard.

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My ancestral house is in Jhang and before joining the Government College, Lahore, I was a student of Jhang College. In 1938, when I was 12 years old, I became a student of Jhang College. In those days it was an intermediate college. So, the foundation of my educational career was laid down in this college. I feel that all of the little accomplishments I have made are the result of the excellent treatment I received from my teachers both at Jhang College and Government College, Lahore. In 1942, I entered Government college, Lahore, as an inter-graduate student, and in 1946, after receiving a Masters degree in mathematics, I left the college.

I cannot forget my four years at the Government College. I still remember the stories of those days which were related to teachers and classmates who were Muslims, Hindus and Sikh. Educational standard at the college was excellent. Mr Aish Kumar who was professor of English is 80 years old and is alive. He lives in Chandigarh in India. Professor Kumar had the habit of reciting verses from Iqbal's poems.

In 1981, when I met him at Guru Nanak University and I asked him, "How is Iqbal?" He responded that *now* he had turned to Ghalib. He considered Ghalib to be the best poet in the world and he had written a very authentic book about Ghalib.

There was another English teacher by the name of Abdul Latif who has died. In Honor classes, Professor Sirajud-Din used to teach English who later on became Principal. Mathematics was taught by Dr S. M. Chawala. Probably, at present he is associated with Kansas University in the USA. The late Professor Abdul Hamid was also a teacher of mathematics. There were some other teachers also.

During my stay at the Government College, I had an opportunity to serve the institution in several ways. For example, in 1945, I had the honor of becoming president of the College Union. I was president of the New Hostel Committee and also was very lucky to be the editor of Urdu and English sections of the college magazine, *Ravi*. Thus, during the college days I had life full of all sorts of activities. However, I feel sorry that I could not benefit from Professor Soofi Tabassum's class. He used to teach Persian. In those days, it was not a tradition to attend extra lectures and Persian was not part of my elective subjects. Like Cambridge, Government College should establish the tradition that even if one has not taken a subject as an elective and does not plan to sit in the exam, still he should be able to attend classes of his favorite lecturer.

After being a student at Government College, I was again associated with the college in 1951 as a teacher when I taught mathematics till 1954. However, this association turned out to be short

lived. I had to leave both Government College and Pakistan. There was lack of environment for good research in Physics either in Government college or in Pakistan. There were only two paths for me to follow and one of these I had to abandon. One of the paths was that I should keep teaching in Lahore and forget about good scientific research. The other was that I go back to Cambridge and continue my research work. By following the second path I had to leave College, Lahore, and Pakistan. With heavy heart, I picked the second path and thus my relationship with the College ended.

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I again come to my student days at the College. After getting my MA from Government College in 1946, I arrived at Cambridge. At Cambridge, students sit in the classrooms in such a respectful manner, as Muslims sit in a mosque while waiting for the Prayer to start. Before the arrival of the lecturer, there is pin drop silence in the class room. During the lecture, the students use pens containing ink of four different colors and rulers to make straight lines. Notes in their notebooks were so nicely written, as if a professional calligrapher were writing. My colleagues had come directly from schools to the University, and they were younger than I in age. However, the level of their self confidence and ambitions was so high that it took me two years to reach to that level. They had come from such schools where every teacher teaches the students: "Dear students, you are sons of that great nation which produced Sir Isaac Newton. So you have inherited deep knowledge of mathematics and science and you too can become Newton."

In Cambridge, the method of discipline was completely new for me. You can sit for the BA exam only once. If, God forbid, you fail in the exam, then it is not possible to sit for the exam again. Hostel discipline was so strict that you could not stay out of the hostel without permission. If you came between 10 pm and 12 pm, there was a penny fine. However, if you came after midnight, then the penalty was *gating* for 7 days. If this happened three times during the

academic year, then you would be expelled from the University. At Cambridge, every student was considered as an adult and was fully responsible for all his deeds. There were no unnecessary interferences, but at the same time, punishments were also cruel, which students accepted courageously. Since 1968, these hardships have been removed.

At Cambridge, students are accustomed to do work with their own hands. I remember my first day at St John's college. My box came to the college by taxi. On arrival at the college I asked a porter to carry the box. He pointed me towards a wheel-barrow and told me to carry the box myself to my room along with other students. I am not narrating here these personal incidents for the sake of pastime. Rather, I want to say to you few things regarding education and obtaining education, and these anecdotes are part of the subject I am going to talk about. There is a direct link between our educational and economic progress. Educational backwardness and inappropriate education is a problem for the whole nation. I feel that the major reason for the national crisis Pakistan is passing through right now is that the nation did not give as much importance to the development of proper educational system as should have been done.

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The foremost function of a good educational system is thought to be development of good personal character. The personal character which one acquires during college years rarely changes throughout the life. Here, however, I will not say much about the personal character. Rather, I would like to say few things about the national aspects of our educational system.

During the last forty years of the existence of Pakistan, the most important problem has been the problem of nationalities. Pakistan's coming into existence is a miracle. After remaining slaves for two hundred years, God Almighty has given us a piece of land which we could have developed as we wished. However, during this long period of existence we could not develop the sense of unity, brotherhood and nationality. Therefore, God

Almighty, considering us incapable of taking care of the land, has taken away from us the favor and the trust in its original form.

After the formation of Pakistan, the first duty of our educational system should have been to strengthen the sense of unity, brotherhood and nationality. The concept of unity, brotherhood and nationality has been gradually changing during different ages. In this respect, according to the present day concept, there are examples of several countries and nations whose consolidation as a nation is mainly due to their good educational system. Let us take America as an example. In the United States of America, people from Irish, German, Italian, Swedish and French tribes live together. I am calling all these people tribes. However, these are people who, when they were living in Europe, they fought and gave their lives in two World Wars just for the sake of maintaining their separate national identity. Before coming to America, they spoke different languages, their religions were different, and even today their religions are different. However, the American educational system has dissolved various tribes by melting them in a crucible and have made them as one nation. In schools, every child is made to memorize the American constitution. The children talk of American folk heroes. Day and night, they listen to the American anthem and other national songs. American writers, poets and dramatists write in such a way that the citizens of America develop deep-rooted love for each and every part of their country. An American is taught to not only love the city in which he or she lives, rather, they are made to think of themselves as citizens of thousands of American cities. American citizens do not keep any feeling of attachment to the cities of the Europe from where they or their ancestors came to settle in America. All the attachment they have now is with the land in which they live, earn their livelihood and do other daily life activities. They are always striving to develop and increase the prestige of the land in which they live. All this is being done through schools, colleges,

newspapers, magazines and television.

At present, Pakistan consists of four provinces. All of its inhabitants are willing to sacrifice their lives for the sake of Holy Prophet, peace and blessings of Allah be upon him. With respect to language, history and culture, Pakistan is one of most homogeneous countries of the world. Believe me, there are more differences among Scotland, Wales and England than there are among Punjab, Sindh, Balochistan and the Frontier. The people of the four provinces of Pakistan are more closer to each other than the people of Scotland, Wales and England. Just like in America, in Pakistan, our educational system and syllabus can develop the sense of love for the country and for each other. It is my personal desire and I would like that in Pakistan we develop a new Urdu language which is made by mixing the old Urdu, Sindhi, Balochi, Pushto, English, Punjabi and the unique tongue of Jhang; and this language increases in us the sense of unity and nationalism. The need is that our educational system consciously develops the sense of unity in the citizens of Pakistan. Several years ago, I was very pleased to note, when in Karachi, Zia Mohiyyuddin in the presence of Zulfiqar Ali Bhutto presented Heer Ranjha stage show and in the words of Inshaa:

Sunaayaa raat ko qissa jo Heer Raanjhay ka  
To ehl-i-dard ko Punjaabiyoon nay loot liya  
(The Punjabis stole the hearts when they related the story of Heer and Ranjha last night.)

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My second request to you is with regards to scientific and technical education. Economically, Pakistan is an underdeveloped country. An American earns 50 times more than a Pakistani and in England the average income is 20 times, in Iran 10 times, in Turkey 8 times, in Iraq, Algeria, Syria and Egypt 6 times more than the average income in Pakistan. Why are we poor as a nation? I agree that a lot of our national wealth was stolen by England during the hundred years of their rule over Delhi, Punjab and Sindh. I admit that America is very



fortunate that Americans discovered a land which was full of minerals and other natural resources. But one can ask us how did we become slaves of England? If the British knew the art of sea travel and we did not, then the question arises, who taught them the art of travelling in the seas? If Lord Clive's *flint-lock* rifles, guns and cannons were so superior in their construction and working that Sirajud-Daula's *match-lock* guns could not face these guns, then again the question arises, who taught the British the art of making such superior artillery? Did not they themselves develop the art of making superior guns and then master it through education in their nation?

In the battle field of Panipat, Baber's success was due to Baber's Roman Guns. Roman Turks, even after the year 1526, kept doing further research to develop still better guns. Unfortunately, Baber's children did not think that they should establish a proper research institute to research the art of making better cannons. If you go to Constantinople, now Istanbul, you will find that the Roman Turks had a concept of a mosque that has a hospital on one side and a school on the other side. The school would not just be to teach religion but also experiments would be done in the development of artillery. Unfortunately, the Turks who came to Pakistan and India had little interest in promoting education. When they died, they left behind as their legacy shrines and splendid mausoleums like the Taj Mahal instead of schools or research institutes.

### G

If God Almighty has provided the Americans plenty of provisions and a vast land, was it not the reward of their strong determination which made them fight furious seas so that they could find the new Continent? If today, Japanese industry is world famous, then how much is it due to the Japanese working ethics? Angels did not come down to educate and train the Japanese. There was a time when Japanese industrial material was considered to be of inferior quality in World markets. Now, with respect to technology they are the best in the world. British Leyland manufactured the Morris car. Japanese have made

the same cars and they get the same engine power from 600 cc, half the size engine, instead of 1000 cc. How is it possible? Honda gathers 100 engineers, just like the engineers which come out with degrees from (Engineering College in) Mughalpur, (Lahore, Pakistan) and gives them one year to use their abilities to develop a new engine, and they consider it a life and death problem. About forty years ago, an American, Professor Townes invented the transistor and he received a Nobel Prize for this invention. In Tokyo University, they started efforts to look for the clues to break the patent for making a transistor. They were so successful in their research that now they are the best in the world in the field of Electronics. Not only did they discover how to make the patented invention, they also published the methodology of making a transistor in a magazine so that any Pakistani, Arab or Iranian, by using the methodology given in the magazine, could develop the transistor.

Who are these Japanese who are so expert and knowledgeable? Believe me, these are the same people who in the beginning of the nineteenth century did not know the art of making horse shoes. When American Admiral Percy, during the last century, came to Japan with his armada of ships, the Japanese tried to block their entry into the harbor, however, just a few gun shots made the Japanese open their harbor. It is said that during night something was stolen from the ship of Admiral Percy and that was a horse. During the night the horse disappeared and the next day the horse was returned. Japanese were very much desirous of seeing and learning how a horse-shoe is made. At that time, their metallurgical science was not developed to the extent that they could make a horse-shoe. Today, the situation is such that in Japan, Matriculation Examination season is considered to be the suicide season. Based on the results of this exam, admissions in colleges take place. However, the standard of this exam is so high that no where in the world could children of that age take exams of such high standards in physics and chemistry. During these exams, the test papers are not leaked before the exam, strikes

do not take place, glass windows of the exam centers are not broken. The entire nation, all teachers, parents and students are gripped with the exam frenzy. Then, they all accept the results of the exam in their own special style.

C

Several years ago, fortunately, I had the opportunity to go to China. In China, when a student joins a Middle School, he is 12 years old and by the time he finishes school, he is 17 years old. You can consider these middle schools equivalent to the intermediate colleges of my college days. During the five years of school, every Chinese student has to study 12 subjects and none of the subjects is elective. The 12 subjects are: Nationalism, Chinese Language, two Foreign Languages (English, Russian or Japanese), Mathematics, Physics, Chemistry, Biology, Agriculture, History, Geography, Arts (Drama or Music), and Workshop Practice.

Every student studies these 12 subjects. They might have changed the system by now. During my childhood it was commonly said that a Muslim does not like to study Mathematics. Today, I have heard that half of the Pakistani minds are capable of studying Mathematics, Physics or Chemistry, and the rest of the 50% of the minds are constructed in such a fashion that these subjects can not enter into them. Chinese have decided that 100% students will study both sciences and arts.

You might think that the outcome of this compulsory science education will be that educational standard of these 17 years old students will be lower than the standard of our intermediate college students. To find out that, I attended one hour lectures both in Mathematics and Physics. I was astonished when I saw that fourteen year old students are studying *orders of infinity*, and we teach this subject to our students in B.A.

China has made up her mind that they will introduce every industrial technique in China. Their new national life started two years after us in 1949. However, the outcome of their resolve is that during past 40 years at the national level they

have raised the standard of the art of electronics to the highest stage of development. The standard of metallurgy in China has reached to that of England and now they make sophisticated machine tools and even Mig 21 fighters. Every Chinese student, spends one day a week in the workshop in his University. The situation in the institution I went to examine was that a group of 14 to 16 students was making transistor components, another group was bringing the mineral potassium carbonate to its grinding titration and filling the bottles with it for the market. A group of four students, 12 years old, was busy cutting the hair of their classmates. In another room, four 12 year old students were fixing the shoes of their classmates for three cents. One girl from these student asked me to look at the windows of the room which were covered with curtains. She said that in the beginning, when we started fixing the shoes we were very much shy of touching the smelly shoes. We used to cover the windows while fixing the shoes. Gradually, we have developed the habit and now we do not feel shy. So, it is very important that during our student life we are productive and not parasites.

I enquired again and again in schools, colleges and universities that even if I accept that all factories are Government owned, but you are employees of the Department of Education and the factories will be under the Department of Industries, how do you get permission from the relevant secretary? You need grants to do all that you are doing. How do you arrange all that? In our country, if a Principal or Headmaster wants to see the Deputy Commissioner, the administrators will stop him from doing so. How do you solve such problems? Believe it, whenever I asked such questions, I could not make them understand my questions. They always told me that building of our society is based on the principle that every person, wherever he is, will support a good idea. How can it be that an officer or a Government administrator becomes a barrier?

While talking about China, I have somewhat digressed from my original topic. I was saying that

the British invented industrial techniques and then, through education, introduced these in the whole nation. If Japan through her educational system (without industrial resources) can teach skills to all of the nation, if China does not consider their people indolent people and expects from each child that he or she will learn some kind of science, and will acquire some kind of expertise and excel in it, and if all nations are trying to eradicate poverty through these methods; then is there not a lesson in it for us?

C

You may say that poverty in itself is such a menace that if a person is hungry and naked then there is no inclination for such a one to increase mental faculties. In this connection, I do not forget an incident about Germany. In 1947, I was a student in Cambridge. Germany was defeated and the German nation had fallen. The American Control Commission invited students from Cambridge and other universities to see the plight of Germans. About 500 students from all over Europe went to Munich. In this city, there was not a single building that was not damaged. It looked as if the inhabitants were living not in houses, but in holes. For us, tents were fixed in a Park. In these tents, I found out that one German was looking for me. Moreover, I found out that the German was a research scholar and probably was getting paid 25 rupees as salary according to the standard of salaries at that time. With this much money he probably could eat food one time a day. He was like a bone skeleton. During the war days, he was employed in a prisoner of war camp where there were a few Punjabi prisoners. He learnt Punjabi from these prisoners. In 1947, this German was compiling a German-Punjabi dictionary. In Punjabi language, all he had was a copy of a *Meer Waris Shah* book and a torn copy of a *Dulla Bhatti* book published in Lahore. After hearing that a Punjabi was in town, that German was searching for me so that I could help him understand the meaning of some difficult passages of *Dulla Bhatti* book. Unfortunately, those passages of the *Dulla Bhatti* book were difficult for me too. So, he could not fulfill his desire.

Now think about this incident. I do not know whether that dictionary ever got published or not, and if it got published then how many people used it. But this is a story of a nation whose total wealth is knowledge of science, technology, and languages. The nation whose people have the determination to write a German-Punjabi dictionary, no matter how useful it may be. They will not waste their time playing cards, going on strikes, watching movies and will not consider their university time as play time. Rather they will try to gain knowledge. May be there is a lesson in this for us.

C

With regards to National development, I was talking about China. A story is told by Chairman Mao-Tse Tung and you will hear this story from every Chinese. Once upon a time, in the north of China there lived an old man and his name was Mr Unlettered. In front of this old man's house there were two huge mountains and due to these mountains, sun rays never reached his house. One day, the old man called his young sons and said to them, let us remove these mountains by digging. The old man's neighbor whose name was Mr Intelligent said to the old man: "Mr Unlettered, I knew that you are an unintelligent person but I did not know that you are so unintelligent. By digging away with hands, how can you remove these huge mountains?" The old man replied, "You are right, however, if I die, my children will carry on and if they die, their children will continue, and the digging will continue. The mountains are not going to grow any taller. With each digging their height will decrease and one day this curse will be removed from the front of our house." On hearing the old man's statement, God Almighty had mercy on him and sent two angels who removed both of the mountains. My request is that menaces of the society are like these two mountains. You should keep trying to remove these menaces from your surroundings with patience and God will have mercy on you. Ameen. Do not worry whether your efforts will succeed or not. You do your duty, and God Almighty will bless greatly your efforts. I think we have derived wrong meaning of Iqbal's

philosophy of *Ego (khudi)* and have become too egotistic and have started to ignore working for the nation.

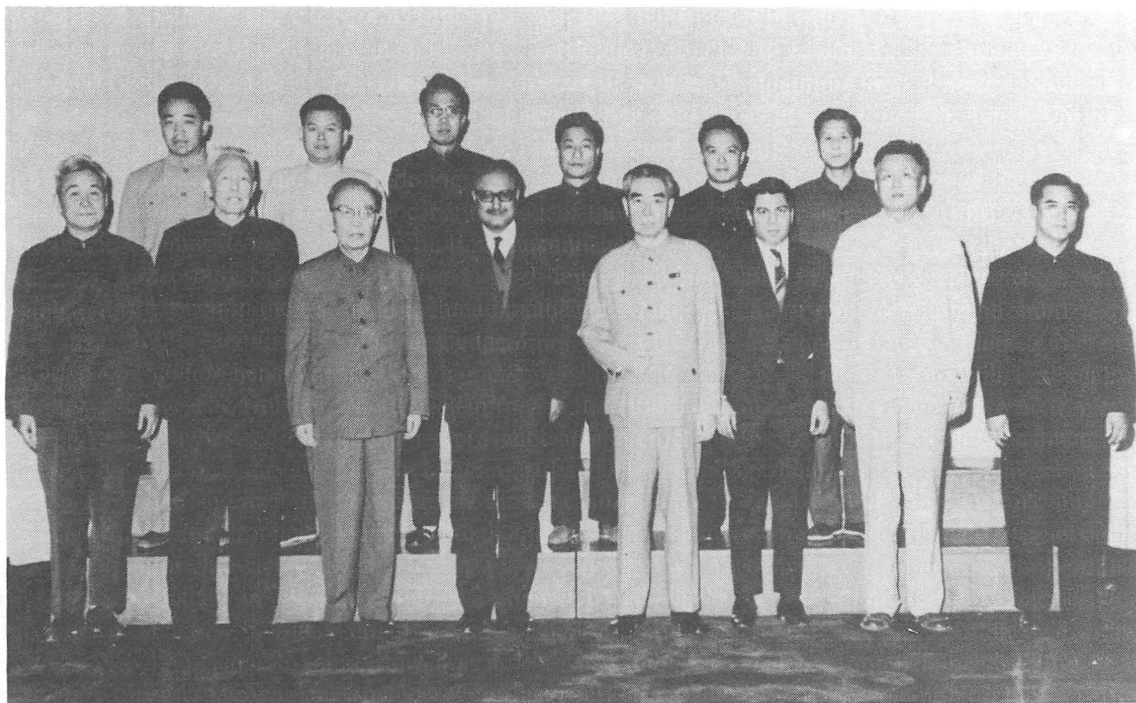
This does not mean that we should start giving preference to our personal gains and give the nation a secondary status. However, it is happening exactly like that.

◐

I like two books very much, one is the Holy Quran, particularly listening to the recitation of the Holy Quran and the other is Shamail Tirmadhi. Hazrat Tirmadhi has collected in this book traditions concerning the personal life of the Holy Prophet, peace and blessings of Allah be upon him, and also concerning his way of speech, way of living, personal affection, his courteousness,

and his holy personality.

In this regard, I recall an incident concerning Chaudhri Zafrulla Khan Sahib. He was admitted in a hospital when I visited him and took Shamail Tirmadhi with me to give to him. I told him that if God gave me Divine guidance, in the future, I would translate it into English. Later on, I went to Trieste. When after several months, I came back to London and went to see him in his house, I was surprised to see that he had an English translation of the book. He said to me that you may not get time and I had plenty of time in the hospital, so I completed the English translation. I will advise every student to read Shamail, as by doing so he will gain a lot.



Prof. Salam with Zhou En Lai, the then Chinese premier, during his visit to the Chinese Academy of Sciences in September 1972.

# Islam and Science

*Dr Abdus Salam*

*Dr Abdus Salam was invited to deliver an address to a meeting in the UNESCO House, Paris, on April 27, 1984. The speech principally elucidates Dr Salam's thoughts on the contribution of Muslim scientists in the field of science and concordance between faith and science. — Editor*

Let me say at the outset that I am both a believer as well as a practicing Muslim. I am Muslim because I believe in the spiritual message of the Holy Quran. As a scientist, the Quran speaks to me in that it emphasizes reflection on Laws of Nature, with examples drawn from cosmology, physics, biology and medicine, as signs for all men.

Thus, "Do they not then look at the camel, how it is created? And at the heaven, how it is raised high? And at the mountains, how they are set up? And at the earth, how it is spread out?" (Holy Quran, 88:18 -21)

The Quran emphasizes the superiority of the "alim," the man possessed of knowledge and insight asking: How can those, not possessing these attributes, ever be the equals of those who do? Seven hundred and fifty verses of the Quran (almost one eighths of the Book) exhort believers to study Nature, to reflect, to make the best use of reason in their search for the ultimate and to make the acquiring of knowledge and scientific comprehension part of the community's life.

The Holy Prophet of Islam (peace be on him) emphasized the quest for knowledge and sciences is obligatory upon every Muslim man and women. He said men of knowledge are the (true) inheritors of the Prophets. He enjoined his followers to seek for knowledge even if they had to travel to far Cathay in its search. In the context of China, clearly he had scientific rather than religious knowledge in mind, as well as an emphasis on the internationalism of the scientific quest. His constant prayer was: O my Sustainer, grant me knowledge of the ultimate reality of things.

This is the first premise on scientific knowledge with which any fundamentalist thinking in Islam must begin. Add to this the second premise reinforced by Maurice Bucaille in his perceptive essay on "Bible, Quran and Science." There is not a single verse in the Quran where natural phenomena are described and which contradicts what we know for certain from our discoveries in Sciences. Reading the Book you are not asked to believe in something you know is palpable wrong. Add to this the third premise: in the whole of Islamic history there has never been an incident like that of Galileo. Persecution, denunciation, excommunication (takfeer), even today, over doctrinal differences, but never, to my knowledge, for scientific beliefs. And paradoxically, the first Inquisition (Minha) in Islam came to be instituted not by the orthodox theologians, but by the so called rationalist, the Mo'tazila theologians who prided themselves on the use of reason. The saintly Ahmad ibn Hanbal was one of those subjected to their fury.

Is the Science of today really on a collision course with metaphysical thinking? Again, the problem, if any, is not peculiar to Islam, the problem is one of Science and Faith at least, can they live together in "harmonious complementarily. Let us consider some relevant examples of modern scientific thinking.

My first example concerns the metaphysical doctrine of the creation from nothing. Today, a growing number of cosmologists believe that the most likely value for the density of matter and energy in the Universe is such that the mass of the Universe adds up to zero, precisely. The mass of

the universe is defined as the sum of the masses and energies of the electrons, the protons, photons and neutrinos, which constitute the Universe minus an expression for their mutual gravitational energies. If the mass of the Universe is indeed zero and this is an empirically determinable quantity, the Universe shares with the vacuum state the property of masslessness. A bold extrapolation made ten years back then treats the Universe as a quantum fluctuation of the vacuum of the state of nothingness. What distinguishes physics from metaphysics, however, is that by measuring the density of matter in the Universe we shall know empirically whether the idea can be sustained in the physicist's sense. If it cannot be, we shall discard it.

My second example is the Principle of the anthropic Universe. The assertion by some cosmologists that one way to understand the processes of cosmology, geology, biochemistry and biology is to assume that our Universe was conceived in a potential condition and with physical laws, which possess all the necessary ingredients for the emergence of life and intelligent beings.

"Basically this potentiality relies on a complex relationship between the expansion and cooling of the Universe, after the Big Bang, on the behavior of the free energy of matter, and on the intervention of change at various levels," as well as on a number of coincidences which, for example, have permitted the Universe to survive a few billion years.

Consider some of the elements of this story told by Carr, Rees and Reeves. The Universe started with a Big Bang; as it expanded and thereby cooled, quarks bound themselves through the well-known physical forces into nucleons, these with electrons into atoms, and the atoms into galaxies and stars. It is of interest to note that stars can form only if they can emit light and heat and emission of light and heat can take place only in a cold Universe. This is guaranteed by the expansion

itself. If the Universe was to stop expanding, all structure including living structures would be dismantled. If the night were not dark, there would be no one to notice it.

Now, normally, nuclear binding should proceed by reaching for the lowest possible stable state. "Nuclear binding on a cosmic scale however stops short of reaching this lowest state. In principle, Big Bang nucleosynthesis could have yielded a world of iron. In fact, we hardly go past helium in the table of nuclei. Why? Because the number of relativistic particles per unit volume created was not high enough." Equilibrium ceased before nuclear evolution reached its lowest state. Did this happen because iron is hardly an appropriate element to promote life? Next, we come to a second chapter of organization of matter. The first chapter from the Big Bang to the birth of the first stars is a chapter of global organization following the decline of cosmic temperature. The second chapter witnesses the rise of complexity in a local scale around the multitude of stars, with their hot interiors and warm surroundings.

The stars formed according to standard cosmological laws: they exploded whenever they were larger than a certain size. This time, however, heavy nuclei were formed generating ices  $\text{NH}_3$ ,  $\text{CH}_4$ ,  $\text{H}_2\text{O}$ , complex molecules, and grains of dust of iron-magnesium silicate. And around a later generation of stars, these grains and ices gave birth to planets with atmospheres and oceans into which chemical evolution pursued its course.

Is the future of the Universe and in particular the course of events leading to this organization implicitly written down in the laws of physics from the very beginning?" It appears NOT. The chemist and the biologist tell us that the Physical processes have not always been in equilibrium. We have a large number of energetically equivalent states, and it is between these states that the game of organization takes place, largely through the effect

of chance. Chance presumably guided and driven by the biologists' principle of "need for survival." However, the biochemist and biologist may understand the role of chance in the evolution of the Universe, the equilibrium, physicist tries to understand the coincidences, which I mentioned, in terms of the twin principles of Self-Consistency and Naturalness. This, I will illustrate through a third example, something I am currently working on myself.

As an extension of the recent excitement in physics, that is, our success in unifying and establishing the identity of two of the fundamental forces of Nature, the electric and the weak nuclear, we are now considering the possibility that space-time may have 11 dimensions. Within this context we hope to unify the electroweak force with the remaining two basic forces, the force of gravity and the strong nuclear force. Of the 11 dimensions which we have postulated, four are the familiar dimensions of space and time. The other seven dimensions are supposed to correspond to a hidden internal manifold. Hidden because these seven dimensions are assumed to have curled in upon themselves to fantastically tiny dimensions of the order of  $10^{-33}$  cms. We live on the surface of a cylinder in the 11 dimensional space: our major source of sensory apprehension of these extra dimensions being the existence of familiar charges, electric and nuclear, which in their turn produce the familiar electronic and nuclear forces.

Exciting idea, which may or may not work qualitatively, but one question already arises: Why the difference between the four familiar space-time dimensions and the seven internal ones? And why eleven dimensions in the first place, and not wholesome number like thirteen or nineteen? Were all the eleven dimensions on par with each other at the beginning of time? Why have the seven curled in upon themselves, while the other four have not? At present, we make this plausible by postulating a self-consistency principle. We invent a field of force designed to guarantee this configuration dynamical system which can exist.

But there will be a price to pay, there will be subtle physical consequences of this hypothesis, for example, in the form of remnants, like the three-degree radiation which we believe was a remnant of the recombination era following on the Big Bang. We shall search for these remnants. If we do not find them, we shall abandon the idea.

Creation from nothing, an anthropic universe, extra dimensions, strange topics for late twentieth century physics, which appear no different from the metaphysical preoccupations of earlier times. But so far as Science is concerned, mark the provisional nature of the conceptual edifice, the insistence on empirical verification at each stage and the concept of driving self consistence.

Let me conclude with two thoughts. One is regarding the urge to know. As I mentioned before, the Holy Quran and the teaching of the Holy prophet emphasize the creating and acquiring of knowledge as bounded duties of believer "from cradle to the grave."

I spoke of Al Biruni who flourished at Ghazna in Southern Afghanistan one thousand years ago. The story is told of his death by a contemporary who says: I heard, al Biruni was dying. I hurried to his house for a last look. One could see that he would not survive long. When they told him of my coming, he opened his eyes and said: Are you so and so? I said, Yes. He said: I am told you know the resolution of a knotty problem in the laws of inheritance of our religion. And he alluded to a well-known puzzle. I said: Abu Raihan, At this time? and Al Biruni replied: Don't you think it is better that I should die knowing rather than ignorant? With sorrow in my heart, I told him what I knew. Taking my leave, I had not yet crossed the portals of his house when the cry arose from inside: Al Biruni is dead. As my last thought, I would like to quote again the Holy Quran. A Book, the very sound of which, in the word of Marmaduke Pickthall "move men to tears and ecstasy." More than anything else I know of, it speaks of the eternal wonder I have personally experienced in my own Science.

# Prof. Salam's tour of Pakistan in December 1979 after winning the Nobel Prize

*Chaudhry Abdul Hamid, Lahore, Pakistan*

Salam won the Nobel Prize for his theory of unification. "Until two decades ago," he explained to a group of academics and President Zia-ul-Haq at the Islamabad University (Pakistan) just after the award, "physicists believed that there are four fundamental forces of Nature: the gravitational, the electromagnetic, and the two nuclear forces, the weak and the strong. Two decades ago, my colleagues and I suggested that there were indications that the weak nuclear force was not really different from electromagnetic and that the two could interconvert, one into the other. We were searching for a unity, in the tradition of Newton, Maxwell and Einstein and the unified theory was formulated in its final form in 1967, at Imperial College, London, and the International Center for Theoretical Physics at Trieste with which I have the privilege of being associated, and also independently at Harvard... The fact that we were seeking a unity among the seemingly disparate forces of nature, is part of our faith as physicists and of mine as a Muslim. Just eight days back, I was asked to reply on behalf of the physics Prize winners to the Banquet address of His Majesty the King of Sweden in the great and glittering Banqueting Hall of Stockholm. With your indulgence, I shall read out part of what I said, for it bears on this faith in the ultimate unity and symmetry of Nature...

The creation of physics is the shared heritage of all mankind. East and West, North and South have equally participated in it. In the Holy Book of Islam, Allah says.

No incongruity canst thou see in the

creation of the Gracious God. Then look again: Seest thou any flaw? Aye, look again, and yet again, your sight will *only* return to you frustrated and fatigued. (Holy Quran, 67:4, 5)

This, in effect, is the faith of all physicists, the deeper we seek, the more is our wonder excited, the more is the dazzlement for our gaze.

"I am saying this, not only to remind those here tonight of this, but also for those in the Third World, who feel they have lost out in the pursuit of scientific knowledge, for lack of opportunity and resources."

This was the first time that the Holy Book was recited in the Banqueting Hall of Stockholm.

President General Zia-ul-Haq invited Prof. Abdus Salam to visit Pakistan in December 1979 as an official guest after he was awarded Nobel Prize. Brothers of Prof. Salam were also invited to accompany him to different cities of the country. I had received the following telegram from the Foreign office, Islamabad, in this regard.

"Prof. Dr Abdus Salam, Nobel Laureate is visiting Pakistan from Dec 15 to 23, 1979. The President of Pakistan has been pleased to direct that you should be invited to all functions being held at Islamabad, Lahore, Peshawar, Multan and Jhang in honor of Prof. Dr Abdus Salam. You are requested to kindly contact Mr Aslam Rizvi, Deputy Chief of Protocol Camp office Karachi for further instructions. Foreign."

Prof. Abdus Salam arrived at Karachi Airport on the morning of December 15, 1979. He was accompanied by his wife and our brother Chaudhri



M.A. Rasheed. He was received by the Vice-Chancellors of Karachi and NED Engineering Universities, Military Secretary to the Governor Sindh, high civil and military officials besides a large number of friends and relatives. After spending a night at the State Guest house, he left on the morning of Dec. 16 for Multan where our eldest sister lived. I and our brother Mr M. A. Majid (presently Ameer Austria) accompanied him to Multan. He was received by Vice-Chancellor Bahauddin Zakria University, Commissioner, Deputy Commissioner, DIG Police, friends and relatives, at Multan Airport. We had lunch at our sister's house. Later Prof. Salam visited Bahauddin Zakria University. We left in the afternoon by Army Helicopter for Sargodha. Hazrat Mirza Tahir Ahmad Sahib and Mirza Khurshid Ahmad received Prof. Salam at the (Pakistan Air Force) airport. Commissioner Sargodha and other civil officials were also present at the Airport.

We left for Rabwah soon after our arrival at Sargodha. A large number of men and children who had lined on both sides of Sargodha Faisalabad Road gave a rousing welcome to Prof. Salam. He met Hazrat Khalifatul-Masih III soon after his arrival, who hosted a dinner in honor of Prof. Salam.

We left for Islamabad on the morning of Dec. 18 after staying for one day in Rabwah, by Army Helicopter. Prof. Salam was received by the Minister of Education, Chairman Pakistan Atomic Energy Commission, Chairman University Grants Commission, Vice-Chancellors of Quaid-i-Azam and Allama Iqbal Open Universities. Representatives of Cabinet Division and Ministry of Foreign Affairs, besides a large number of high civil and military officials, friends and relatives. We drove to Sindh House where our stay was arranged.

Prof. Salam attended a special convocation held in the National Assembly Hall, Islamabad, where Gen. Zia-ul-Haq, Chancellor Quaid-i-Azam University, conferred Honorary Degree of Doctor of Science on Dr Abdus Salam.

Guests were served with refreshments after the convocation ceremony. But before that the proceeding was adjourned for few minutes for Asar Prayer. As Gen. Zia-ul-Haq and Prof. Salam were leaving the Hall for offering Prayer, following conversation took place between Gen. Zia-ul-Haq and Prof. Salam. I and my brothers are witness to this as we were following right behind.

Gen. Zia: Prof. Sahib! Will you offer Prayer with us or you will offer Prayer separately.

Prof. Salam: Sir, I will offer Prayer separately.

Gen. Zia: I know you are a better Muslim as compared to us.

Prof. Salam: Shall I get this statement of yours published in the newspapers.

Gen. Zia: Yes, by all means, but I will deny it.

Dr Shami, Chairman University Grants Commission, hosted a dinner in honor of Prof. Dr Salam in the evening of Dec. 18.

On December 19, Prof. Salam visited *PINSTECH*, where he was entertained to lunch by Chairman PAEC (Pakistan Atomic Energy Commission). He addressed the scientists after lunch. Dr M. A. Qazi, Chairman Pakistan Academy of Sciences, and Maj. Gen. Shafiq Ahmad, Chairman, Science Foundation, hosted dinner in honor of Prof. Salam. Maj. Gen. Shafiq in his address of welcome said that Allama Iqbal was Poet of the East whereas Prof. Salam is the Scientist of the East and we are proud of him.

On December 20, President Gen. Zia-ul-Haq conferred order of the *Nishan-i-Imtiaz*, the highest Civil Award of the country in an impressive ceremony held at President House at 3:00 PM. Light refreshments were served after the ceremony. Prof. Salam introduced his six brothers to Gen. Zia.

Gen. Zia hosted a dinner in honor of Prof. Salam at the State Guest House which was largely attended by Cabinet Ministers, Diplomats, Scientists, high civil officials. We brothers were also invited to this dinner.

On December 21, there were no official

engagements in the morning, being Friday, a closed holiday. We left for Peshawar by Pakistan Air Force Fokker Friendship plane in the afternoon. Military Secretary to Governor NWFP, Vice-Chancellor, Peshawar University, scientists and civil officials received Prof. Salam at the Airport.

Governor NWFP, Lt. Gen. Fazal Haq hosted a dinner in the honor of Prof. Salam at the Governor house which was largely attended.

On December 22, Prof. Salam visited Agricultural Research Farm at Tarnab just outside Peshawar. After this visit, citizens of Peshawar arranged a reception in honor of Prof. Salam. Vice-Chancellor, Peshawar University, hosted lunch in the honor of Prof. Salam at the Hotel Intercontinental.

We left in the afternoon for Lahore by PAF Fokker Friendship plane. We arrived Lahore at about 4:30 PM. Military Secretary to Governor Punjab, Vice-Chancellors of Punjab and Engineering Universities, high civil officials, friends and a large number of relatives received Prof. Salam at the Lahore Airport. We drove to State Guest House where our stay had been arranged.

Lt. Gen. Sawar Khan, Governor Punjab hosted a dinner at the Governor House in honor of Prof. Salam, which was attended by the Vice-Chancellors of Punjab and Engineering University professors and scientists.

On December 23, Prof. Salam addressed professors, teachers and students of the Punjab University at the Senate Hall of the University. Vice-Chancellor, Punjab University, hosted a lunch at the Hotel Intercontinental in honor of Prof. Salam which was largely attended. Prof. Salam went to the shrine of Hazrat Data Ganj Bakhsh and prayed for the saint.

In the evening, Prof. Salam went to the house of our nephew Chaudhary Munir Masood, Circle Registrar, Cooperative Dept Govt of Punjab, where more than one hundred close relatives from

Lahore, Sahiwal, Okara met Prof. Salam. Sardar Allah Bakhsh, Chief Engineer Irrigation Dept, who was Prof. Salam's class fellow hosted a private dinner.

On December 24, we left in the morning by Army helicopter for Jhang. When the Helicopter landed at the freshly prepared helipad near the office of Deputy Commissioner, a large number of well wishers, friends, relatives welcomed their hero. Besides Chief Secretary Punjab, Commissioner Faisalabad, Chairman University Grants Commission, famous poet of Jhang, Sher Afzal Jaffery and Principal Government College Jhang were among those who had come to welcome Prof. Salam. After spending some time at the Rest House, we left for Jhang City. We went to the house of our uncle, Chaudhary Bashir Ahmad, where we had lunch. Hundreds of people had gathered to have a glimpse of their "own" hero. Prof. Salam met each one of them hugging the elderly.

After lunch, Prof. Salam proceeded on foot to our ancestral house where Salam and we were brought up. He was meeting every one and was enquiring about their welfare constantly saying "*khair ay, wull o*" (Is it all well? How are you doing?).

Afterwards he went to his first Educational Institution, M. B. High School (it was a middle school when he was student), where he had a Science Block constructed a few years ago. It was named Muhammad Hussain Block after the name of our father.

Prof. Salam, when reached his old college in the afternoon, was given a very warm welcome by the teachers and students. Principal of the college read out an address of welcome in which he said that they are proud of Prof. Salam for bringing fame to his country. Afterwards, Prof. Salam delivered a moving speech. He told the audience that when he was student of Jhang College during his lecture, the physics teacher, while teaching electricity, told the students, "There is great power

in electricity and it is found in large towns like Lahore.” We,” he continued, “were all surprised (at that time there was no electricity in Jhang). The first time I saw electricity was when I joined Government College Lahore in 3rd year in 1942.” He advised the students to work hard as the country needs engineers and scientists for development. The guests were served tea and light refreshments afterwards.

