### The Baily Star



Penthouse

extended a warm welcome to me

After retirement Fakhru returned

from his loneliness and married

ple and traveled in many parts of the

Meanwhile Fakhru continued to

which presided over the first holding

become a poll watcher in many

parts of the world. He then started

the Fair Elections Monitoring Alli-

ance (FEMA) and became its Chair-

man. That organisation has become

famous and has been playing an

ever growing role in the conduct of

Fakhru became afflicted by

cancer and for several years he

fought bravely on. Finally he suc-

cumbed in the recent past. I am glad

that the former Foreign Minister of

Bangladesh and now President of

National elections in Bangladesh.

# How Islam won, and lost, the lead in science

#### **DENNIS OVERBYE**

ASIR al-Din al-Tusi was still a young man when the Assassins made him an offer he couldn't refuse.

His hometown had been devastated by Mongol armies, and so, early in the 13th century, al-Tusi, a promising astronomer and philosopher, came to dwell in the legendary fortress city of Alamut in the mountains of northern Persia. He lived among a heretical and secretive sect of Shiite Muslims, whose members practised political murder as a tactic and were dubbed hashishinn, legend has it, because of their use of hashish.

Although al-Tusi later said he had been held in Alamut against his will, the library there was renowned for its excellence, and al-Tusi thrived there, publishing works on astronomy, ethics, mathematics and philosophy that marked him as one of the great intellectuals of his age.

But when the armies of Halagu, the grandson of Genghis Khan, massed outside the city in 1256. al-Tusi had little trouble deciding where his loyalties lay. He joined Halagu and accompanied him to Baghdad, which fell in 1258. The grateful Halagu built him an observatory at Maragha, in what is now northwestern Iran.

Al-Tusi's deftness and ideological flexibility in pursuit of the resources to do science paid off. The road to modern astronomy scholars say, leads through the work that he and his followers performed at Maragha and Alamut in the 13th and 14th centuries. It is a road that winds from Athens to Alexandria, Baghdad, Damascus and Cordoba, through the palaces of caliphs and the basement laboratories of alchemists, and it was travelled not just by astronomy but by all science.

Commanded by the Koran to seek knowledge and read nature for signs of the Creator, and inspired by a treasure trove of ancient Greek learning, Muslims created a society that in the Middle Ages was the scientific centre of the world. The Arabic language was synonymous with learning and science for 500 years, a golden age that can count among its credits the precursors to modern universities, algebra, the names of the stars and even the notion of science as an empirical inquiry.

"Nothing in Europe could hold a candle to what was going on in the Islamic world until about 1600," said Dr. Jamil Ragep, a professor of the history of science at the University of Oklahoma.

It was the infusion of this knowledge into Western Europe, historians say, that fuelled the Renaissance and the scientific revolution.

"Civilisations don't just clash, said Dr. Abdelhamid Sabra, a retired professor of the history of Arabic science who taught at Harvard "They can learn from each other. Islam is a good example of that."

The intellectual meeting of Arabia and Greece was one of the greatest events in history, he said. "Its scale Christian Understanding at Georgetown.

"Knowledge is part of the creed," added Dr. Farouk El-Baz, a geologist at Boston University, who was cience adviser to President Anwar el-Sadat of Egypt. "When you know more, you see more evidence of God.

So the notion that modern Islamic science is now considered "abysmal", as Abdus Salam, the first Muslim to win a Nobel Prize in Physics, once put it, haunts Eastern scholars. "Muslims have a kind of nostalgia

for the past, when they could contend that they were the dominant cultivators of science," Dr. Bakar said.

The relation between science and religion has generated much debate in the Islamic world, he and other scholars said. Some scientists and historians call for an "Islamic science" informed by spiritual values they say Western science ignores, but others argue that a religious conservatism in the East has dampened the sceptical spirit necessary for good science. The Golden Age

When Muhammad's armies swept out from the Arabian penin-

sula in the seventh and eighth

centuries, annexing territory from

Spain to Persia, they also annexed

the works of Plato, Aristotle,

Democritus, Pythagoras, Archime-

des. Hippocrates and other Greek

Hellenistic culture had been

pread eastward by the armies of

Alexander the Great and by reli-

gious minorities, including various

Christian sects, according to Dr.