Prof. Salam once again went to the Government Rest House where he met friends and well wishers for about an hour. We spent the night at the Canal Rest House at Trimmu Head. This is the place where rivers Chenab and Jehlum meet. It is about eighteen miles from Jhang.

On December 25, we left Jhang in the morning by Helicopter for Sargodha en route to Rabwah. This was a private visit to attend *Jalsa Salana*. Prof. Salam attended the proceedings for three days.

On Dec. 27, Hazrat Khalifatul-Masih III, during the course of his address invited Prof. Salam to mike for addressing the audience, who were much excited to see him and raised slogans of *Allah-o-Akbar* (God is Great) which were deafening. Prof. Salam, in his brief address, said:

About fifteen years ago Hazrat Mirza Bashir Ahmad (may Allah be pleased with him) wrote to my father, “I see in your son, Prof. Abdus Salam, prophecy of Hazrat Masih-i-Mau’ood (alaihissalaam) come true.”

The prophecy of the Promised Messiah, alaihissalaam, as written in his book, *Tajalliat-i-Ilahiyyaa*, was:

“God will cause my Jama’at to spread all over the Earth and cause my people to be victorious over all other groups. And the members of my Jama’at will advance in knowledge and understanding so much that they will render the enemies of True Islam speechless through the light of their truth and logical arguments.”

I am grateful to Allah who listened to the prayers of the Imam, my parents and every one from the community for bestowing this honor (award of Nobel Prize) on me.

Prof. Salam spent a very busy time during the three days of *Jalsa Salana*. We left for Lahore by cars on the evening of Dec. 28. On the instructions of Hazrat Khalifatul-Masih, a party of Khuddam escorted us to Lahore.

We left for Karachi in the early hours of December 29. On December 30, Prof. Salam went to Hyderabad where he visited Sindh University and met teachers and students. In an address in the Senate Hall he suggested that a Technical School and a hospital should be built with every mosque.

Lt. Gen. Abbasi, Governor Sindh, hosted dinner in honor of Prof. Salam at the Governor House, which was largely attended.

Prof. Salam had a very busy schedule during the next two days. He visited Karachi University and attended reception hosted in his honor by:

- ✓ Karachi Press Club.
- ✓ Pakistan Medical Association.
- ✓ Old Ravians.
- ✓ Pakistan Association of Scientists and Scientific Professions.
- ✓ Dinner by NED University of Engineering.
- ✓ Visit to the office of *SUPARCO*.
- ✓ Interviews to Dawn, Radio Pakistan and daily Jang.

This hectic tour of Pakistan ended on the morning of January 2, 1980, when he left for London.

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For more than 30 years, the ICTP and Abdus Salam were one and the same. After 21 November 1997, the Centre will bear the name of its late founder.

## A Dedication...

*Miguel Virasoro, Director, ICTP*

It's hard to believe that we are approaching the first-year anniversary of the death of Abdus Salam. But, as many of you know, Salam died on 21 November 1996, after a long and difficult illness.

Those of us fortunate enough to have been touched by his life will never forget him. He was an imposing figure, who was as comfortable discussing global diplomacy with heads of state as he was debating gauge theory with his fellow physicists. His scientific prowess—he received the Nobel Prize in 1979—did not undermine his deep religious convictions. And his worldly excursions only strengthened his commitment to his native land of Pakistan.

Salam may be gone but his spirit remains ever-present within the ICTP. Thousands of researchers, largely from the developing world, have benefited from studying at the Centre that Salam created and then guided throughout his enormously productive career. In a life marked by many successes, Salam cherished the success of the ICTP perhaps more than any of his other achievements.

These are some of the reasons why we have decided to rename the ICTP The Abdus Salam International Centre for Theoretical Physics. The memorial meeting at which the official renaming ceremony will take place, will be held at the ICTP headquarters in Trieste, Italy, between 19 and 22 November 1997.

Salam often said that "scientific thought and its creation is the common and shared heritage of mankind." Thanks in part to his efforts, that observation is truer today than at any time in the 20th century. When Salam first suggested the idea of a research centre dedicated to the needs and aspirations of scientists in developing countries,

many scoffed at the idea. As one critic sarcastically noted, "a centre for underdeveloped countries...will remain an underdeveloped centre."

Yet, today, some of the most sophisticated scientific research in the world is taking place in nations that critics said were incapable of such pursuits: Argentina, Brazil, China, India and Korea now have facilities and scientists that rival those of Europe and North America.

That's not to say problems don't persist. Indeed if Salam were alive today he would be diligently searching for ways to advance the cause of science in the Third World and improve the plight of the billions of impoverished people in developing countries who have yet to share in the world's growing material wealth.

How can we ensure that the next generation of scientists in the Third World enjoy the same opportunities as their predecessors? How can we increase public understanding and appreciation for science in the developing world? How can we narrow the gap between those nations in the Third World that have made significant progress in establishing viable research agendas and those that have witnessed a deterioration in their scientific expertise?

These are critical issues that demand our attention. But on the occasion of the first-year anniversary of the death of Abdus Salam, let us celebrate the accomplishments of this extraordinary man and let us honour his memory by renaming the institution to which he devoted so much of his intelligence and energy, The Abdus Salam International Centre for Theoretical Physics. It's the right thing to do for both the man and the institution.

# A summary of the proceedings of the Abdus Salam Memorial Meeting held from November 19-22, 1997 at ICTP, Trieste, Italy

*Dr Aziza Rahman, Los Angeles, CA*

The Abdus Salam Memorial Meeting was held at the International Center for Theoretical Physics (ICTP) in Trieste, Italy, on November 19-22, 1997. The program for the conference included three days of scientific presentations and one day, Friday November 21, 1997, was dedicated to commemorating the life and work of Prof. Abdus Salam.

More than 150 delegates from all over the world were present at the meeting, including Professor Salam's family.

The commemoration Day Program commenced with a welcome address by the Director of ICTP, Dr Miguel Virasoro. He announced that the Center was to be renamed *The Abdus Salam International Center for Theoretical Physics*. Professor Virasoro said that this was a befitting way to pay tribute to the man who was responsible for creating the Center. He also read a message from the Prime Minister of Pakistan. Mr Muhammad Nawaz Sharif welcomed the renaming of the Center and said this was an honor not only for the memory of Professor Abdus Salam but also for Pakistan (the full text of the message is given elsewhere in this issue).

The Program was divided into four sessions. During the first session, tribute was paid to Professor Salam's work in creating the Center. The following eminent scientists from the center and University of Trieste spoke of Professor Abdus Salam's great vision in creating the Center:

i. Professor Giuseppe Furlan, Department of

Theoretical Physics, University of Trieste and ICTP

ii. Professor Paolo Budinich, Co-Founder of the ICTP

iii. Professor Luciano Bertocchi, Ex-Deputy Director of the ICTP

iv. Professor Luciano Fonda, President of the Consorzio University of Trieste

v. Professor Gian Carlo Ghirardi, Chairman, Department of Theoretical Physics, University of Trieste

vi. Dr A. M. Hamende, ICTP/TWAS

vii. Professor Sergio Fubini, University of Torino/TH Division, CERN

They recalled the early days of the Center when Professor Salam's determination and hard work overcame many obstacles. They spoke of his vision, his tremendous personality and enthusiasm.

The second session was chaired by Prof. Riazuddin from King Fahd University of Petroleum and Minerals, and the speakers were all distinguished physicists who had either been his students or had collaborated with him. They came from all over the world to honor him:

i. Professor Daniel Akyeampong, Department of Mathematics, University of Ghana

ii. Professor Robert Delbourgo, Department of Physics, University of Tasmania

- iii. Professor Gordon Feldman, Department of Physics, Johns Hopkins University
- iv. Professor Gerhard Mack, Institute for Theoretical physics, University of Hamburg
- v. Professor R. P. Bambah, Emeritus Professor of Mathematics, University of the Punjab
- vi. Professor John Ziman, Emeritus Professor of Physics, University of Bristol
- vii. Message from Professor Stig Lundqvist, Chalmers University of Technology, Goteborg

Each spoke of the effect that Professor Salam had on their lives.

After Lunch, the meeting resumed under the chairmanship of Professor M.A. Virasoro. The first speaker in this session was the President of Albania, Professor Rexhep Meidani, himself a well known physicist who had been a research scholar at the ICTP. He said that Prof. Salam had brought great honor and dignity to the poor scientists of the developing countries and was a hero of the third world. Representative of the Italian Government and the Vice-Mayor of Trieste, Professor Roberto Damiani, also paid tributes to his work. Also during this session, the Director General of the IAEA, the Deputy Director General of UNESCO, the Director of the Third World Academy of Sciences and the President of the Third World Organization for Women in Science honored his memory. Dr Hans Blix, Director General of IAEA, called Prof. Salam a great figure of contemporary physics and a Servant of Peace. Dr Adnan Badran, the Deputy Director General of UNESCO said that Prof. Salam had opened so many avenues for the poor scientists of the Third World that for decades to come he will be remembered for his services to the developing countries. Professor M. H. A. Hassan, Executive Director, TWAS and Professor Lydia Makhubu, President, Third World Organization for Women in Science, also spoke of his goal of making science and technology an important part of Third World development, in this session.

The final session of the meeting was presided

by Professor Saeed Durrani, University of Birmingham. The session included Nigel Calder, the Eminent British Science Writer, three Pakistani Professors (Professor Munir Ahmad Khan, Retired Chairman, Atomic Energy Commission, Professor Pervez Hoodbhoy and Professor Asghar Qadir, both of Quaid-i-Azam University), and Prof. Nguyen van Hieu, the President of the National Center for Science and Technology in Vietnam. Professor Hieu announced that in recognition of Prof. Salam's support for sciences in Vietnam, it had been decided to open a Salam Center for Theoretical Physics in Hanoi. Prof. Pervez Hoodbhoy said that Salam was respected in the world and was the pride of Muslim countries, but had been rejected in Pakistan because of his belonging to the minority, Ahmadiyya Community. While Pakistan had forgotten him, the world was honoring him. Professor Munir Khan and Professor Qadir recalled the days that Prof. Salam had been a student with them in Government College, Lahore and how his brilliant career began.

The final speakers were members of Prof. Salam's family. Ahmad Salam, his elder son, conveyed a message from the Head of the Worldwide Ahmadiyya Movement in Islam, Hazrat Mirza Tahir Ahmad (full text of the message is published in this issue). Hazrat, in his message, told of his relationship with professor Salam and of his vastness of knowledge, yet complete humility and devotion to his faith.

Imran Saadi, his grandson told of a few incidents concerning his grandfather, and the meeting closed with a vote of thanks from Umar Salam, his younger son, on behalf of the family.

By the grace of Allah, the meeting was most successful. The outpouring of respect, admiration and love for Prof. Salam from his contemporaries was overwhelming. His unique personality, his drive and ambition to help others, his generosity, his complete devotion to Almighty God were highlighted.

May Allah elevate his soul to the highest heights.

# The Abdus Salam International Center for Theoretical Physics

*Dr Karimullah Ziroy*

(Based on the information given in the brochure published by the International Center for Theoretical Physics, Trieste, Italy, 1996. Editor: A. Triolo. Revision: A. Gatti)

The International Center for Theoretical Physics (ICTP) is an institute of research and high-level training in pure and applied physics and mathematics which belongs to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France and the International Atomic Energy Agency (IAEA), Vienna, Austria. It, therefore, rests under the aegis of the United Nations Organization.

The ICTP is located in the city of Trieste, Italy. Trieste was selected from among applicant host cities for historical, geographical and political reasons. Trieste – the “East Gate” of Italy – has been a cosmopolitan city for centuries, a trading and business center where Western and Central Europe have come together with Eastern Europe and the Mediterranean. The establishment of an international center in Trieste has led to the city’s determination to become a “City of Science” and to host numerous other scientific institutions.

The rules and regulations of the ICTP clearly set out its aims:

- a) To help in fostering the growth of advanced studies and research in physical and mathematical sciences, especially in the developing countries.
- b) To provide an international forum for scientific contacts between scientists from all countries.
- c) To provide facilities to conduct original research to its visitors, associates and fellows, principally from developing countries.

The ICTP implements its aims through the following schemes of its Scientific Program:

- Research Groups and Laboratories
- Training Courses and Scientific Meetings
- Diploma Courses

- Training and Research in Italian Laboratories
- External Activities
- Associate Members
- Federal Institutes
- Donation Programs
- Awards

It is not possible to talk about the International Center for Theoretical Physics without mentioning Professor Abdus Salam – the man who had the vision of a forum for the world’s scientific community, who fought to materialize it and who directed and guided the institution for 30 years.

Not only did Professor Salam envisage the Center as a place where scientists could carry out research of the highest level but through the ICTP he also managed to set an example for other nations to follow. He travelled extensively throughout the world in effort to convince heads of states and governments of the paramount importance of supporting science in their own countries for the betterment of humanity. His deep conviction and untiring efforts have been effective and numerous institutions have now been established all over the world.

Professor Abdus Salam was born in Jhang, Pakistan, in 1926. He was educated at the Panjab University, St. John’s college, Cambridge, and Cavendish Laboratory, Cambridge, where he obtained his Ph.D. in 1952. He then returned to Pakistan where he served as professor at Government College, Lahore and Panjab University. There he suffered the isolation which scientists experience when they are not supported by their home countries. There was no tradition of any postgraduate work; there were no journals; there was no possibility of attending any conferences. He suffered the tragic dilemma of



having to make the choice between physics or Pakistan. So he returned to Cambridge to take up the position of Lecturer. In 1957 he was appointed as full professor of Theoretical Physics at Imperial College.

Fired by his own unhappiness at having had to leave his own country, he determined to find a way of making it possible for those like him to continue working for their own communities while still having opportunities to remain first-rate scientists. It was in 1960 that he conceived the idea of setting up an International Center for Theoretical Physics with funds from the international community.

As a scientist, Abdus Salam needs no introduction. He has received 18 awards in 10 countries for his contributions to Physics, including the Nobel Prize for Physics in 1979 for the unification of the electromagnetic and weak forces and the Copley Medal of the Royal Society in 1990. He has received 14 awards for contributions towards peace and promotion of international scientific collaboration. He has been elected member of prestigious Academies and Societies in 24 Third World and Industrial countries. He is also an honorary member of seven important national Orders of four countries. Professor Salam has received 45 Doctor Honoris awards in 28 countries.

Professor Salam's United Nations assignments include twice Scientific Secretary, Geneva Conferences on Peaceful Use of Atomic Energy. He was elected member of the Board of Governors, IAEA, and at various times was member and chairman of the United Nations Advisory Committee on Science and Technology. He was a member of the United Nations Panel and Foundation Committee for the United Nations University and then of the United Nations University Advisory Committee, as well as Council Member of the University of Peace in Costa Rica. He was elected Chairman, UNESCO Advisory Panel on Science, Technology and Society in 1981.

Professor Salam has also been a member of various national and international organizations such as the South Commission, the Scientific

Council of SIPRI and Board of Directors of the Beijir Institute of the Swedish Academy of Sciences. He has also served as Vice-President of IUPAP (International Union of Pure and Applied Physics) and as a member of the CERN (Center for European Nuclear Research) Scientific Policy Committee.

Professor Salam has published 275 papers on physics of elementary particles, several books and numerous papers and articles on scientific and educational policies for developing countries.

The ICTP has set an example at home and abroad. In Trieste, the establishment of ICTP in the early '60s contributed to the re-direction of the role of the city from industry to the tertiary sector, notably in science. Since then, the establishment of important research institutions and laboratories has continued. Now Trieste is called "The City of Science," and many institutions across the world have praised the example of its being a "Scientific Pole."

Moreover, ICTP was the first institution to operate under the flag of the United Nations – now this Organization counts five institutes in the city of Trieste.

The ICTP has had a significant impact abroad. Thanks to the untiring efforts of Professor Abdus Salam and the growing need for scientists to remain in contact within their own countries or regions, quite a number of research centers have been established or proposed. For Example:

- International Center for Science and High Technology (ICS)
- The UNIDO Center for Genetic Engineering and Biotechnology with components in Trieste and Delhi
- Centro Internacional de Fisica, Santa Fe de Bogota, Columbia
- International Institute of Theoretical Physics, Iowa State University, Iowa, USA
- International Center for Mathematical Sciences, Edinburgh, Scotland
- Asia Pacific Center for Theoretical Physics, Korea
- International Institute for Theoretical Physics, Texas A&M University.

# The International Center for Theoretical Physics – A Personal Impression

*Dr Sameen A. Khan, Chennai (Madras), India*

Dr Sameen A. Khan obtained his Ph. D. degree from the Institute of Mathematical Sciences, Madras, India. I had my first contact (e-mail) with Dr Khan in May 1997. I asked Dr Khan to write an article about his impressions about the International Center for Theoretical Physics, Trieste, Italy, where he had spent three weeks. Although his visit to the ICTP was after the demise of Professor Sir Mohammad Abdus Salam, this article gives an insight into what the ICTP offers to the scientists from the Third World Countries.

– Dr Wajeeh Bajwa.

Recently, I had the privilege of visiting the world renowned Science center, the International Center for Theoretical Physics (ICTP) at Trieste, Italy, for the first time. The three weeks long visit was to participate in the Winter College on Quantum Optics, “Novel Radiation Sources,” March 3-21, 1997.

I had requested the ICTP in October for airfare and accommodation. Initially, I was offered half the airfare and total local hospitality. However, as I failed to get the required support from the sources here in India, the ICTP kindly agreed to fund my travel completely as well. Without the generous support of the ICTP, I would not have been able to make the visit which has been fruitful in more than one way. A long desire to visit the world famous center was fulfilled.

Winter College in Optics is one of many (more than thirty-five for this year) activities organized every year at the ICTP. It is organized under the directorship of four experts from across the globe. The Winter College enabled us to interact with leading experts and participants from four continents. I met several lecturers in person for the first time whom I had read of only in books and journals. Our discussions were not confined to research alone. Some of us actively discussed the status of science and technology in our countries and scientific collaboration across national boundaries.

On one of the afternoons in the third week of the Winter College, there was the meeting of African LAM (Laser, Atomic and Molecular) Network, open to all, under the supervision of Professor Denardo and Professor Ahmadu Waguè (from Senegal) who is the Coordinator and President of the African LAM Network. The meeting started with a three-minute silence in honor of Professor Salam, as this was the first LAM meeting after the passing away of Professor Salam. The meeting discussed the problems faced by the African Physicists and the need to promote research in Physics (particularly in Optics and related sciences). Professor Waguè lauded the efforts of the ICTP in assisting the African LAM Network. Professor Waguè has kindly made me the African LAM Network’s foreign coordinator for India. I am trying to work out something at the Indian end, though it is difficult at this stage since I am only a student now. Presently, I will be mostly keeping the LAM Network posted about the Physics (optics in particular) activities and programs in India.

It is meetings of the above kind which makes the visit to the ICTP so different from the meetings held elsewhere. I am in many ways impressed by the Center and its grand functioning. At the ICTP, I was extremely pressed for time. In addition to the participation in the Winter College, there was the excellent opportunity to explore the other

attractions, like the excellent library, the Salam Archives, meeting various persons who have been associated with the Center since the beginning. There are so many Centers within the ICTP Campus, which include, the Department of Theoretical Physics of University of Trieste, International School of Advanced Studies (SISA), Trieste International Foundation for Scientific Progress and Freedom, and Third World Academy of Sciences (TWAS), to name but a few. It is like a science city with one center of excellence after the other.

I liked the ICTP library very much with its particularly courteous and exceedingly helpful staff and an excellent online documentation system.

Professor Salam's personal collection of books (and some other belongings) is very well kept, in one of the rooms in the ICTP main library. In fact a video monitor manned by the staff at the library counter ensures that nothing is disturbed in Professor Salam's room, with so many visitors round the year. In recent times there have been about four thousand visitors to the Center every year. There, and in the main library collection, I came across the translations of his very famous book, "Ideals and Realities" in several languages, including Urdu, Persian, Arabic, Chinese, Japanese, and most of the European languages.

At the ICTP, I had the occasion to see numerous photographs of Professor Salam, not only in the various publications, but also on the walls of the ICTP (particularly near the Director's office). I saw many of these photographs for the first time. The Archives must have many more. Professor Salam had the added facet of statesmanship, rare to find, which make his photographs so unique and exciting. I am sure this will make a very interesting and inspiring collection, sufficient for an excellent publication titled "A Pictorial Biography of Abdus Salam." This will be the only one of its kind. A publication, titled "The Collected Speeches of Abdus Salam," containing his speeches (numbering more than a hundred) will constitute an ideal guiding source for all those who want to promote Science and

Technology in the developing world.

Due to the tight schedule of lectures, meetings and visits to various centers, I could not meet the Director, Professor Virasoro and the Deputy Director Professor Bertocchi. My attempts to meet them coincided with the Scientific Council Meeting of the ICTP. I eagerly look forward to meeting them during my next visit.

The ICTP publications which I collected included a Directory of Mathematicians from Developing Countries, a Directory of Physicists from Developing Countries, a Directory of ICTP Arab Friends Society (SARF), and a Directory of African Physicists. The first two were provided to me by Ms Ines Radatti of the Publications Office. The very idea of the above publications reflects Professor Salam's concern for the developing world. I hope that the ICTP continues with the new editions of the above and other related publications.

In a brief time of three weeks I developed an attachment to the ICTP. The older staff could make me feel the spirit of Professor Salam, whom I had the privilege to meet only once. The meeting occurred by a certain chance, which deserves some description. I met him very briefly, that too in a crowd, in the summer of 1989. I was visiting Aurangabad and returned home to Hyderabad with the train running late. On reaching home, the first thing I learned from my mother was that Professor Salam was scheduled to give the "Birla Memorial Lecture" that morning. I was not very hopeful of meeting him. But my mother insisted that I take an auto-rickshaw (a three-wheeled taxi) and at least see him at the airport even if I were late for the lecture. I rushed to the Birla planetarium where the "question and answer" session was in progress. There I learned that he was scheduled to leave the same evening. I also learned about his brief program at a mosque. From the Birla Planetarium I followed him to the mosque, located in the historic Charminar area of Hyderabad. There he gave a very memorable speech that dealt with the promotion of Science and Technology in the developing countries. He also quoted some verses from the Holy Quran, in

which the Almighty Allah exhorts mankind to pursue learning:

*In the creation of the heavens and the earth and in the alternation of the night and the day, there are indeed Signs for men of understanding.*

(The Holy Quran, 3:191)

Professor Salam further pointed out that there are seven hundred and fifty verses of the Holy Quran, almost one eighth of the Divine Book which exhorts the believers to “study Nature, to reflect, to make the best use of the reason in their search for the ultimate and to make the acquiring of knowledge part of community’s life.”

After his beautiful speech, we all stood in a long queue to meet him. I was scheduled to accompany Professor Salam to the airport along with Professor Alladin of the Astronomy Department, Osmania University, Hyderabad. Suddenly, there was a huge rush of people wanting to go to the airport. One of the more senior of them said to me: “You are young and can meet Salam in the West! My days are coming to an end.” At this I left the car. I wish the elderly person’s words had come true! Had it not been for my mother’s insistence I would have missed seeing Professor Salam altogether. It is sad to note that

our media never gives advance notice of such major scientific events. The seminar obviously had been planned well in advance.

Professor Salam will continue to influence science in the developing countries through his thought-provoking writings and his living monument, the ICTP.

My stay in the Galileo Guest House was very comfortable and enjoyable. Hospitality at the ICTP knew no bounds. The Galileo Guest House has a Meditation room with a collection of books on Religion and Philosophy. It is in this room where the congregational Friday prayers were offered in true Islamic tradition.

The ICTP has excellent Internet connectivity. This enabled me to be in close contact with my home-Institute, my Ph. D. thesis supervisor in particular, all the time. I could share the excitement of my stay at the ICTP with him and my friends. There was no reason for me to feel homesick while at the ICTP. Indeed, there seems to be no detail that has been overlooked. Professor Salam’s thoughtfulness concerning the academic as well as personal needs of visitors to the ICTP is exemplary.

I do not know when I will get a chance to visit the ICTP again. I will do so at the earliest opportunity.

## Ansar Chanda Literature

Sadr Ansarullah, U.S.A., has noted that many members of Ansarullah have not paid the Ansarullah Chanda Literature. All the members are reminded that the rate of Chanda Literature, for Ansarullah, has been set at \$10.00 per year. Currently the cost of publishing Al-Nahl is being met out of other funds. This creates a burden on our other important activities.

Members are therefore urged to please pay their share of the Chanda Literature as soon as possible. May Allah enable us to fulfill our obligations in a timely manner. Ameen.

# The Creation of International Center for Theoretical Physics

*Prof. Paolo Budinich, ICTP, Trieste, Italy*

(Prof. Paolo Budinich is the co-founder of the International Center for Theoretical Physics. He was the Center's Deputy Director for 17 years. He has written this article for TWAS Newsletter, Vol. 8, No. 4, October-December 1996).

The first time I met Abdus Salam was in June 1960, when he came to one of the several international seminars which we, from the newly established University of Trieste, used to organize at the "Castelletto." in the park of Miramare. It was a wonderful informal meeting, he was as brilliant as usual, and a natural sympathy arose between us. Such that, when I heard by chance, in the autumn of that year, that he had suggested to the IV General Assembly of the International atomic Energy Agency (IAEA) in Vienna a resolution for the creation of an international center for physics under the flag of United Nations, it was natural for me to write to him immediately, proposing the candidature of Trieste, since we – in the vicinity of the "iron curtain" (the border between East and West), generating all sort of poisoning nationalism – badly needed an international scientific institution with the flag of the United Nations.

He answered immediately with a nice letter saying, "OK, let us work together!" And a wonderful, stormy collaboration started, which soon turned into a deep friendship which was to last over 35 years, embarking us into an adventurous enterprise which first brought the ICTP to Trieste and afterwards transformed it into an emblematic example of what can, and should be, done to help the South to emancipate from intellectual slavery.

The first three years at the General assembly of IAEA in 1961, 1962 and 1963 in Vienna were spent in diplomatic battles in order to induce the representatives of the big countries (USA, USSR, UK, France and some others) to vote in favor of the resolution. Salam was determined – and

effective – in mobilizing every one of the large and small nations in the South in such a way that the big ones were defeated by sheer numbers, or, better, persuaded to vote for Trieste in 1962. The candidature of Trieste was finally unanimously accepted in 1963. I remember that Salam used to come to the difficult sessions with a bunch of grapes as fuel, to get more energy for his bursting interventions.

Then, when in Trieste, we had to face numerous difficulties to increase the budget by a factor greater than 20 and to convince the politicians and diplomats that good science was what the poor countries badly needed as a prerequisite for their emancipation. Salam always had good convincing arguments, and the best was the experimental evidence of his own life and curriculum: from an unknown student in Pakistan to a Nobel Prize winner in 1979. Which was also the best encouragement for the thousands from the South who came to the ITCP to work and study day and night in our library.

It was a difficult battle, but a good one. Once, after a victorious action, he told me: "Paolo, ask your friends in the municipality of Trieste to dedicate to us two tomb-stones here in the Park of Miramare where we can rest at the end of our lives!"

I hope and wish that he might constitute an example to the thousands of young scientists from the South who have come, and will hopefully come in the future, to the ITCP despite the tremendous difficulties they face at home: they will have to try and try again, and I hope they will understand that they must have courage and faith, for nothing is impossible.

# Abdus Salam: The Man and the Mission

*An interview with Seifallah Randjbar-Daemi and Faheem Hussain*

ICTP's founder and Nobel Laureate Abdus Salam died one year ago, on 21 November 1996, in Oxford, England. He had been unable to communicate for the previous three years as a result of a debilitating disease.

In the West, Salam was honoured as one of the foremost theoretical physicists of his generation. In the East, he was praised as the first Muslim to win a Nobel Prize in science.

Salam's reputation was also built on the success of the ICTP, which he often stated was his most prized accomplishment. The institution that he devoted 30 years of his life to-and which he loved dearly-will soon bear his name. After 21 November 1997, the ICTP will be called The Abdus Salam International Centre for Theoretical Physics.

To honour Salam's rich and complex legacy, News from ICTP asked two ICTP staff members, Seifallah Randjbar-Daemi and Faheem Hussain, to offer their views on the accomplishments of this charismatic man.

"As a scientist, Salam always had a wide range of interests," says Seifallah Randjbar-Daemi, an Iranian scientist who heads the ICTP's High Energy Physics Section. Randjbar-Daemi first met Salam in 1976 and worked closely with him from the early 1980s until Salam's death.

"His name, however, will forever be tied to the theory that has come to be known as the Standard Model, which is one of the greatest intellectual achievements of this century. The theory represents the cumulative effort of many imaginative thinkers who sought to discover what the physical world is made of and how it works."

"This endeavour," Randjbar-Daemi observes, "is very much in the European tradition. As a result, much of the work was carried out in the

wealthy universities of Europe and North America."

"But among the creators of this intellectual system are representatives from other, less wealthy parts of the world."

Together with John Strathdee of the ICTP, Salam in the mid 1970s invented a mathematical framework of supersymmetry known as superspace.

And, in 1979, Salam shared the Nobel Prize with Sheldon Glashow and Stephen Weinberg for the mathematical and conceptual unification of the electromagnetic and the weak forces-concepts later proven to be correct by accelerator experiments in Europe and the United States. Then, during the 1980s and the early 1990s, Salam worked on various aspects of supersymmetry and superstrings.

As Randjbar notes, "Unification was the guiding principle of Salam's scientific thought. He was confident that the new theories of supersymmetry, developed during the 1970s, would permit the ultimate unification of all the forces of nature."

Ranjbar still marvels at the speed at which Salam could join an entirely new field of research. He recalls, for example, that "In 1984, Michael Green of Queen Mary College in London and John Schwarz of Caltech in the United States circulated a preprint that launched the first superstring revolution." Their work made substantial use of the 10-dimensional supergravity theories.

"Salam asked us to examine the same quantum mechanical consistency problems in models of less than 10-dimensions. We soon constructed a 6-dimensional model and we sent our findings to the editors of Physics Letters B less than 10 weeks after they had received Green and Schwarz's

breakthrough essay.”

“This gives you some idea of the speed with which Salam-and the ICTP-would enter new fields,” Randjbar observes. “He was always fired by an intense enthusiasm towards everything that was new and challenging.”

Unification and speed characterised Salam’s work as a promoter of science in the developing world as well.

Faheem Hussain, a Pakistani who is the coordinator of the ICTP Diploma Course in High Energy Physics, first met Salam at London’s Imperial College, where he began his postgraduate studies in 1963.

“I don’t know whether at the time of his formulation of the Standard Model, Salam felt he was close to the truth,” Hussain recalls. “Salam was always enthusiastic and adventurous in his theories. Some of his ideas, of course, turned out to be great successes. But Salam also had some failures, some of them quite big,” Hussain notes. “This was the mark of the man: to speculate, to go to the edge.”

“Salam was very enthusiastic about supersymmetry and especially about superstrings. When superstring theory really took off with the work of Green and Schwarz in the mid 1980s, he wanted everybody to work on it. I think he felt that superstring theory would lead towards further unification.”

By then, Salam had certainly come a long way. After receiving his Ph.D. in Cambridge, in 1951, Salam had decided to return to Pakistan to work in his native country. But he was soon frustrated by the environment in which he found himself.

Within three years after his arrival, Salam realised that he faced an unwelcome choice between remaining in his native country and pursuing his professional career. He rationalised his decision to return to England by claiming he would be of no use to Pakistan if his work failed to progress because of the obstacles he faced.

“When Salam returned to Pakistan from Cambridge, he found that he simply could not do physics there,” Hussain notes. “There was no structure, no tradition of research and no one to

talk to.”

As Hussain also observes, there’s no doubt that Salam remained deeply troubled by his decision to turn his back on his home land. In fact, that very personal decision subsequently prompted Salam to propose the creation of the ICTP. In his mind, such a centre would help other young scientists avoid the difficult choice that he had to make.

Salam’s journey, in fact, eased the way for others who followed in his path. “After I returned to Pakistan in 1968, upon receiving my Ph.D. from Imperial College in London and working as a postdoctoral student at the University of Chicago in the United States, I faced an entirely different situation,” Hussain says.

“Thanks to his example, 10 particle theorists returned together to Pakistan to set up a group. We also received support from the ICTP through its Associateship Programme and Federation Scheme.”

“We were not so isolated and could continue to do research in our home country, although with difficulty because we were not at one of the main centres of research. Periodic visits to the ICTP during my 20 years in Islamabad, before I left again, kept me alive as a physicist.”

“Salam pursued realistic dreams,” Hussain says. “He succeeded in implanting science in some developing countries, but not as much as he or others would have liked.”

“Science, in fact, has flourished in countries like India, where the government has shown the political will to patronise science. There, the ICTP’s help has been crucial. However, science is stagnating in countries like Pakistan, where successive governments have refused to support education and science.”

“I think Salam’s belief that there can be no economic and social development without scientific development remains as valid today as it was 20 years ago. Unless developing countries grasp this fact, they will remain impoverished.”

As a religious man, Salam insisted that the Holy Koran encourages its followers to seek knowledge about nature. But he wrote many times that religious people in Islamic countries often

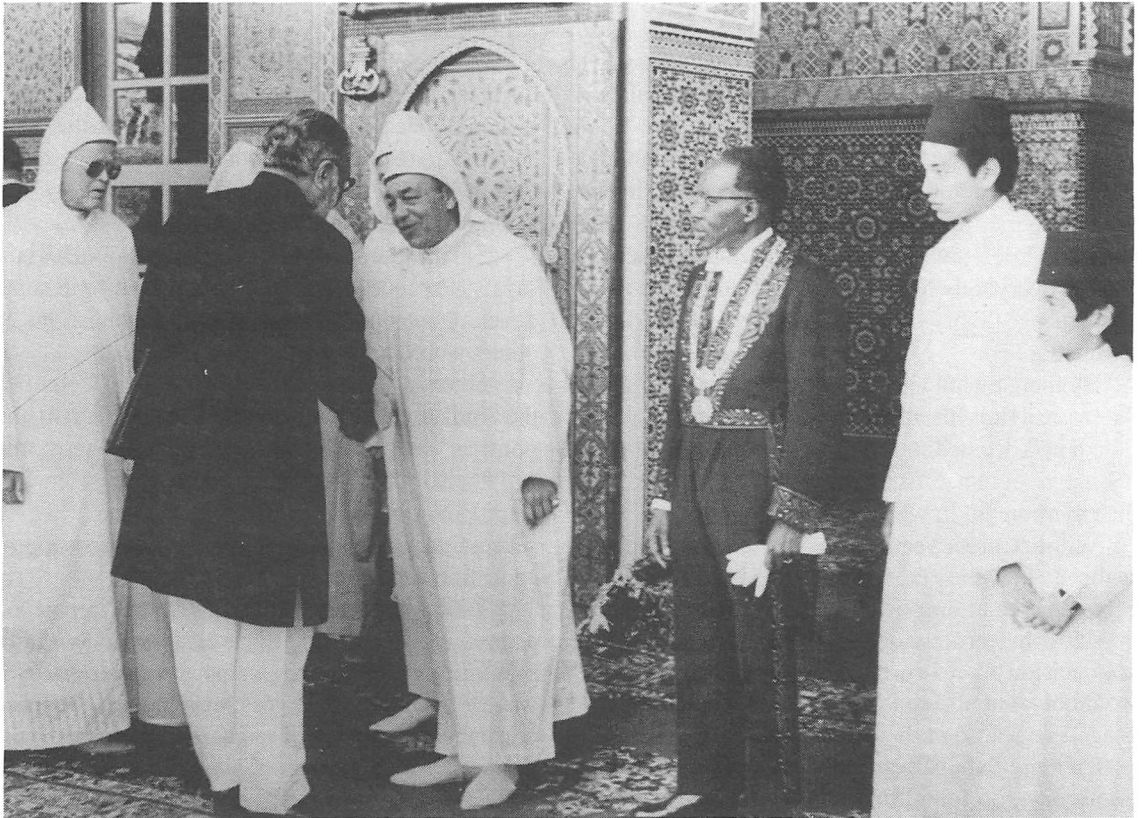
boycott science, despite the magnificent accomplishments of Muslim scientists and philosophers in past centuries.

Hussain concurs that “Science is often ignored by many religious scholars and mullahs in some Islamic countries like Pakistan.” However, he believes the Islamic world is not inherently opposed to science.

“Most people in the Islamic world,” Hussain

says, “adapt to modern science very well and are hungry for knowledge. Except for a misguided minority, who oppose modern science in the name of so-called indigenous non-Western knowledge, most people welcome scientific knowledge and the benefits it brings.”

That, too, is one of the enduring legacies of Salam, another example of his relentless desire for unification.



Dr Salam with King Hassan of Morocco.



# A Glowing Tribute

*M.H.A. Hassan and Hassan Dalafi, Trieste, Italy*

Introduction to the book “Muhammad Abdus Salam: Renaissance of Sciences in Islamic Countries,” Scientific Publishing Co., Pte. Ltd. Editors: MHA Hassan and HR Dalafi.

*“Men like Abdus Salam do not belong to any community or country. Their place is amongst the most brilliant in the world and therefore they belong to the entire humanity. In my opinion, wherever Abdus Salam has the facilities for work he should stay there and Pakistan should help him to stay there. His personal gain or the gain to his family or to his country would be insignificant as compared to the gain to science to which he is devoted and the advancement he makes will benefit all human beings whichever country they may be living in.”*

— “Imagined Worlds” by Paul Anderson and Deborah Cadbury, BBC, 1985.

Truly prophetic! Addressed to Chaudhry Mohammad Hussain, Professor Abdus Salam’s father, in June 1951 by Mian Afzal Husain, Vice-Chancellor of the Punjab University, the words came true not much later. As a physicist, Salam moved “ahead of the wave, embedding half a dozen notions in omnibus papers...” to win the Nobel Prize in 1979, the first (and so far the only) Muslim ever to receive the Prize in sciences. The Prize signified much more than a personal triumph. As the only living developing country national with a Nobel Prize in the sciences, he symbolized the upsurge of scientific inquiry in Third World countries.

Salam won the Nobel prize for his theory of unification. “Until two decades ago,” he explained to a group of academics and the country’s President at the Islamabad University (Pakistan) just after the award, “Physicists believed that there are four fundamental forces of Nature: the gravitational, the electromagnetic and the two nuclear forces, the weak and the strong. Two decades ago, my colleagues and I suggested that there were indications that the weak nuclear force was not really different from electromagnetic and the two could inter-convert, one into the other. We were searching for a unity, in the tradition of

Newton, Maxwell and Einstein and the unified theory was formulated in its final form in 1967, at Imperial College, London, and the International Center for Theoretical Physics at Trieste with which I have the privilege of being associated, and also independently at Harvard... The fact that we were seeking a unity among the seemingly disparate forces of nature, is part of our faith as physicists and of mine as a Muslim. Just eight days back, I was asked to reply on behalf of the physics Prize winners to the Banquet address of His Majesty the King of Sweden in the great and glittering Banqueting Hall of Stockholm. With your indulgence, I shall read out part of what I said, for it bears on this faith in the ultimate unity and symmetry of Nature...

The creation of physics is the shared heritage of all mankind. East and West, North and South have equally participated in it. In the Holy Book of Islam, Allah says:

ما ترى في خلق الرحمن من تفاوت

فارجع البصر هل ترى من فطور

ثم ارجع البصر كرتين

ينقلب اليك البصر خاسئا وهو حسير

“Thou seest not, in the creation of the All-

Merciful any imperfection. Return thy gaze, seest thou any flaw. Then return thy gaze, again and again. Thy gaze comes back to thee dazzled, aweary.” (The Holy Quran, 67:4)

This, in effect, is the faith of all physicists; the deeper we seek, the more is our wonder excited, the more is the dazzlement for our gaze. “I am saying this, not only to remind those here tonight, of this, but also for those in the third World, who feel they have lost out in the pursuit of scientific knowledge, for lack of opportunity and resources.”