David Lindberg, a medieval science

historian at the University of Wis-

conquerors turned to the local

intelligentsia to help them govern,

Dr. Lindberg said. In the process, he

said, they absorbed Greek learning

that had yet to be transmitted to the

West in a serious way, or even

translated into Latin. "The West had

a thin version of Greek knowledge,

The largely illiterate Muslim

thinkers

consin.

Kepler and Newton as a great mathematical scientist," said Dr.

Lindberg. The mathematician, astronomer and geographer al-Biruni, born in what is now part of Uzbekistan in 973, wrote some 146 works totalling 13,000 pages, including a vast sociological and geographical study of India.

Ibn Sina was a physician and philosopher born near Bukhara (now in Uzbekistan) in 981. He compiled a million-word medical encyclopaedia, the Canons of Medicine, that was used as a textbook in parts of the West until the 17th century.

Scholars say science found such favour in medieval Islam for several reasons. Part of the allure was mystical: it was another way to experience the unity of creation that was the central message of Islam.

"Anyone who studies anatomy will increase his faith in the omnipotence and oneness of God the Almighty," goes a saying often attributed to Abul-Walid Muhammad Ibn Rushd, also known as Averroes. a 13th-century anatomist and philosopher. Knocking on Heaven's Door

Islam is one of the few religions in human history in which scientific

procedures are necessary for religious ritual, Dr. David King, a historian of

science at Johann Wolfgang Goethe University in Frankfurt, pointed out in his

book "Astronomy in the Service of Islam," published in 1993...From the 10th

to the 13th century Europeans, especially in Spain, were translating Arabic

works into Hebrew and Latin "as fast as they could", said Dr. King. The result

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Service of Islam," published in 1993

The requirement that Muslims

they pray, for example, required

the job of producing tables or dia-

raised the stakes for astronomy.

was a rebirth of learning that ultimately transformed Western civilisation.

Another reason is that Islam is

similar to the Muslim astronomers in his early writings.

This has led some historians to suggest that there is a previously unknown link between Copernicus and the Islamic astronomers, even though neither ibn al-Shatir's nor al-Tusi's work is known to have ever been translated into Latin, and herefore was presumably unknown in the West

Dr. Owen Gingerich, an astronomer and historian of astronomy at Harvard, said he believed that Copernicus could have developed the ideas independently, but wrote in Scientific American that the whole idea of criticising Ptolemy and reforming his model was part of "the climate of opinion inherited by the Latin West from Islam" The Decline of the East

Despite their awareness of Ptolemy's flaws, Islamic astronomers were a long way from throwing out his model: dismissing it would have required a philosophical as well as cosmological revolution. "In some ways it was beginning to happen," said Dr. Ragep of the University of Oklahoma. But the East had no need of heliocentric models of the universe, said Dr. King of Frankfurt. All motion being

century produced a hunger fo Western science and technology, or at least the economic and military power they could produce, scholars say. Reformers bent on modernising Eastern educational systems to include Western science could argue that Muslims would only be reclaiming their own, since the West

had inherited science from the Islamic world to begin with. In some ways these efforts have been very successful. "In particular countries the science syllabus is quite modern," said Dr. Bakar of Georgetown, citing Malaysia, Jordan and Pakistan, in particular Even in Saudi Arabia, one of the most conservative Muslim states science classes are conducted in English, Dr. Sabra said.

Nevertheless, science still lags in the Muslim world, according to Dr. Pervez Hoodbhoy, a Pakistani physicist and professor at Quaid-e-Azam University in Islamabad, who has written on Islam and science. According to his own informal survey, included in his 1991 book Islam and Science, Religious Orthodoxy and the Battle for Rationality", Muslims are seriously underrepresented in science accounting for fewer than one per cent of the world's scientists while they account for almost a fifth of the world's population. Israel, he reports, has almost twice as many scientists as the Muslim countries put together.