This was the first time that the Holy Book was recited in the Banqueting Hall of Stockholm.

Salam’s second achievement – that of providing a rendezvous for developing-country physicist – came earlier in 1964 with the establishment of the International Center for Theoretical Physics in the idyllic surroundings of Trieste, Italy.

These accomplishments on the two fronts – physics and nurturing science in developing countries – have won accolades for Salam. In the words of Professor J. Song, State Councilor and Chairman, State Science and Technology Commission, China, Salam’s “wholehearted devotion to the promotion of science and technology in the Third World countries, first reflected in the founding of the International Center for Theoretical Physics and, more recently, in the initiative of setting up the Third World Academy of Sciences and its affiliated organizations, has won admiration from all over the international scientific community... An internationally renowned scientist who was born in a Third World country, who is dedicating his life to the development of science in the Third World countries, and who has won honor for the Third World, you, of all others, will always be respected as a pioneer in attempting to narrow the gap between the industrialized countries and the developing countries in science and technology.”

Yet, all through the years, Salam has nursed a passion for the rejuvenation of science in the

Islamic World – once a bastion of innovation and creative impulse – as the papers appearing in this volume show. They are based on lectures delivered by Salam in various scientific meetings and fora to review the state of science in the Islamic countries and to suggest measures for its improvement.

The papers convey the simple message: The Muslims have a scientific past in accordance with the commandments of the Holy Book and the prophet of Allah. It is their religious duty to strive for a scientific future.

Salam is intimately familiar with the golden era of Science in Islam and contends that modern science is not a creation only of the Western Judeo-Christian tradition as is often claimed – but that contemporary scientific advances have their roots in innovations and discoveries made earlier in Islamic lands. In making the claim, he is neither argumentative nor contentious but rational and scholarly, quoting extensively from eminent historians and researchers. Thus, we have Briffault testifying, “The Greeks systematized, generalized and theorized, but the patient ways of detailed and prolonged observation and experimental inquiry were altogether alien to the Greek temperament... What we call science arose as a result of new methods of experiment, observation and measurement, which were introduced into Europe by the Arabs. (Modern) science is the most momentous contribution of the Islamic civilization.” These thoughts are reechoed by George Sarton, the great historian of science: “The main, as well as the least obvious, achievement of the Middle Ages was the creation of the experimental spirit and this was primarily due to the Muslims down to the twelfth century.”

Salam quotes Charles Singer who contests the Eurocentrism of Western historians in History of Technology and makes the observation, “Europe, however, is but a small peninsula extending from the great land masses of Afrasia. This is indeed its geographical status and this, until at least the

thirteenth century AD, was generally also its technological status.” In skills and inventiveness during most of the period A.D. 500 to 1500, Singer continues, “the Near East was superior to the West... For nearly all branches of technology, the best products available to the West were those of the Near East... Technologically, the West had little to bring to the East. The technological movement was in the other direction.”

Salam, however, does not confine himself to a study of the Islamic past. He talks of the present and the future and poses the following question to the contemporary Muslims: “The 20th century has been a century of great synthesis in science – the syntheses represented by quantum theory, relativity and unification theories in physics, by the Big Bang idea in cosmology, by the genetic code in biology, by ideas of plate tectonics in geology; likewise in technology the conquest of space and the harnessing of atomic power. Just as in the 16th century when the European man discovered new continents and occupied them, the frontiers of science are being conquered one after another. Do you not feel as passionately as I do that our men in Arab-Islamic lands should also be in the vanguard of making these conquests?”

The exhortation is not an exercise in rhetoric. Salam suggests practical steps for rejuvenating the “Islamic Commonwealth of Science” and gives the blueprint of the establishment of an “Islamic Science Foundation” to “turn the pages of history back and again lead the world in the sciences.” He appears convinced that “it does not need more than a decade of enlightened science policy to bring about a wholesome change. First and foremost, our society – and here, I include our young men and women, their parents, their career-advisers, their teachers and our merchant-princes – must develop a commitment to the scientific enterprise, a commitment like the one which was recently developed in Japan, USSR, India, China and North Korea. This will happen when our ministers and princes undertake generous patronage of sciences, and our industrialist and our agriculture entrepreneurs begin to believe that there is a profit in science and technology – particularly in science

based on high technology.” The renaissance of sciences within an Islamic, an Arab Commonwealth, according to Salam, is contingent upon five cardinal preconditions: “passionate commitment, generous patronage, provision of security, self-governance and internationalization of the scientific enterprise.”

Salam firmly believes that the laws, traditions and modalities of science are universal and deprecates the diversionary slogans of Islamic (“Christian” or “Buddhist” or “Hindu”) science. He contends that “Islamic Science is a slogan with no meaning.” To some, it may mean that Islamic ethics should be applied to science. “But Islamic ethics are universal anyway – care for the environment, lack of specialization, care for wholeness and so on. To call this Islamic science is an absurdity.” He also maintains that science and faith can live in harmonious complementarity.

Elaborating on this point, Salam explains, “Unfortunately, some of us Muslims believe that while technology is basically neutral, and that its excesses can be tempered through an adherence to the moral precepts of Islam, science – on the contrary – is value-loaded. It is believed that modern science must lead to ‘rationalism’, and eventually apostasy; that scientifically trained men among us will ‘deny the metaphysical presuppositions of our culture.’ Leaving aside the fact that high technology cannot flourish without high science and also leaving aside the insult of the ‘presuppositions of our culture’ for implied fragility, I believe that such an attitude towards science is a legacy of the battles of yesterday when the so-called ‘rational philosophers’ with their irrational and dogmatic belief in the cosmological doctrines they had inherited from Aristotle found difficulties in reconciling these with their faith.”

Lamentably, the current state of science in the Islamic world, which embraces almost a fifth of humanity, leaves much to be desired. The minuscule investment in indigenous research and development is indicative of the low priority generally accorded to science.

Citing recent figures, Salam laments the frail base of Science in Islam: “Around 45,000 research

and development scientists within the Islamic world (as given in the Background Paper submitted to the first meeting of the Science Commission of the Organization of Islamic Conference during May 1983) compared to one-and-a-half million in the USSR and four hundred thousand in Japan... an analysis of these and similar figures reveals that as far as physics is concerned, the Islamic community is around one-tenth in size and one-hundredth in scientific creativity in research publication compared to international norms." Salam quotes Francis Giles writing in Nature. "Some of the Islamic states are busy fighting wars which cost billions of dollars – no doubt they have little time for science. Trade structures are dominated by imported technology and most countries have economic and scientific systems geared to imitation rather than originality." Also included in this book is a 1977 memorandum signed by Arab physicist visiting ICTP, addressed to "a few chosen men in high positions of scientific, cultural and educational leadership" to create a fund "for increased participation of Arab scientists in activities at the center and for regional activities, like winter colleges and conferences, organized in collaboration with the center. The latter are particularly important as a prelude to the realization of an independent Arab Physics Center in the future..." Regretfully, the response to the memorandum has been, and still remains, one of complete indifference.

This "zero patronage" of science evokes Salam's deepest anguish. "The Arabs have been building palaces, but no palaces of science." They "will talk of fighting the West, but no one talks of science." What is particularly appalling is that the science communities are not self-governing and are "run by bureaucrats – not scientists" who "frown at internationalism," an attitude typical of most Islamic states. No wonder that of all civilizations on earth, the Islamic – both Arab and non-Arab – is the weakest in science today."

It is painful and agonizing that Salam's sustained strivings for the promotion of science in Islamic countries have remained largely unheeded. His passionate pleas in interviews with the Islamic Heads of State have elicited verbal support but no action. His quest for a twentieth-century Haroun al-Rashid who could put on the mantle of a Patron Saint to nurture science in the Islamic World remains an elusive dream.

Mirroring deep frustration, his recent Faiz Lecture (included elsewhere in this issue) at Lahore, Pakistan, ended on a pessimistic note. Salam cited the example of Sir Syed Ahmad Khan, the great educationist among the Indian Muslims, who showed enterprise and courage in imparting English education to the Muslims. Sir Syed was opposed by the orthodox diehards who loathed English education. Driven to desperation, Sir Syed ultimately had to say: "You may disown me, you may call me an infidel – a kafir – but allow me to educate the nation's youth for the sake of the future just as you allow a non-Muslim mason to build a holy mosque." In the mould of Sir Syed, Salam repeated Sir Syed's plea and suggested that he too would be content with the status of a non-Muslim mason building a holy mosque.

One of Salam's papers begins with Alfred North Whitehead's words: "In the conditions of modern life, the rule is absolute: the race which does not value trained intelligence is doomed... Today we maintain ourselves, tomorrow science will have moved over one more step and there will be no appeal from the judgment which will be pronounced ... on the uneducated."

We end this brief recital of the work of the greatest scientist in Islam since Ibn-ul-Haitham and Ibn Sina with the above words.

8 July 1988, Trieste, Italy

# A Tribute to Abdus Salam

*Dr Andre M. Hamende, ICTP, Trieste, Italy*

As Scientific Information Officer of the International Center for Theoretical Physics for over 25 years, Dr Andre M. Hamende was one of Professor Salam's closest collaborators. (TWAS Newsletter - Vol. 8 No 4)

A great figure of contemporary physics has left us. Abdus Salam passed away on 21 November 1996, at the age of seventy, in his house in Oxford after a long and cruel illness.

His death represents a great loss not only for the great family of physicists from all over the world, but especially for the scientists of the developing countries for whom he is the model par excellence to be emulated by the young generation. He is also the continuation of the lineage of the Saha, Bose and Raman, those great physicists from the orient who contributed to the progress of science in the first half of this century, and the first Muslim scientist honored with the Nobel Prize.

Abdus Salam was an extraordinary personality. His brilliant intelligence, restless energy and boundless generosity fascinated all those who approached him. One of his colleagues, John Ziman, said that he was a man who connects. In fact, in physics, he connected two forces which govern the laws of nature (the electromagnetic and the weak interactions), an important step towards the full unification with the other two (gravitation and strong interactions). Behind this discovery, there is not only intuition for discerning the possibility of uniting such apparently distinct concepts but also boldness for persisting in his quest until the victorious conclusion, despite difficulties and criticism. He displayed the same intelligence and energy in attempting to unite entities of quite different kind, i.e., all the scientists of the world, by creating international institutions (the International Center for Theoretical Physics (ICTP), the Third World Academy of Sciences (TWAS) and the International, Center for Science and High Technology (ICS), all located in Trieste, Italy. which were to favor the promotion of science in the developing countries and the scientific

cooperation between these countries and the industrialized world. He was as successful in this second type of activity as in the first. In this tribute, we shall go through the main phases, and in particular through the initial one which is perhaps not so well known nowadays, of the long journey of Abdus Salam as a man involved in international affairs, a journey which started, as we shall see, from a reflection on a personal experience.

Abdus Salam was foremost a theoretical physicist. After brilliant studies at Cambridge where he met P.A.M. Dirac, a giant of physics of our time, and worked with N. Kemmer and P.T. Matthews, he could have conducted the normal life of a University Professor. But his appointment as professor at the Government College in Lahore, Pakistan, was to radically change the course of his career. It was there that, after having met with the joys of discovery while in England, he was immersed in total isolation. In his College, there was no real interest for theoretical physics. One can easily imagine the feelings which disturbed the young professor in that situation: powerlessness for continuing his research in which he had already obtained important results, frustration because of the danger of drifting to the margins of the international competition in physics where he had already made his mark and a painful sensation of social uselessness in a country for which, like many others, science was not an absolute priority since other more urgent and earthly issues had to be faced. Therefore, he had to decide whether to return to the West to satisfy his passion for research for which he was so highly gifted, or to remain in Lahore where he would have been definitely excluded from scientific competition. The choice was extremely difficult indeed for Abdus Salam, as he was very attached to his country and to his parents of whom he always

spoke with great affection and respect. Eventually, he chose to go back to Cambridge where he had won his PhD but his decision left a deep imprint on his way of thinking. It was certainly at that time that he resolved not only to commit himself entirely to the pursuit of research, but also to find a way so that, after him, none of his fellow physicists in the developing countries would be compelled to make the choice he had been obliged to make himself. This also meant that he would have to convince political authorities in developing countries to recognize, appreciate and encourage the role of science (of physics in particular) within the process of social and economic development.

This is what he did, in fact, with an extraordinary deployment of intelligence, farsightedness and energy as well as a remarkable intuition for perceiving opportunities in circumstances which, at first sight, did not always show any obvious relevance to his design.

One of these circumstances was his participation as scientific secretary in the 1958 United Nations Conference on Peaceful Uses of Atomic Energy in Geneva, Switzerland, where he met Sigvard Eklund, a Swede, who became the Director General of the International Atomic Energy Agency (IAEA) four years later. The IAEA is the organization under whose auspices the first international initiative of Abdus Salam materialized.

In those days, there was a strong movement in the scientific world for cooperation between the East and the West in the field of nuclear energy. It is in this context that the IAEA was created in 1957 in Vienna, Austria. The IAEA is a specialized agency within the family of the United Nations whose target is to encourage and facilitate the peaceful use of nuclear energy in general and the utilization of radioisotopes in medicine and agriculture among its Member States. At the time of its establishment, the IAEA counted a relatively small number of developing countries among its members since the decolonization phase started

after the end of the second World War was not yet completed. Nevertheless, the appearance of the IAEA on the United Nations scene was certainly, as we shall see later on, a trump card in favor of the project of Abdus Salam.

On the other hand and in parallel with the development of nuclear reactors, the particle accelerators required for the investigation of subnuclear matter had become sophisticated and expensive since the invention of the cyclotron, to the point that the experimental particle physicists believed that in the future such machines would have been built by many cooperating nations at a large scale than that which had led to the European accelerator at CERN in Geneva. At the 1960 Rochester Conference, a proposal submitted in that sense did go very far and was received with skepticism. Abdus Salam who was one of the lecturers in that meeting, seized the opportunity to implement his ideas. Theoretical physics is not a costly exercise. Why not create an international center in that discipline rather than an expensive machine? Real possibilities for such a project were definitely more concrete rather those for building an international accelerator.

Abdus Salam's dream was that talented physicists from the developing countries trained in the great research institutions of the West and of the East would never have to choose between returning home and resigning themselves to a professional decline, or leaving their country for good. However, in order to return, these scientists needed, in their home institution, not only the scientific books and journals required to remain informed on the research frontiers but also possibilities of discussions with competent colleagues as well as reasonable working conditions.

There were two issues in this dream. The first was that of the so-called "critical mass" (an expression borrowed from nuclear physics meaning the quantity of nuclear matter required for a fission nuclear reaction to start and sustain itself), i.e., a sufficient number of scientists within

a research group or within a country to maintain the exchange and confrontation of ideas at high level, and that of a propitious environment for research. But to satisfy these necessities, those responsible for science policy had to be persuaded to promote the setting up of viable research groups in theoretical physics or, at least, not discourage them. In those days only a few countries like India for instance which was then led by Pandit Nehru, were prepared in that sense. Abdus Salam was concerned by this aspect of the problem at a very early stage of his career, but it was mainly after he was honored with the Nobel Prize that he was able to devote more time and energy to it.

The second issue was that of setting up a structure where physicists working in developing countries could spend some time refreshing their knowledge, learning about new trends and discussing with experts, and exploit their enhanced capabilities once at home again. It is true that research institutions in the industrialized countries offered such opportunities to scientists trained in their facilities, but these were limited; on the other hand, there were only few theoretical physicists, and they came from a small number of countries such as Argentina, Brazil, India, Iran, Turkey, Egypt, etc.

In Abdus Salam's mind, an international center under the flag of a UN organization would have offered substantial advantages from the point of view of "universality" and access without discrimination of any sort. It is with this background that he presented his subject as Representative of Pakistan at the General Conference of IAEA in September 1960, after having participated in an international seminar on theoretical physics in Trieste, Italy (where he met P. Budinich). The Agency had been created three years before and its *modus operandi* was then not yet entirely fixed and there was still lee-way for flexibility. Among others, the Agency was in a position to provide support in terms of fellowships, dissemination of scientific and technical information, and of scientific meetings related to nuclear energy. But it was to be expected that the Agency might have been hesitant in

accepting the responsibility of running a research center. The proposal came from a young man of 34, well established in scientific circles but not yet well known among diplomats of the General Conference. His own research field was close to the limits of the statutory interests of the Agency. Subnuclear physics (or high energy physics or elementary particle physics as it is called nowadays) was a field already distinct from nuclear physics (nuclear models, nuclear reactions) which, with reactor theory, constituted the basis of techniques used in the applications of nuclear energy and radioisotopes. But Abdus Salam strongly believed in cross-fertilization between nuclear disciplines and, in his mind, the proposed center should have been multi-disciplinary. He resorted to all his talent and power of persuasion to dissipate possible misunderstandings among the delegates. The General Conference resolved to request the Director General of the IAEA to proceed with a feasibility study of Abdus Salam's project. A panel of distinguished physicists met on 21-23 March 1961 and submitted an enthusiastic report recommending the establishment of an international center which would:

- (a) Encourage and assist international contacts and exchange of ideas, especially between the "West" and the "East."
- (b) Help and encourage able theoretical physicists from the newly developing countries to continue and develop their research work, and
- (c) Serve as a "pilot plant" for future international research institutes. The fields to be covered were: theoretical nuclear physics, reactor theory, theoretical high-energy physics, solid state physics, plasma physics and controlled nuclear fusion. It was also decided that the Agency should organize a seminar on theoretical physics in order to better assess the possibilities of success of the project. This was the first victory for Abdus Salam; but other battles were to follow.

The city of Trieste, in the person of Paolo Budinich, was another favorable element for the

materialization of Abdus Salam's ideas. P. Budinich, Professor of theoretical Physics at the University of Trieste, immediately contacted Abdus Salam. He also dreamt of scientific cooperation, mainly on regional level with institutions from Italy, Austria, Yugoslavia, Czechoslovakia and other Eastern European countries. Trieste was then very close to the so-called "iron curtain" which divided Europe into two opposing blocks for more than 40 years. A group of politicians, administrators and academics soon realized the importance of Budinich's ideas in terms of international prestige that this would bring to a city which had been cut off from its natural hinterland after the second world war. The ideas of Abdus Salam and P. Budinich converged and eventually merged into one single project. A fruitful friendship and collaboration was born and was to last for ever.

The international seminar on theoretical physics organized by the IAEA was held from 16 July to 25 August 1962, in an outbuilding of the Castle of Miramare, the former residence of Maximilian of Austria when Trieste was part of the Austria-Hungarian Empire. Thanks to the efforts of P. Budinich, Trieste had indeed been chosen as the venue for the meeting. The seminar turned out to be an exceptional success, not only for its content, but also for the quality of its participants. Abdus Salam was then 36 years old. He directed the meeting with great talent and authority. Among others, the faculty of lecturers included E. Wigner and J. Schwinger who won the Nobel Prize later on, and T. Regge and S. Fubini, two Italian physicists already renowned in those days. The city and the University of Trieste as well as the IAEA did their very best to ensure the success of the seminar. Director General, S. Elkind, and high-ranking IAEA officials attended to obtain first-hand knowledge of the experiment. At the conclusion of the seminar, the participants declared their enthusiastic interest for an international center for theoretical physics under the aegis of the IAEA. The following General

Conference of the Agency took note of this recommendation and requested the Director General to undertake a detailed feasibility study. Another battle was won.

The study was carried out by L. van Hove (CERN), R. Marshak (USA) and J. Tiomno (Brazil) in April 1963. In addition to institutional and organizational matters, the report of these distinguished scientists included a draft for a four-year program. Also on this occasion, Abdus Salam could count on the unselfish support of eminent friends.

At last came the question of the location of the intentional center. The offer from the Government of Italy was accepted and Trieste was chosen as the location of the future ICTP.

Among other possibilities, Vienna (Austria) and Copenhagen (Denmark) presented advantages from the point of view of scientific tradition, but the offer of Italy was by far the most comprehensive and generous one.

Since the beginning in July 1964, Abdus Salam was in Trieste as Director of ICTP, which was to be officially inaugurated three months later on the occasion of the opening of a seminar on plasma physics. He was faced with many problems, but he was very ably assisted by P. Budinich, who had been appointed as Deputy Director. Everything has to be organized. For the majority of the administrative staff, the jobs were entirely new. Some were seconded from the IAEA or from the Italian government, while many others were beginners. Abdus Salam inspired respect and the atmosphere was extremely stimulating. A group of young physicists worked very hard with Salam, while two outstanding theoreticians, C. Fronsdal (Norway) and A.O. Barut (Turkey), both professors in American Universities, took care of other scientists from developing countries and Eastern Europe. The Center, which was then hosted in provincial premises in town, immediately produced first class scientific results in high energy physics and in plasma physics. Noteworthy for the time of the "cold war" was the



presence at the ICTP of a group of physicists from the USSR and from the West who worked together under the leadership of M.N. Rosenbluth (USA), R. Sagdeev (USSR) and C. Oberman (USA) for nearly two years.

The scientific reputation of ICTP was firmly established in a short time and acknowledged by the cream of the theoretical physicists including J. Openheimer. The instruments for limiting the "brain drain" were set up from the very beginning. The first was the program of associates, which consisted in enabling good physicists from, and working in, developing countries to spend up to three months each year at the Center, on the condition that they would return home after their stay at Trieste. While at the ICTP, the associates were expected to accumulate enough information to enable them to continue their work in their home institutions. The first associates were physicists already well established in their profession, and they were not very many. The duration of the contract was three years. But the number of the candidates grew more rapidly than the financial resources, and it was decided to extend the duration of the contract to six years with three visits lasting from six to twelve weeks, and to also accept younger scientists. This program is still active today, and has helped many scientists from developing countries to secure a brilliant career. The successor of Abdus Salam as Director of the ICTP, Professor Miguel Virasoro, for instance, is a former associate! In addition, the Federated Institutes program was created, to allow young scientists from Eastern Europe and developing countries to participate in the activities of the Center. Under this program, agreements are signed with selected research institutions in these countries, which stipulate the total number of days that one or more scientists may spend at the Center, from 40 to 120 days, depending on the geographical distance between the institution and the ICTP.

Abdus Salam had won his battle and set the base for future development. He had created a center of excellence where scientists from the developing countries could, in various capacities, periodically

update their knowledge and continue to work for the rest of their time at home where they could improve the quality of their research and that of their colleagues, and of their teaching. The viability of such an original Center was widely acknowledged.

In the following period, after the Center had moved to its permanent premises in 1968, Abdus Salam devoted part of his time the consolidation of his brainchild and to its adaptation to new necessities and requirements. One of these was the diversification of the scientific disciplines dealt with at the ICTP. In addition to low and high energy physics and plasma physics, the following branches were introduced: Condensed matter physics (as early as 1967), mathematics (1971), atomic and molecular physics including lasers (1973), physics of the oceans and atmosphere (1975), physics of the living state, physics of the solid earth, physics of energy, computer sciences and others. This development brought a gradual change in the general atmosphere of the Center, since the activities in the new disciplines consisted in high-level courses rather than pure research in these subjects. The courses had a duration of three to six weeks and their number grew regularly. They were instituted because the greater part of the above subjects were not taught in the majority of the developing countries. The lecturers were always chosen from among the leading experts in the world, and the participants had plenty of opportunities to discuss research projects with them. There are certainly similar courses in other places, but in Trieste, they are characterized by the extensive participation of scientists from developing countries.

During this time, however, Abdus Salam did not neglect his own research, and in 1979, the Nobel Prize was conferred to him, S. Glashow and S. Weinberg. The Prize caused an explosion of joy at the Center and in the developing world, and gave Salam new opportunities to extend his field of action. He took advantage of his official visits to heads of states and heads of governments as well as to academic authorities to plead for the role of science and scientists in the progress of prosperity

and peace. He was invited to Pakistan, India, Bangladesh, Turkey, Morocco, Nigeria and many other countries. Before and after the Prize, he presided and was member of many prestigious committees of the United Nations, UNESCO and the United Nations University, where he never forgot to present and defend his ideals.

A happy consequence of the Nobel Prize was the substantial increase in the financial resources made available from the Italian Government to the ICTP, and activities initially started on a small scale were given a firm basis. One of these is the office External Activities which supports courses, conferences and other scientific meetings in developing countries. These meetings are organized by local scientists in collaboration with the ICTP, and are normally financed on a fifty-fifty basis. The program of research fellowships in Italian laboratories is another of these activities. It offers training opportunities to experimentalists from developing countries in a vast range of scientific and technological areas in about three hundred academic and industrial laboratories scattered all over Italy. In this phase of expansion, one must also mention: the creation of laboratories for microprocessors, optical physics, radio wave propagation in the atmosphere and physics of the solid earth; the complete computerization at the scientific and administrative levels of ICTP; the consolidation of the permanent research groups in high energy and condensed matter physics and in mathematics as well as the setting up of a one-year diploma course in the same field for the benefit of young scientists from the poorest developing countries.

Nowadays, and every year, the ICTP welcomes 4000 scientists, three quarters of which come from developing countries. It counts 428 associates and 246 Federated Institutes. It produces 400 scientific preprints. Some 40 scientific meetings are held in Trieste, while 60 meetings are supported in the developing countries; 70 fellowships in Italian Laboratories are granted.

In thirty years, the ICTP has gone through a

spectacular revolution: from a restricted group of sciences related to nuclear energy to mathematics, computer sciences and all other fields of physics, from pure theory to experimental sciences, from in situ activities to extramural programs and from 400 scientific visitors a year to 4000.

The ICTP is by itself a unique achievement but it is not the only one. In 1983, Abdus Salam founded the Third World Academy of Sciences (TWAS), a body uniting eminent sciences from the developing countries in all disciplines. The Academy counts over 400 fellows and runs several programs aiming, among others, at promoting scientific collaboration between the countries of the South. In 1988, he founded the International Center for Sciences and High Technology (ICS), which, in his mind, should have been the alter ego of the ICTP in the domain of technology. Strangely enough for a man involved in one of the most sophisticated branches of knowledge, Abdus Salam was very much aware of the concrete problems of poverty in the Third World. He, of course, knew very well that the wealth of nations is closely linked to the mastery of science and technology. In the latter, he made a distinction between low technology, which was needed for survival only, and high technology, the source of prosperity and welfare. He was aware of the cost of the conventional technology transfer from the West to the South and, therefore, he constantly insisted that the developing countries should build up their own capacity of creating new technologies and for adapting or properly using imported technologies. For that purpose, these countries need a class of well-trained scientists and technologists who will work shoulder to shoulder in well-equipped facilities. This is why Abdus Salam increasingly encouraged authorities to strengthen research in specialized institutions (several years ago, he proposed the establishment of twenty centers of excellence for science, technology and environment) and the quality of science teaching in the universities as well as in the secondary education system.

# Third World Academy of Sciences Loses Its Founder and Honorary President

*Mohammed H.A. Hassan, Executive Director, Third World Academy of Sciences*

On 21 November 1996, a few days before the eighth general meeting of TWAS was scheduled in Trieste, the founder, former president and honorary president of TWAS, Professor Abdus Salam passed away in Oxford after a long illness. The news was received with shock, great sadness and regret by TWAS and TWNSO (Third World Network of Scientific Organizations). The TWAS eighth general meeting was held as a tribute to his memory.

Professor Salam could have devoted all his time to creative intellectual research in which he attained the highest distinctions and became one of the greatest scientists of this century. Instead, he devoted a great deal of his time in pursuing, with equal vigor, his other passion: the promotion of science and technology in the developing world. It was that intense passion which made him establish the International Center for Theoretical Physics (ICTP) in 1964, and prompted him to create the Third World Academy of Sciences (TWAS) 20 years later.

This idea of mobilizing the scientific leadership in the Third World under an academy of scientific excellence was first mooted by Professor Salam in October 1981, when he was attending the annual general meeting of the Pontifical Academy of Sciences. He discussed the idea over lunch with nine distinguished scientists from developing countries. As a result, a memorandum was drawn up in support of the initiative and Professor Salam was requested to take up the challenging task of following it through.

The Academy was subsequently founded in November 1983 in Trieste by Professor Salam, and a group of forty world-class scientists from developing countries, including the nine Nobel

Laureates in science of Third world origin. Professor Salam was unanimously elected first president of the Academy by the founding members.

From the very beginning, Salam was very clear about the mission and the objectives of TWAS. He wanted the Academy to focus on four major issues. First and foremost, it should identify, recognize and support scientific excellence in all Third World countries. Secondly, it must support young and talented scientists, particularly those from poor countries, by providing them with the research facilities they need to advance their work. Thirdly, the Academy should promote South-South cooperation between individuals and centers of scholarships. And fourthly, it should encourage and facilitate the involvement of leading scientists world-wide in the complex problems confronting Third World development.

Immediately after successfully founding TWAS, Salam embarked on the very difficult task of searching for funds to fulfil the objectives of the Academy. The Canadian International Development agency (CIDA) was the first funding organization to see the real benefits of TWAS, and they provided it with a small grant to support the setting up of the secretariat. The real breakthrough in funding only happened, however, after Salam finally convinced the Italian Government to provide a US\$ 1.5 million grant to TWAS which was announced by the Italian Minister of Foreign Affairs on the occasion of his first visit to the ICTP in 1984. Salam immediately decided to convene a major conference in Trieste on South-South and South-North cooperation to inaugurate the Academy. At the invitation of Professor Salam, the General secretary of the United Nations attended

the conference in July 1985 and officially launched the Academy.

With the powerful and visionary leadership of Professor Salam and the generous financial support of the Italian government, TWAS rapidly acquired, through its membership and programs, international prestige and reputation of very high level. It has already made a significant contribution to the promotion of science and technology in the Third World and has given new hope to Third World scientists. Those who doubted its usefulness before it was launched are now seeking its advise and collaboration in all issues related to science and technology in the Third World.

This would never have been achieved without Professor Salam's remarkable vision and diligent leadership. When he realized that the poor state of his health was making it difficult for him to play an active role in the leadership of the Academy, he wrote a letter to TWAS members on 15 June 1994, announcing his retirement. The letter was received with great regret by the members, and most of them wrote back expressing their feelings.

Prof. F. Mayor, UNESCO's Director-General, wrote:

... I should like to say once again how instrumental your outstanding leadership has been in enabling TWAS to achieve such renown in so short a time span and to attain its present level of activity. I am confident that the good effects of your leadership will be felt for many years to come and that it will be a major factor in ensuring the continued success of the Academy...

Prof. J.I. Vargas of Brazil, who succeeded professor Salam as TWAS President, wrote:

... Undoubtedly the existence of the Third World Academy of sciences, created under your inspiration, was consolidated due to your ever present personal efforts, distinguished leadership and permanent kindness. Besides your fundamental contribution to science. You have also demonstrated an outstanding talent for management which made the existence of the

Academy possible...

Prof. T.R. Odhiambo of Kenya, TWAS Vice-President, wrote:

... As a crowning achievement of your professional life, you have built up the Academy from scratch, and put it into a position so that it has become a beacon of scientific light in the countries of the South – within a matter of a decade. It is a monumental achievement – and it, indeed, is a monument to you, amongst other monuments you have constructed over the years...

But for Salam, the success of TWAS in organizing and assisting the scientific communities of the South, was only an essential prerequisite to his untiring efforts to assist in uplifting Third World science to a status that would enable it to contribute effectively to economic development. He also strongly believed that resolving the global environmental and developmental problems facing the world today would require the involvement of well organized and strong scientific communities in the South. Underlying all Professor Salam's efforts was his deep conviction that only through science-led development can the Third World overcome hunger, poverty, disease and further marginalization. In the abstract of his book entitled "Science, Technology and science education in the Development of the South," he wrote:

This globe of ours is inhabited by two distinct species of humans. According to the UNDP count of 1983, one quarter of mankind, some 1.1 billion people, are developed. They inhabit 2/5ths of land area of the earth and control 80% of the world's natural resources, while 3.6 billion developing humans – "Les Miserables," the "mustazeffin" (the deprived ones) – live on the remaining 3/5ths of the globe.

What distinguishes one species of human from the others is the ambition, the power, the álan which basically stems from their differing mastery and

utilization of present day Science and Technology. It is a political decision on the part of those (principally from the South) who decide on the destiny of developing humanity if they will take steps to let Les Miserables create, master and utilize modern Science and Technology.

A political decision by the leaders in the South to support science and technology was what Professor Salam considered most essential. In 1987 he launched an intensive campaign aimed at convincing the political leadership in the South to take appropriate decisions to develop science and technology by utilizing their own resources. His immense prestige in the developing world, his enthusiasm and convincing power, his charm and humility, won him the admiration and respect of every head of state or government he visited, many of whom agreed with him and promised to allocate more funds to S&T (Science and Technology). Salam's message was clear. He wanted every country in the South to spend a minimum of 1% of its GNP on research and development. He frequently argued that whereas the industrialized world invests about 2.5% of GNP in R&D (Research and Development), the developing world spends only 0.25% of their GNP on average. The two worlds, however, spend equal proportions of their GNP on the military (about 4.5%).

Salam's strong conviction that the poor status of science and technology in the Third World can only be improved substantially by the countries themselves, prompted him to establish, in 1988, a network uniting ministries of science and technology, national research councils and science academies in the South. This ingenious initiative by Salam enabled TWAS to have strong and effective political arm in the South, and to address broad issues concerning science policy and government expenditure on S&T.

But uniting the scientific leadership in the South under TWAS and the ministries of science and technology, academies and research councils under the Third World Network of Scientific Organizations (TWNISO) was not so difficult for

Salam to accomplish. The hardest nut that he wanted to crack shortly before he became ill was to involve economists and planners. In 1989, Salam was invited to become a member of the South Commission setup by G-77 under the chairmanship the former President of Tanzania, Dr. J. Nyerere. Professor Salam was the only natural scientist in the commission. The other members were very high-level economists, planners and social scientists, Salam fought very hard to get science and technology included in almost every chapter of the celebrated Commission's report. In his message of condolences, President Nyerere wrote:

... Abdus Salam was a very special human being, who combined a commitment to pushing forward the frontiers of Science with a deep sense of responsibility to the countries and the people of the developing countries. The South Commission Report would have been very different — and much less useful — without his contributions to the many discussions held and his constant reiteration of the importance of promoting the development of Science and Technology within developing countries...

In 1990, Salam became fascinated by the CGIAR network of about 16 international centers in agriculture sciences located in different countries in the South, and supported by the World Bank and a group of international funding organizations with an annual amount of about US\$ 300 million. He developed a project to set up a similar network of 20 international centers of excellence in various fields of S&T modelled on the International Center for the Theoretical Physics in Trieste in 1964. In 1991, he visited the World Bank where he tried to "sell" his 20 centers project to the hard-line economists who, with their short-term view of development, were hardly sympathetic to Professor Salam's long-term vision of science-led development. He was advised, however, by his friend Moeen Qureshi, senior Vice-President of the World Bank at that time, that he should seek the support of the heads of governments in the South for the project. That prompted Salam to establish his last monument, "a

commission of heads of state or government in the South” to support his project. The Commission was formed in 1992/93, and 19 heads of state or government agreed to join it. Professor Salam invited the Prime Minister of Pakistan (his own country), to chair the Commission and to organize its first meeting. The meeting was successfully held in 1994, but unfortunately, Professor Salam was not well enough to travel to Islamabad to attend it. The meeting, however, paid a very special tribute to him and to what he had done for the Third World. The meeting endorsed Professor Salam’s project of 20 centers and agreed to establish the Commission’s headquarters in Islamabad, with an endowment of US\$ 1 million donated by the government of Pakistan.

With the passing away of Professor Salam the world lost its most powerful and illustrious advocate of the promotion of science and technology among its poorer nations, and the most effective supporter of North-South cooperation in sciences.

He will be sadly missed by TWAS and TWNSO members and he will always be remembered by them for his immense contribution

to the formation, leadership and success of the two organizations.

The greatest tribute that we can pay to his memory is to strive with great virility to ensure that his dream of establishing a more equitable world through science-based development paradigms will be fulfilled.

Salam was a great believer in the international ideal of Family of Man, and he sometimes ended his speeches by quoting the 17th century mystic, John Donne, who wrote:

“No man is an island entire of itself;  
every man is a piece of the continent, a part of the  
main;  
if a clod be washed away by the sea, Europe is the  
less,  
as well as if a promontory were, as well as if a  
manor of thy friends or thine own were;  
Any man’s death diminishes me, because I am  
involved in mankind;  
and therefore never send to know for whom the  
bell tolls; it tolls for thee.”

(Courtesy: TWAS Newsletter, Vol. 8 No. 4,  
October-December 1996)



A View of Dr Salam’s Funeral Prayer at Rabwah, Pakistan

# Servant Of Peace, Abdus Salam (1926-96)

After being unable to communicate for the past three years by a crippling disease Abdus Salam, world physicist and Nobel laureate, died on 20 November in Oxford.

In September 1956 a bespectacled 30 year old Pakistani physicist was returning to Cambridge, UK, from a physics meeting in Seattle. Instead of taking a scheduled flight, Abdus Salam boarded a US Air Force plane destined for a USAF base in England. In those days the US Air Force generously supported scientific research in European universities and this support enabled physicists wishing to attend physics meetings in the US to take advantage of special flights for US servicemen and their families.

Although the European scientists were glad of the opportunity of cheap transatlantic travel, these flights were notoriously inconvenient and uncomfortable. Check-in meant traveling to a remote air base. Instead of tickets, there were flying orders, multiple copies of which had to be successively surrendered at various stages of the journey. The planes were propeller-driven and laboriously slow, some fifteen hours to cross the Atlantic. The flights were frequently full of families with young children, noisy and excited about the prospect of moving from one country to another. The overnight west-east trip was particularly uncomfortable. But the European physicists appreciated this generous travel opportunity.

At the Seattle physics meeting, Salam had listened to Frank Yang explain his and Lee's ideas about weak interactions breaking mirror symmetry. Mrs Wu & Co. had not yet embarked

on their historic experiment, but Salam, receptive to innovative ideas, was prepared to believe what Lee and Yang were suggesting. As the US Air Force flight droned eastwards through the night, Salam's mind locked onto the problem. What could be special about the weak force to make it mirror sensitive?

Just a few months before the Seattle physics meeting, Fred Reines and Clyde Cowan had sent a telegram to Pauli in Zurich – “We are happy to inform you that we have definitely detected neutrinos...” After 25 years, Pauli's prediction, a bizarre particle which hardly reacted at all, had been confirmed, and the Seattle meeting had heard the implications of this physics.

Thus, neutrinos as well as broken mirror symmetry, were very much on Salam's mind that airborne September night in 1956. ‘I could not sleep,’ recalled Salam. ‘I kept reflecting why Nature should violate left-right symmetry in weak interactions. Now the hallmark of most weak interactions was Pauli's neutrino. While crossing the Atlantic, there came back to me a deeply perceptive question about the neutrino which Rudolf Peierls had asked me at my Ph.D. examination a few years before – *Why is the neutrino's mass zero?*’ (Peierls later admitted that he did not know the answer to that question himself, but knowing Salam's reputation, he was interested in the reaction it would receive.)

In Arabic, Abdus-Salam means ‘servant of peace.’ In 1949, the young servant had arrived at Cambridge as an aspiring research student. However, coming directly from Pakistan, he had little knowledge of the new quantum

electrodynamics. Assimilating these ideas in record time, he went on to apply them to other particles. With several landmark papers to his name and with a future in physics assured, in 1951 Salam nevertheless chose to return to Pakistan to become, at the age of 25, Professor at the College and University of Punjab, Lahore. Despite the local prestige of this new position, Salam found himself cut off from the excitement and continual stimulation of modern research. He realized this excitement was his lifeblood, and in 1954 left his native land to return to Cambridge, this time as a lecturer. Salam was only to stay at Cambridge for two years, but it was to there that he was returning from Seattle in 1956.

During that comfortless night in the air, Salam finally realized the answer to Peierl's trick question. In his cramped seat, Salam wrote down a prototype neutrino equation using standard Dirac formalism. Dropping the mass term, he immediately saw that the remaining Dirac algebra could act like a switch – the neutrino could spin only one way but not the other. Salam realized that a zero-mass neutrino could be a minuscule corkscrew, drilling its way through space at the speed of light. Traveling at this speed, no other particle could overtake it, so there is no other vantage point of view to the neutrino's spin. It would always appear to point the same way. A conventional right-handed corkscrew looks left-handed when reflected in a mirror, so a neutrino reflected in a mirror would no longer look like a neutrino – it would instead look like an antineutrino. Salam had realized that the neutrino, Pauli's ghost particle, was the culprit which broke the mirror of weak interactions.

The following morning, an elated Salam bustled off the plane and rushed as fast as he could to his Cambridge office, where he frantically calculated a few consequences of his new theory. Even more elated by the way everything seemed to be working out, he rushed onto a train to Birmingham, where Peierls lived, to say he now

had the answer to the trick question posed a few years before.

Peierls' reply was typically kind but firm. 'I do not believe left-right symmetry is violated in weak nuclear forces at all.' With Mrs Wu & Co. still assembling their epic experiment at Columbia University, Salam had knocked too early on Peierls' door. But the young Pakistani was insistent, and gave his neutrino paper to a physicist who was going to visit Pauli in Zurich. The reply soon came: 'Give my regards to my friend Salam and tell him to think of something better.' Quashed, Salam hesitated before submitting his massless neutrinos idea for publication. Four months later, on 24 January 1957, Pauli wrote again to Salam. Mrs. Wu & Co's result on the left-right asymmetry in cobalt decay had been published, and independent measurements had come in from Lederman and from Telegdi. Pauli changed his mind and Salam's ideas had been vindicated. Meanwhile, Lee and Yang in the United States and Lev Landau in Russia had arrived at a similar conclusion about the neutrino and its mirror reflection.

Soon after formulating his neutrinos theory, at the tender age of 31, Salam became Professor of Theoretical Physics at London's prestigious Imperial College of Science and Technology. With Salam's drive and ambition, Imperial soon became one of the world's leading centers in field theory.

As a researcher, Salam was always where the action was. Not for him the isolation of a research retreat. Seeing how physics was developing, Salam pushed Imperial theorists towards the problems of symmetry in particle classifications, and graduate student Yuval Ne'eman, at Salam's suggestion, explored the implications of group theory in particle physics, going on to arrive at parallel conclusions to those of Murray Gell-Mann's *eightfold way*. Later, with Bob Delbourgo and John Strathdee, Salam explored how these internal particle symmetries could be welded with those of space-time.



The pinnacle of Salam's physics career came in 1979 when he shared the Nobel Physics Prize with Sheldon Glashow and Steven Weinberg for their unification of electromagnetism and the weak nuclear force in the 'electroweak' theory, a word invented by Salam in 1978. This unification was the outcome of an effort which had begun with Fermi but for Salam had commenced with a 1958 paper with John Ward and which went on to make Imperial College a focus for the study and applications of spontaneous symmetry breaking. In 1961-62, Weinberg and Salam, collaborating at long range with Jeffrey Goldstone, confirmed the prediction that massless *Goldstone bosons* necessarily accompanied conventional spontaneous symmetry breaking. A few years later, it was realized that these bosons do not apply to gauge theories, and a new route was discovered, a route now known as the Higgs mechanism, which led in 1967 to the electroweak unification.

As well as his physics research, Salam worked tirelessly to further the cause of science in developing countries. Remembering vividly his own isolation when he had returned to his home country, in 1964 he founded the International Center for Theoretical Physics in Trieste, Italy, now a world-class research establishment, where promising young scientists from all over the world get a taste of front-line research early in their careers.

Salam's deceptively soft, husky voice masked an iron will and ruthless ambition. He could be arrogant, but also used argument as an intellectual weapon to pry open a difficult problem or seek new ideas. A consummate international, he was equally at home with P.G. Wodehouse or the Koran.

Despite being the only Pakistani to have won a Nobel Prize, and despite his impressive international achievements, Salam's position in his home country was ambivalent. Under the powerful rule of Ayub Khan, Salam once wielded considerable influence. However, as a member of the minority Ahmedi Islamic sect, he resigned his influential position as chief scientific adviser in

1974 when Pakistan's National Assembly under Zulfikar Ali Bhutto excommunicated the Ahmedis from Islam. The Ahmedis claim that Mirza Ahmed, born in Qadian in northern India in the late 19th century, was the Mahdi, or Messiah, a view which is sacrilege to conventional Islam. Mainly confined to Pakistan, India and East Africa, the small Ahmedi sect is a frequent target of intolerance and discrimination, both from the religious orthodoxy and the mass of people. In 1979, after the announcement of his Nobel award, Salam was initially invited to Pakistan by General Zia-ul-Haq, but other pressures soon blew an icy wind of excommunication.

With Salam stricken by illness, at Trieste, it became clear he could not function much longer as the Institute's Director. As a tribute to its founder, which he would still be able to appreciate before his powers waned completely, in 1993, the Centre organized a three-day physics meeting which was attended by colleagues, admirers and former students from all over the world. One was Frank Yang, whose talk on mirror symmetry in 1956 had so much impressed the young Salam.

The culmination of the meeting was the award of an honorary degree of the University of St Petersburg, Russia. The rector of the University made the trip specially. Salam listened from his wheelchair but could not speak. After the formal ceremony, participants stood patiently in line to offer their own congratulations. There was little response from Salam, but all hoped their message was getting across.

After famous names, it was the turn of younger students. One of the last was a nervous young man from Pakistan, a young researcher who had succeeded in gaining one of the highly-prized scholarships to Salam's Centre. As he bent towards Salam hunched in his wheelchair, he said, "Sir, I am a student from Pakistan. We are very proud of you." Salam's shoulders shook and tears ran down his face.

Source: CERN Courier,  
January/February 1997)

# A Tribute to Abdus Salam

*M. J. Duff, Center for Theoretical Physics, Texas A&M University, College Station, TX 77843-4242*

*Some personal reminiscences by a former graduate student of the life and works of Abdus Salam.*

*(Excerpts from an after-dinner talk delivered at the Workshop on Frontiers in Field Theory, Quantum Gravity and String Theory, Puri, India, 12-21 December 1996.)*

When all else fails, you can always tell the truth. Abdus Salam

The death earlier this month of Abdus Salam was a great loss not only to his family and to the physics community, it was a loss to all mankind. For he was not only one of the finest physicists of the twentieth century, having unified two of the four fundamental forces in Nature, but he also dedicated his life to the betterment of science and education in the Third World and to the cause of world peace. Although he won the Nobel Prize for physics, a Nobel Peace Prize would have been entirely appropriate.

Salam was born in Jhang in what is now Pakistan in 1926 and came from what he himself described as humble beginnings. In fact, "I am a humble man" was something of a catchphrase for Salam and used whenever anyone tried to make physics explanations more complicated than necessary. He attended the Government College in Lahore and Punjab University before setting off for England and St John's College, Cambridge, in 1946, where he gained a double first in Physics and Mathematics. He gained his PhD at the Cavendish Laboratory in 1952. He returned to Lahore for a couple of years but was appointed lecturer at Cambridge in 1954. Undoubtedly, the greatest influence on Salam at these early stages of his career was his mentor at St John's, the great Paul Dirac, who remained Salam's hero throughout his life both as a great physicist and as a man who was largely disinterested in material wealth. (Salam himself never craved material riches, and was known to have paid for poor Third World

students and postdocs out of his wn pocket.)

At the behest of Patrick Blackett, Salam moved to Imperial College, London, in 1957 where he founded the Theoretical Physics Group. He was elected to a Fellowship of the Royal Society in 1959. He remained at Imperial as Professor of Physics for the rest of his career and it was there that I was fortunate enough to be his PhD student from 1969 to 1972. In 1964 he established the International Center for Theoretical Physics (ICTP) in Trieste, Italy, where he remained until recently as its Director.

Among Salam's earlier achievements was the role played by renormalization in quantum field theory when, in particular, he amazed his Cambridge contemporaries with the resolution of the notoriously thorny problem of overlapping divergences. His brilliance then burst on the scene once more when he proposed the famous hypothesis that *All neutrinos are left-handed*, a hypothesis which inevitably called for a violation of parity in the weak interactions. He was always fond of recalling his visit to the formidable Wolfgang Pauli where he submitted (or should I say "humbly" submitted) his two-component neutrino idea. Pauli sent him packing unceremoniously with the jibe that this young man does not realize the sanctity of parity! So Salam delayed publication until after Lee and Yang had conferred the mantle of respectability on parity violation. That taught Salam a valuable lesson and he would constantly advise his students never to

listen to grand old men. (I hope this student, at least, has lived up to that advice!). It also taught him to adopt a policy of publish or perish, and his scientific output was prodigious with over 300 publications.

Of course, the work that won him the 1979 Nobel Prize that he shared with Glashow and Weinberg was for the electroweak unification which combined several of his abiding interests: renormalizability, non-abelian gauge theories and chirality. His earlier work in 1960 with Goldstone and Weinberg on spontaneous symmetry breaking and his work with John Ward in the mid 1960s on the weak interactions was no doubt also influential. One of my greatest regrets is that as a student in the Theory Group at Imperial from 1969 to 1972, a group that included not only Abdus Salam but also Tom Kibble, no-one suggested that weak interaction physics would be an interesting topic of research. In fact I did not learn about spontaneous symmetry breaking until after I got my PhD! The reason, of course, is that neither Weinberg nor Salam (nor anybody else) fully realized the importance of their model until 'tHooft proved its renormalizability in 1972 and until the discovery of neutral currents at CERN. Indeed, the Nobel Committee was uncharacteristically prescient in awarding the Prize to Glashow, Weinberg and Salam in 1979 because the W and Z bosons were not discovered experimentally at CERN until 1982. Together with Pati, Salam went on to propose that the strong nuclear force might also be included in this unification. Among the predictions of this *Grand Unified Theory* are magnetic monopoles and proton decay: phenomena which are still under intense theoretical and experimental investigation. More recently, it was Salam, together with his lifelong collaborator John Strathdee who first proposed the idea of superspace, a space with both commuting and anticommuting coordinates, which underlies all of present day research on supersymmetry.

However, it is to Abdus Salam that I owe a tremendous debt as the man who first kindled my interest in the Quantum Theory of Gravity: a

subject which at the time was pursued only by mad dogs and Englishmen. (My thesis title: *Problems in the Classical and Quantum Theories of Gravitation* was greeted with hoots of derision when I announced it at the Cargese Summer School en route to my first postdoc in Trieste. The work originated with a bet between Abdus Salam and Hermann Bondi about whether you could generate the Schwarzschild solution using Feynman diagrams. You can (and I did) but I never found out if Bondi ever paid up.) It was inevitable that Salam would not rest until the fourth and most enigmatic force of gravity was unified with the other three. Such a unification was always Einstein's dream and it remains the most challenging tasks of modern theoretical physics and one which attracts the most able and active researchers, such as those here tonight.

I should mention that being a student of someone so bursting with new ideas as Salam was something of a mixed blessing: he would allocate a research problem and then disappear on his travels for weeks at a time (consequently, it was to Chris Isham that I would turn for practical help with my PhD thesis). On his return he would ask what you were working on. When you began to explain your meager progress he would usually say, "No, no, no. That's all old hat. What you should be working on is this," and he would then allocate a completely new problem! After a while, we students began to wise up and would try to avoid him until we had achieved something positive. Of course the one place that could not be avoided was the men's room. So if you were unlucky, that was frequently the location of receiving your new orders.

I think it was Hans Bethe who said that there are two kinds of genius. The first group (to which I would say Steven Weinberg, for example, belongs) produce results of such devastating logic and clarity that they leave you feeling that you could have done that too (if only you were smart enough!) The second kind are the "magicians" whose sources of inspiration are completely baffling. Salam, I believe, belonged to this magic

circle and there was always an element of eastern mysticism in his ideas that left you wondering how to fathom his genius.

Of course, these scientific achievements reflect only one side of Salam's character. He also devoted his life to the goal of international peace and cooperation, especially to the gap between the developed and developing nations. He firmly believed that this disparity will never be remedied until the Third World countries become the arbiters of their own scientific and technological destinies. Thus, this means going beyond mere financial aid and the exportation of technology; it means the training of scientific elite who are capable of discrimination in all matters scientific. He would thus vigorously defend the teaching of esoteric subjects such as theoretical elementary particle physics against critics who complained that the time and effort would be better spent on agriculture. His establishment of the ICTP in Trieste was an important first step in this direction. He served as President of the Third World Academy of Sciences, and was hotly tipped as the Director of UNESCO until ill-health forced him to withdraw his candidacy. He also acted as chief scientific advisor to the President of Pakistan. His visionary insights into the urgent need for science and technology in the Third World are set out in his book *Ideals and Realities*.

I will not list his numerous awards but would just mention the Atoms for Peace Prize (1968), the Einstein Medal (1979) and the Peace medal (1981). He holds honorary degrees from over 40 universities worldwide and he received a Knighthood for his services to British Science in 1989.

Another aspect of Salam's thinking was that he remained until the end of his life a devout Muslim. Unfortunately, this is the side of his character on which I am the least qualified to comment, except to say that he took it all very seriously. [...]

[...] It is indeed a tragedy that someone so vigorous and full of life as Abdus Salam should

have been struck down with such a debilitating disease. He had such a wonderful *joie de vivre* and his laughter, which most resembled a barking sea-lion, would reverberate throughout the corridors of the Imperial College Theory Group. When the deeds of great men are recalled, one often hears the cliché "He did not suffer fools gladly," but my memories of Salam at Imperial College were quite the reverse. People from all over the world would arrive and knock on his door to expound their latest theories, some of them quite bizarre. Yet Salam would treat them all with the same courtesy and respect. Perhaps it was because his own ideas always bordered on the outlandish that he was so tolerant of eccentricity in others; he could recognize pearls of wisdom where the rest of us saw only irritating grains of sand. Such an example was provided by the young military attache from the Israeli embassy in London who showed up one day with his ideas on particle physics. Salam was impressed enough to take him under his wing. The young man was Yuval Ne'eman and the result was flavor SU(3). [...]

[...] Theoretical physicists are, by and large, an honest bunch: occasions when scientific facts are actually deliberately falsified are almost unheard of. Nevertheless, we are still human and consequently want to present our results in the best possible light when writing them up for publication. I recall a young student approaching Abdus Salam for advice on this ethical dilemma: "Professor Salam, these calculations confirm most of the arguments I have been making so far. Unfortunately, there are also these other calculations which do not quite seem to fit the picture. Should I also draw the reader's attention to these at the risk of spoiling the effect or should I wait? After all, they will probably turn out to be irrelevant." In a response which should be immortalized in *The Oxford Dictionary of Quotations*, Salam replied: "When all else fails, you can always tell the truth." Amen.

# Professor Abdus Salam — Some Reminiscences

*Professor Saeed A. Durrani, Birmingham, U.K.*

My earliest memory of Salam goes back to the early 1940's – perhaps to the summer of 1940 when we in the Punjab of undivided India suddenly heard of a young Muslim student from an obscure school in Jhang who had shattered the matriculation record of the University of the Panjab.

Soon thereafter a personal connection became known to me. I learnt that a grand uncle of mine, Hakim Muhammad Hussain, was, in fact, the Principal of the Government Intermediate College at Jhang, where he had taken very great personal interest in Salam's education. Hakim Sahib (as everyone called him) was, indeed, himself an outstanding scholar, and had topped the Indian Educational Service Examination in the whole of India (if I remember it right). His interests ranged widely in the field of education, literature, history, philosophy and religion. He used to tell in latter years how, during his Principalship of the Jhang College, one fine morning a village school-teacher (or perhaps minor functionary) came along to enrol his son (Salam must have been around 12 then), asking him to take very special care of him on the grounds that he was a genius! Hakim Sahib at first wondered what may have brought about this somewhat high-flaunting remark – a genius in this backward rural area, indeed! But, he told us, when he looked closely at the young boy and watched his performance, he soon realized that he had, indeed, a most unusual product on his hands. He then gave a good deal of personal attention to coaching young Salam and encouraged him to realize his full potential. This bore fruit, and justified Salam's father's and Hakim Sahib's faith in the boy, when Salam broke that landmark record and stood first in the province in the university matriculation examination. We heard

that Salam, after again breaking the record for the Intermediate examination from the Jhang College, two years later, had been admitted to the Government College, Lahore, in 1942 – one of the premier educational institutions in the whole of India – and we all keenly followed his progress there, as he kept breaking the University's educational records every two years (i.e., after Matriculation and Intermediate examinations: BA, then MA mathematics). Salam's career inspired all other students of the era, and he appeared to offer us a role model.

It was at Government College, Lahore, that I first sighted Salam. He was already a legendary figure, a lean, handsome, tallish young man, with a small brush moustache, who was rarely seen outside his classroom or his hostel room. I, too, was resident of the New Hostel, where Salam resided as a boarder, and where there were stories abroad about the superhuman industriousness of Salam. It was rumored that each morning, when Salam emerges from his bedsitter, there were stacks of papers littered with calculations, piling up outside his room.

Anyway, soon after my arrival, Salam left the Government College, Lahore, for Cambridge, trailing clouds of glory. Then, around 1951, Salam returned to the College as a Lecturer. He was then teaching a course of Quantum Mechanics at the University, and was staying at the house of the Principal of the Government College, Lahore, Qazi Muhammad Aslam. I sometimes ran into Salam at the College swimming pool. I was at the time a student of the MSc class in Physics, and used to attend his lectures. Salam was an informal man and very friendly to his students.

An important event during that time was an international conference organized by the Pakistan

Association for the Advancement of Science at Lahore which was attended, amongst others by several Nobel Laureates, including Sir G. P. Thomson and Professor A. V. Hill. During this meeting many of us realized in what high regard Salam was held by the top scientists of the world; this was very uplifting for young students of science in the country. After the conference, the participants were taken by train to visit Peshawar and the historic Khyber Pass. During that train journey, I had the opportunity to have several discussions with Professor Salam.

I next saw Salam at Cambridge, where I had gone for my PhD studies at the Cavendish Laboratory on an Open Research studentship in 1953. Salam arrived in Cambridge in 1954 as a Fellow and Lecturer of St. John's College. I again attended his lectures (and those of P. A. M. Dirac) at the Department of Mathematics, University of Cambridge. I was struck by the mastery of both of these lecturers of their abstruse subject: theory of quantum mechanics. But Salam also used to attend the meetings of societies such as the Majlis (which embraced students from the Indian subcontinent and concerned itself with their cultural and social activities). He was always very accessible to Pakistani and Indian students, and I had the occasions to visit his elegant rooms for a chat or for advice.

Another place where I regularly encountered Salam was the weekly evening coffee meetings in the Prioress's Room at Jesus College, held by the Supervisor (now, Sir) Denys Wilkinson, to discuss the latest theories of high energy physics for the benefits of his research students. Salam and Professor Brian (later, Lord) Flowers were frequent guests at these discussion meetings. All this culminated in Salam being my External Examiner for my PhD Thesis (although I was an experimental physicist) in 1958. Wilkinson had by then taken up the Chair of Experimental Nuclear Physics at Oxford, whither all his students had followed him from Cambridge, and Salam had not

only been elected as the youngest Fellow of the Royal Society (at the age of 31), but had also been appointed Professor of Theoretical Physics at Imperial College, London. Professor Salam was very kind as the external examiner and praised my 'flair for theoretical formulations' in high energy physics and also encouraged me to publish some linguistic speculations that I had put in footnotes regarding the Greek, Persian and Sanskrit cognateness of terms as photon, baryon, meson and hyperon (I am afraid I never came round to acting on his advice.)

After my PhD, it was to Salam that I turned for advice as to the next step in my career. He suggested that I join the Atomic Energy Commission of Pakistan, it being the only scientifically active organization in the country. He offered to introduce me to Dr. I. H. Usmani, the brilliant Chairman of the Commission, who was personal friend of Salam and always stayed with Salam in his Putney house in London whenever he was visiting London. This Salam did when Dr. Usmani next came to England, and so I met Usmani in Oxford. He said that working on hyperon was of no interest for Pakistan, and suggested that I change my field and specialize in reactor physics. This I did, and spent the next three years working with UK Atomic Energy Authority at Harwell and Winfrith. I eventually joined the Commission in 1963, and was promptly appointed Director of the Atomic Energy Center at Lahore. Salam was a frequent visitor to that Center in his capacity as Chief Scientific Advisor to the President of Pakistan.

It was also during that time (around 1964), when Dr. Usmani, in his capacity of Governor of the International Atomic Energy Agency, Vienna, and Salam conceived a plan for what later became the International Center for Theoretical Physics (ICTP) at Trieste, and for which Lahore had been the original target location. However, the reluctance of the Government of Pakistan to commit large sums of money, and the foresight and

generosity of the Italian Government finally resulted in making Trieste the permanent headquarters of the ICTP – and the rest is, as they say, history.

In 1967, I myself joined the faculty of the University of Birmingham, in the Department of Physics. And in 1979, when Salam won the Nobel Prize, I wrote to congratulate him. In his reply he wrote: “I am sorry your grand-uncle is not alive anymore – for he would have been proud of me today.”

My next substantive interaction with Salam was in 1991 in Trieste, where I had gone as a faculty lecturer in Radon workshop at the ICTP. Salam invited me to lunch and then a chat in his office early one morning. There he explained to me his concept of the Commission on Science and Technology in the South (COMSATS), which would be composed of heads of states or governments of the Third World countries of the globe, so as to exercise at the very highest level, the will for a revolution in science and high technology – which he had been pushing for several years as President of the Third World Academy of Sciences. During that November 1991 encounter, Salam was bemoaning the lack of progress in holding the foundation meeting of COMSATS in Pakistan – the country he dearly wanted to host the first meeting. He said that Benazir Bhutto had agreed to join the Commission and hold the foundation meeting there – but her Government had fallen before she could do so. The new Government, headed by Nawaz Sharif, had, he said, been dragging its feet. On the spur of the moment I offered to do what I could do to help his cause – since I happened to be going to Pakistan in a month’s time for a science conference. I asked him to give me a letter addressed to the President of Pakistan, with a copy to the Prime Minister. I also proposed to him that, by way of inducement, he should offer to locate the headquarters of COMSATS in the country that hosted the foundation meeting. Salam readily agreed to both my suggestions.

Armed with Salam’s letters, I first called on the President of Pakistan, Mr. Ghulam Ishaq Khan, in

January, 1992. The President proved a hard nut to crack; but eventually he gave his blessings to the proposal, and asked me to see the Prime Minister, who was the proper authority in this matter. The Prime Minister was then away, but I finally caught up with him at the Economic Summit at Davos in Switzerland on 1 February 1992. Fortunately, I was able to persuade Mr. Nawaz Sharif that the foundation meeting of COMSATS be held in Pakistan – and even agree to a provisional date, February 1993 in Lahore. The Prime Minister ordered a budget provision of US\$2 million to be made in the next budget for the conference, likely to be attended by up to 50 heads of state/government. I rang Salam in Oxford, from Davos, with the good news. He was very pleased with the outcome and asked me to thank Mr. Nawaz Sharif and invite him to visit ICTP whenever had the chance.

In June 1992, when the Prime Minister of Pakistan was passing through London on his way back from the Earth Summit in Rio de Janeiro, I drove Salam from Oxford to see Mr. Nawaz Sharif at the Dorchester Hotel. Mr. Sharif was visibly distressed to see Salam in such a poor state of health. He said to Salam: “Sir, because of you, there is much honor to Pakistan. And that, in turn, has brought honor to us. Please give us any orders, and we shall be happy to carry them out; and if there is anything that we can do to alleviate your health problems, please do not hesitate to let me know personally.” It was all very touching, and showed in what high regard Salam was held by the leaders of Pakistan. The final decision on dates for the COMSATS foundation meeting was, however, deferred to the TWAS General Conference in Kuwait, to be held in November 1992. But once again, the Government of Pakistan ( this time Mr. Nawaz Sharif’s) fell before the meeting could be held!

We had to start all over again. Benazir Bhutto was once again in power, and I obtained a new letter from Salam, addressed to her, during the TWAS 10th Anniversary Celebrations in November 1993. I saw Ms Bhutto in December 1993, and fortunately she agreed to honor her

earlier pledge. She said Pakistan greatly needed Professor Salam's help and guidance; and on hearing in what poor health he was, she immediately sent him a personal get-well message and ordered a bouquet to be delivered to him at his London hospital.

The Foundation Meeting of COMSATS duly took place in Islamabad from 4 to 5 October 1994, with great pomp and ceremony, and the permanent headquarters of the Commission was located in Islamabad. But alas, the author of all that grand plan was too ill to attend the meeting where his long-cherished dream was finally coming true. I had actually foreseen that eventuality, and had formally proposed to both TWAS and ICTP that a portrait of Salam be painted for the occasion of the COMSATS meeting. I asked the world-renowned Pakistani portraitist Mr. Gulgee (who had done portraits of De Gaulle, George Bush, the Shah of Iran, Allama Iqbal, and Rajiv Gandhi) to make a special portrait of Salam – who was too ill to sit for a proper portrait. These sketches were then displayed at the COMSATS Foundation Meeting. So, if Salam was not able to be physically present at this historical meeting, at least, his portrait sketch was there to savor the occasion. The selected sketch out of the seven executed by Gulgee was slipped by me to Trieste from Islamabad in early 1995 – and it now hangs in Galileo Galilei Guest House of the International Center for Theoretical Physics.

I saw very little of Salam after the September 1994 portrait-making meeting until his death in November 1996. Although I did speak to him over telephone once or twice – when all I could hear was some whispers in his native Punjabi tongue. At the request of his wife, Louise, I translated for her into English some of the *ghazals* of the great Urdu poet Ghalib (1797-1869), whose tapes she said, Salam enjoyed listening to, finding much solace in Ghalib's poetry. I sent to Professor Salam a cassette of a selection of the Urdu and Persian poetry of the poet philosopher of the East, Muhammad Iqbal (1877-1938), which the Iqbal

Academy (UK) – of which I am the Chairman – had produced in 1992. Salam was very knowledgeable about Urdu and Persian poetry, and Mrs Salam said that he very much appreciated the tapes.

So, these are some of the reminiscences of that great man, Salam, whom I considered to be a scientific genius, on par with Einstein, Dirac and Heisenberg. In view of many of us, Salam deserved a second Nobel prize – this time the Peace Prize for his life-long service to the development of science in the Third World. ICTP and TWAS are two of his brain-children that will continue to glorify his name and his dedicated endeavors for science and for the Third World. In the words of the 14th century Persian poet Hafiz:

*He whose heart has been animated in love, never dies*

*His immortality leaves a lasting imprint on the Chronicles of Time.*

Salam's name is, verily, so imprinted.

(Courtesy: TWAS Newsletter: Vol. 8, No. 4, October-December 1996)



Dr Salam with UN Secretary General, Javier Perez de Cuellar (July 1985)



شاہین کی تازہ اور عمدہ مٹھائیاں خوشی کے موقع کو چار چاند لگا دیتی ہیں  
کوڑھی مرغ، کوڑھی گوشت، نہاری، حلیم،  
سیخ، کباب، بہاری کباب وغیرہ کھانوں کے علاوہ  
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# Abdus Salam

*Jogesh C. Pati, University of Maryland at College Park*

Abdus Salam died at age 70 on 21 November 1996, at his home in Oxford, England. He was best known for his pioneering work on electroweak unification, for which he shared the Nobel Prize in Physics in 1979 with Sheldon Glashow and Steven Weinberg. Salam will be remembered also for his invaluable contributions to the propagation of science in the third world. He founded the International Center for Theoretical Physics (ICTP) in Trieste, Italy and directed it for over 30 years; he also helped create other international research centers, several international foundations, such as the Third World Academy of Science, and a number of international prizes.

Salam was born in Jhang, a district in the part of British India that is now Pakistan. Known at an early age for his sharp intellect, he completed his undergraduate education at the University of the Punjab in 1946, and won a scholarship to continue his graduate studies at the University of Cambridge's St. John's College. He excelled there, securing a first (top honors) in both physics and mathematics. While seeking a research problem for his thesis, he asked the advice of Paul Matthews, who was about to finish his PhD. Matthews had been attempting to extend to meson theories, which describe the nuclear forces, the renormalization techniques that had recently been applied successfully to avoid the infinities in quantum electrodynamics. Matthews challenged Salam to solve the problem of the so called overlapping divergences, which arise in meson theories in higher orders of perturbation theory. To Matthews' great surprise, Salam arrived at a complete solution to the problem in just a few months. This thesis made Salam well known at the very beginning of his career.

After finishing his PhD at Cambridge in 1951, Salam returned to Pakistan as a professor of Mathematics at the University of the Punjab, hoping to build research groups in theoretical physics in his own country. However, he was

frustrated in achieving his goals by both the lack of official support and acute isolation in Physics that he faced in Pakistan. He felt that he could serve his country better by staying abroad, so he returned to Cambridge in 1954 as a lecturer and fellow of St. John's College. Three years later, he accepted a professorship at what is now the University of London's Imperial College of Science and Technology and Medicine, where he succeeded in establishing one of the best theoretical physics groups in the world, well known for its contributions to the role of symmetries in particle physics. He maintained his professorship at Imperial College to the end of his career despite spending most of his time after 1964 at the ICTP.

From 1957 to 1967, Salam, initially in collaboration with John Ward, attempted to unify the radioactive weak and electromagnetic forces – an idea introduced by Julian Schwinger in 1957. Following a suggestion by Glashow on the usefulness of the gauge symmetry  $SU(2) \times U(1)$  and a crucial observation made by Peter Higgs and independently by F. Englert and R. Brout and (earlier) by Philip Anderson on how massless gauge particles can acquire masses through spontaneous breaking of symmetries, Weinberg (in 1967) and, independently, Salam (in 1968) proposed a model for electroweak unification based on the idea of a spontaneously broken  $SU(2) \times U(1)$  gauge symmetry. The model gained great impetus in 1971, when Gerhard 'tHooft showed that such a model is renormalizable. Thus, it permitted reliable predictions of the masses of the W and Z particles, as well as dozens of neutral current weak processes, all of which have turned out to be in spectacular agreement with experiment.

During 1974 and 1975, Salam collaborated with John Strathdee on the superspace-superfield formalism for dealing with a new type of symmetry – supersymmetry, which has the novel property that it can transform spin -1/2 fermions

into spin -0 bosons and vice versa. The Salam-Strathdee formalism has turned out to be an indispensable tool for dealing with the quantum behavior of supersymmetric field theories.

My personal collaboration with Salam started in the summer of 1972 and remained intense for over ten years. Together, we introduced the idea of underlying unity of quarks and leptons and, simultaneously, of their weak, electromagnetic and strong gauge forces. Believing in  $SU(4)$  color symmetry for quark-lepton unification and seeking a compelling reason for quantization of electric charge, we introduced the concept of left-right symmetry. This in turn led us to predict the existence of right-handed neutrinos accompanying the observed left-handed ones – a prediction that, now plays a role in proposed solutions to the solar neutrino puzzle and in theories of dark matter.

In 1973, despite the skepticism of the physics community at the time, Salam and I noted that a gauge unification of quarks and leptons would inevitably lead to nonconservation of baryons and lepton numbers and thereby naturally to an unstable proton. These ideas have matured and evolved considerably. Salam had hoped to see more final chapter of this theory of unification in his lifetime. We were both encouraged, however, to see that the search for proton decay was continuing with the recent completion of the Superkamiokando detector in Japan.

During our collaboration, Salam always reacted to our occasional disagreements with a good-natured spirit. If he were greatly excited about the idea that I did not like, he would impatiently ask, “My dear sir, what do you want? Blood?” I would reply, “No, Professor Salam, I would like something better.” Whether I was right or wrong, he never took it ill.

While Salam was moving forward in his research, he never lost sight of his ardent desire to help the growth of science and technology in the third world. Determined to help, he approached the International Atomic Energy Agency (IAEA) of the United Nations in 1960 for support of what was to become the ICTP. Salam’s proposal met with great resistance, with one delegate from a developed nation saying, “Theoretical physics is

the Rolls Royce of sciences – the developing countries need only bullock carts.” After Salam and several colleagues lobbied intensely for four years, Salam finally succeeded in creating the center in 1964, with partial support from the IAEA (now taken over by UNESCO) and primary support from the government of Italy.

Thanks to Salam’s tireless efforts, the ICTP has emerged as one of the finest research-cum-training institutions in the world, not only producing high-quality science but also providing opportunities for scientists from the developing countries and developed nations to interact regularly through annual workshops and summer schools. In its 33 years, the ICTP has hosted some 60,000 visits by experimental and theoretical research physicists, about half of whom are from developing countries.

Salam dreamed of creating 20 international centers like ICTP spread throughout the world and emphasizing different areas of science and technology. He appealed vigorously to the developed as well as many developing countries and to the World Bank for funds to create the centers. Meanwhile, Salam also dreamed of creating a “World University,” which would be funded internationally and would be linked for its functioning to a consortium of universities worldwide.

Salam’s efforts in these directions in the last eight years of his life were unfortunately severely hampered by a crippling neurological illness, attributed to a variant of Parkinson’s disease. Thanks to his own initiative and that of several others, he nevertheless succeeded in creating International Center for Genetic Engineering and Biotechnology, with components in Trieste and Delhi, and the International Center for Science and High Technology in Trieste.

Salam will surely be remembered as one of the great scientists of the 20th century and as a humanitarian who devoted much of his life to uplifting the status of science and technology in the third world. Salam may have been somewhat ahead of his time in dreaming 20 international centers and a world university. It remains for the present generation of scientists and world leaders to fulfill his dream. (Physics Today, August 1997)

# Lessons in Peace and Particle Physics

*Irfan Husain*

Perhaps, it is because a questioning and open-minded approach makes it difficult to cling to dogma or the status quo that scientists here are not the respected figures they are in the West. But a country that has no place for people of Dr Abdus Salam's stature deserves to be where we are, right at the bottom.

The news of Dr Abdus Salam's death triggered off feelings of sorrow and anger: Sorrow for the passing of a great mind and a gentle soul, anger at our rejection of an outstanding Pakistani.

In a country so short of heroes, our disdain for the few towering figures we have produced is truly amazing. Dr Salam's dazzling achievements are too many to recount here, but his work in particle theory has helped to change the direction of research in electromagnetic forces. How this will effect our lives is still unclear, but the impact of his genius on mankind's future will be significant. Indeed, he is not just the only Pakistani to win the Nobel Prize but also the only one from the Muslim world – his Ahmadi beliefs notwithstanding – to win this award for any of the sciences. And yet, the tepid reaction in his own country to the sad news of his death – to say nothing of the deafening silence in the rest of the Islamic world – tells us more than any learned treatise could about why we are at the bottom of the heap.

Years ago, a revealing but possibly apocryphal story about Dr Salam did the rounds. Apparently, at some official dinner, one civil servant's begum (wife) pointed out the famous scientist to another and detailed his glittering achievements. The second lady sniffed and asked: "If he's so intelligent, why couldn't he become a CSP?" This story, true or not, says more about us than it does about Dr Salam. Afflicted by a mysterious death-wish, we have always been our own worst enemies. Never missing a chance to shoot

ourselves in the foot with a large-caliber automatic weapon, we really outdid ourselves with Dr Salam.

For years we had one of the most eminent physicists in the world begging successive leaders to allow him to open a center for advanced research in Pakistan. He even offered to bring in financing, including his prize money for the Nobel award. Unfortunately, Ayub, Bhutto and Zia all gave him the run-around. But until the very end, Dr Salam's love and loyalty for his homeland did not waver despite our consistently shabby treatment of him.

Quite apart from Dr Salam's Ahmadi beliefs, we are uncomfortable with the logic and rational approach implicit in scientific education, thought and research. This is because the scientific attitude demands rigorous examination of facts, and a refusal to accept anything for granted. This questioning and open minded approach makes it difficult to cling to dogma or status quo, and is therefore discouraged in our educational institutions and our society. For this reason, scientists here are not the respected figures they are in the West, and nor is much attention paid to the teaching of the physical sciences. It should, therefore, come as no surprise that the Muslim world has produced few scientists and even few scientific discoveries in the last few centuries. As Dr Parvez Hoodhboy informed us in his marvelously readable book, *Muslims and Science*, when Zia convened an international conference on – wait for it! – miracles, some Pakistani "scientists" read papers proposing among other things, that we harness the fire of jinns to solve our energy problems and suggesting the ways to mathematically calculate the extent of hypocrisy in society.

Against this backdrop of ignorance and apathy, it is no wonder that Dr Salam was largely ignored

by the government and his countrymen. But in his virtual ostracism, fanaticism played a major role: just because he was an Ahmadi, claiming him as one of our own became a problem for leaders more concerned with the fundamentalist backlash than in the development of science in Pakistan. When the Jamiat disgraced us all by demonstrating against him at the Quaid-i-Azam University in the eighties, Zia did not lift a finger. This sent a clear signal to Pakistani academia and officialdom that Salam was beyond the pale. Hurt and sad, he returned to the Center he had created at Trieste. But despite this latest rebuff, he never became bitter or turned against Pakistan.

Again, during Zia's poisonous era, when the UNESCO Director General's tenure was expiring, the Italians sounded out Pakistan about nominating Salam. Instead of agreeing wholeheartedly, Zia submitted general Sahibzada Yaqub's name. Needless to say, he was thrashed roundly in the election after the government pumped millions into the doomed campaign. Incidentally, in case anybody is counting, this is Yaqub's eighth stint as foreign minister; obviously, it is easier to be sworn in during caretaker arrangements than it is to be elected to head international organizations.

A deeply religious man, Salam's belief in God was strengthened by his conviction that the 'unifying force' underlying the weak and strong electromagnetic forces was the Deity. For him, there was no contradiction between science and religion. In his chosen field of particle physics, there were many wonders and phenomena for which, according to him, there was no other explanation but the existence of an omnipotent, omnipresent God. For a man like him to be ignored and forgotten on the basis of his religious beliefs was perhaps the unkindest cut of all. And we allowed it to happen without protest.

The fact that we did not honor him when he was alive, or mourn him properly when he died, makes me think we are incapable of appreciating genius. Indeed, so steeped are we in our mediocrity and our backwardness that we feel positively uncomfortable with anyone that rises

above the lowest common denominator. A country that has no place for people of Salam's stature deserves to be where we are: right at the bottom.

Apart from his scientific achievements, if Salam taught us anything else by his example, it is that we should be able to accept and tolerate different points of view. Sadly, this is a lesson we seem incapable of learning.

(The Herald, December 1996)



Hadrat Chaudhry Mohammad Hussain  
Dr Salam's Father

# Dr Abdus Salam: A Muslim Scientist Unappreciated by His Nation

## *Grievously Disregarded Because He was an Ahmadi*

*Fehmi Hoveidi, Saudi Arabia*

Translated by Ismail K. Nayyar

(Mr Fehmi Hoveidi, a famous columnist, published an article on the late Dr Abdus Salam, Nobel Laureate, under the above caption, in a Saudi Weekly called, “Al-Mujalla” in its issue of January 12, 1997. The columnist has shown courage in extolling the achievements of Dr Abdus Salam. Excerpts from this article are presented here with acknowledgement to Mr Mohammad Tahir Nadeem, who translated the article from its original Arabic into Urdu for publication in “Al-Fazl” International, in its issue of October 3, 1997. Excerpts from the Urdu translation of the Fehmi Hoveidi article have been rendered into English by Ismail K. Nayyar.)