Among other sociological and economic factors. like the lack of a middle class, Dr. Hoodbhoy attributes the malaise of Muslim science to an increasing emphasis over the last millennium on rote learning based on the Koran.

"The notion that all knowledge is in the Great Text is a great disincentive to learning," he said. "It's destructive if we want to create a thinking person, someone who can analyse, question and create." Dr. Bruno Guideroni, a Muslim who is an astrophysicist at the National Centre for Scientific Research in Paris, said, "The fundamentalists criticise science simply because it is

Western." Other scholars said the attitude of conservative Muslims to science was not so much hostile as schizo-

phrenic, wanting its benefits but not its worldview. "They may use modern technology, but they don't deal with issues of religion and science,' said Dr. Bakar.

One response to the invasion of Western science, said the scientists, has been an effort to "Islamicize" science by portraying the Koran as a source of scientific knowledge.

Dr. Hoodbhoy said such groups had criticised the concept of cause and effect. Educational guidelines once issued by the Institute for Policy Studies in Pakistan, for example, included the recommendation that physical effects not be related to causes.

For example, it was not Islamic to say that combining hydrogen and oxygen makes water. "You were supposed to say," Dr. Hoodbhoy recounted. "that when you bring hydrogen and oxygen together then

## In Memoriam **Fakhruddin Ahmed**

**ARSHAD-UZ ZAMAN** 

HE death of Fakhruddin Ahmed in the USA has left a big void among his many friends and admirers, and I count myself as one of them. This is a loss that will be very difficult to fill.

My first meeting with Fakhruddin Ahmed took place in New York in 1959. He joined the Pakistan Consulate General in New York where late Khwaia K M Kaiser was the Consul General. Fakhruddin Ahmed was a vice Consul General. Fakhruddin whom we all called Fakhru was lodged in the Penthouse of the Consulate General. He was a bachelor and the Penthouse was an ideal bachelor's flat. I was Press Attache in the Pakistan Mission to the UN. The address of both the offices was 4 East 65<sup>th</sup> Street in Manhattan and they were joined together, with a large hall between them.

We were very young then and a natural friendship developed between us. There were not many Bengalis in Pakistan foreign missions and fewer in important positions. With Fakhru on one side and SAMS Kibria as a member of the Pakistan Mission on the other, we often talked about a future independent homeland of ours in East Pakistan.

I have spent many hours in the company of Fakhru, specially in his Penthouse. He was an expert cook and rather enjoyed cooking. I fondly recall those evenings, when evening breeze would envelop us at the Penthouse. Those were happy carefree days.

I left the Permanent Mission of Pakistan in 1964 and our paths did not meet right upto the birth of Bangladesh. We of course kept in contact with each other in our wandering around the world.

In 1972 when I was Chief of Protocol in our Foreign Ministry in Dhaka, Fakhru, who was posted in Islamabad, reached Dhaka taking the clandestine route via Kabul. He was staying at the central circuit house. He joined then as Additional Foreign Secretary in the Ministry of Foreign Affairs. He has made a mention of this in his autobiographi-

cal book Critical Times. Indeed this book is excellent reading to get a Shortly thereafter his wife passed flavour of the times when our foreign away. policy was just evolving. It is an excellent autobiography of Fakhru. to Dhaka and we often met. I was delighted that Fakhru broke away In this book Fakhru has bitterly criticised former dictator Hussein Muhammad Ershad on matters of Lina. They were a very happy cou-



policy differences. Fakhru, who never bore grudge against any one, was too deeply hurt by the decision of H M Ershad and felt compelled to make a mention of it.

Thus Fakhru and I became colleagues in the same Ministry. I fondly recall my time with Fakhru. He was a wonderful friend and it was a joy to work with him. He was steady and completely unruffled, however strong the pressure. In those early days of our journey through an uncharted course, Fakhru's steady hand was of great mportance in the execution of our foreign policy.