Mr Hoveidi begins his article with a barbed comment when he explains that Dr Abdus Salam was unappreciated in the Muslim World first because he was a physicist, a scientist, and not a musician or a football player. Secondly, he happened to be born into and raised by a family whose belief it was that Mirza Ghulam Ahmad Qadiani was the Imam Mahdi and the Khalifa to the Holy Prophet, peace and blessings of Allah be

upon him, and thus some of his beliefs were injurious to the faith. In spite of this he declared himself to be a Muslim. These are the two reasons that upon his departure from this world, no one expressed regret on his passing, nor did any Arab newspaper publish an obituary, with the exception of one, though, the world of Learning and Science – which has true appreciation of his Noble Prize-winning scientific achievements – keenly feels the void that his passing has created. He was the first Muslim Noble Laureate, and Mr Hoveidi prays that he is not the last.

The columnist writes that he had misgivings about writing the article on Dr Abdus Salam because of the petty misunderstandings existing about his faith which would have him placed outside the pale of Islam. In order to avoid confrontation with such people who cannot engage in civilized argument nor are versed in civil language, he delayed the article for several weeks, but eventually decided to publish it because his conscience would allow him no respite. He relates that at this time he came across an article which

was drawn from Dr Abdus Salam's paper on "Islam and Science" (The article is published in this issue of Al-Nahl). On reading this article he found that Dr Abdus Salam speaks with the conviction of a *Momin* (True Believer) who is proud of his magnificent Islamic civilization and culture and who believes in the Holy Quran as a supreme miracle. This is when Mr Hoveidi decided that it was incumbent upon him to write about Dr Abdus Salam as a debt of gratitude.

Mr Hoveidi writes that at the early age of 17, Dr Abdus Salam published a paper on an Algebraic problem. In 1949 he went to Cambridge University in England on a Government scholarship. It was at Cambridge that he published a paper which sent waves of appreciation through the scientific community, and propelled him into limelight of Theoretical Physics. In 1954, when he returned home after completing his studies, he was given a minor assignment and soon realized that his skills could not be honed in the existing circumstances in Pakistan. As a result, he returned to England the same year and within two years was appointed to the teaching faculty of the Imperial College. He was asked to lay the groundwork for the Theoretical Physics Department and was elected as the youngest member of the Royal Society at the age of 37. He continued his research, and based on this research, he was awarded the Nobel Prize in 1979 along with two Professors of Harvard University. Thereupon, after painful deliberation, he decided to reside in London even though he dearly wished to serve his country, Pakistan. In 1993, he laid the foundation of the Third World Science Academy and was elected its first President. He explained that the purpose of this Academy was to provide a platform to Third World scientists in order to further their research. While this great Third World Scientist strove to assist in the scientific development of the Third World, relations with his native Pakistan were strained because in the Seventies, the

Government of Zulfiqar Ali Bhutto in Pakistan declared the Ahmadiyya Jama'at outside the pale of Islam. As a result, Dr Abdus Salam's contacts with Pakistan remained severed but in later years relations improved and in a Government-sponsored program, the President of Pakistan gave an address in his honor. It should be mentioned here that after the award of the Nobel Prize, in spite of strained relations with the Government of Pakistan, Dr Abdus Salam donated a handsome sum to Pakistan for the development of Science in that country.

Mr Hoveidi writes that as far as Dr Abdus Salam's being an Ahmadi is concerned, that is a separate issue. The truth is, Dr Abdus Salam was born into an Ahmadi home, and learnt of Islam through the teachings of his sect, believing it to be the true Islam. The columnist asserts that as far as his knowledge of Islam is concerned, he believes Dr Abdus Salam to be a staunch Muslim with an unwavering faith in his religion. All his life he presented himself as a Muslim and addressed all gatherings as a Muslim. That is why, the author states, he feels an affinity with Dr Abdus Salam, although he, the author, does not share this affinity with the Ahmadiyya Jama'at. He further questions why there is a section of Muslims who are quick to label a person a disbeliever even though he calls himself a Muslim. He notes that under no circumstances does anyone have the right to call a person who calls himself a Muslim a disbeliever. Instead of casting out, Muslims should concentrate on assimilation. It is his earnest desire that a day may dawn soon when a person who announces that he is a Muslim, is accepted and honored as a member of the Islamic Ummah until he proves otherwise by his actions. Mr Hoveidi wonders why Muslims cannot open up their hearts and minds to let the Islamic Ummah benefit from the contributions of people like Dr Abdus Salam, and let the question of belief be decided by God on Judgement Day.

# Nobel Prize-Winning Physicist Abdus Salam Dies at 70

*Martin Weil, Washington Post Staff Writer*

Abdus Salam, 70, the Indian-born son of pious Muslims who won the Nobel Prize in Physics and founded an institute to train Third World scientists, died Nov. 21 at his home in Oxford, England.

His death was reported by the Imperial College of Science and Technology and Medicine at the University of London where he taught for more than 30 years. No cause of death was given.

Dr Salam, one of the world's foremost theoretical physicists, was known for making significant contributions to the solution of one of the most challenging intellectual problems of the age; the development of a grand unifying theory of matter and energy that essentially would explain the structure and behavior of the entire universe.

The 1979 Nobel Prize, which he shared with two Americans, Steven Weinberg and Sheldon Glashow, honored him for his mathematical demonstration of the underlying connection between the basic natural forces and phenomena that previously had been believed separate and independent.

One was electromagnetism, which draws together electricity and magnetism, light waves and radio waves. The other was the "weak force," another of the primary forces of nature, but one that is not so easily recognized in the every day world.

It acts on the subnuclear level, but it also accounts for some of the most essential processes in the universe. As Glashow pointed out in an interview yesterday, without the weak force, through which protons are transmitted into neutrons in a fusion reaction, "the sun could not

shine."

Although, electromagnetism and the weak force were once considered independent, "they have fit together very neatly now," Glashow said, in a connection that supports what is known as the "standard model" of nuclear particle structure and interaction.

That fit, he said, helps explain why the standard model "is regarded as a scientific triumph." Although, it leaves many questions unanswered, it nonetheless offers a way of explaining "everything we see about us."

Although, the areas of physics in which Dr Salam specialized appear "absolutely impractical," in Glashow's words, "he had a practical bent," expressed in his keen desire to train scientists from the less developed countries.

To this end, he founded the International Center for Theoretical Physics in Trieste, Italy.

"What I wanted was to give the poor a place of their own where they would not have to beg anybody," he said. It was regarded during the Cold War as perhaps the only place where scientists from the East and West could work together.

Dr Salam's share of the Nobel Prize award went to an international fund for young scientists.

Dr Salam descended from a long line of forebears known for Islamic learning and piety, was born in 1926, the son of a teacher and civil servant in the Punjab province of what was then British India.

At 14, he received the highest marks then recorded on a Punjab University entrance exam and began studying mathematics. A scholarship sent him to England to study at Cambridge



University, where he obtained his doctorate.

Handed exceptionally challenging cutting-edge problem for his doctoral research, he polished it off in five months, winning a prize and establishing himself as an intellectual prodigy. Dr Salam spent a year on a fellowship at the Institute for Advanced Study in Princeton, NJ, and in 1951, he went back to the now independent Pakistan, as head of the Mathematics department at Punjab University.

Biographers said Dr Salam soon realized that he could do more for science in Pakistan by working in a place where he would be closer to the frontiers of science: in 1954, he returned to Cambridge as a professor.

Until he resigned in 1974, Dr Salam served for 16 years on Pakistan's Atomic Energy

Commission. A 1992 story in the Washington Post reported "Western analysis" as saying disagreement existed over whether he might have had a role in the Pakistani nuclear weapons program. He preached for decades against nuclear weapons.

Glashow, Higgins professor of physics at Harvard University called Dr Salam "a beloved friend" who was "one of the most delightful characters in the world of physics" and a "truly lovable and gentle soul."

The Associated Press said that Dr Salam lived in Oxford with his wife, Louise Johnson, and that they had one child. It quoted friends as saying he had four children from an earlier marriage.

(The Washington Post, November 23, 1996, p. C4)



The Chinese leader, Mr Deng Xiaoping, in conversation with Prof. Salam at the Great Hall of the People in Beijing in September 1986.

# Abdus Salam is Dead at 70

## Physicist Shared Nobel Prize

*Malcolm W. Browne*

Abdus Salam, a Pakistani physicist whose work helped reveal the underlying unity of two of the fundamental forces of nature, died on Thursday (November 21, 1996) at his home in Oxford, England. He was 70 and had been suffering for years from a disabling neurological disorder.

Dr Salam shared the 1979 Nobel Prize in Physics with two Americans, Dr Steven Weinberg (now a professor at the University of Texas in Austin) and Dr Sheldon Glashow of Harvard University for research all three conducted independently of one another. Their theory on the fundamental forces is regarded by physicists as one of the landmarks of 20th century science.

Besides his trailblazing research in theoretical physics, Dr Salam was a leader in international efforts to make physics accessible to students from developing countries. He was a founder of the International Center for Theoretical Physics in Trieste, Italy, which has supported the studies of third-world physicists since its founding in 1964.

Research by Dr Abdus Salam, Dr Weinberg and Dr Glashow culminated in equations demonstrating a fundamental relationship – or “symmetry” – between the electromagnetic force (which is transmitted by light and other forms of radiation) and the weak nuclear force, which operates within atomic nuclei and is responsible for certain types of radioactive decay. The four known forces of nature are the electromagnetic force, the weak and strong nuclear forces, and gravity.

For the first instant after the universe was created by the Big Bang fireball some 15 billion years ago, physicists believe, the underlying symmetry of nature unified all the forces as one. But as conditions cooled, the symmetry was

broken and the forces went their separate ways.

Dr Salam, remembered for his kindly manners and luxuriant black beard and mustache, used to explain the concept of symmetry breaking by analogy with a dinner party, at which the guests are seated around a circular table and a salad dish is placed between each pair of neighbors. The table setting is symmetrical until someone takes a salad dish either from his right or left side, after which salad dish symmetry is broken, and the other guests can no longer choose between left or right dishes. The broken symmetry of the weak force results in interactions that have a left handed bias.

But the three physicists were able to show that although the weak and electromagnetic forces seem completely unlike one another, they nevertheless share a hidden symmetry that can be demonstrated by an extremely difficult set of equations. Complicating matters, most of the solutions of these equations produce infinite values rendering the equations useless. A solution was found by developing mathematical tools to make the equations “renormalizable,” that is, free of uselessly infinite solutions.

This was no easy task.

In an interview yesterday, Dr Glashow recalled that in 1960 he presented a paper in Copenhagen that he believed would lead to a “standard model” of particle physics that would be renormalizable.

“This caused a dispute,” Dr Glashow said, “and about a month later, Abdus Salam showed that I was all wet.”

But by the end of the 1960’s all three scientists had reached generally similar conclusions. One was a prediction that the weak force must be transmitted by particles undiscovered up to then, known as weak vector bosons. These hypothesized

particles – the W-plus, W-minus and Z-zero particles, analogous to the photon particle, which transmits the electromagnetic force – became the objects of a sometimes bitter race between accelerator physicists.

In 1983, a group headed by Dr Carlo Rubbia at CERN, the European Laboratory for Particle Physics in Geneva, found the W-particles, and the next year they detected Z-zero particle, which transmit what is called weak neutral current within atomic nuclei.

Acting with unusual speed, the Nobel committee awarded a physics prize to Dr Rubbia and his collaborator, Dr Simon Van der Meer, in 1984, and the “electroweak theory” forged by Dr Salam, Dr Weinberg and Dr Glashow was confirmed.

Dr Salam was born on Jan. 29 1926, at Jhang, a rural community in what is now Pakistan. His father was a schoolteacher who encouraged his education, and his prodigious intellect won him first-class educational opportunities even as a child. At age of 14, he entered Government College in Lahore, having achieved the highest grade ever recorded for an entrance examination to the college.

He completed his under graduate education at Punjab University and then moved to Cambridge University in England, which awarded him a doctorate in 1952. From 1951 to 1954 he also served as a professor of mathematics at Government College and Punjab University in Lahore. He then moved back to England, where in 1957, he became a professor of theoretical physics at the Imperial College of Science and Technology in London, where he remained for most of his life. It was there that he developed the mathematics of the electroweak theory.

Awarded an honorary knighthood by Queen Elizabeth as well as many scientific prizes, Dr Salam spent much of his later life trying to promote scientific education in developing countries, including Pakistan. In 1966, he recalled that while he worked in Lahore, he had felt “terribly isolated” by lack of communication with scientific peers, and that above all, third world

scientists need contact with counterparts in developed countries. He dreamed of founding a “World University” to that end.

Dr Salam, the first Muslim scientist to win a Nobel Prize, observed Muslim customs, including multiple marriages. His two wives attended his award ceremony in Stockholm in 1979, but the Swedish officials felt obliged to seat them in different parts of the auditorium while the King decorated their husband.

Dr Salam, unable to speak or move without a wheelchair in his last years, is survived by his wife, Dr Louise Johnson, and their child, as well as four children by his Muslim wife.

New York Times, November 23, 1996)



Dr Abdus Salam, in his early yeras

# Abdus Salam

## (1926-96)

*Seif Randjbar-Daemi,  
International Center for Theoretical Physics,  
Trieste, Italy*

Among the great intellectual achievements of this century is the theory of elementary particles that has come to be known as the Standard Model. It represents the cumulative effort of many profound and imaginative thinkers whose common motivation was to find some glimmer of understanding as to what the physical world is made of and how it works. This kind of endeavor is very much in the European tradition, and much of the work was carried out in the wealthy universities of Europe and North America. But among the creators of this intellectual system there are some from other, less wealthy parts of the world. One such is Abdus Salam, who died on November 21 (1996). Salam made a major contribution to the creation of the Standard Model. For this work he shared the Nobel Prize with Steven Weinberg and Sheldon Glashow in 1979.

The Standard Model is the best existing mathematical description of the physical phenomena that take place on subnuclear scales. Its predictions have been confirmed to a high degree of accuracy. The main element in the construction of the model is a type of field theory known as Yang-Mills theory. In the 1950s, Salam, together with J. C. Ward, was one of the first to appreciate the significance of Yang-Mills theory in the description of weak nuclear forces.

Then in 1962, an important theorem, due originally to Goldstone, was proved by Salam,

Weinberg and Goldstone. Its extension and application to models of the Yang-Mills type by Higgs, Kibble and others led to an understanding of how the Yang-Mills vector particles can become massive. This was the last ingredient needed for the construction of a unified theory of weak and electromagnetic interactions, and the electroweak theory of Weinberg and Salam soon followed.

Abdus Salam was born in 1926 into an ordinary family in the village of Jhang in Punjab, in what was then British India. His father was a deeply religious person and placed great emphasis on education, and he was the single most formative influence on Salam during his education in Pakistan. Salam was educated at the government college in Lahore, at St John's College, Cambridge, and at the Cavendish Laboratory, where he obtained his PhD in 1952. In 1957, he was invited by Blackett to occupy the chair of theoretical physics and to create a theoretical physics group at Imperial College, London. In 1959, he was elected fellow of the Royal Society.

A guiding principle during his entire active life was that of symmetry. During the early 1960s, together with Gellmann and others, he emphasized the group-theoretical classification of hadrons. Salam's contribution, to a rather abstract form of symmetry known as supersymmetry is well known. In 1974 and 1975, they invented a mathematical

framework of supersymmetry known as superspace. As an aside, it may not be well known, even among the experts, that several terms in common use by physicists, such as electroweak theory, astroparticle physics and supersymmetry, were invented by Abdus Salam.

Also in the mid-1970s, Salam and Robert Delbourgo were the first to formulate a possible violation of the equivalence principle in general relativity, due to the quantum effects of chiral fermions. This work influenced the development of gravitational instantons by Stephen Hawking and others. Salam and Jogesh Pati were among the first group of theoreticians to propose the idea of a grand unified theory encompassing electroweak and the strong nuclear forces, and that in such models the proton may be unstable.

The idea of creating an international center where scientists of all nationalities and political creeds could interact was rooted in Salam's experience of being isolated from world science in Pakistan. Due mainly to his efforts, the international Center for Theoretical Physics (ICTP) at Trieste, Italy, was established in 1964 under the aegis of the International Atomic Energy Agency and with the support of the Italian government. It was directed by Abdus Salam from 1964 until December 1993.

Even if he had not been such a creative and influential scientist, Salam would have been remembered for the creation of the ICTP and for his charismatic leadership. The center has had a significant impact on the development of science in that large part of the world where, perhaps due to social and political conditions, the basic sciences are almost completely ignored. The ICTP is, and has been, a meeting point for physicists of all cultures and religions. For example, during the Cold War, it was one of the few institutions where scientists from the Soviet bloc countries could meet and collaborate with their Western colleagues.

The ICTP has overcome many seemingly insurmountable difficulties to become as well

established as it is now. Only a person of Salam's moral and intellectual power, fired by a dedication to the well-being of the neglected part of humanity, could have made this enterprise survive. His relentless efforts on the political front are legendary. He has talked with some of the most important political leaders of his time, from John F. Kennedy and Zhou En-lai to Francois Mitterand and Margaret Thatcher.

Abdus Salam was elected to membership of prestigious societies in 24 countries, including the US National Academy of Sciences, the Royal Swedish Academy of Sciences and the USSR Academy of Sciences. He was made an honorary KBE in 1989 and was an honorary member of seven other important national orders in four continents. He received 45 Doctor Honoris Causa awards in 28 countries, and nine medals for his contributions towards peace and the promotion of international collaboration, including the Atoms for Peace Award. Salam also founded the Third World Academy of Sciences and was its president until 1994.

During the last years of his life, Salam suffered from a neurological disorder, progressive supranuclear palsy. This was perhaps the only significant battle, among so many, that he fought but did not win. He bore the illness with grace and tranquility. He accepted with equal humility the great gifts that enabled him to act so effectively in sciences and for the Third World, and to face the vicissitudes of illness.

It was difficult not to be impressed by the forceful but deeply humane personality of Abdus Salam. He had a genuine respect for others and a very intelligent sense of humor. What he generously gave to others were his time and inspiration, perhaps the most valuable gifts that such a singular person could offer to his fellow human beings.

(Source: Nature, Vol 384,  
12 December, 1996, p. 520)

# Friends and Believers Bid Farewell to Nobel Laureate

*Ehsan Masood*

Mr. Ehsan Masood writes under the title, “Friends and Believers Bid Farewell to Nobel Laureate” in *Nature*, London, UK:

Religion and science blended seamlessly last Monday, 25 November, when, in an apparently unique event for a Nobel science prizewinner, tens of thousands of people gathered in the north Pakistan town of Rabwah to honor the physicist Abdus Salam, who died on 21 November (1996).

Salam, who was 70, had been ill for more than a decade. His body was brought to a mosque in London from his house in Oxford, and flown to Lahore on 23 November. It was then taken by road for burial in Rabwah, near Salam’s birth-place. Rabwah is the capital of Pakistan’s Ahmadiyya community, a controversial and much-persecuted religious minority of which Salam was a member. [...]

[...] Salam’s passions were divided between theoretical physics, religion, Pakistan and the developing world. Last week, tributes flowed from all four, as well as from the Italian town of Trieste, where Salam was founding director of the International Center for Theoretical Physics, an institution designed to benefit third world scientists. “This is surely the end of an era,” says Luciano Bertocchi, deputy director of the center.

Salam shared the 1979 Nobel physics prize with Sheldon Glashow and Steven Weinberg for unifying electromagnetism and the weak nuclear

force. Tom Kibble, professor in the theoretical physics department at Imperial College, London, places Salam among “the first rank of physicists, if you exclude Einstein and Dirac.” Kibble joined this department in 1959, two years after it was established by Salam.

Salam remains the only scientist from a Muslim country to have won a Nobel Prize. To him, science and faith were inseparable, and he would frequently urge religious leaders to become knowledgeable about science. [...]

[...] Salam never publically criticized the government and insisted on retaining Pakistani citizenship. This continued commitment to Pakistan baffled many, including some of his Pakistani colleagues. “I have never been able to understand why he was so dedicated to his country when he was virtually ostracized here, being an Ahmadi,” says Pervez Hoodbhoy, professor of physics at the Quid-i-Azam University in Islamabad.

“Salam was never embittered and never gave up trying to do what he could for this country,” Hoodbhoy adds. [...]

(*Nature*, Vol. 384, 28 November 1996, p 296)

# Abdus Salam

## Reconciling Two Worlds

*Anthony Tucker*

Pakistan's first Nobel Laureate, Professor Abdus Salam, who has died aged 70, was a theoretical physicist and mathematician of world stature who developed theories that unify and extend seemingly irreconcilable aspects of particle physics. Acting as a one-man bridge between North and South, he greatly influenced and encouraged science and its support in developing countries throughout the world.

Abdus was founder, inspiration and, until 1995, director of the International Center for Theoretical Physics in Trieste (ICTP), which was set up in 1964 under The International Atomic Energy Agency as a forum for North-South intellectual exchange to help train theoretical physicists from developing countries. In the 1970s, Abdus established a Summer College on Physics and Contemporary Needs at Nathiagali in Pakistan, extending the range of interests well beyond those of theory.

As a scientific advisor to successive President of Pakistan from 1961 to 1974, he played a major role in establishing Pakistan's science, medical and agricultural research councils, based broadly on a state and university "dual support" system. The national collaborative framework for scientific policy and finance, drawn up under his guidance, is still in place. However, while he spoke of a balanced system for Pakistan in which agriculture, medicine and public health would be supported on equal terms with other sciences, the large share of resources allocated to nuclear science and technology resulted in serious imbalance and vigorous criticism.

Thus, in spite of his powerful influence in world physics, his eminence in the West and lifelong commitment to science in developing countries, in his own country Abdus Salam has been blamed for the starvation of important areas

of science through encouraging theoretical and nuclear physics and, by inference, weapons research. He was advisor and a member of the Pakistan Atomic Energy Commission during the setting up and staffing of Pakistan's Candu reactor and the establishment of Institution for nuclear science and space science.

Yet his interests had two prime areas of focus; the elegant mathematics underlying and linking the fundamental forces of nature, and the role of science in tackling world-wide problems of poverty, development and human well-being. The research imbalance in Pakistan which, in later life, Salam acknowledged as scientifically and socially unsatisfactory, arose from a perceived political need for defense against the "Indian nuclear threat." As an expression of political and defense aims, it was never a product of planned science policy.

Whether he could have influenced national defense policy or prevented the political annexation of the nuclear program in Pakistan with any more success than, for example, his brilliant contemporary, Homi J. Bhabha in India, is a question that is unlikely ever to be answered. Salam's influence as an advisor ended in 1974. Paradoxically, although he was a member of the UN Advisory Committee on Science and Technology throughout this period, and its chairman in 1971-72, he was criticized in Pakistan for living and working in the West and turning his back on the problems of his own country.

Never justified, this criticism was heightened because, although born Muslim, he was a member of the Ahmadiyya Sect and condemned as a heretic by extreme religious orthodoxy in Pakistan. Hostility and inadequate facilities led him, inevitably, to concentrate his scientific research mainly in his department at Imperial College in

London, and his work for developing countries at ICTP in Trieste and through other international agencies, such as the Third World Academy of Science.

Tragically by the early 1980s, he was already in the grip of a degenerative neural disorder that he bore with amazing tolerance. Suggestions that he might somehow have been linked with Pakistan's costly deal with China for reactor technology in the 1990s, or with the decisions to build a 40 megawatt plutonium producing reactor at Khushab (a project of the 1980s not revealed to the world until Benazir Bhutto's visit to America in the spring of 1995) are absurd.

Salam sought nuclear disarmament. He was a vigorous supporter of Pugwash, a philosopher of huge intellect who, outside his science, dreamed of and worked for a better and more peaceful world. In science, his concern was the reconciliation of the invisible and seemingly fragmented and ephemeral micro-world of particle physics, with the solid world of matter and the visible reality of the universe – one of the major philosophical challenges of the 20th century.

In 1959, under Blackett and with Paul Matthews, Salam set up the first theoretical physics group at Imperial College. Over the following two decades he produced a torrent of work which clarified fundamental if esoteric aspects of physics. Delving into what was then an unfashionable sector of the complex mathematics of elementary particles, he unified the theories of electromagnetism and the so called weak nuclear force, predicting the existence of distinctive particles (intermediate vector bosons) and a phenomenon known as the neutral current. This won him, with Weinberg and Glashow, a share of 1979 Nobel Prize for physics. All the predictions were later confirmed.

Although increasingly limited by disability, which put him in a wheelchair and eventually robbed him of the power of communication, this was only a fragment of his theoretical work. A 700-page *Festschrift* published in 1993 was, his

colleagues emphasize, only a selection of his papers.

Although he sometimes quoted Einstein's whimsical paradox to his students – "The incomprehensible thing is that the universe is comprehensible" – his life was dedicated to an unending search, through mathematics, for greater comprehension of the seemingly incomprehensible. A giant, who met and defeated many difficulties, he was, in many ways, inspirational.

Abdus Salam was born in Jhang, a small town in a poor farming district of what is now Pakistan. His father, a former schoolteacher and an official in the local department of education, was dedicated to learning. His family soon realized that young Abdus has great gifts. When only 14, he gained the highest marks ever attained in the Punjab University matriculation examination. On his return, the whole town gathered to meet him.

After graduating in 1946 at Government College, Lahore – part of the University of Punjab – he was awarded a scholarship to St John's College, Cambridge. There he gained a double first in mathematics and physics in 1949 and, a year later, won the Smith's prize for the most outstanding pre-doctoral contribution to physics. His doctoral thesis, published in 1952, extended highly original fundamental work on quantum electrodynamics which had already gained him an international reputation and which served as the spring-board for his later scientific career.

Salam intended to base this in Pakistan. Returning to Government College at Lahore to teach mathematics in 1952, he was appointed head of the mathematics department at Punjab University the following year. Although things seemingly went well, it proved impossible to establish the type of post-graduate research school that he sought. In 1954 he returned to Cambridge and in 1957 became professor of Theoretical Physics in Imperial College.

In 1955 and 1958, he was scientific secretary of the United Nations Geneva Conferences on



Peaceful Uses of Atomic Energy, became a member of the foundation committee of the United Nations University (1970-73), served as a member of the Stockholm International Peace research Institute and was Vice-president of the International Union of Pure and Applied Physics (1972-78). He served as president of the Third World Network of Scientific Organizations and of the Third World Academy of Sciences.

Elected a Fellow of the Royal Society in 1959, he later won the Royal Society Hughes Medal, the Royal Medal and the Copley Medal, and a host of awards and honorary doctorates in countries throughout the world.

In 1965, he contributed to a series of lectures on Radio Pakistan that were named after the great Pakistani poet, Iqbal. The Pakistan Atomic Energy Commission published his own lectures,

essentially a history of particle physics, in 1966. In the closing words of a preface looking forward to a great resurgence of poetry and of science in Pakistan, Salam expressed both the purpose of the lectures and his own scientific credo.

“These lectures are an account of man’s search for unity in the understanding of the physical universe and the ultimate nature of the matter. During them, I would like to show how rewarding the faith in the eventual unity, the eventual harmony, the eventual beauty of the basic laws of nature has proved in unravelling some of the deeper insights we have achieved.”

“Some of these concepts are extremely deep. I can only hope I have not relapsed into a misty profundity which is quite often in science a cloak for one’s own ignorance.”

(The Guardian, November 22, 1996)



Prof. Salam in his office with On. Giulio Andreotti, Prime Minister of Italy.

# Two Ceremonies Held in London in Memory of the Late Dr Abdus Salam

*Rashid A. Chaudhary*

(Translated From Al-Fazl International by Majeed A. Mian)

Some time ago a ceremony was held in the Imperial College of Science, London, to pay tributes to the life and achievements of Professor Abdus Salam. This event was organized by Pakistani scientists and was attended by renowned scientists from all over the world. The speakers highlighted different angles of Dr Abdus Salam's life. They said that he was a great scientist and had particularly performed exemplary work in promoting scientific knowledge among the Third World countries. Majority of the speakers were Professor Dr Salam's colleagues or his former students. Professor Kibble of Imperial College who was one of the colleagues of Dr Salam and is currently the head of Theoretical Physics, spoke at length explaining the achievements of Dr Salam in the field of sciences.

Students from various universities were also present at this occasion. Professor R. Delbourgo of the University of Tasmania said in his address that Dr Abdus Salam was a great scientist who performed research work in the field of physics. He said that various scientific projects were initiated by Dr Salam. He further said that his life is a practical guide for other scientists. Dr Salam, Professor Delbourgo mentioned, had revolutionized the thought process in the field of science through his own research. He said that his lectures were very scholarly and at the same time, easily understandable. In spite of reaching such heights in his life, Dr Salam was an extremely gentle human being and possessed very affectionate and humble qualities. Dr Fahim Hassan read out his paper on the subject of Professor Abdus Salam, Science and Technology in Pakistan. He mentioned the achievements of Dr Salam and added that unfortunately the leaders of

Pakistan did not give much heed to the valuable proposals put forth by Dr Abdus Salam. Dr Hassan further stated that at the time of the partition of India, Pakistan did not have adequate level of higher scientific education. On the contrary, he said, that Madras and West Bengal in India already had recognized institutions of higher scientific learning. Dr Abdus Salam tried to promote scientific research in the field of sciences. He had desired to promote the quality of science in Pakistan to come at par with the international standards. Dr Abdus Salam was scientific advisor to the President of Pakistan from 1961 to 1974. This was the era in which Pakistan accomplished great success in the field of science in economics. It was mentioned during this gathering that Dr Abdus Salam was the founder president of Pakistan Space and Upper Atmosphere Committee. Besides, he was also the founder of many scientific organizations in the country. He was awarded Sitara-i-Imtiaz or "The Star of Distinction" medal for his brilliant performance. Dr Fahim Hassan mentioned during his address that Pakistani political leaders have always ignored Dr Abdus Salam as in their view, progress in the field of science held only secondary importance. In spite of this, Dr Salam did not give up. He continued to motivate the scientists to promote sciences in Pakistan. Dr Fahim Hassan expressed his views that due to this kind of treatment from the rulers of Pakistan, Dr Salam was quite concerned but he never lost hope.

Another ceremony that was held on Friday, February 21, 1997, at Pakistan High Commission to commemorate Dr Abdus Salam's meritorious achievements was organized by the British Association for Pakistan Studies and Pakistan

Society. Renowned scientists paid glittering tributes to Professor Abdus Salam. They admitted that the services rendered by Dr Salam for the advancement of science have become etched on the pages of history. He advanced the cause of science throughout the Third World in such a way that today, the whole world is benefiting from it.

Among other notable speakers present were Professor Tom Kibble of Imperial College, Professor Chris Isham, Dr Saeed Durrani, a Pakistani scientist from Birmingham University, and Sir Oliver Foster, the President of the Pakistan Society and the British Association for Pakistan

Studies. Many other important personalities from various walks of life also attended this event.

The speakers while addressing the audience, asserted that Dr Abdus Salam was a staunch patriot as he continued to hold his Pakistani citizenship till the end of his life and had made a will to be buried in Pakistan. They told the audience that Professor Dr Abdus Salam Sahib was the founder of Third World Academy of Sciences as also the founder director of International Center for Theoretical Physics in Italy.

# Message of the Prime Minister of Pakistan at the Ceremony for Renaming ICTP after Dr Salam

Professor Miguel Virasoro  
Director  
International Center for Theoretical Physics  
Trieste, Italy

Dear Prof. Virasoro,

I am delighted to learn that the Steering Committee of the International Center for Theoretical Physics together with its major sponsors namely the Government of Italy, the International Atomic Energy Agency and the United Nations Educational and Cultural Organization have decided to rename the Center as Abdus Salam International Center for Theoretical Physics.

Renaming this highly prestigious Center is not only an honor for the memory of Prof. Salam but also for Pakistan. He was a scientist of world stature and built up this Center over a period of three decades. We are proud of him as the only Nobel Laureate of Pakistan. As the Scientific Advisor to the President of Pakistan for 11 years he rendered invaluable services to his country. As Director of ICTP he served the cause not only of the international physics community but also of the scientists of the third world. He made outstanding contribution toward extending the frontiers of human knowledge and promoting science and technology throughout the world. I am sure that the renaming of the Center will be a source of great inspiration to the younger scientists everywhere.

Muhammad Nawaz Sharif  
Prime Minister of the Islamic Republic of Pakistan

# Dr Abdus Salam Remembered

*C. H. Llewellyn Smith, Director General,  
European Organization for Nuclear Research, Geneva*

When Abdus Salam died a year ago, the world lost a great scientist and citizen, and Pakistan lost a great son. The news of his death, on 21 November 1996, reached me when I was chairing the Research Board at CERN, the European Laboratory for Particle physics situated near Geneva in Switzerland. This was highly appropriate because the Research Board was the body which in 1978, approved the modification of CERN's large proton accelerator to collide protons with their antiparticles (anti-protons). These collisions were sufficiently powerful to create the particles (called W and Z bosons) that transmit the so-called "weak force," which is essential in powering the sun. These particles were discovered at CERN in 1983 with the masses predicted by Salam and independently by two Americans (Glashow and Weinberg) thereby confirming beyond doubt their theoretical arguments for which they had already been awarded the Nobel Prize in 1979, that the weak force and electromagnetism are different manifestations of a single unified force.

Latterly, Salam suffered from a crippling neurological disease, and he had effectively been lost to his friends and admirers for some years. Nevertheless, his death moved us greatly and focused our minds on how much we had lost; a wonderfully warm and sparkling human being, a scientist of profound originality, and a tireless servant of the developing world.

Salam's unified description of the weak and electromagnetic forces is as intellectually profound as the nineteenth century unification of the electricity and magnetism which led to the development of radio and the other marvels of the electronic age. Indeed, in some ways it is more surprising since superficially the differences between the weak and electromagnetic forces are even greater than those between the first

manifestations of electricity (sparks) and magnetism (attraction between certain stone). But Salam's list of scientific achievements contains others of almost equal importance as the experts will recognize (e.g., two-component neutrino theory; first grand-unification theory, invention of superspace). His contributions were recognized by many honors (membership of some 20 academies, he was the youngest Fellow of the Royal society of London when elected at age 33, over 20 prizes, over 20 honorary doctorates, and some 50 orders), but their number and range indicates that he was much more than a great scientist...

Salam had no formal connection with CERN, although he was a frequent visitor, and from 1980 to 1986 a member of CERN's Scientific Policy Committee. However, his work inspired much experimental and theoretical work there including the discovery (in 1973) of so-called neutrino neutral currents which was the first evidence for his unified electro-weak theory. It was typical of his generosity that, on hearing that he had been awarded the Nobel prize in 1979, he hurried to CERN to pay tribute to those who had made this discovery.

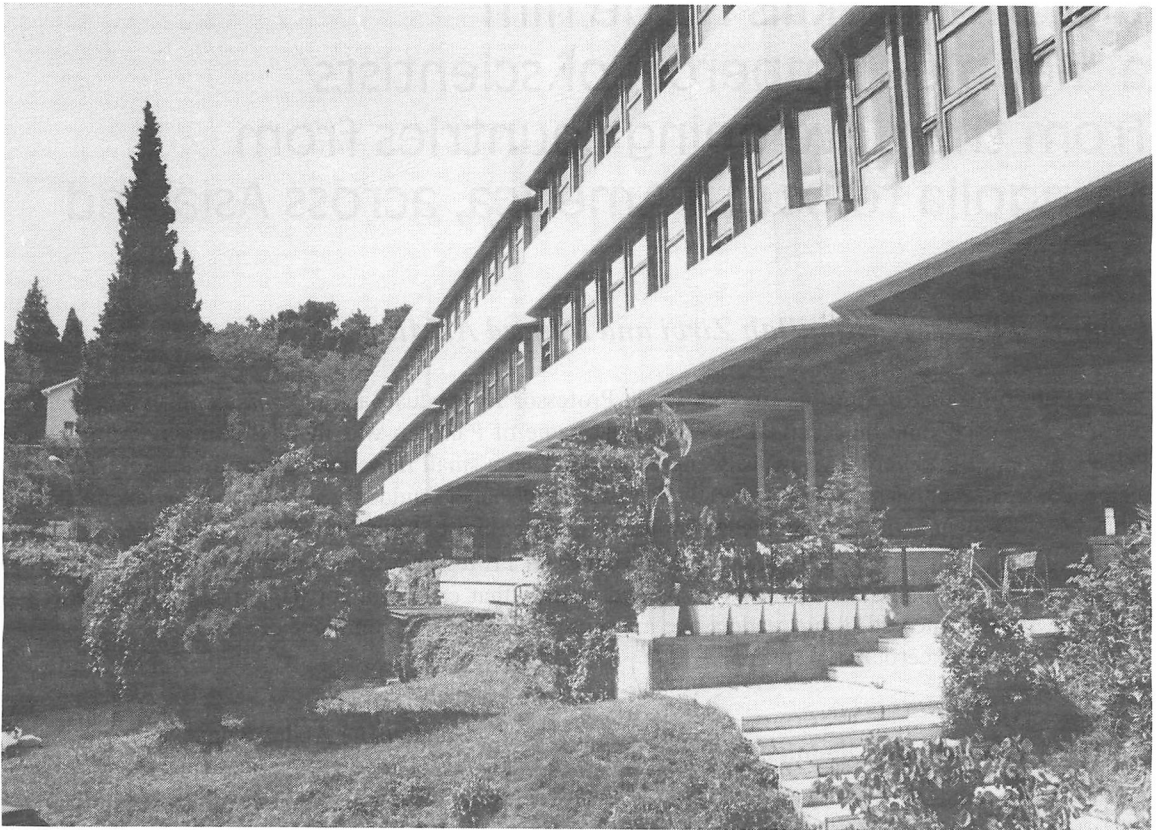
Salam appreciated the fact that, in experimental particle physics, CERN is playing the role that he envisaged for ICTP in theoretical physics. This has enabled scientists based in developing countries to participate in the exciting intellectual endeavor, and technological challenge, of exploring the fundamental structure of matter in large accelerator-driven experiments. Salam would have viewed the increasing collaboration between Pakistan and CERN with particular pride and satisfaction. Despite the demands of his own scientific work and duties as Director of ICTP, Salam was generous with his time both officially (he accepted some dozen assignments from the UN and from the government of Pakistan, including

that of the scientific advisor to the president). He was a tireless worker who was sustained by his deep religious faith. To finish with Salam's own words:

“The Holy Quran exhorts believers to study nature, to reflect , and to make the best use of reason in their search for the ultimate. The quest of knowledge and science is obligatory to every Muslim from cradle to grave: Science is important because of the understanding it provides of the

world around us, for the material benefits it can give us, and because of its universality. Science and technology are shared heritage of all mankind. East and West, South and North have all equally participated in their creation in the past as, we hope, they will do in the future, this joint endeavor becoming a unifying force among the diverse people of this globe.”

(Dawn, November 22, 1997)



A view of the Abdus Salam International Centre for Theoretical Physics.

# Pakistan Mourns the Death of Prof. Dr Abdus Salam

His great intellectual stature, his mastery over language, his commitment and deep sense of self respect, his enormous confidence and diplomatic skills made him a "People's Emperor" of scientists from the developing countries from Mongolia to South America, across Asia and Africa.

*Compiled by Dr Karimullah Zirvi and Majeed A. Mian*

It is an irony that during his lifetime while Professor Dr Abdus Salam, *Rahimahullah*, was gaining stardom, and each time he received an honor, the name of Pakistan was mentioned along with his, the Pakistani press either kept mysteriously silent or published a small news item as if nothing important had happened. However, as he passed away, the Pakistani newspapers suddenly seemed to have taken an about turn. Most English and Urdu language newspapers carried not only the news of his sad demise but also published long articles and editorials paying tributes to Professor Salam's noble character. It will be difficult to accommodate all the news items and articles that came out for days in the Pakistani Press. However, for the interest of our readers, we are presenting hereby a summary of some of the newspaper articles and news excerpts:

## **President of Pakistan Condoles Death of Dr Salam**

*Islamabad, Nov. 21, 1996 (INN):* President Farooq Ahmad Leghari has expressed his deep sense of shock and grief over the tragic demise of

Nobel Laureate, Dr Abdus Salam.

In his condolence message, the President eulogized the services of Dr Salam for Pakistan and termed it an irreparable loss. The vacuum created by his death, can not be filled for a long time to come, the President added.

The President said, “Dr Salam was Pakistan’s ambassador-at-large and as the only Nobel Laureate of Pakistan who brought fame and recognition to his motherland in the scientific community of world and put Pakistan firmly on the world’s science map.”

“In his death the nation has lost a great son,” the President said.

The President prayed to Almighty Allah to rest the departed soul in eternal peace and grant courage and fortitude to the bereaved family to bear this irreparable loss with equanimity.

### **Prime Minister of Pakistan Condoles death of Dr Abdus Salam**

*Islamabad, Nov. 21 (INN):* Caretaker Prime Minister Malik Meraj Khalid has paid glowing tributes to the invaluable services rendered by Prof. Abdus Salam in the field of science.

In a condolence message, the Prime Minister expressed deep sorrow and grief over the sad demise of Prof. Abdus Salam. The contribution, he said, not only won Nobel Prize for him but also earned pride and recognition for Pakistan in international circles.

*Death of a Genius*, was the heading of a long editorial of *The Daily Dawn* of its issue of November 22, 1996. The editorial highlighted the achievements of Dr Salam and his meritorious services to Pakistan. The editorial also mentioned how his achievements also brought fame and glory to his native Pakistan.

**Dr Anis Alam** writes under the caption, “The Force We Never Applied Fully” in *The News International* (November 29, 1996):

Dr Abdus Salam, the greatest scientist that Pakistan has produced, died in Oxford in the early hours of November 20. He would have turned 71 next January. It is difficult for an average Pakistani engrossed in his daily concerns to comprehend the loss Pakistan has suffered. Dr Salam was the lone Pakistani star who shone brightly on the international scene. With his passing away there is no Pakistani scientist whose name and personality

inspires similar respect and admiration. He brought fame and glory to Pakistan by researching into the mysteries of the basic building blocks and fundamental forces that bind together into a myriad of things, intricate and beautiful. His researches have been recognized the world over. The crowning glory to his work was the award of Nobel Prize for Physics in 1979. Besides the Nobel Prize, he won innumerable other honors for his work from the very beginning of his scientific career...

We were not hospitable to our hero. His last public engagement in Lahore was nearly eight years ago when he delivered the Faiz Memorial lecture to a packed hall of admirers. Dr Salam has been known to the older generation of Pakistanis very well but the younger generation has not been exposed much to his genius.

He stands along with giants like the English Newton, who discovered the universal law of gravitation in the year 1687, the French, Coulomb, who discovered the law between electric charges in the year 1770, the Japanese Yukawa who discovered the law governing the strong force in 1935, and the Italian Fermi who discovered the weak nuclear force.

Dr Abdus Salam is one of those who successfully made the first advance towards achieving Einstein’s goal; unifying all forces of nature into a single one. Salam succeeded in unifying two of the four fundamental forces into one...

Dr Abdus Salam contributed to every major advance made in the field of particle physics since 1950. He narrowly missed sharing the Nobel Prize in 1957 for his theory of parity violation in weak interactions...

Throughout his working life, Salam was driven by this desire to create a better world. It would have been far easier for him to keep busy with his scientific researches, accept professional chairs in prestigious seats of learning, make life comfortable for himself and his family. But being strongly aware of his social being, hence of his social responsibilities, he took the more hazardous road. All his life he gave as much importance to social

concerns as to his scientific work. His life is a shining example of a person living a full professional life with all its responsibilities while fully alive to social obligations...

He was proud of his Pakistani origin. While keeping himself in the forefront of international scientific community, he continued to draw sustenance from his philosophical, cultural and religious roots. He was a deeply religious man, who found no contradictions between his scientific investigations and his religious beliefs...

Dr Abdus Salam was such a personality that Pakistani youth ought to emulate. He is no more with us. The best way to cherish his memory is to create an environment that is conducive for the development of scientific spirit and temper essential for the creation of many more Salams.

**Dr Pervez Hoodbhoy** writes under the caption, "Encounter with Salam:"

The year was 1972 and all the big guns of physics had turned up to hear Professor Abdus Salam speak at a joint MIT-Harvard seminar. It was rare for so any of the famous to come, but this was no ordinary speaker. Salam confidently navigated this arena, the graveyard of many a bold idea, presenting his work and easily disposing of the questions which followed...

Born in a lower middle-class family in a village near Jhang, he went to a perfectly ordinary Urdu-medium school. One of his brothers, who now lives in Islamabad, says that as a boy, Salam had never seen an electric light until one day he was told about it by somebody, at which point he was wonder struck. Subsequently, he was delighted to go to Lahore and have the exquisite pleasure of studying under an electric light. An unsophisticated home and environment notwithstanding, this child prodigy mastered his studies and rapidly out-paced his teachers who recognized and respected the young boy's talent, and bore him no grudge...

The truth is that Abdus Salam was not Isaac Newton or Albert Einstein or Richard Feynman;

he never claimed otherwise and would have felt deeply uncomfortable if someone else had claimed this for him. But his achievement of unifying two basic forces of nature had greater impact upon the development of physics, and is deeper and more profound, than the works of most other Nobel Prize winners in this century. Today, unification theory is touchstone of modern physics...

Salam was able to show that two apparently very different forces which govern nature have the same mathematical origin. One is the electromagnetic force... The other is the "weak nuclear force" which, among other things, is that force which causes the sun to convert its hydrogen into nuclear energy. Although there was suspicions that the two were somehow related, nobody could pin-point in mathematical terms the precise relation until Salam (from Trieste and London) and Weinberg (from MIT), working independently of each other, came up with a sound explanation almost simultaneously. Now called the electroweak force, it has been tested in dozens of clever experiments and has passed with flying colors in each. Today the search for the "Higgs" particle, predicted by Salam, is considered the number one priority in the world of physics...

Certainly, Salam's integrity and intelligence did not permit his beliefs, or matters of personal preference and ego, to determine the outcome of his scientific work. The creator of electroweak Unification never, for example, claimed that this theory was the last word; he spent much of his years after 1968 seeking routes for more complete vision of physics. But his religious beliefs and cultural background deeply influenced the course of his life. These became more important as he grew older. Sometimes in the 80's he began signing himself as "Muhammad Abdus Salam." At the one level he sought peace, tranquility, and inspiration in contemplation and prayer. He became persuaded that the Holy Quran demands man to seek scientific truth, and that man has been uniquely empowered to solve the deep mysteries of the universe. At another level, he became an



intrepid fighter for the cause of even those who would have nothing to do with him...

Salam's epoch-making achievements as a scientist stand in stark contrast with his dismal failure to bring science back to Islam. It was not for lack of trying, but nothing ever really worked. The Islamic Science Foundation, a grand scheme for scientific advancement with an endowment of \$1 billion collected from oil-rich countries, came to nought after Salam was banned from ever setting foot in Saudi Arabia. Kuwait and Iran did give some money for supporting their scientists at the ICTP, but the amounts were niggardly. Promises by kings, princes, and emirs remained promises...

Salam died on November 20th, 1996. The Islamic world, deep in medieval slumber, scarcely noted it. (Source: Progressive Mailing).

**Munir Ahmed Khan** writes under the caption, "Salam Passes into History:"

Very few Pakistanis have brought such honor and respect to their homeland as Prof. Salam. He was not only the most outstanding scientist of Pakistan but perhaps the greatest scientist produced by any Muslim country in this century. His health failed him when he reached the pinnacle of his achievement and could not enjoy the fruits of his life-long labors and ceaseless endeavors. He was working on new vistas in science which could have won him a second Nobel Prize.

Besides being a scientist of world renown, he was a visionary, a patriot, a servant of the third world and above all an unassuming human being. His success in extending the frontiers of science only deepened his humility and strengthened his commitment to his fellow countrymen. He leaves behind thousands of highly trained scientists in many countries of the Third World particularly in Pakistan who will carry forward his mission well into the 21st century. While he did so much for us and for the developing countries, there is little that we can do to repay the debt we owe him...

His vision of what science could do for accelerating the economic and social development of the Third World went far beyond theoretical

physics. He demonstrated this over the years by continuously expanding the role of ICTP from theoretical physics to cover computers, electronics, chemistry, energy, environment, biotechnology, and genetic engineering. He not only held meetings in these areas at Trieste but founded allied institutes in some of these fields there. He awakened the developing countries to the crucial role that the science had to play for their survival in the 21st century. He fired the imagination of many presidents and heads of governments in Latin America, Africa, the Middle East and Asia to give greater priority to science, but, alas, his repeated pleas to Pakistani leadership did not have the same effect. He tried and tried but failed to persuade Pakistan to establish high technology centers, MIT type universities and other infrastructure for science in our country. This is a great misfortune and failure on the part of our policy makers and politicians who have not yet grasped the crucial importance of science for our future development and survival...

Professor Salam made invaluable contributions to the development of science in Pakistan and remained the Chief Scientific advisor to the President and a member of the PAEC for 14 years. He became the mentor of the PAEC since its very inception. He helped select the site for Pinstech and supported the acquisition of Kanupp. he encouraged the government to train scientists abroad and helped them obtain placement in key universities and laboratories through his personal contacts. He was responsible for the establishment of Suparco. He advised Ayub Khan to seek US help for waterlogging and salinity problems in Pakistan which led to the Revelle Mission...

He enjoyed tremendous respect not only among the scientists but heads of governments and states in numerous countries and some of them became his personal friends. Once, while visiting Beijing, I was told that the Chinese Academy hosted a dinner in his honor which was to be attended by the prime minister. However, breaking all protocol, the President of China also decided to attend the dinner just to honor Salam. The South Korean President once asked Salam how a South

Korean scientist could get Nobel Prize.

My last meeting with Salam was only three months ago. His decease had taken its toll and he was unable to talk. Yet he understood what was said. I told him about the celebration held in Pakistan on his seventieth birthday. He kept staring at me. He had risen above praise. As I rose to leave he pressed my hand to express his feelings as if he wanted to thank everyone who had said kind words about him.

Professor Salam had deep love for Pakistan in spite of the fact that he was treated unfairly and indifferently by his own country. It became more and more difficult for him to come to Pakistan and this hurt him deeply. Now he has returned home finally, to rest in peace for ever in the soil that he loved so much. May be in the years to come we will rise above our prejudices and own him and give him, after his death, what we could not when he was alive.

**Dr Mujahid Kamran** writes under the caption, "Abdus Salam – The Human Side," in *The News International* (Nov. 26, 1996, p. 10)

... He was not only brilliant but also had the gift of immense concentration. He was able to develop and retain this trait throughout his life. There are numerous instances which illustrate this. I will mention only two, one from his childhood and one from his later years.

The childhood incident has been narrated to me by his first cousin, Iqbal, who is also his brother-in-law. One day, his mother kept on calling him but there was no response. The worried family launched a search for him. Eventually, he was discovered inside the house hidden behind a stack of quilts (razais and lihaffs) reading a book quite oblivious of the hullabaloo that accompanied the search for him. Col. Iqbal further said that Salam used to find for himself suitable nooks and corners or other places in the house where he could concentrate.

The second instance is from the year 1992

when I last met him. At the time his illness, a rare disorder of the nervous system, had rendered it impossible for him to walk easily even with a stick. Adjoining his office was a room where he used to rest alone around lunchtime. He asked me to walk him to that room. It was with a quite bit of difficulty that we managed to walk up to the door of his office when he spotted a recent research paper lying on the top of a stack of papers on a chest-high safe or rack. He stopped instantly and started looking at the paper. And then suddenly I felt that he was no longer with me. He was completely absorbed in it for several minutes and I could sense his immense powers of concentration. His illness, his difficulty in standing, seemed to have disappeared for those minutes and there was an air of such intense absorption about him that it appeared to me that he would not come out of it. Then he gradually came out of it and we walked to the next room silently...

Salam was one of those rare scientists of stature who combine their supreme creative powers with a great capacity of institution building. He was, therefore, to use the categorization of the late Prof. Baqi Beg, simultaneously a "Greek" and a "Roman." ...

His great intellectual stature, his mastery over language, his commitment and deep sense of self respect, his enormous confidence and diplomatic skills made him a "People's Emperor" of scientists from the developing countries from Mongolia to South America, across Asia and Africa. His death shall be mourned by his admirers all over the world. With his departure, an era has come to an end.

**Mr Ahmed F. Jivanjee**, Karachi writes under the caption, "Tributes to a Great Scientist:"

The void created by the passing away of Prof. Dr Abdus Salam, the internationally famous scientist, scholar, and humanitarian, will be extremely difficult to fill and the immense loss, not only to the Third World, but the entire world of

scientists, scholars, intellectuals and humanitarians will be almost irreparable.

In recognition of his colossal and brilliant contribution to scientific inventions and research, he was awarded the prestigious Nobel Prize and other citations, prizes, scholarships, degrees and awards by numerous countries of the world, including, “surprisingly,” by Pakistan in rather a “luke-warm” manner...

Just because he was an Ahmadi, Dr Abdus Salam was ignored by successive governments in Pakistan; so much so that he had to reluctantly leave his beloved homeland and establish himself in Trieste, Italy. Now, after his death, we have the audacity to “grab” him as a Pakistani, but during his lifetime, did we treat him as one? In spite of the fact that the Holy Quran and our Holy Prophet (peace be on him) have laid great stress on protection of the minorities, we have thrown to the winds this noble message...

In another article entitled, *A Hero is Gone*, by **Mr Pervez Hoodbhoy** in the same issue of *The Daily Dawn*, a more impressive account appears that details Professor Salam’s love for physics and his country. His article begins by saying:

“With the death of professor Abdus Salam, the world has lost one of the mightiest intellectuals born on the subcontinent, and the most powerful and influential advocate of science for developing countries. To the world of physics, he has left a legacy, known as the Unification Theory, that is now a benchmark against which future progress in physics will be measured. To the countries of the Third World, he has left behind a unique institution in Italy which invites and benefits over a thousand scientists each year.”

Mr Hoodbhoy goes on to pay his tributes to Dr Salam profusely quoting from his personal experiences. The last part of this account reads as follows:

“Salam was an intimidating personality. I can remember that the first time I asked him a physics question was after I had received my doctorate in nuclear physics in 1978. “Go look it up in a book,” was his curt reply. I felt thoroughly

chastened and small. It wasn’t until 1984 that I approached him again. It was different this time, and we developed an understanding which grew deeper and firmer with each passing year. He asked me to co-author with him an article. I accepted instantly, feeling distinctly proud of honour.”

“In interacting with Salam, I could see that two strong passions governed his life. Physics research occupied him intensely. His mind would lock onto a problem making him oblivious to all else. He engaged only the most challenging and difficult problems in the field, problems that only the greatest can dare try. The elegance of his solutions was startling, as for example in his brilliant creation of what are superfields. Without this powerful mathematical concept, physics would have a very hard time to progress beyond a certain point in grappling with the basic laws of nature.”

“Salam’s other passion was Pakistan. I have never been able to understand why he was so dedicated to the country of his birth given that he was virtually ostracized there, being an Ahmadi. I can remember that when the members of the physics department at Quaid-i-Azam University sought to invite him for a lecture after he received the Nobel Prize, the idea was vetoed when the student arm of a vociferous religio-political party threatened to use violence if he came to the campus. In spite of this and much more, Salam was never embittered and he never gave up trying to do whatever he could for his country.”

“Many people ask why Salam did not stay in Pakistan, choosing to stay as a professor at the Imperial College in London and the director of the Physics Centre in Italy. I think his decision was wise. His genius as a scientist would have been wasted had he stayed on in Pakistan, the loss to physics would have been certain and enormous. Moreover, he would have little real chance to make a big difference because priorities in Pakistan have always been skewed heavily against the development of science. The most Salam could have achieved was a slight amelioration, if at all.”

“Salam is gone. There is no Pakistani, or for

that matter any scientist from any Muslim country, who even remotely approaches him in stature. The loss is irreparable. Let us mourn.”

In its editorial entitled, *Dr Abdul Salam, a genius and pride of Pakistan*, *The News* of November 22, 1997, after paying long tributes to the great scientist, closes with the following paragraph:

“As, a young boy, when Dr Salam passed his matriculation exam he recalled, “I started for home on my bicycle from Maghiana to Jhang city. News of my standing first in the Punjab province had already reached Jhang city. I had to pass through Police Gate District of Jhang city to reach my home in Buland-Darwaza. I distinctly recall that those Hindu merchants who normally would have closed their shops due to the afternoon heat, were standing outside their shops to pay their homage to me.”

*The Muslim* of November 26, 1996 carried the following headline:

‘Salam source of inspiration for all scientists of world’

In describing the event held in his memory, the newspaper wrote, “... Glowing tributes were paid to Professor Abdus Salam, the only Nobel Laureate of Pakistan, by several distinguished scientists, educationists, colleagues and students of the Late Professor at a meeting held in his memory here Sunday, says a Pak Nuclear Society...”

In another news item under the caption, Dr Salam laid to rest, *The Muslim* of the same day writes:

RABWAH, Nov 25 (PPI): Prof. Dr Abdus Salam, Pakistan’s only Nobel Laureate and one of the foremost figures in the 20th century physics was laid to rest on Monday morning at Rabwah graveyard besides the grave of his father, Ch. Muhammad Hussain.

His funeral was attended by thousands of

mourners from all over the country who had assembled at the graveyard to have final glimpse of the world renowned scientist.

Local Amir Mirza Mansoor Ahmed (led) Nimaz-i-Jinaza of the late Nobel Laureate.

Dr Abdus Salam died on Thursday in London and his body was flown to Lahore Sunday night which later was shifted to Rabwah for burial.

Prof Dr Salam won the Nobel Prize in 1979 for his theory unifying the two fundamental forces of nature, the electromagnetic force with the weak nuclear force.

He was widely respected in international intellectual and political circles.

**The Nation** of November 29, 1996, publishing a long news item paid glowing tributes to Professor Salam. The headline was entitled, *Remembering Dr Abdus Salam*, and the subheading said, *All his professional life, Salam worked at the frontier of physics. His example is a morale booster for the youth in developing countries, says Dr Anis Alam.* In the rest of the article, Dr Anis Alam has highlighted the life and accomplishments of Dr Salam. It is a long article that enumerates not only Dr Salam’s achievements in the field of physics but also present him as a multifaceted personality. According to Dr Anis Alam, Professor Salam’s reflections on science, technology, education, history, philosophy, religion, economics, cultural and general problems of under-developed in the Third World are extremely important, thought provoking and very valuable. Dr Anis Alam concludes his article with the following words:

“Professor Salam is no more with us. But his legacy remains. His work and his thought are available to us in his writings. Let us make use of them. Let us try to create an environment that will be conducive to the growth of knowledge in general and of science and technology in particular. Let us create an environment that creates Salams and allows them to prosper in their

own country. That will be our best remembrance of Abdus Salam.”

This same article also appeared in the *Encore 4* section of *The News* of November 29, 1996. The headline read, *The force we never applied*, and the sub title read as follows:

Dr Abdus Salam, who put Pakistan on the world scientific map, is no more. His death thousands of miles away from home serves as a sad reminder about the manner in which we treat our heroes.

*The Muslim* of December 9, 1996, carried another full page article entitled *Salam – an intellectual giant* by Mr Pervez Ahmad Butt. His article begins by saying:

Salam was a great scientist but in fact he was even greater as a human being. The greatness of a human being can be said to be directly proportional to the extent of the circle of his love. Salam had the greatness to continue to love his countrymen in spite of hostility. Thousands of scientists benefited irrespective of cast, colour or creed from the institutions founded by Salam... He brought honour to Pakistan right from his days as a child. He kept on topping in all examinations and setting new records.

Another long article was published by **Mr Masood Hassain** in the Weekly Friday Times of November 29, 1996, under the caption, *Farewell Dr Salam, we didn't deserve you*. He begins his article by saying:

We should all feel a sense of shame this week as we bury Dr Salam. Not that we will feel the shame because we are long past such considerations. While he was alive, we spurned him and in the country's fashionable drawing rooms moaned about the government's bigotry and extolled the virtues of the great scientist, but it was then, as it is now, a cop out, a convenient manner in which to pass the buck and avoid the responsibility.

“The fact is that Dr Salam lived through more than one intolerant government. He was there

when Zia ul Haq ruled us. He was there when Mr Junejo was around, there when Mr Balak Sher Mazari briefly ruled the roost and he was there when Mian Sahib and the defunct daughter of the East was ruling. The fact is that none of these leaders had the grace, the vision and the courage to give him the respect he deserved.”

The author goes on to lament the behavior of the political leaders and equally blames the people for not standing up to the truth and just hiding behind “blame the government.” The author's closing paragraph is another eye-opener. He says:

“This reminds me of a likely problem that is bound to arise at Rabwah when Dr Salam is buried this week. Are the authorities going to censor the tombstone to ensure that it contains no objectionable reference to God, His Prophet or Islam? You may not know it, but the tombstones in the graveyard where rest the mortal remains of the leaders of that sect we cannot name, have been defiled by the obliteration of all references to Islam thought by the authorities to be anti-Islamic. Isn't it a supreme irony that we, the Muslims, should erase references to God and words from the Holy Quran because they are being used by ‘non-Muslims?’ I suppose the Irony is lost on those who make sure this ludicrous charade is allowed to carry on. Dr Salam loved this country more than anything else. He drew his inspiration from the Holy Quran...”

In another very thought provoking tribute by Ms Tahmina Masud in *The News International* of December 5, 1996, under the caption, *Salam remembered*, she writes:

“Abdus Salam is dead. A titan has fallen. As part of His grand design, the Creator sometimes produces a giant like Abdus Salam in a nation which has otherwise produced and patronized pygmies.”

“Salam's high intellect and vision to transform Pakistan into a nation at the forefront of science and technology had little relevance to a country which has always been eager to plunge backwards. In the late thirties and early forties, some of the greatest scientists in Europe faced Nazi

persecution and were forced to emigrate to the US where they revolutionized American science.”

“In the early stages of his career, finding the Pakistani soil hostile, Salam left Pakistan to enrich European science. For about three decades, he worked in the UK and Italy. All these years he was adored by Italians whose language he did not speak or understand, revered by Britishers whose culture he hardly liked and despised by his own countrymen whose affection he always sought.”

“In a country where there were hardly any scientists or technologists who had the intellect, imagination or will to think or act in a big way, Salam had little say in the affairs of science and technology in Pakistan. He made a passionate appeal to his countrymen when at Faiz Memorial Lecture at Lahore he said: “If you consider me a non-Muslim... that is your problem. Treat me as a non-Muslim mason if you like, but do let me lay a few bricks for the mosque you want to build.”

“Nobody really cared for him or his words. About the loss of great people, Shakespeare said, “the Heavens themselves blazed forth the death of princes.” The skies may be in mourning over Salam’s death but there is hardly any gloom or grief seen in the land in which he was born and now lies buried. Those who mattered most were too busy in the mundane duties of the State to find time to receive his body at the Lahore Airport or place any floral wreaths on his grave.”

“Our nation stands diminished by its treatment to Salam. Who knows how many centuries we may have to wait before we produce another Salam. Societies and civilisations which do not respect their scholars and thinkers are destined to vanish.”

At the opening ceremony of the 8th General Meeting of the Third World Academy of Sciences on 26 November 1996, TWAS Fellow Professor **Zafar H. Zaidi** from Pakistan remembered Professor Abdus Salam with these words:

I am grateful to organizers for providing me

this opportunity to share with you the grief on the sad demise of Prof. Abdus Salam.

The scientific accomplishments of Prof. Salam are universally acknowledged. Rather than recounting his academic accomplishments, in the limited time I have, I shall confine myself to certain aspects of his personality which have left an indelible mark in the hearts and minds of his compatriots. The foremost of these was his humility which stemmed out of the greatness of his mind and soul.

Pakistan, his motherland, is extremely proud of her illustrious son who strove for enlightenment all his life. He was up against massive hurdles raised by the forces of darkness and obscurantism, but his spirit remained undaunted. He worked tirelessly to convince the powers that be in the Third World countries that scientific progress was *sine qua non* for the spiritual and material well being of their people. His concern for scientific progress was universal; nonetheless science and its future in Pakistan claimed a special place in his heart.

The Government College, Lahore, Panjab University has produced two Nobel Laureates, Prof. Salam and Prof. Khorana. This is a singular honor for any college to achieve.

As the world bids an eternal farewell to him, Pakistan bleeds and enfolds him in an eternal embrace. He is buried in Rabwah, near Lahore, as he had willed.

I recall a similarity in Prof. Salam and another great man of the subcontinent, also Nobel Laureate, Rabindranath Tagore, who was in search of the same truth, but in different realm, that is, literature and arts. I would like to recite a couplet from Tagore’s *Gita Angeli*:

“I dive down into the depth of the ocean of forms,

hoping to gain the perfect pearl of the formless.”

The two are now not with us, but the torch of light they carried will continue to light the path.

# Trieste's physics center named after Abdus Salam

*The Nation, November 25, 1997*

Trieste (Italy) (PR) — The world physics community has welcomed the renaming of the prestigious Physics Center at Trieste as the Abdus Salam International Center for Theoretical Physics (ICTP).

The announcement was made at the Salam Memorial meeting, by the Director of the Center, Professor Miguel (Virasoro), who said that it was a befitting way to pay tribute to the man who was responsible for creating the Center. Salam proposed the establishment of this institution in 1960 to overcome the isolation of the physicists of the Third World and to improve closer contacts between the Western and Eastern scientists during the Cold War years. So far this Center has sponsored 70,000 visits of scientists from over 80 developing countries to interact with scientists from the advanced countries and publish several thousand scientific papers and reports.

The Prime Minister of Pakistan, Muhammad Nawaz Sharif, welcomed the renaming of the Center after Prof. Abdus Salam, Pakistan's only Nobel Laureate. He said that this was not only an honor for the memory of Abdus Salam but also for Pakistan. The Prime Minister recalled that Salam was the Chief Scientific Advisor to the President of Pakistan for 14 years and had rendered invaluable services to his country. He also made outstanding contributions towards the extending of the frontiers of human knowledge and the cause of

the Third World.

The president of Albania, himself a well-known physicist who had been a research scholar at the ICTP, said that Salam had brought great honor and dignity to the poor scientists of the developing countries and was really a hero of the Third World.

The Center is jointly sponsored by the Italian Government, the International Atomic Energy Agency (IAEA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The representatives of the Italian government and the city of Trieste who pay almost 20 million dollars amounting to 80 per cent of the budget of the Center, expressed pride and satisfaction at the performance of the Center. They said that they will continue to support it as an outstanding Center for the Third World scientists as well as the international physics community.

The Director General of the IAEA, Hans Blix, welcomed the change of name and recalled the art which the Agency had played in running the Center for 30 years before its transfer to UNESCO. He called Salam a great figure of contemporary physics and a servant of peace. He said, Salam had expanded the mandate of the Center from theoretical physics to such applied fields as computers, lasers, geophysics and material sciences.

# Abdus Salam – A Seasoned Personality and A Great Teacher

*Dr Ghulam Murtaza*

Translated by Dr Wajeeh Bajwa

This article was published in Urdu in the August 1997 issue of the "Ravi," the official magazine of Government College, Lahore, Pakistan. - Wajeeh Bajwa

Professor Abdus Salam, who has been illuminating the world of physics for more than half a century, passed away on Thursday, November 21, 1996. His demise has left not only Pakistan but the entire Third World without an exceptional person.

## Some Introductory Remarks About His Life

Professor Salam was born on January 29, 1926 in an ordinary home in Jhang. Young Salam won his first prize when he was recognized as a healthy and beautiful baby of Jhang City. His mother realized very early on that he had exceptional talent. He memorized every fairy tale, adventure story, Islamic history and verses of the Holy Quran which his mother told or recited to him. He took first position in every exam from Matriculation to the Master's degree. His remarkable success continued and he wrote research paper for his Ph. D. in the field of particle physics. His dissertation was about the most difficult and challenging topic of "Renormalization of Mass." Several leading physicists had failed to solve this problem. Immediately after the publication of his research paper, he began to be recognized as a leading physicist. At the completion of his doctoral degree, he decided to return to Pakistan. Before returning to Pakistan, Professor Salam asked his supervisor to write him a letter of recommendation. His supervisor replied, "I think you should give me a testimonial that you have worked with me." He spent three unpleasant years at Lahore College and the Punjab University.

Three unpleasant incidents took place in these three years. Firstly, the Principal of the Lahore college asked him to perform duties in addition to his teaching responsibilities. He was asked to choose between being a hostel warden, college accountant, or president of the college football (soccer) team. The second adversity happened in 1951 when he went to visit the Tata Institute Bombay on the invitation of Professor Pauli. Dr. Bhabha had sent him the invitation along with a return ticket. On his return, Professor Salam learnt that Government College, Lahore, has issued a "charge sheet." The only way out of that charge sheet was to have "leave without pay" for the days that he had spent at the Tata Institute. The third adversity took place at the time of year-end evaluation. The principle of the Lahore College had written, "Dr. Salam is not fit for Government College, Lahore. He may be an excellent researcher but he is not a good college-man." After a three year stay in Pakistan, Professor Salam reluctantly decided to go back to Cambridge University as a lecturer. He became a Full Professor in three years and at the age of 33, was elected the youngest Fellow of the Royal Society. At he age of 38, in 1964, he became director of the International Center For Theoretical Physics (ICTP). This center was solely the result of his own efforts.

Professor Salam was always at the forefront of physics and competed against "educational giants" of the time. He wrote more than 300 research papers and in the field of particle physics his extraordinary contributions have enhanced human



knowledge about the basic particles, of mass and the natural forces. The highlight of his work was about "Parity Violation in Weak Interactions." The significance of this work can be judged by the fact that two American scientists were awarded the Nobel Prize for their work in this field. In my view, Professor Salam and a Russian scientist, Landau, should have shared that Nobel Prize, since they had both worked independently on the same problem. The most famous work of Professor Salam was the "Unification of Weak and Electromagnetic Forces." He shared the Nobel Prize in 1979 with two other scientists for this work. In this work two basic forces, weak and electromagnetic, were shown to be unified. As you know, almost 125 years ago Maxwell had unified magnetism and electricity and 150 years before that Newton had shown that gravitational forces at earth and in the space are unified. After this unification of forces theory, Professor Salam and other scientist presented the idea of "grand unification." The weak, the electromagnetic, and the strong nuclear forces are included in this idea. As a result of this hypothesis, a proton that was considered as "stable" was declared as "unstable" with a lifespan of  $10^{31}$  years. Several laboratories around the globe are working to prove this hypothesis. The grand unification was not the last stage for Professor Salam. He enthusiastically participated in the "theory of everything" and "Super String Gravity Super Symmetry." According to Professor Salam, life is a continuous scientific process and he believed in it from the point of view of the religion as well. He always supported his theories with the verses of the Holy Quran. His favorite verse that he used in lectures at various times is Verse 4 of Chapter 67 (*Al-Mulk*): *"Who has created seven heavens in harmony. No incongruity canst thou see in the creation of the Gracious God. Then look again: Seest thou any flaw?"*

Professor Salam was honored with numerous prizes and awards. He was appointed a member in more than 30 academies and societies and more than 40 universities awarded him an honorary "Doctor of Sciences" degree. Professor Salam was

not only a top scientist, he proved to be an excellent administrator as well. The creation of ICTP in Italy and other centers conducting research in life sciences are testament to that. Under his guidance, a program of applied physics was initiated at the ICTP and some examples are: lasers, solar energy, plasma physics, controlled fusion, bio-physics, geology, soil physics, and climatology. So far four laboratories have been formed at the ICTP and these laboratories are: Microprocessor Laboratory, Super Conductivity Laboratory, Laser and Optical Fiber Laboratory, and Climatology Laboratory. Professor Salam was a strong advocate of using applied physics according to the need and requirements of the Third World countries. He also encouraged scientists from these countries, especially from Pakistan, to focus on applied physics. I think he was quite successful at convincing scientists from the Third World countries to use applied physics. A few other Pakistani scientists and myself said "good-bye" to our field of specialization and successfully adopted the field known as "Physics and Controlled Fusion Plasma." This field has formed strong roots in Pakistan and I am very proud to state that I have fulfilled the desire and wish of my great teacher, Professor Abdus Salam.

## How Professor Salam managed ICTP

As I have stated earlier, Professor Salam was appointed as the Director of ICTP in 1964. This center was temporarily housed in the center of the Trieste City in a building in the "Piazza Oberdar." In 1968, the ICTP moved to its beautiful building in Miramare. To commemorate this occasion, Professor Salam held an International Conference on "Contemporary Physics." More than 300 scientists from all over the world attended this thirty-day long conference. I was also one of those lucky ones who attended that conference. A scientist from the Third World country spends his entire life in isolation like a frog in a deep well. Scientists from the Third World countries were in "heaven" as we only hear or read names of the top scientists in books. This conference provided an

opportunity for these “starved” scientists to mingle with the six top scientists of this century. The six invited speakers were Landua, Oscar Klein, Wigner, Hans Bethe, Dirac, and Heisenberg. Landua, however, was unable to come due to sickness but he had sent his famous colleague Lifshitz. One evening, Heisenberg was to deliver a lecture and Dirac was present in the audience. Both are Nobel Laureates and at that time Professor Salam was not a member of this elite club. As a host, Professor Salam came on the stage and said “I am facing a dilemma which is similar to the dilemma faced by the Chief Minister of Persia (Iran) a few centuries ago. The king of the neighboring country was visiting Iran and the two kings were sitting next to each other. When the drinks were served, the Chief Minister did not want to offend any of the kings by not offering the first drink to him. The Chief Minister served the drink to his king saying, ‘It befits one king to present to another.’ This Chief Minister has solved my dilemma and now I invite Professor Dirac to come and introduce Professor Heisenberg.”

The Nobel Prize is the pinnacle of a scientist’s life. People familiar with the field of research are well aware of the fact that scientists mercilessly scrutinize one another’s ideas and thoughts. And they also know that America has monopolized science along with everything else. America’s pride, ego, and arrogance does not let any one succeed. Professor Salam was facing two challenges: one, he was not an American, and secondly, he was a colored person from a developing country. My hat is off to this son of Jhang who not only conquered Europe with his knowledge but also established himself as a leader in Europe who could come face to face with America.

It was not easy for Professor Salam to win the Nobel Prize. His name was proposed for the prize two or three times. For some time he was very frustrated as some American scientists never acknowledged his work in conferences and

publications. The Americans would acknowledge each other’s work but not Professor Salam’s. Once he said, “It is not easy to compete with Americans. I attend these conferences and sit in the front row to look directly in their eyes so that they do not forget to acknowledge my work.”

Professor Salam was in London on the day when it was announced that he had been awarded the Nobel Prize. It was my good fortune that I was in Trieste on that day. The entire city was buzzing with the news. Local television and radio stations aired special programs about Professor Salam and Pakistan. The ordinary people of Trieste suddenly became aware of Pakistan and the ICTP. I do not think Pakistan has ever had a better Ambassador in its history. Couple of days after the announcement Professor Salam came to Trieste. Everyone in the ICTP was lined up outside the main gate of the Center. There was a grand reception at the ICTP in the evening where I embraced Professor Salam and said: “Sir, you have created history, you are the first from the Muslim world to have received this honor,” and Professor Salam’s response to these comments was only in the words of “*Alhamdulillah, Alhamdulillah*” (All praise belongs to Allah, All praise belongs to Allah). Alas, we Pakistanis have foolishly not taken advantage of his enormous capabilities.

## The Story of The Pakistan Government, Bureaucracy, and Missed Opportunities

Ayub Khan was the President of Pakistan when the discussions for the formation of the ICTP were started. Professor Salam was the Chief Scientific Advisor to the President. Professor Salam expressed his desire that the ICTP should be established in Pakistan. Professor Salam asked the Government of Pakistan to make an effort and offer to house the ICTP, as other countries were also doing at that time. For a long time this proposal stayed “under consideration” by the

Finance Minister of that time, but no decision was made. Finally, President Ayub Khan asked the Finance Minister over the phone. The Finance Minister's response was, "Sir, this proposal is not for the ICTP in Pakistan. Professor Salam wants to create an international hotel so that scientists can spend their holidays here." I am confident that Finance Minister realized thereafter what a big mistake he made. His one decision could have changed Pakistan's history.

Another incident, which is not only shameful for Pakistan but for all the developing countries, is the time (1986) when the election for the Director General of UNESCO was being held. Professor Salam's name also came under discussion for the post. The Foreign Minister of Italy, who was a staunch supporter of Professor Salam, and several other influential countries proposed Professor Salam's name for the post. Professor Salam was a perfect fit for the requirements of the position. The qualifications were:

*"A person who is an academic of international standing, preferably a Nobel Laureate in his field, who has demonstrated ability in an international environment, awareness of the political dimension of education, science and culture, particularly in the Third World, and someone who has exerted an influence on this area evenhandedly between the East and West, so that he is also acceptable to the Soviet Union."*

It would seem that these qualifications were tailor-made for Professor Salam. Unfortunately the Government of Pakistan refused to nominate him and proposed another name. That person lost the election by a big margin. It is interesting to note that there were other countries like Italy and England who wanted to nominate Professor Salam for the post but to Professor Salam it was supremely important that his own country nominate him. His nationalistic pride did not permit him to accept another's nomination.

### Professor Salam as a Teacher

I was honored to have obtained my Ph. D.

degree in 1962 under the guidance of Professor Salam at Imperial College, London. I had left lectureship at Punjab University to join the Pakistan Atomic Energy Commission and went to Imperial College for higher education soon after joining the Atomic Energy Commission. This was the time when Professor Salam and Dr. I. H. Usmani had initiated several programs to promote science and technology in Pakistan and one aspect of these programs was to have Pakistani scientist trained in the western countries. Today we see several scientists in Pakistan that have been trained under these programs.

Why did I choose the field of particle physics? I think it was a decision made by nature. My educational background was in physics and math. It was the time when I was deciding about higher education that Professor Salam, who by that time had become a celebrity, visited Pakistan. He gave an outstanding lecture at the Senate Hall of the University of Punjab. Professor Salam had definitely become a hero and an ideal for the younger generation and I decided to follow his footsteps.

Professor Salam was not one of those who would spend hours and hours in making a lecture simple and easy to understand. This was Professor P. T. Matthews's style, who along with Professor Salam, Dr. Lovelace, and Dr. Streater Kibble was part of a small but talented group of scientists at the Imperial College, London. Professor Salam had a unique style of teaching that was different from Professor Matthews's. Professor Salam never wrote down detailed notes on the "blackboard." Most of the lectures delivered by Professor Salam were not comprehended by ordinary students but still they would diligently take notes and write down each and every word uttered by him. Sometimes we felt that he was in a big hurry and he did not have enough time to explain things to ordinary students. If you could not grasp and continue with his pace then he would not wait for you to catchup. This is the reason that he had so many students but very few were able to endure this hardship. He had no patience for mediocrity.