From the foreign ministry, I moved to Algiers in the middle of 1973 and opened our Mission. I then assumed the post of Ambassador. I received total support and the hand of friendship from Fakhru, who had become the Foreign Secretary. He steered our foreign policy with total integrity and patriotism.

I met Fakhru in London in the early eighties and he was our High Commissioner. Although he was grief stricken by his suffering wife who was stricken with cancer, he maintained his equanimity and

the Republic Prof A Q M Badrudozza Chowdhury has named the meeting hall in the Foreign Ministry after Fakhruddin Ahmed. While I offer my deepest condolences to Lina and all the children and all the members of the family, I to pray Almighty for the safe repose of the soul of Fakhruddin Ahmed (Inna Lillah-i.....) It is a thousand pities that due to the delay caused bv the Biman Fakhru's dead body could not be laid to rest on the soil of Bangladesh. He lies in eternal rest in Toronto. I am deeply saddened at

the thought because Fakhru loved nis Bangladesh dearly.

Arshad-uz Zaman is a former Ambassador

Dr. Lindberg said. "The East had it would use them, noted Dr. King. Astronomers at the Samarkand In ninth-century Baghdad the Caliph Abu al-Abbas al-Mamun set observatory, which was founded about 1420 by the ruler Ulugh Beg, up an institute, the House of Wismeasured star positions to a fraction dom, to translate manuscripts. of a degree, said Dr. El-Baz. Islamic astronomy reached its Among the first works rendered into Arabic was the Alexandrian astronomer Ptolemy's "Great Work," which described a universe in which the

zenith, at least from the Western perspective, in the 13th and 14th centuries when al-Tusi and his successors pushed against the limits of the Ptolemaic worldview that had ruled for a millennium.

as the work was known to Arabic According to the philosopher

relative, he said, it was irrelevant for the purposes of Muslim rituals whether the sun went around the Earth or vice versa

science at Johann Wolfgang Goe-From the 10th to the 13th century the University in Frankfurt, pointed Europeans, especially in Spain, out in his book "Astronomy in the were translating Arabic works into Hebrew and Latin "as fast as they Arabs had always been knowledgecould", said Dr. King. The result was able about the stars and used them a rebirth of learning that ultimately to navigate the desert, but Islam transformed Western civilisation.

Why didn't Eastern science go forward as well? "Nobody has face in the direction of Mecca when answered that question satisfactorily," said Dr. Sabra of Harvard. knowledge of the size and shape of Pressed, historians offer up a conthe Earth. The best astronomical stellation of reasons. Among other minds of the Muslim world tackled things, the Islamic empire began to be whittled away in the 13th century grams by which the gibla, or sacred by Crusaders from the West and Mongols from the East.

directions, could be found from any point in the Islamic world. Their Christians re-conquered Spain efforts rose to a precision far beyond and its magnificent libraries in the needs of the peasants who Cordoba and Toledo, full of Arab earning. As a result, Islamic centres of learning began to lose touch with one another and with the West. leading to a gradual erosion in two of the main pillars of science - communication and financial support.

In the West, science was able to pay for itself in new technology like the steam engine and to attract financing from industry, but in the East it remained dependent on the patronage and curiosity of sultans and caliphs. Further, the Ottomans, who took over the Arabic lands in the

not just for Islam but for Europe and the world.'