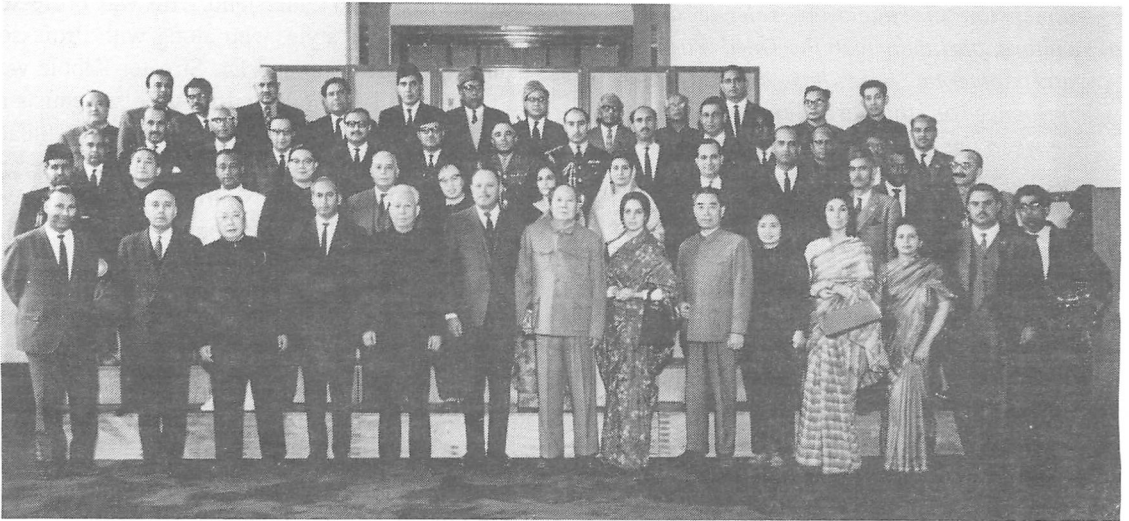
Professor Salam had an authoritarian and

dominant personality. He always seemed to have a sparkle in his eyes. No one could look at him eye-to-eye and dare to talk to him. Initially, students from the east thought it was only they who were scared of his personality but later on we realized that everyone, students from the east or west, were in the same boat. His personality always dominated. Once, Professor Salam's secretary complained to Professor P. T. Matthews that when he (Prof. Salam) calls me to his office he does not say "hello" and does not look at me. He just starts dictation. Professor Matthews said, "You should be thankful that he does not look at you otherwise you would be shaking with fear."

When we look at Professor Salam's life it becomes very evident that his personality was such that not only Lahore College and Punjab University but the world-famous Cambridge

University seemed small and worthless. Even Imperial College that used to pride itself for having a gathering of several Nobel Laureates was not able to quench the thirst of Professor Salam's thought process. He eventually succeeded in expressing himself at the international level at the ICTP. The formation and continued existence of the ICTP was a miracle in itself. It was Professor Salam's desire and wish to fill this world with centers like the ICTP so that the world, especially the Third World, could benefit from science and technology.

Professor Salam is not among us today but his efforts and dedication should be engraved in gold. A couplet from Allama Iqbal embodies Professor Salam perfectly. This couplet's literal translation is: "*Once in a centuries is someone born with these capabilities.*"



Dr Salam in China

accompanying Ayub Khan, the then President of Pakistan, and the great Chinese leader Mao Tze Tung.

# Abdus Salam

*Jilani Kamran*

Translated by Naeem Ahmad, Long Island, NY

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*The status reached by Dr Abdus Salam in higher science and mathematics is lofty indeed. The traditions established by Al Bairuni, Al Khwarzimi, and Omar Khayam in higher science and mathematics had been dormant for centuries, and there was very little hope of its continuation in the Muslim World. But Dr Salam has revived it.*

Examining Dr Abdus Salam's life and work, his most dominant traits appear to be his extraordinary good nature and his brilliant mind. For a student, these qualities are a guarantee of great academic success. Great mental prowess and good attitude are endowed qualities which cannot be acquired. And if not nurtured in a suitable environment, these qualities would still manifest themselves in other ways. But we need not speculate in the case of Dr Abdus Salam, who from the very beginning found the most suitable environment for his talents. His father was an official of the Divisional Office of the Punjab Educational Department in Jhang District during the 1920s and enjoyed an influential position in local educational circles. Dr Abdus Salam studied in the renowned Government High School, Adhiwal, in Jhang. This school was established in the late 1880s and was the premier high school in

the division. The staff consisted of teachers of highest caliber from the mixed Hindu-Muslim culture, and the method of instruction was progressive and enlightened.

Abdus Salam passed the Punjab University Matriculation Examination with great distinction. He stood first from among all students of the far flung University area including Baluchistan, Kashmir, undivided Punjab and the Frontier Province, and broke all previous academic records. And so this young man who wore a turban and a half coat and came from the deep Southwestern part of the province, joined the most prestigious Government College in Lahore where G. D. Sondhi was the Principal, and stayed till 1946, when he obtained the Master of Science degree in Physics and again stood first in the University.

Abdus Salam's college years were during the 1939-45 second World War. The competitive

central examinations for government service in India were suspended at that time, and despite his great educational triumphs, Abdus Salam could not sit for these most sought after civil service exams. During the war there was a Punjab War Fund, and in 1945, when the war was over, the fund surplus was used for educational scholarships for children of small land-owners. And that is how Abdus Salam was awarded the last of these scholarships, at the end of the British Raj, for his great educational achievement. After 1947, nothing could be learnt of this fund. Abdus Salam, however, received the scholarship regularly during his stay at Cambridge University.

The stay at Cambridge was a most valuable experience for him. Abdus Salam said that when he arrived at Cambridge as an undergraduate, he was older than his classmates, and also knew more than them. But his classmates enjoyed a certain stature as they belonged to a nation that had produced Newton, Maxwell, Darwin and Dirac—all great scientific minds. His British colleagues also betrayed a sense of pride in their national heritage of their contributions to the advancement of science and learning over the past few hundred years. At that time Abdus Salam, like his Muslim compatriots, was relatively unaware of the great Age of Islamic contributions to learning, and as such his ego was constantly buffeted by the vainglorious discourses of his classmates and he harbored a certain feeling of backwardness.

In his lectures about the Muslim Universities of Spain, Abdus Salam also mentioned a destitute traveling student from Scotland, Michael Scott. He was a poor man of no great family, but he was determined to study at the Universities of Toledo and Cordoba, where Musa bin Maimoon used to teach a generation before. Michael Scott reached Toledo in AD 1217. He wanted to translate Aristotle from Arabic to Latin, as Arabic was the medium of instruction in Toledo. After a few years, Michael Scott went to Sicily where he joined the Medical School in Salerno. This school was established on the pattern of the Arabic

Medical schools, by the King of Sicily in AD 1231. While at Salerno, Michael Scott met the most famous physician of his age, Hendrik, who was in Salerno to complete his research on Surgery and blood-letting. Michael Scott translated Arabic Medical sources for Hendrik. These translations are in seven volumes and are now preserved in the National Library at Stockholm.

When Michael Scott arrived in Toledo, one of his teachers tried to dissuade him from his pursuit of learning, saying that it would be better for him to return to Scotland and learn his ancestral occupation of sheep-shearing! Something similar was also said to Abdus Salam by a famous scientist, who wondered why should the West help the Muslim students, as the entire Muslim world has done nothing to add an iota to the present day knowledge of Mankind and advancement of Science.

Abdus Salam's intellectual relationship with the West was formed at a time when the Muslim young men from the Indian subcontinent, while recounting the greatness of their past, longed to see some confirmation and practical impact of that greatness. As a representative of his age, Abdus Salam had to undergo several such exercises. One such experiment was the idea to revive our last scientific greatness in this age and to formulate a working model and a plan to reach this goal.

In a way Abdus Salam's entire life passed in the pursuit of fulfillment of this dream. The elusiveness of this goal grieved him constantly and also affected his health. His remarkable achievement lies in his intellectual efforts and practical approaches to revive and establish the learning of modern day science in developing countries in general and Muslim nations in particular. He made meaningful efforts to promote an atmosphere for academic learning and tolerance modeled on his own intellect. Towards establishing a lasting basis for the future, he emphasized the natural scientific approach, which had guided the Muslims in the early Islamic countries, and which had obtained great results. In

this context he also tried to define the “why” of the pursuit of learning of physical sciences by these early Muslims. Abdus Salam has written: The Quran has 250 verses pertaining to laws, as against 750 verses which address and exhort the believers to study Nature and to ponder and reflect upon all aspects of the physical world. These verses tell us to make the pursuit of knowledge an essential part of our everyday life.

Abdus Salam adds that in the Arabic language there is no separate word, term or expression for science except *'ilm* or knowledge. In the Muslim world scientific knowledge was on the rise for four centuries. During the 8th, 9th, 10th and 11th centuries of the Christian Era, all center of advancement of knowledge were in Muslim countries and Muslim scholars were engaged seriously in the acquisition and assimilation of scientific knowledge. Not much thought has been given to the decline in the field of science in the Islamic world after 1099 CE. However, to Abdus Salam, the important question is whether the Muslims once again could be in a leadership position for scientific research and in the advancement of learning of the physical sciences.

According to Dr Abdus Salam, it is of the utmost importance that Muslim young men should be consumed by a passion that it is a Muslim's destiny to be the Leaders in the field of Science. This objective should become a national objective. There is no shortcut for this work. In Abdus Salam's view, if half of the national population adopts the objectives of scientific leadership, and is prepared to follow with all practical measure, then this will not be a difficult task. In the present world, Japan, China and Russia have adopted such a national goal and have achieved the desired results. Such a revolution in thinking and learning is not possible without the patronage of the Governments. To get the desired results, society and the States have to change their perception and attitudes towards scientists. If the governments do not protect and welcome them, the scientists would avoid going to such countries and be part of their societies. However such difficulties can be overcome by a “commonwealth” of Muslim nations.

During Pax Islamica, a Muslim scientist could go from Samarkand to Cairo easily, or from Cordoba to Damascus. He was welcomed with honor not only by the governments of the day, but also by society in general.

According to Abdus Salam, a change in thinking by the powers that be and by the intelligentsia, and the society at large is essential before the people of science can prepare the proper atmosphere in such countries where the Muslims have a future. For the revival of science, there are five essential priorities which form the scientific approach to achieve the objective:

1. Complete commitment to a Leadership role in Science
2. Clear expression of patronage to the Scientific Community from the governments in particular and people in general.
3. Professional security for the scientific community.
4. Freedom of academic and experimental pursuits for the scientific community.
5. The acceptance of concept of Scientific Leadership in Muslim countries and mutual interstate relationship for scientific exchanges.

Dr Abdus Salam has related the revival of science to that World view where scientific knowledge brings about technological revolution. Technology cannot be developed without science. In the Muslim's religious perceptions, the harnessing of nature and power of reasoning are stressed greatly. However there is no separate science and technology section in the Muslim Countries Planning Commissions and that is why the objectives of the present age remain unfulfilled.

Dr Abdus Salam writes: Why am I advocating with such vehemence and emphasize that we should engage fully in the aim of scientific creativity? It is not only because God has given us the urge to seek knowledge, and also not only that knowledge (science) is a boundless power in the present age and the best of means for material advancement, but also because of an international

level, the industrialized countries look down on us with contempt. For this reason alone it has become imperative for us to pursue Scientific Leadership to maintain our self-respect.

Dr Abdus Salam's views are noteworthy as he points out the alternative way for progress through science for the poor and developing countries. He holds that the knowledge of physical science is vital for the backwards Muslim countries and the Third World. His opinion is not another aspect of the typical emotional response of the Third World intellectuals, but it is based on historical precedents. Dr Salam has never discounted the historical perspective, which shows the great advancement of learning during the past six hundred years by the Western world. During the sixteenth century, the knowledge of physical science was not pursued in a systemic manner in Europe. In fact the church held all study of the universe and nature to be Satanic activity. From this ground zero, the pursuit of scientific knowledge started in Europe. And today knowledge of science has divided the world in North and South. Where the North are the affluent and developed nations, and the South is populated by the poor, the backward and destitute peoples. It is, therefore not difficult to reach the conclusion that in the present day, material riches and well-being of nations is entirely due to science. Science has not only emerged as a powerful force in the hands of man, but also as the most wealth generating tool. In this world view, the inescapable truth is that continued ignorance of science will lead to a total lack of power and wealth. Nations will remain weak and underdeveloped without science, with their future always in doubt, and their annihilation only a matter of time. The weak cannot survive, and it is not difficult to imagine this.

At this fearful juncture, Dr Abdus Salam's views to guide the underdeveloped nations must be studied. Dr Salam calls the mind-set of these nations as *kufr* (infidelity). This is the Islamic term meaning worldliness, or lack of faith and also the

state of being unappreciative of the gifts of Providence. When *kufr* dominates it obscures and covers the good thoughts and deeds. According to Dr Salam, poverty has appeared as *kufr* in the developing nations and it has dominated their spirit and obscured their purpose in the present age. And unless this poverty is eradicated, these nations cannot find their souls or appreciate their place in this age. For these backward and destitute nations, their Spirituality, their Time and their Space has been enslaved. Indeed this slavery extends to their future. For time stops when you cannot foresee the future, and nations are annihilated and only their echo can be heard in archaeological sites.

Dr Abdus Salam has postulated the dictum that poverty is *kufr*. Whether this poverty extends to the life of an individual or that of a nation; poverty is always fatal. To tolerate and make do with poverty is also *kufr*. It is vital that poverty be eradicated. According to Dr Salam, before entering the field of science, it is essential that the eradication of poverty should be the main stimulus for national policy and of the application and administration of that policy. Without this basic provision, the desired results can never be obtained. No society can become dynamically progressive if its members are not engulfed in a wave of development and technology. This wave will resonate only in a culture and society where the level of poverty is very low, and is also not life threatening. This condition brings forth political power and develops an economic force at the same time. Before embarking on the route to the mastering of science, the national leadership must be fully conversant with these political and economic forces. Dr Abdus Salam says that the situation being faced at the present time can only be handled by a capable, dedicated and talented leadership. And the wisdom and know-how obtained through science can eradicate poverty and thus introduce man to his humanity. Science will also open the doors to a welcoming future.

Dr Salam believes that the government



administration cannot move any plan without the bureaucracy. The present bureaucracy borrowed from the British Colonial Administration, is neither capable nor dedicated, and cannot be trusted to fulfill the planning needs of this revolution. Wherever the affairs of state have been in the hands of British patterned bureaucracy no revolution has taken place in learning and science and nor has there been eradication of poverty. The bureaucrats have, however, come up with the question that whether science is more important to our developmental objectives, or is it technology. The developing nations have been made to believe that they do not need basic science, but rather modern technology, which can readily be purchased from Western markets. In the Arab world, modern town planning has changed the face of the desert environment, and technology has made life much easier, but there are no means to obtain basic science learning in these countries. It is notable that you need maretable resources to purchase technology. Perhaps that is why the countries which are poor in resources, the vultures of international loan systems circle overhead, and these indebted countries are forced to bargain away their meager resources and eventually their self-respect.

What should come first? Basic sciences or technology? In Dr Abdus Salam's considered opinion, no nation can achieve intellectual maturity nor plan for their future without basic learning of science. The question does arise that the path of basic science is the longer route. Although at the end there will be technological breakthroughs which will hopefully enrich the nation and do away with poverty. But does this program not demand a period extending to 2 or 3 centuries?

To put this question in perspective, Dr Salam cites the Miji scientific revolution in Japan. An excerpt from the speech by Prime Minister Itoh, delivered in 1886, is reproduced below:

"For the continuous power of the people, and for public welfare and prosperity, there is only one way. And that way moves through the fields of science. Our nation will succeed if it will apply

scientific principles. If we wish to equal the developed nations, then the best way is to pursue science and not waste an instant in delaying scientific research and development.

The age of scientific progress started in Japan in 1869, and is still continuing. Even though the Japanese had to undergo several traumatic experiences, the fact remains that the Japanese scientific development is a great challenge to the Western industrialized world. The period of Japanese scientific development is about 150 years."

The Russian scientific age started in 1809 by the orders of Tsar Peter the Great, when he established the Russian Academy of Science. This Academy has been expanded by every subsequent ruler or government. China also gained a foothold in the world of science in a few decades. In China of today, science is being introduced at every level. Its education, research, development and practical application is managed in a very organized way, and is going at a great speed. Discipline, single minded devotion, patronage and individual training of scientists, and the will and determination of scientific institution can shorten the necessary length of time for reaching the goals in basic science and technology. This journey of centuries can bear useful fruits within a few decades. The question of the length of preparatory period is irrelevant when the goal is building a secure future. With the first step, the goal becomes nearer.

In Dr Abdus Salam's opinion, to gain a high level of proficiency in science requires one generation (25 years) or as a maximum two generations (50 years). A set number of students must be sent abroad to pursue a Ph.D. As real research starts after the Ph.D. level. The guidance of senior educators is most essential, so that the young scientists can be steered toward a speedy acquisition of knowledge, and thereby a "cadre" of scientists can be formed. This cadre will grow progressively and its members' ability, academic standing and professional renown should be of international stature. The international exposure will expand the horizon of our scientific cadre and

make their minds more fertile and will make their usefulness and importance more secure at the national level. Society will be permeated by scientific thoughts giving rise to a new scientific approach, which will utilize the energy of our past civilization to illuminate the way to a secure future. Without such an arrangement, Pakistan cannot stand p to the forces that may challenge it in the very near future. The countries hostile to her can prevent Pakistan's entry to her rightful honorable place in the world. The world of tomorrow will emerge as a supremacy of mind over matter. And it will not be easy to negotiate our way in this world without the aid of science.

Dr Abdus Slam maintains that Pakistan's intellectual culture is of a literary type. The educated mind in Pakistan delves mostly in literary discourses. During the present age, business and industrial issues have also been included. For the past 50 years, our culture has given poetry and ghazal (a special form poetry) its serious attention and the regularly weekly meetings of "Circle of Literary Friends" have helped in finding a secure place for literature. It follows, therefore, that if we should also meet regularly every week to discuss science topics, at "Circle of Scientific Friends" with a view to promote the knowledge of sciences, then there is no reason why our cultural mind-set will not become scientific, as it is now literature oriented. This will give rise to a new intellectual atmosphere to promote and develop the scientific community, and establish a culture of scientific knowledge. The expanded cadre of scientists will be the builders of a new age. Pakistan is searching for this new age, and without this new age, Pakistan cannot provide an evidence for its future. Talking on this topic, Dr Salam says:

I am fully convinced that if we are able to ignite the flame of scientific discovery in our youthful generation, there will be no limit to our successes. And I can also say like the late Gamal Abdul Nasser of Egypt, "O Brother –

Raise your head with pride and self-respect." However, I am afraid that the coming historian may write that the scientists of the 15th century (AH) had the ability, but there were no leaders who could formulate a policy to nurture this ability and to establish science in Pakistan.

The status reached by Dr Abdus Salam in higher science and mathematics is lofty indeed. The traditions established by Al Bairuni, Al Khwarzimi, and Omar Khayam in higher science and mathematics had been dormant for centuries, and there was very little hope of its continuation in the Muslim World. But Dr Salam has revived it. In the Islamic world, from Morocco to Indonesia, there is none but Abdus Salam who can be included in the tradition of the past Islamic glory. His love for Pakistan and his identification with Pakistan's future were an integral part of his psyche. One must not forget that Dr Abdus Salam faced the same impediments as are faced by all who wish to pursue higher learning in Western Universities. His Nobel Prize winning work had divided opinion about it. However, Dr Salam's single minded pursuit of his objective, his firm faith in his purpose and the passion to ever stretch the boundaries of knowledge are the qualities that brought this obscure person from a far flung town to the highest stags of knowledge. Without such individuals, nations cannot identify themselves or know themselves. In all fields of knowledge, there can be no future without persons of superior intellect. To build secure future requires free flow of ideas as an essential medium.

Dr Abdus Salam is a valuable metaphor of our civilization and our culture. With such metaphors we discover and build that world which is located in the future.

Dr Abdus Salam's (1926-96) book Aspirations and Reality was translated by Shahzad Ahmad in 1996. I have made use of this book and other sources for this essay.

# A hero is gone

*Dr Pervez Hoodbhoy, Islamabad, Pakistan*

With the death of Prof Abdus Salam, the world has lost one of the mightiest intellectuals born on the subcontinent, and the most powerful and influential advocate of science for developing countries. To the world of physics he has left a legacy, known as the Unification Theory, that is now a benchmark against which future progress in physics will be measured. To the countries of the Third World, he has left behind a unique institution in Italy which invites and benefits over a thousand scientists each year.

I first saw Prof Salam in 1972 when he came to Cambridge, Massachusetts, to give a talk at MIT. I was nearing the end of my masters degree in physics, but I understood nothing of his lecture and just sat in awed wonder. From the critical appreciation of the audience, who included some of the most well-known physicists at MIT and Harvard, I was however, able to infer that this was no ordinary seminar and Salam was considered no ordinary visitor. It was many years later, and after having had to learn a great deal more of physics, that I was able to understand Salam's incredibly deep and beautiful work of physics which earned him the Nobel Prize in 1979. It is hard to describe something so sophisticated in simple words but an analogy might help.

More than a century ago, James Clark Maxwell had showed that magnetism and electric forces were actually the same thing, an achievement which led to the discovery of radio waves and much else. In 1968, Salam showed that electromagnetism and the so-called "weak forces", which lead to light and heat being emitted from the sun and stars, were also actually just different aspects of a more fundamental "electroweak" force. His discovery, and prediction of certain particles completely unknown at that time, sparked a wave of interest all over the world and billion-dollar experiments were set up to check the predictions.

Salam was an intimidating personality. I can remember that the first time I asked him a physics question was after I had received my doctorate in nuclear physics in 1978. "Go look it up in a book," was his curt reply. I felt thoroughly chastened and small.

It wasn't until 1984 that I approached him again. It was different this time, and we developed an understanding which grew deeper and firmer with each passing year. He asked me to co-author with him an article. I accepted instantly, feeling distinctly proud of honor.

In interacting with Salam, I could see that two strong passions governed his life. Physics research occupied him intensely; his mind would lock onto a problem making him oblivious to all else. He would engage only the most challenging and difficult problems of the field, problems that only the greatest can dare try. The elegance of his solutions were startling, as for example in his brilliant creation of what are called superfields. Without this powerful mathematical concept, physicists would have a very hard time to progress beyond a certain point in grappling with the basic laws of nature.

Salam's other passion was Pakistan. I have never been able to understand why he was so dedicated to the country of his birth given that he was virtually ostracised there, being an Ahmadi. I can remember that when the members of the physics department at Quaid-i-Azam University sought to invite him for a lecture after he received the Nobel Prize, the idea was vetoed when the student arm of a vociferous religio-political party threatened to use violence if he came to the campus. In spite of this and much more, Salam was never embittered and he never gave up trying to do whatever he could for his country.

Many people ask why Salam did not stay in Pakistan, choosing to stay as a professor at the Imperial College in London and the director of the

Physics Centre in Italy. I think his decision was wise. His genius as a scientist would have been wasted had he stayed on in Pakistan; the loss to physics would have been certain and enormous. Moreover, he would have had little real chance to make a big difference because priorities in Pakistan have always been skewed heavily against

the development of science. The most Salam could have achieved was a slight amelioration, if at all.

Salam is gone. There is no Pakistani, or for that matter any scientist from any Muslim country, who even remotely approaches him in stature. The loss is irreparable. Let us mourn.



Dr Salam receiving his Nobel Medal from the King of Sweden in December 1979.

# "Salam believed that only liberal, tolerant, and pluralistic societies can advance scientifically and culturally"

*Pervez Hoodbhoy, Visiting Professor, Theory Group for Quarks, Hadrons & Nuclei, University of Maryland, College Park, MD*

Dear Friend,

I was at the Salam Memorial Meeting, November 19-22, in Trieste. The first two days had some excellent colloquia on string theory and cosmology – Seiberg, Green, Veneziano, Sciama... The third day was dedicated to reminiscences about Salam. Here's the text of my contribution, which was a bit different from the others. Actually, so different that an hour before my talk, I decided to pull out. Well, I changed my mind once again. Some of my compatriots appear to be mortally offended, but so be it. The skeleton had to walk out of the closet some day. I don't know if I'll bother to get it published, but you are welcome to share it with anyone you want.

Cheers! Pervez

Very properly this memorial meeting is to honour Professor Abdus Salam for his spectacular achievements, both as a physicist and for having created this Centre, now a focal point for scientific development in the Third World. It is a historic moment that, from today, the Centre shall be known as the Abdus Salam Centre for Theoretical Physics. I cannot think of any great physicist of this century who has been honoured at a comparable level. It is, therefore, with considerable hesitation that I have chosen to talk not about Salam's brilliant successes but, instead, his most spectacular failure, by which I mean his unfulfilled quest to bring science to Pakistan and other Muslim countries of the world.

Three reasons compel me to talk about unpleasant matters in a meeting where so many pleasant things have been said over the last three days.

First, Salam was passionately committed to the idea that the cultural and material improvement of society hinges critically upon it developing science. He wished this for all countries, but did so with special intensity for the country of his birth. Hence, to let his unfulfilled expectations pass without comment would be a significant omission.

Second, Salam's failure does not take away from him or make him a lesser person. Rather, it forces us to confront the question: what went wrong? It particularly demands that those of us who live in Pakistan ask why scientific and social development in our country continues to elude us, and why it appears an even more distant goal than it was 30 years ago. To my mind, telling the truth now – harsh though it be – may well be the only way of avoiding tragedy in the future.

Third, it is almost entirely in the context of Third World scientific development that I got to know Professor Salam. Over a period of many years, I had the privilege of engaging with him in numerous discussions and correspondence. I first met him as an awe-struck undergraduate student at MIT in 1972, and then as a visitor to the Centre in 1978. However, these were non-events. He did not know me then, or, for that matter, need to know. It was in 1985 that I was pleasantly surprised to receive a letter from him in Islamabad, where I was (and am) teaching, saying that he had read my critique of orthodox Islamist attempts to create an "Islamic Science" and the role of religious intolerance in destroying Muslim intellectual achievements many centuries ago. He suggested

that, should I visit the Centre, he would like me to call upon him.

I can, therefore, date my association with Prof. Salam to the summer of 1985. The following year he suggested that we jointly author a preface to Michael Moravcsik's book "On the road to world-wide science", which he had just received. I was proud to accept. Two years later Salam wrote the introduction to my book "Islam and Science - Religious Orthodoxy and the Battle for Rationality". In his essay he makes perfectly explicit that the validity of a scientific truth can be adjudicated only according to criteria internal to science and not by appeal to religious, metaphysical, or aesthetic considerations. I am happy that my book provided Salam a vehicle to clearly articulate his views because much confusion existed about where he stood on the issue of religion and science.

The previous speaker detailed some of the ways in which Salam used his talent, time, prestige, and power, to raise the level of scientific development in Pakistan. As the scientific adviser to the President of Pakistan, Salam was responsible for laying the groundwork for the Pakistan Atomic Energy Commission, initiating research on problems of waterlogging and salinity, and agricultural research. He was the role model for many of those who opted for careers in science. To all this I may add that his personal generosity was simply extraordinary. He supported poor students in various cities of Pakistan and bought scientific equipment for schools and colleges with his personal funds. He laid aside part of his Nobel Prize money for a yearly prize to be awarded to the best researcher in a scientific field. And, I am witness to the pile of letters on his desk, received from students and admirers. Since time is the most precious and scarce resource for a busy and productive person, it always amazed me that Salam would reply to almost all of them.

So, you might expect that Salam would be a hero in Pakistan. Not so!

Right here we have the biggest, by far,

theoretical physics institution in the world named after Salam. But, in the country of his birth and citizenship, no scientific or other institution, building, or even a street, bears his name. School textbooks do not mention him, nor are children told about him by their teachers. Fake heroes are spattered all over the place but Salam is never to be found. Reflecting the disdain felt by much of Pakistani academia, a former vice-chancellor of my university scornfully asked in a meeting, "Who is Salam? What has he done for Pakistan?"

It is a fact that Salam had easy access to most world leaders, UN high officials, the Pope, and others, but found it very difficult to be heard by the leaders of his own country. In 1988 I was in Prof. Salam's hotel room in Islamabad where he had been patiently waiting for 2 days to meet with Prime Minister Benazir Bhutto. I took advantage of this to discuss his participation in a TV programme on educational problems that I was preparing. It was not right, I thought to myself, for a person of his stature and ill-health to be kept waiting in this manner. Suddenly the phone rang and Salam's face momentarily lit up. Then I saw his face fall as BB's secretary told him that meeting had been called off. No reason was given. Yes, I am glad that Prime Minister Nawaz Sharif was gracious enough to send a message of congratulation today at this meeting. We must always be grateful for small mercies. But how much did that cost? I can recall that, about 5 years ago, while addressing a convocation at Government College, Lahore, Mr. Sharif named all the illustrious alumni of the College but did not consider Salam worthy of mention!

It is remarkable that, about a decade ago, Professor Salam wanted to be in the run for the position of Director General of UNESCO but Pakistan refused to endorse his candidature. This was in spite of the fact that several developing countries, particularly Jordan and Kuwait, had pledged to fully support him. Since Salam had never given up his Pakistani nationality, the lack of endorsement by his home country killed his

candidature.

Apart from being ignored and denied by officialdom, Salam was also the target of bitter attack, and vilification as well. Right wing magazines concocted wild conspiracies of nuclear espionage, claiming that he had sold nuclear secrets to India. Fundamentalist student groups made it impossible, or very difficult, for Salam to visit any university campus. I am ashamed to say that Salam could never set foot in my university in Islamabad, whose physics department had been inspired in considerable part by him, and which was the only department in the country where his lectures could be possibly understood.

So much for Pakistan. And what of the Muslim countries who Salam endlessly cajoled, persuaded, and repeatedly visited for over three decades in the hope of prodding them along the road to scientific progress? He had many ideas and, in particular, a grand scheme to bring science to these countries by putting together an Islamic Science Foundation, with an initial endowment of \$1 billion, pooled together by a consortium of Islamic countries. It fell flat on its face after Saudi Arabia pulled out and Salam, together with his coreligionists, was banned from ever setting foot on Saudi soil. Salam never complained about this or other matters publicly, but privately he would express distress and disappointment that only two countries, namely Kuwait and Iran, seemed to be at all interested in putting money into science.

I am sure that many people in this audience must be very confused about what brought about this situation. Allow me to explain.

Before 1974, Salam was legally a Muslim in Pakistan, but subsequently he became a non-Muslim in a state where non-Muslims are, by law, second class citizens. Subsequent to his excommunication by an act of the Pakistani national parliament, and of his Ahmadiyya sect, Salam resigned as Adviser to the President. Although he maintained informal contacts with the government, scientific institutions, and individuals, in effect he ceased to exercise significant authority.

Salam never accepted this excommunication. It clearly drove him into becoming more religious.

Regrettably so, in the opinion of some, but that is not for me to comment upon. Subsequently (I think), he developed an intense pride in his heritage and did what no one else — Muslim or other — had done. From dry and dusty history books he rescued the scientific and intellectual achievements of Muslim intellectual giants of a thousand years ago and turned them into symbols of cultural pride. The crucially important thing is that he emphasized these achievements as belonging to the realm of the rational. For example, it is from one of Salam's essays that I first learned of the 12th century Arab scholar, Ibn-al-Haytham, long forgotten by all except professional historians, who had anticipated Fermat's principle of least action applied to light. Similarly, Salam's lecture, delivered in Stockholm at the Nobel Prize ceremony, begins with the travels of Michael the Scot who travelled to Toledo in Muslim Spain, searching for learning and knowledge, all of which were then concentrated in the lands of Islam. Salam's purpose was to rekindle a sense of pride and hope amongst those who had long lost both. He did succeed, but the victory was partial and temporary. No mortal can fight the forces of history, especially when they are oriented towards the past rather than the future.

To my mind, Salam was the mythical Sisyphus in human form. Condemned by Pluto to forever push a large rock up Mount Olympus, each time Sisyphus would labour his way to the top, the rock would roll all the way down and he would have to begin once again. Until his long and tragic illness left him incapacitated, Salam too was condemned into perpetually and painfully pushing his schemes for scientific development up the unyielding mountain of religious prejudice. The brutal fact is that Salam was squarely defeated in the end by the very side whose cause he so vigorously championed.

The excommunication of 1974 merits further mention. Certainly, the doctrinal differences between Ahmadiyyas and mainstream Muslims are not of the slightest concern to us here — they are as arcane and impossible to resolve as the

differences between, say, Catholics or Protestants or Anabaptists or Calvinists. It is usual, as in the Middle Ages of Europe, for theological disputes to be resolved by the use of force with the weaker side being exterminated or terrorized into fleeing. Historically, this is the legacy that every religion has left to mankind. To prevent the majority from slaughtering the minority was precisely the historical reason for the emergence of secularism in Europe. Tragically the Pakistani state moved the other way and became party to a theological dispute which had simmered for many years. As it turned out, 1974 was the first step down the steep slippery slope, the bottom of which is not yet in sight. More and more sects and communities are facing the threat of persecution and possible excommunication as the fires of religious extremism burn ever higher. To be quite honest, on the balance sheet of history, what happens to a

particular individual is of scarce import. Therefore what really matters is not Pakistan's treatment of Salam, or even the persecution of this or that community, but the fate of Pakistani society at large.

Let me now conclude. With characteristic generosity of spirit, Salam chose to forgive and forget. He could easily have become very bitter but remarkably he chose not to go that way. Let us acknowledge and respect this. While Salam was never a cultural libertarian, he did believe that only liberal, tolerant, and pluralistic societies can advance scientifically and culturally. Therefore the best tribute to him would be for each of us, in our own way, to work towards building a global society which offers equal opportunity to all inhabitants of our planet, encourages diversity and creativity, and allows religious beliefs to be pursued without fear.

## Death of a genius

*Omar R. Quraishi*

KARACHI, Nov. 21: Dr Abdus Salam, Pakistan's internationally renowned scientist and scholar, died early on Thursday morning at his home in Oxford, England after a prolonged illness. He was the country's only Nobel Prize laureate having won the world's most prestigious award honouring scholarly achievement which he won in 1979.

His relatives in Karachi said he would have been 70 years old this coming Jan 29.

Dr Salam's sister told Dawn that contrary to what had been popularly thought, Dr Salam was born in the small village of Santok Das in Sahiwal district, and not in Jhang. She said they were seven

brothers and she was the only sister.

Dr Salam is survived by a Pakistani wife by whom he had three daughters and a son, and an English wife by whom he had one son and one daughter.

Dr Salam's body will arrive in Lahore early Sunday morning and will be taken by relatives to Faisalabad and then onwards to Rabwah for burial. His sister said it was in his will that he be buried in Rabwah where their parents lay to rest.

Dr Salam's brilliant academic and scholarly career was capped in 1979 when he won the Nobel Prize for Physics for work in particle physics —



for “the prediction of the unification of the electromagnetic with the weak nuclear force.”

Dr Salam was chief scientific advisor to the president of Pakistan from 1961 to 1974 and was the founder-chairman of the Pakistan Space and Upper Atmosphere Research Committee (SUPARCO). He was awarded Sitara-i-Pakistan and the Pride of Performance Medal in 1959, and the Order of Nishan-i-Imtiaz, Pakistan's highest civilian honour, in 1979.

In 1957, Dr Salam founded and headed the Theoretical Physics Department at the Imperial College of Science and Technology in London and stayed in that position till 1993. Before that, at the age of 25, he became head of the department of mathematics at Punjab University, from 1951 to 1954.

In 1964, Dr Salam founded and became director of the International Centre for Theoretical Physics (established with the support of the International Atomic Energy Agency of UNESCO and of the Italian government).

Dr Salam was a brilliant student throughout his academic life earning the top position in every exam at Punjab University. In 1946, he won the prestigious Foundation Scholarship to the University of Cambridge where he studied mathematics and physics at St John's College. He achieved a Double first in both subjects, winning the Wrangler Prize in Mathematics. He got a PhD in Theoretical Physics and did much of his research at the university's Cavendish Laboratories. In 1950, he was awarded Smith's Prize by Cambridge for “the most outstanding pre-doctoral contribution to Physics.”

From 1954 to 1956 he lectured at Cambridge and was elected Fellow of St John's College from 1951 to 1956. In 1958, Dr Salam won the Hopkins Prize and the Adams Prize. In 1961, he became the first recipient of the Maxwell Medal and Award of the Physical Society, London. Three years later, he was awarded the Hughes Medal by the Royal Society, London. In 1965, Dr Salam gave the prestigious Scott Lectures at Cavendish Laboratories in Cambridge. In 1971, he won the J.

Robert Oppenheimer Memorial Medal and Prize from the University of Miami and in 1976, the Guthrie Medal and Prize from the Institute of Physics in London.

In a short seven-year period from 1977 to 1983, Dr Salam won awards from the Calcutta University, the Accademia Nazionale di XL in Rome, the American Institute of Physics, the Royal Society, the Einstein Medal from UNESCO, from the Indian Physics Association, from the USSR Academy of Sciences and the Czechoslovak Academy of Sciences.

Dr Salam also received awards from Italy, Bangladesh and from the Charles University in Prague for his efforts for the promotion of world peace. He was a fellow of the Royal Society, London, the Royal Swedish Academy of Sciences, the Pakistan Academy of Sciences and an honorary fellow of the Tata Institute of Fundamental Research, Bombay. In 1983 Dr Salam founded the Third World Academy of Sciences and in 1986 he was elected Honorary Life Fellow of the London Physical Society.

He was one of the few foreign members of the influential American Academy of Arts and Sciences, the USSR Academy of Sciences, the Accademia Nazionale de Lincei in Rome, the European Academy of Science, Art and Humanities, and several other such organisations in Iraq, South Korea, Morocco, Bangladesh, Portugal, Poland, Ghana, Guatemala, Sweden and Venezuela.

Dr Salam was awarded honorary Doctor of Science degrees by 36 universities in 23 different countries. These institutions included his alma mater, the Cambridge and Punjab Universities, as well as the University of Goteborg in Sweden, the University of Exeter, the University of Peking, University of Glasgow and the Punjab University.

Several foundations were created by Dr Salam using the monetary benefits that accrued to him as part of these awards.

Daily Dawn, Pakistan, Friday 22 November 1996

# Gracious Host To Scientists – Professor Abdus Salam

*Saadat Anwar Siddiqui*

Translation By Ismail K. Nayyar, New York, NY

Professor Abdus Salam is no longer among us. I saw his face through a glass window as he lay in repose in a white wood coffin for mourners to view on November 20th, 1996, in Darul-Zikr. It was not the face I was familiar with, the face that exuded strength and vitality, lit up by his darting eyes, so full of determination and resolve.

Hundreds of thousands of plans found a home in his mind, and his burning desire to fulfill them was his life's goal. A person like me, whose world of resolve also is host to a tiny point of light, understands these goals and wishes that this tiny point of light is never extinguished, but increase in brightness until it is visible to the outside world.

Such points of light illuminate the minds of thousands of Third World scientists. Abdus Salam's inspiring presence nourishes these points of light. When the violent winds of unsound and poorly funded Third World economic, scientific and educational policies threaten to overwhelm these flickering points of light, these scientists head for the International Center For Theoretical Physics (ICTP) in Italy, where Professor Abdus Salam provides a warm embrace full of solace, providing them with needed facilities for furthering scientific and educational goals. Here is where they realize that they are useful and respected human beings in a developing world. There is no charge for these facilities, which include boarding and lodging, access to libraries and computers, and modern laboratories. Networking with eminent scientists from the developed world rounds off a total learning and enriching experience. Here is where the tiny point of light is in no danger of dying out but indeed is strengthened so that it burns with intensity even

when the scientist returns home.

Why are Third World scientists like me dejected today at the demise of Professor Abdus Salam? Is it because he was a Nobel Laureate who solved a knotty Physics problem? No, it is because he was so different from other award winning scientists. It was his desire that Third World scientists should be shielded from the problems he himself faced in his career. The establishment of an organization like ICTP seemed like a dream, but sincerity and determination turned this dream into reality through the hands of a Pakistani scientist, hands which proved to be helping hands for many. To this day I remember his warm handshake when I visited ICTP in 1987 and stood on line with scientists from Chile, Peru, India, Iraq, Ethiopia, Nepal and Bangladesh. When it was my turn to shake his hand, he grasped my hand in both of his and his bright eyes said to me: "It is your duty to change the future of your nation, and you can do this only by the development of science. Seize this opportunity and share it with others."