But historians say they still know very little about this golden age. Few of the major scientific works from that era have been translated from Arabic, and thousands of manuscripts have never even been read by modern scholars. Dr. Sabra characterises the history of Islamic science as a field that "hasn't even begun yet" Islam's rich intellectual history,

scholars are at pains and seem saddened and embarrassed to point out, belies the image cast by recent world events. Traditionally, Islam has encouraged science and learning. "There is no conflict between Islam and science," said Dr. Osman Bakar of the Centre for Muslim-

scholars, became the basis for cosmology for the next 500 years. Jews, Christians and Muslims all

Sun. Moon, planets and stars

revolved around Earth; Al-Magest,

participated in this flowering of science, art, medicine and philosophy, which endured for at least 500 years and spread from Spain to Persia. Its height, historians say, was in the 10th and 11th centuries when three great thinkers strode the Fast: Abu Ali al- Hasan ibn al-Havtham, also known as Alhazen; Abu Rayham Muhammad al-Biruni; and Abu Ali al-Hussein Ibn Sina,

also known as Avicenna. Al-Haytham, born in Iraq in 965, experimented with light and vision, laving the foundation for modern optics and for the notion that science should be based on experiment as well as on philosophical arguments "He ranks with Archimedes,

move in circles at uniform speeds. But the beauty of Ptolemy's attempt to explain the very un-uniform motions of planets and the Sun as seen from Earth was marred by corrections like orbits within orbits, known as epicycles, and geometrical modifications.

Al-Tusi found a way to restore most of the symmetry to Ptolemy's model by adding pairs of cleverly designed epicycles to each orbit. Following in al-Tusi's footsteps, the 14th-century astronomer Ala al-Din Abul-Hasan ibn al-Shatir had man-

aged to go further and construct a completely symmetrical model. Copernicus, who overturned the Ptolemaic universe in 1530 by

proposing that the planets revolved around the Sun, expressed ideas

16th century, were builders and celestial bodies were supposed to conquerors, not thinkers, said Dr. El-Baz of Boston University, and support waned. "You cannot expect the science to be excellent while the society is not," he said.

Others argue, however, that Islamic science seems to decline only when viewed through Western, secular eyes. "It's possible to live without an industrial revolution if you have enough camels and food," Dr. King said.

"Why did Muslim science decline?́" he said. "That's a very Western question. It flourished for a thousand years - no civilisation on Earth has flourished that long in that

#### Islamic Science Wars

Humiliating encounters with Western colonial powers in the 19th

by Jim Davis

I FEEL

SILLY

by the will of Allah water was created."

Even Muslims who reject fundamentalism, however, have expressed doubts about the desirability of following the Western style of science, saving that it subverts traditional spiritual values and promotes materialism and alien-

"No science is created in a vacuum," said Dr. Seyyed Hossein Nasr, a science historian, author, philosopher and professor of Islamic studies at George Washington University, during a speech at the Massachusetts Institute of Technology a few years ago. "Science arose under particular circumstances in the West with certain philosophical presumptions about the nature of reality.'

Dr. Muzaffar Igbal, a chemist and the president and founder of the Centre for Islam and Science in Alberta, Canada, explained: "Modern science doesn't claim to address the purpose of life: that is outside the domain. In the Islamic world, purpose is integral, part of that life.

Most working scientists tend to scoff at the notion that science can be divided into ethnic, religious or any other kind of flavour. There is only one universe. The process of asking and answering questions about nature, they say, eventually erases the particular circumstances from which those questions arise.

In his book, Dr. Hoodbhoy recounts how Dr. Salam, Dr. Stever Weinberg, now at the University of Texas, and Dr. Sheldon Glashow at Harvard, shared the Nobel Prize for showing that electromagnetism and the so-called weak nuclear force are different manifestations of a single force.

Dr. Salam and Dr. Weinberg had devised the same contribution to that theory independently, he wrote despite the fact that Dr. Weinberg is an atheist while Dr. Salam was a Muslim who prayed regularly and quoted from the Koran. Dr. Salam confirmed the account in his introduction to the book, describing himself as "geographically and ideologically remote" from Dr. Weinberg.

"Science is international," said Dr. El-Baz. "There is no such thing as Islamic science. Science is like building a big building, a pyramid Each person puts up a block. These blocks have never had a religion. It's irrelevant, the colour of the guy who put up the block."

Courtesy: The New York Times











O WATCHPOG ON VACATION PLEASE BARK AT HOURSELF

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By Hanna-Barbera