This visit to the ICTP was an eye-opener for the direction of my scientific research. I learnt about High Temperature Superconductors and obtained as yet unpublished papers in this field from scientists present at the ICTP when I returned to Pakistan to start my research in this emerging field. When Professor Abdus Salam arranged substantial funding for a practical research station in this field at ICTP, I was among the few scientists responsible for setting it up. This was in 1989, when I stayed at ICTP for a year, helping in setting up the research laboratory and then working in it. Since that time I have published

over 22 papers worldwide in highly reputable scientific journals and await publication of more. I am happy to state that all the credit for these achievements goes to Professor Abdus Salam. Otherwise, I could not have received the recognition and status accorded to me today by being invited to pay homage to him.

Although Professor Abdus Salam is no longer among us, he has shown the developing nations of the world a practical path. This is the principle of

self help coupled with a resolute determination to emerge from backwardness. The development of science to its highest potential is the key. It is essential that the tiny flame burning in the minds of Pakistani scientists be fed the oxygen of favorable opportunities so that it may burn ever brighter. Finally, I can say without hesitation that scientists are many, but great scientists like Professor Abdus Salam are born after centuries.



Prof. Salam, in his native dress, at the Nobel Award Ceremony.

# One Who Has Travelled Beyond The Limits Of Time

*Babar Shehzad*

Translated By Ismail K. Nayyar, New York, NY

Sincerity surrounds some people like a mother's prayers and their memory is engraved forever on one's heart. Mentions of "great" people in childhood conjured up visions of tall and brawny individuals, but it was not until later that I learnt that great people are not of great physical build but are great because of their great deeds and service to humanity.

Recently it was said that a great man died many miles from home after spending a busy and productive life, leaving behind an unfillable vacuum. This great man who ascended the horizon of the scientific world like a shining star, was born in Jhang, a city in the Punjab, when the 20th century was only 29 days old. He grew up and achieved wonders in the field of scientific endeavor. Knotty problems of theoretical physics which had bedevilled mankind for aeons found a solution through his efforts.

His parents named him Abdus Salam, and the world added prefixes and suffixes to his name as it piled honor upon honor upon him. In his initial educational career from 1938 to 1946, he broke all academic records, setting new ones, always standing first. It is a matter of pride for the Government College, Lahore, that Dr Abdus Salam first studied at this institution, and then served as Professor of Mathematics and as the Head of the department. He stayed in the hostel during his studies, and a colleague who later served as Pakistan's Chief of Air Staff states that Professor Abdus Salam had his door locked from the outside so that visitors should not intrude on his study. His occasional recreation was a couple of games of chess with a hostel employee.

In 1946 the Government arranged for outstanding students to study abroad on

scholarship, on condition that the student's family owned agricultural land. Professor Abdus Salam dearly wished to go abroad for higher education, but had not been able to do so because of his family's financial constraints. He now saw a glimmer of hope at the scholarship offer but as fate would have it, his father owned no agricultural land. Things looked gloomy indeed, but great deeds were in his future. Thus it was that his uncle, who owned substantial tracts of agricultural land, decided to transfer some land to Professor Abdus Salam, completing the scholarship requirements for Professor Abdus Salam. He was admitted to St John's College at Cambridge, and in just three years obtained a double first in Mathematics and Physics.

Following this, he chose theoretical physics as his subject for a doctorate at Cambridge University. In a year, he presented a solution to unanswered questions in this field and in 1951 was given the prestigious Smith Award.

He returned to Lahore in 1951 and served as the Head of the Mathematics department at Punjab University. In 1952 Cambridge University awarded a Ph.D. degree to Professor Abdus Salam for his outstanding work on the Renormalisation Theory. He served Punjab University as the Head of the Mathematics department until 1954, when he went abroad again. In 1957, the Imperial College of Science and Technology appointed him as the Founding Professor and Head of the department of Theoretical Physics. The next year, he was given the Adam Award and the Hopkins Award. He was the first person to receive the Maxwell Medal in 1971. In 1976, the London Institute of Physics awarded him the Guthrie Medal. UNESCO awarded him the Einstein Medal

and in 1983 a Russian science academy awarded him the Lomonsov Gold Medal.

In 1955, the first International Conference on the use of Atomic Power for peaceful purposes was convened in Geneva. Dr Abdus Salam was appointed Secretary. The world marvelled at the appointment of a Third World scientist from Pakistan to this very important position. Three years later the second conference of this series took place, again in Geneva, again with Dr Abdus Salam as Secretary. These two conferences convinced Dr Abdus Salam that developing nations needed scientific development if they were to emerge from their economic backwardness. It was then that he launched his efforts to promote scientific development of developing nations. It was as a result of these efforts that the Atomic Energy Commission was formed in Pakistan. In 1959, Dr Abdus Salam was appointed Advisor to

the Education Commission in order to streamline education in Pakistan to international standards. It was the strong recommendation of this Commission that special attention be paid to scientific and technical education. The Commission recommended that sufficient educational institutions be set up in the country to graduate about 7000 technical experts each year. In response to this recommendation several technical, educational and engineering institutions were established in the country. Specialized Colleges with post graduate programs in science came into being. In short, scientific education was given a firm foundation for regular and rapid expansion for the future.

Ravi (Government College, Lahore, Magazine),  
August 1997

## A Sign of Acceptance of Prayer

*Syed Sajid Ahmad*

I started hearing about **Dr Abdus-Salam** during my teens. My father used to tell me a story about the childhood years of Dr Salam.

Dr Salam had speech difficulties when he was a child. His parents took him to Hazrat Maulana Rajeki, razi Allahu 'anhu, and requested his prayers in this respect. He prayed and gave the glad tidings to his parents of the acceptance of his prayers. Maulana Rajeki told them that Salam will speak and the whole world will listen.

Rajeki Sahib's prediction came true in many ways. He was invited by heads of states for discussion, his opinions on scientific issues were sought by world governments, his papers were and are read, referred to and quoted by scientific community all over the world. But what is special to me is that when he gave a series of lectures arranged by the UN which were broadcast all over the world through radio — the major pre-TV era communications media in those days — I listened to them in the company of my late father, Syed Sajjad Haider. May God be pleased with both of them.

# Abdus Salam

## Educational Career, Awards and Achievements

### Educational Career

- Government College, Jhang, and Government College, Lahore, Pakistan ..... (1938-1946)  
Punjab University, Lahore, Pakistan ..... M.A.  
(First place in every examination at the Punjab University)  
Foundation Scholar, St John's College, Cambridge (1946-1949) ..... B.A. Honors  
Awarded Smith's Prize by the University of Cambridge for the outstanding pre-doctoral contribution to  
Physics ..... (1950)  
Double First in Mathematics (Wrangler) and Physics Cavendish Laboratory, Cambridge (1952) .....  
..... Ph.D. in Theoretical Physics

### Appointments

- Professor, Government College (Lahore) ..... (1951-1954)  
Head of the Mathematics Department, Punjab University (Lahore) ..... (1951-1954)  
Lecturer, Cambridge University (Cambridge) ..... (1954-1956)  
Professor of Theoretical Physics, London University, Imperial College (London) ..... (1957-1993)  
Founder and Director, International Center for Theoretical Physics (Trieste) ..... (1964-1993)  
President, International Center for Theoretical Physics (Trieste) ..... (1994-1996)  
Elected Fellow, St. John's College (Cambridge) ..... (1951-1956)  
Member, Institute of Advanced Study (Princeton) ..... (1951)  
Elected, Honorary Life Fellow, St. John's College (Cambridge) ..... (1971)  
Awarded Honorary Professorship, Peking University (Peking) ..... (1987)  
Emeritus Scientist of Centro Brasileiro de Pesquisas Fisicas - CBFP (Rio de Janeiro) ..... (1992)  
Senior Research Fellow, Department of Physics, Imperial College (London) ..... (1994)

### United Nations Assignments

- Scientific Secretary, Geneva Conferences on Peaceful Uses of Atomic Energy ..... (1955, 1958)  
Elected Member of the Board of Governors, IAEA, Vienna ..... (1962-1963)  
Member, United Nations Advisory Committee on Science and Technology ..... (1964-1975)  
Elected Chairman, United Nations Advisory Committee on Science and Technology ..... (1971-1972)  
Member, United Nations Panel and Foundation Committee for United Nations University ... (1970-1973)  
Elected Chairman, UNESCO Advisory Panel on Science, Technology and Society ..... (1981)  
Member, United Nations University Advisory Committee ..... (1981-1983)  
Member, Council, University for Peace (Costa Rica) ..... (1981-1986)

## Other Assignments

Member, Scientific Council, SIPRI (Stockholm International Peace Research Institute) .....	(1970)
Elected Vice President, IUPAP (International Union of Pure and Applied Physics) .....	(1972-1978)
First President, TWAS (Third World Academy of Sciences) .....	(1983-1994)
Member of the CERN Scientific Policy Committee .....	(1983-1986)
Member of the Board of Directors of the Beijir Institute of the Royal Swedish Academy of Sciences .....	(1986-1989)
Member of the South Commission .....	(1987-1990)
First President of TWNSO (Third World Network of Scientific Organizations) .....	(1988-1994)
Honorary President for Life, TWAS (Third World Academy of Sciences) .....	(1995)
Honorary President for Life, TWNSO (Third World Network of scientific Organizations) .....	(1995)

## Awards for Contribution to Physics

1. Hopkins Prize (Cambridge University) for the most outstanding contribution to physics during 1957-58 .....	(1958)
2. Adams Prize (Cambridge University) .....	(1958)
3. First recipient of Maxwell Medal and Award (Physical Society, London) .....	(1961)
4. Hughes Medal (Royal Society, London) .....	(1964)
5. J. Robert Oppenheimer Memorial Medal and Prize (University of Miami) .....	(1971)
6. Guthrie Medal and Prize (Institute of Physics, London) .....	(1976)
7. Sir Devaprasad Sarvadhikary Gold Medal (Calcutta University) .....	(1977)
8. Metteuci Medal (Accademia Nazionale di XL, Rome) .....	(1978)
9. John Torrence Tate Medal (American Institute of Physics) .....	(1978)
10. Royal Medal (Royal Society, London) .....	(1978)
11. NOBEL PRIZE for Physics (Nobel Foundation) .....	(1979)
12. Einstein Medal (UNESCO, Paris) .....	(1979)
13. Josef Stefan Medal, Josef Stefan Institute, Ljubljana .....	(1980)
14. Shri R. D. Birla Award (Indian Physics Association) .....	(1981)
15. Gold Medal for outstanding contribution to physics (Czechoslovak Academy of Sciences, Prague) .....	(1981)
16. Lomonosov Gold Medal (USSR Academy of Sciences) .....	(1983)
17. Copley Medal (Royal Society, London) .....	(1990)
18. Gold Medal (Slovak Academy of Sciences) .....	(1992)
19. J.C. Maxwell Prize and Medal (Academy of Creative Endeavors, Moscow) .....	(1995)

## Awards for Contribution towards Peace and Promotion of International Scientific Collaboration

1. Atoms for Peace Medal and Award (Atoms for Peace Foundation, New York) .....	(1968)
2. International Prize for Peace and International Understanding, UNESCO Center, Florence (Italy) .....	(1978)

3. Peace Medal (Charles University, Prague) ..... (1981)
4. Diploma of Highest Merit and Honor, Club of Turkish Intellectuals of Istanbul ..... (1981)
5. The Medal of the City of Paris (Echelon Vermeil) ..... (1983)
6. Premio Europeo Umberto Biancamano (Italy) ..... (1986)
7. Dayemi International Peace Award (Bangladesh) ..... (1986)
8. First Edinburgh Medal and Prize (Scotland) ..... (1988)
9. Genoa International Development of Peoples Prize (Italy) ..... (1988)
10. Ettore Majorana – Erice – Science for Peace Prize (Italy) ..... (1989)
11. Catalunya International Prize (Spain) ..... (1990)
12. Medal of the 260th Anniversary of the University of Havana (Cuba) ..... (1991)
13. Mazhar-Ali Applied Science Medal (Pakistan League of America) ..... (1992)
14. International Leoncino d'Oro Prize (Italy) ..... (1993)

### Academies and Societies

1. Fellow, Pakistan Academy of Sciences (Islamabad) ..... (1954)
2. Fellow, The Royal Society (London) ..... (1954)
3. Fellow, Royal Swedish Academy of Science (Stockholm) ..... (1970)
4. Foreign Member of the American Academy. of Arts and Sciences (Boston) ..... (1971)
5. Foreign Member of the USSR Academy of Sciences (Moscow) ..... (1971)
6. Member, Club of Rome ..... (1976)
7. Honorary Fellow, Tata Institute of Fundamental Research (Bombay) ..... (1978)
8. Foreign Associate, USA National Academy of Sciences (Washington) ..... (1979)
9. Foreign Member, Accademia Nazionale dei Lincei (Rome) ..... (1979)
10. Foreign Member, Accademia Tiberina (Rome) ..... (1979)
11. Foreign Member, Iraqi Academy (Baghdad) ..... (1979)
12. Honorary Member, Korean Physics Society (Seoul) ..... (1979)
13. Foreign Member, Academy of the Kingdom of Morocco (Rabat) ..... (1980)
14. Foreign Member, Accademia Nazionale delle Scienze dei XL (Rome) ..... (1980)
15. European Academy of Arts, Sciences and Humanities (Paris) ..... (1980)
16. Associate Member, Josef Stefan Institute (Ljubljana) ..... (1980)
17. Foreign Fellow, Indian National Science Academy (New Delhi) ..... (1980)
18. Fellow, Bangladesh Academy of Sciences (Dhaka) ..... (1980)
19. Member, Pontifical Academy of Sciences (Vatican City) ..... (1981)
20. Honorary Fellow, National Academy of Sciences (Allahabad) ..... (1981)
21. Corresponding Member, Portuguese Academy of Sciences (Lisbon) ..... (1981)
22. Member, Council University for Peace, Costa Rica ..... (1981-86)
23. Founding Member, Third World Academy of Sciences. (Trieste) ..... (1983)
24. Corresponding Member, Yugoslav Academy of Sci. and Arts (Zagreb) ..... (1983)
25. Honorary Fellow, Ghana Academy of Arts and Sciences ..... (1984)



26. Honorary Member, Polish Academy of Sciences .....	(1985)
27. Corresponding Member, Academia de Ciencias Medicas, Fisicas y Naturales de Guatemala ....	(1986)
28. Honorary Life Fellow, London Physical Society .....	(1986)
29. Elected, Fellow, World Academy of Art and Science, Stockholm .....	(1986)
30. Fellow, Pakistan Academy of Medical Sciences .....	(1987)
31. Corresponding Member, Academia de Ciencias Medicas, Fisicas Mathematicas, Naturales de Venezuela .....	(1987)
32. Honorary Fellow, Indian Academy of Sciences (Banglore) .....	(1988)
33. Distinguished International Fellow of Sigma Xi .....	(1988)
34. Foreign Fellow, African Academy of Sciences .....	(1988)
35. Honorary Member, Brazilian Mathematical Society .....	(1989)
36. Honorary Member, Nepal Physical Society .....	(1989)
37. Honorary Member, National Academy of Exact, Physical and Natural Sciences, Argentina ....	(1989)
38. Member, <i>Creation</i> International association of Scientists and Intelligentsia, USSR .....	(1989)
39. Member, Academia Europaea .....	(1989)
40. Honorary Member, Hungarian Academy of Sciences .....	(1990)
41. Honorary Member, Societa Dante Alighieri di Tucuman, Argentina .....	(1990)
42. Honorary Member, Centro Internacional de Fisica (Bogota) .....	(1991)
43. Member, Russian Academy of Creative Endeavours .....	(1992)
44. Foreign Member, American Philosophical Society .....	(1992)
45. Foreign Member, Russian Academy of Sciences .....	(1992)
46. Fellow, American Physical Society .....	(1993)
47. Honorary Member, Academia Nacional de Ciencia y Tecnologia, Peru .....	(1993)

### Orders and Other Distinctions

1. Order of Nishan-i-Imtiaz (Pakistan) .....	(1979)
2. Honorary Citizen of Trieste, Italy .....	(1979)
3. Order of Andres Bello (Venezuela) .....	(1980)
4. Order of Istiqlal (Jordan) .....	(1980)
5. Cavaliere di Gran Croce dell'Ordine al Merito della Republica Italiana .....	(1980)
6. Honorary Knight Commander of the Order of the British Empire .....	(1989)
7. Brazilian Order of Scientific Merit in the Grade of Great Cross .....	(1994)

### D.Sc. Honors

1. Punjab University, Lahore, Pakistan .....	(1957)
2. University of Edinburgh, Edinburgh, UK .....	(1971)
3. University of Trieste, Trieste, Italy .....	(1979)
4. University of Islamabad, Islamabad, Pakistan .....	(1979)
5. Universidad Nacional de Ingenieria, Lima, Peru .....	(1980)
6. University of San Marcos, Lima, Peru .....	(1980)

7. National University of San Antonio Abad, Cusco, Peru ..... (1980)
8. Universidad Simon Bolivar, Caracas, Venezuela ..... (1980)
9. University of Wroclow, Wroclow, Poland ..... (1980)
10. Yarmouk University, Yarmouk, Jordan ..... (1980)
11. University of Istanbul, Istanbul, Turkey ..... (1980)
12. Guru Nanak Dev University, Amritsar, India ..... (1981)
13. Muslim University, Aligarh, India ..... (1981)
14. Hindu University, Banaras, India ..... (1981)
15. University of Chittagong, Bangladesh ..... (1981)
16. University of Bristol, Bristol, UK ..... (1981)
17. University of Maiduguri, Maiduguri, Nigeria ..... (1981)
18. University of Philippines, Quezon City, Philippines ..... (1982)
19. University of Khartoum, Khartoum, Sudan ..... (1983)
20. Universidad Complutense de Madrid, Spain ..... (1983)
21. The City College, The City University of New York, USA ..... (1984)
22. University of Nairobi, Nairobi, Kenya ..... (1984)
23. Universidad Nacional de Cuyo, Cuyo, Argentina ..... (1985)
24. Universidad Nacional de la Plata, La Plata, Argentina ..... (1985)
25. University of Cambridge, Cambridge, UK ..... (1985)
26. University of Goteborg, Goteborg, Sweden ..... (1985)
27. Kliment Ohridski University of Sofia, Sofia, Bulgaria ..... (1986)
28. University of Glasgow, Glasgow, Scotland ..... (1986)
29. University of Science and Technology, Hefei, China ..... (1986)
30. The City University, London, UK ..... (1986)
31. Punjab University, Chandigarh, India ..... (1987)
32. Medicina Alternativa, Colombo, Sri Lanka ..... (1987)
33. National University of Benin, Contonou, Benin ..... (1987)
34. University of Exeter, UK ..... (1987)
35. University of Gent, Belgium ..... (1988)
36. *Creation* International Assoc. of Scientists and Intelligentsia, USSR ..... (1989)
37. Bendel State University, Ekpoma, Nigeria ..... (1990)
38. University of Ghana, Ghana ..... (1990)
39. University of Tucuman, Argentina ..... (1991)
40. University of Warwick, UK ..... (1991)
41. University of Dakar, Senegal ..... (1991)
42. University of Lagos, Nigeria ..... (1992)
43. University of South Carolina ..... (1992)
44. University of the West Indies, Jamaica ..... (1992)
45. St Petersburg University, Russia ..... (1992)
46. Gulbarga University, India ..... (1993)
47. University of Dhaka, Bangladesh ..... (1993)

## Assignments in Pakistan

1. Member, Pakistan Atomic Energy Commission ..... (1958-74)
2. Elected President, Pakistan Association for Advancement of Sciences ..... (1961-62)
3. Adviser, Education Commission (Pakistan) ..... (1959)
4. Member Scientific Commission (Pakistan) ..... (1959)
5. Chief Scientific Adviser to President of Pakistan ..... (1961-74)
6. Founder Chairman, Pakistan Space and Upper Atmosphere Committee ..... (1961-64)
7. Governor from Pakistan to the International Atomic Energy Agency ..... (1962-63)
8. Member National Science Council (Pakistan) ..... (1963-75)
9. Member, Board of Pakistan Science Foundation ..... (1973-77)

## Pakistani Awards

1. Sitara-i-Pakistan (S. Pk.) ..... (1959)
2. Pride of Performance Medal and Award ..... (1959)
3. The Order of Nishan-i-Imtiaz (The Highest Civilian Award) As "Servant of Peace" (Abdus Salam)  
..... (1979)

## Published Papers

Around 285 scientific papers on physics of elementary particles. Papers on scientific and educational policies for developing countries and Pakistan.

## Scientific Contributions

Research on physics of elementary particles. Particular contributions:

1. Two-component neutrino theory and the prediction of the inevitable parity violation in weak interactions.
2. Gauge unification of weak and electromagnetic interactions — the unified force is called the "Electroweak" force — a name given to it by Salam; predicted existence of weak neutral currents and W, Z particles before their experimental discovery.
3. Symmetry properties of elementary particles; unitary symmetry.
4. Renormalization of meson theories.
5. Gravity theory and its role in particle physics; two tensor theory of gravity and strong interaction physics.
6. Unification of Electroweak with strong nuclear forces, grand (electro-nuclear) unification.
7. Related prediction of proton-decay.
8. Supersymmetry theory, in particular formulation of superspace and formalism of superfields.

## Books

1. *Symmetry Concepts in Modern Physics*. Iqbal Memorial Lecture by Abdus Salam (Atomic Energy Center, Lahore), 1966.
2. *Aspects of Quantum Mechanics*. Edited by Abdus Salam and E.P. Wigner (Cambridge University Press), 1972
3. *Ideals and Realities: Selected Essays of Abdus Salam*. First Edition edited by Z. Hassan and C.H. Lai (World Scientific Publishing Co. Pte. Ltd., Singapore), 1984. Second Edition edited by C.H. Lai, 1987. Third Edition edited by C.H. Lai and Azim Kidwai, 1989. Editions also published in Arabic, Bengali, Chinese, French, Italian, Persian, Punjabi, Romanian, Turkish and Urdu.
4. *Science and Education in Pakistan* by Abdus Salam (Third World Academy of Sciences, Trieste), 1987.
5. *Science Education and Development*. A collection of Essays by and about Abdus Salam (Research Center for Cooperation with Developing Countries, Ljubljana, Yugoslavia), 1987. Editions also published in French, Italian, Persian and Spanish.
6. *Supergravity in Diverse Dimensions, Volumes I and II*, by Abdus Salam and Ergin Sezgin (World Scientific Publishing Co. Pte. Ltd., Singapore), 1988.
7. *From a Life of Physics*. Edited by Abdus Salam (World Scientific Publishing Co. Pte. Ltd., Singapore), 1989.
8. *Unification of Fundamental Forces: The First of the 1988 Dirac Memorial Lectures* by Abdus Salam (Cambridge University Press), 1990. Editions also published in French, Greek, Italian, Japanese, Portuguese and Spanish.
9. *Notes on Science, Technology and Science Education in the Development of the South* (Red Book). Thirteen editions by Abdus Salam. Last edition prepared for the last meeting of the South Commission and for the meeting of the United Nations Economic and Social Council (ECOSCO), Geneva, July 1991 (Third World Academy of Sciences), May 1991. Editions also published in Arabic, Chinese, Farsi, French, Italian and Spanish.
10. *Science and Technology: Challenge for the South* by Muhammad Abdus Salam (Third World Academy of Sciences), November 1992.
11. *Selected Papers of Abdus Salam (with Commentary)*. Edited by A. Ali, C. Isham, T. Kibble and Riazuddin (World Scientific Publishing Co. Pte. Ltd., Singapore), 1994.
12. *Renaissance of Science in Islamic Countries*. Edited by H.R. Dalafi and M.H.A. Hassan (World Scientific Publishing Co. Pte. Ltd., Singapore), 1994.

## Biographies of Abdus Salam

1. *Abdus Salam* by Dr Abdul Ghani (Ma'aref Printers Limited, Defense Housing Society, Karachi), 1982.
2. *The Greats in Science from the Third World: Abdus Salam* by Azim Kidwai (Third World Academy of Sciences, Trieste), 1989
3. *Abdus Salam un Physicien*. Entretien avec Jacques Vauthier (Beauchesne Editeur, Paris), 1990
4. *Abdus Salam: A Biography* by Jagjit Singh (Penguin Books India), 1992.

Compiled by Dr Karimullah Zirvi

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Literary contributions for publication in the Al-Nahl can be sent to Majeed A. Mian, Editor, Al-Nahl, 4 Nasir Ahmad Rd, Sharon MA 02067 (e-mail: miankhel@aol.com). It will be helpful if the contributions are saved onto a diskette in IBM compatible PC readable ASCII text format (text only with line breaks), MS Publisher, or in WinWord (Microsoft Word for Windows) and the diskette is sent, or contents are e-mailed or attached to an e-mail. References to other publications should include as much of the following as can be available: the name of the publication, volume and number, name of the author, the date and place of publication, the name of the publisher, and the page number(s). Please, keep a copy of your submissions. We may not be able to return originals unless arranged with us previously. All items are subject to review and approval by the Sadr Majlis. Majlis Ansarullah does not necessarily agree with the views of the writers. Publications of U.S. Jamaat and its auxiliaries reach the same homes, therefore, make sure that your article appears in only one of them to avoid unnecessary duplicatin.

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# Majlis Ansarullah, U.S.A.

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## Ansar Pledge

اشهد ان لا اله الا الله وحده لا شريك له  
واشهد ان محمدا عبده ورسوله

I solemnly pledge that I shall endeavor throughout my life for the propagation and consolidation of Ahmadiyyat in Islam and shall stand guard in defense of institution of Khilafat. I shall not hesitate to offer any sacrifice in this regard. Moreover, I shall exhort my children to always remain dedicated and devoted to Khilafat. Insha Allah Ta'ala.

## Publications

Al-Nahl: Published quarterly. See page 2 for subscription information.

Ansarullah News: Monthly newsletter. Copy available from the Sadr or Secretary Ishaat.

Salat Chart: 18x24" Color, Arabic with English transliteration and English translation, \$2/copy. Available from Sajid.

Razzaq and Farida: A story for children. \$1.50/copy. Available from Sajid.

## Calendar

US National Annual Ijtema Ansarullah and US National Majlis Shura Ansarullah: Silver Spring, MD: September 11-13, 98.

West Coast Ansar Ijtema: San Francisco, CA, October, 98.

Annual Ijtema Ansarullah Southern Region, Houston TX, November 1998.

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**1997**

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Salim Nasir Malik

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Dr M. Aslam Nasir

**Qā'id Tehrik-i-Jadid:** Jalaluddin Abdul Latif

**Qā'id Waqf-i-Jadid:** Khalil Mahmood

**Qā'id Zehānat-o-Sihhat-i-Jismāni:**

Dr Imtiaz Chaudhary

**Qā'id Tajnid (Census):** Sheikh Abdul Wahid

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## **Arakin-i-Khusus**

(Special Members)

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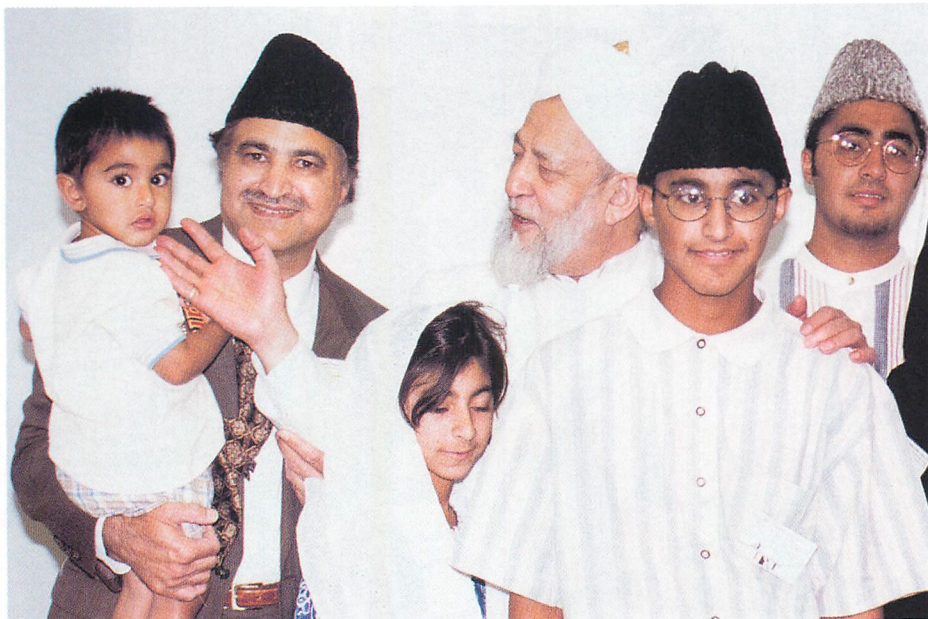
Munir Hamid, Philadelphia, PA

Dr Ahsanullah Zafar, Lambertville, N.J.

Sheikh Mubarak Ahmad Sahib,

Washington, D.C.

A group photo of Dr Salam's son-in-law, Dr Hamid-ur-Rahman (holding son Azeem-ur-Rahman mentioned by Hazur in his khutba included in this issue) and his children with Hazrat Khalifatul-Masih IV, ayyadahollah, who is talking to Azeem-ur-Rahman.



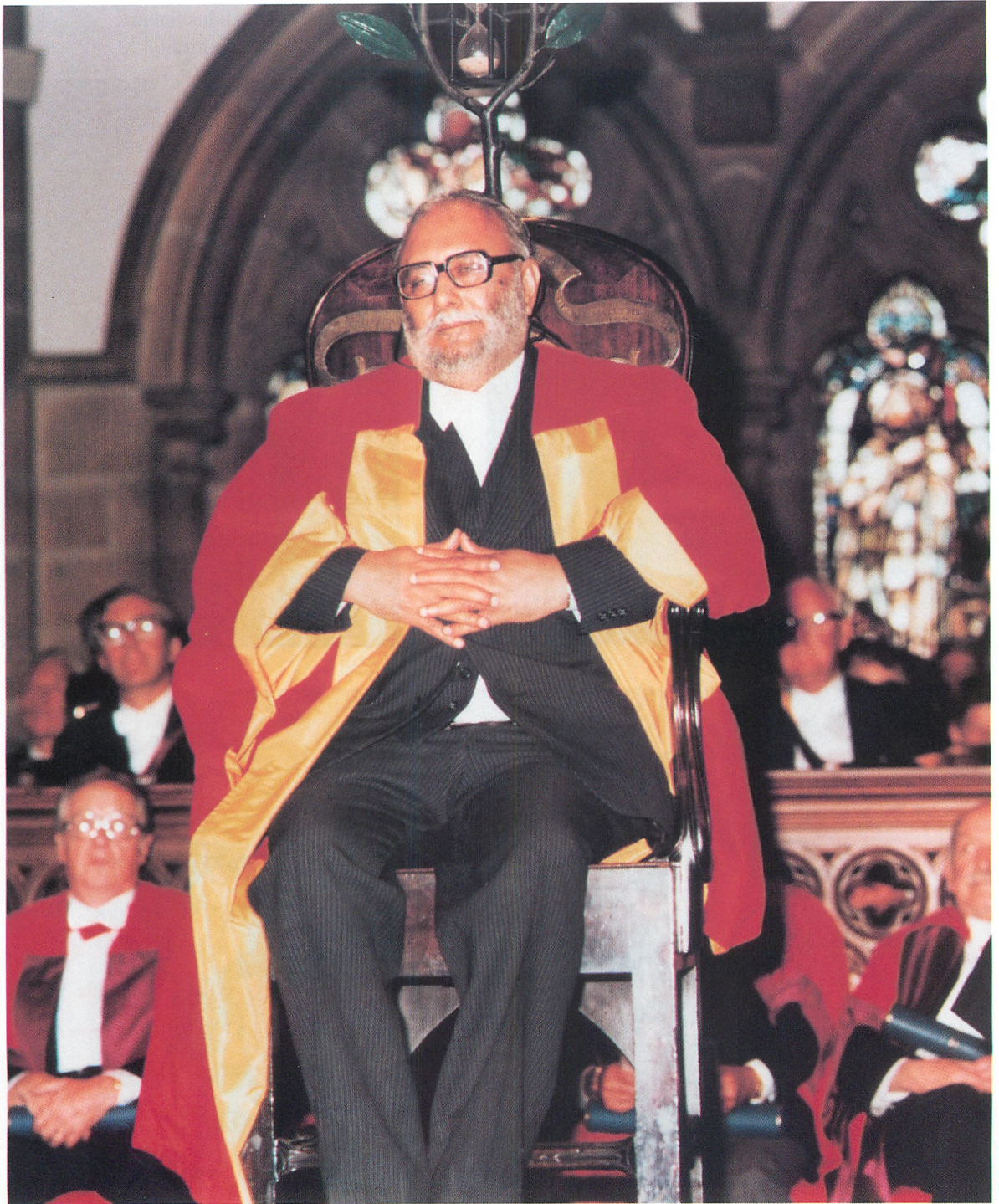
Abdus Salam Sahib with his son Ahmad Salam at the occasion of the wedding of Ahmad Salam.

Prof. Salam's brothers in a group photo, from left:  
Chaudhry Abdul Hamid, Chaudhry Muhammad Abdur Rasheed, Chaudhry Abdus Sami,  
Chaudhry Abdul Majid, Chaudhry Abdul Qadir, Chaudhry Abdul Wahhab.



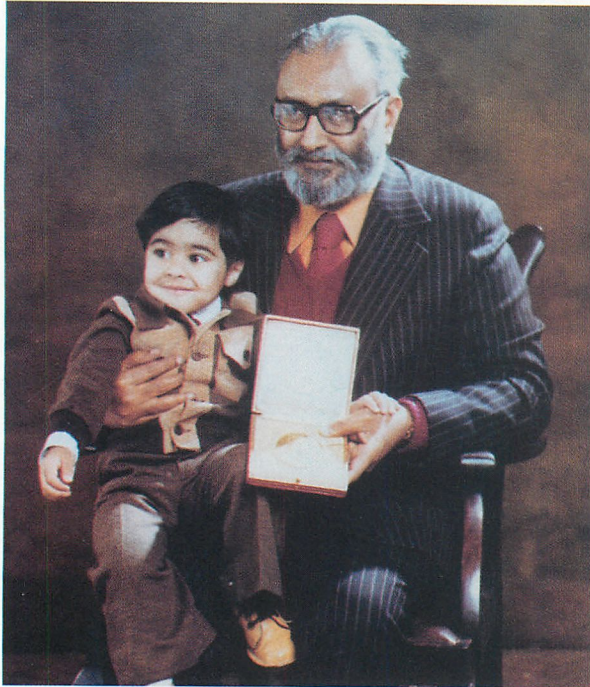
The large gathering at the Funeral Prayer of Dr Abdus Salam in Rabwah, Pakistan.



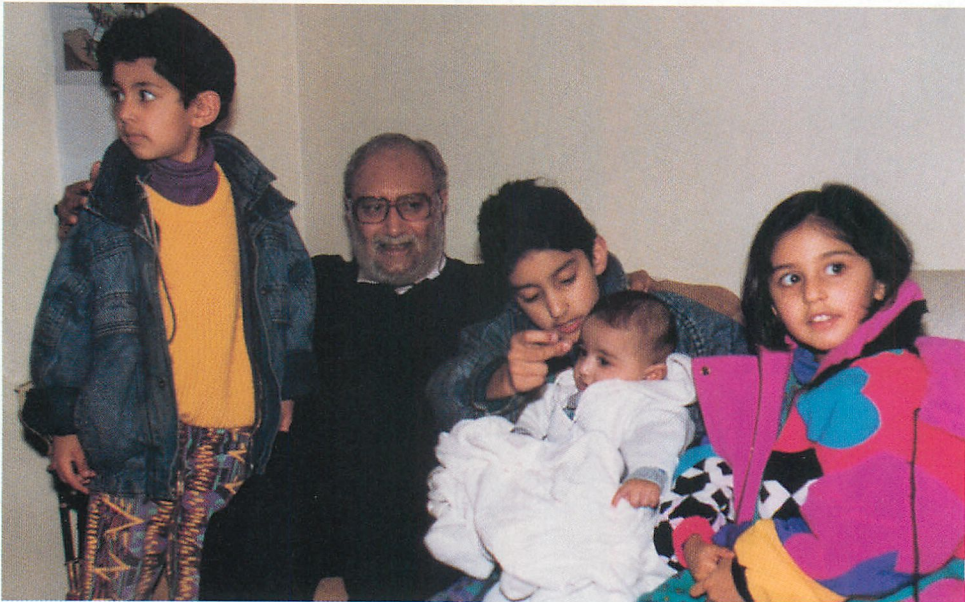


Dr Salam at the Nobel Prize Ceremonies.

Dr Salam holding Nobel Medal with eldest grandson, Faiz-ur-Rahman in London in 1979.

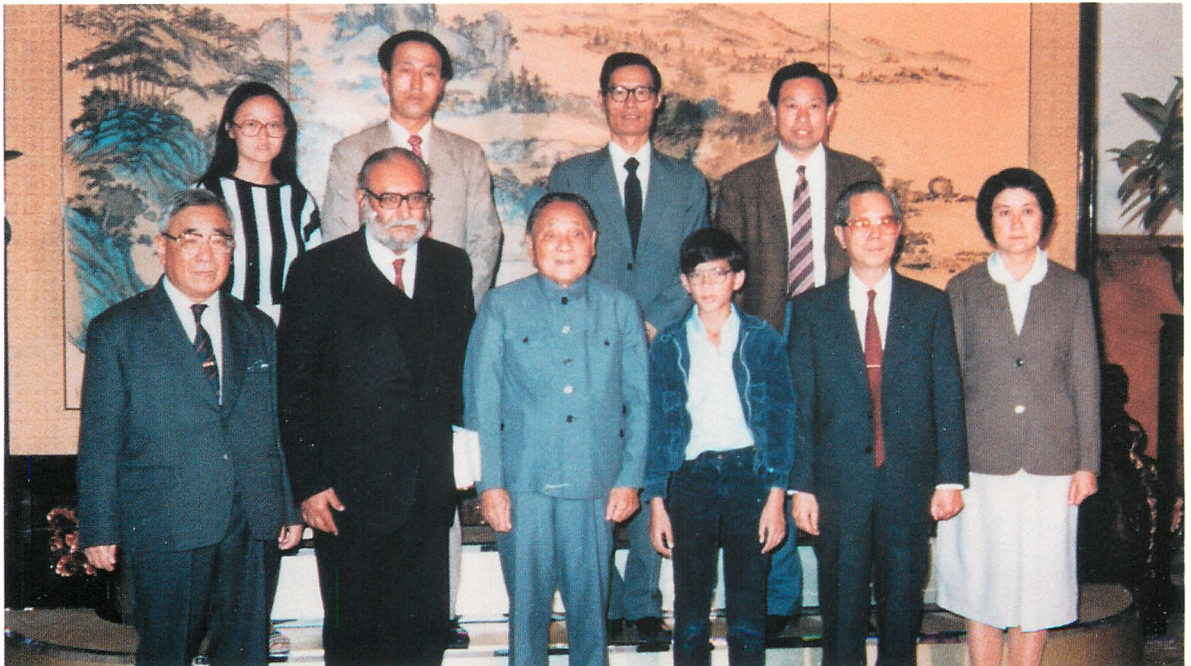


Dr Abdus Salam, a portrait.



Dr Sir Mohammad Abdus Salam at the Michigan home of his daughter, Bushra Salam Bajwa, on December 23, 1992, with grandchildren (from left to right) Moazzum, Ma'az, Momin and Maariya.

Dr Abdus Salam with H.R.H. Juan Carlos, King of Spain.



Dr Salam with Chinese leader Xiaoping Deng and other Chinese officials.

Dr Abdus Salam is addressing audience while Hazrat Khalifatul-Masih IV, ayyadahollaho ta'ala, is presiding at the occasion of the opening of Masjid Basharat in Spain. Chaudhri Muhammad Zafrullah Khan is seated to the right of Hazur.



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