GREAT SCIENTIST AND SCHOLARS FROM UZBEKISTAN

(From Samarkand and Bukhara)

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Imam Mohammed Ibn Ismail Bukhari (R.A)
809 C.E.– 869 C.E.

A brief Bio sketch of Imam Bukhari

Imam Bukhari was born in Bukhara. His father died when he was very young. By the age of sixteen he memorized over 2000 ahadiths. Performed Hajj at the age of 16 and stayed in Makkah and Madina for four years. He compiled two books of Ahadith before the age of 20. 'Qadhaayas-Sahaabah Wat-Taabi'een' and 'Taareekhul-Kabeer'.

He travelled to Syria Egypt Kufa Basra and Baghdad to expand his knowledge and collect Ahadith from various sources. He was also teaching the research methodology of collection of Ahadith to students in all these places. It has been said that 9000 people were privileged to sit in his lectures when he taught "Kitab Sahih Al Bukhari". Governor of Bukhara requested Imam Bukhari to teach his children at his home. Imam Bukhari declined by saying "I give greater respect to knowledge rather than to people, for it is they who are in need of the knowledge and it is they who should seek it."

The governor deported him from Bukhara. He went to Samarkand where he passed away in year 869 C.E. Imam Bukhari's (R.A) memory was considered to be a miracle, for as soon as the saying of a hadith would finish Imam Bukhari (R.A) would repeat it orally. There are a number of books compiled by Imam Bukhari (R.A) however, Saheeh ul Bukhari has gained great esteem. After he had finished he had shown the manuscript to his teacher Imam Ahmad Ibn Hanbal (R.A) for approval .It took him 16 years to gather the ahaadeeth and to complete the book. Imam Bukhari studied book of ahadith and found ahadeeth of both week and strong testimonials compiled together. Imam Bukhari (R.A) had taken great care in writing the a hadeeth and choosing those which met the standards and conditions which he set to find ahaadeeth with only strong testimonials which included only reliable and trustworthy testifiers.

All the Muhaditheen who possess great knowledge of ahaadeeth must agree upon the testifiers' in question ability to learn and memorize, along with his reporting techniques. The testimonial must be complete without any missing testifiers. If there are two different narrators of a hadith related to them by a Sahaabi then the hadith shall be given a high stage in rank. However, if only one narrator can be found and the testimonial proves to be a strong one then this shall be accepted without any doubts.

It is said that Imam Bukhari examined and evaluated thousands of Ahadiths and excluded those which did not meet his stringent criterion. Sahih-ul-Bukhari consists of 7 275 ahaadeeth and after excluding the repetitions 2 353 narrations of the Prophet Sallallahu Alaihi Wasallam can be found.

Naqshbandiyyah

The Naqshbandiyyah Order was founded by Shaykh Baha al-Din Naqshband born in the 14th century near Bukhara in what is now called Central Asia, but which, at that time, was culturally a part of the Persian-speaking world. The Order spread rapidly from its original home into the Eastern areas of Persia and present-day Afghanistan, and from there, into India which became the home of some of its greatest later figures. The name of the Order, derived from its founder, means on one level, what is related to an embroiderer or literally one who casts patterns upon cloth (naqshband). But on a deeper level, it means

bonding the heart with God through the imprint of His Name upon the human heart. The Naqshbandis have always been very orthodox, staunch defenders of the Shari'ah and emulators of the Sunnah. Throughout Islamic history they have played a most important role in the preservation and spread of Islam especially under conditions of duress while of course having as their central aims the spiritual, inner perfection of their followers. The Naqshbandi order is over 1,300 years old, and is active today. It is the only Sufi order that claims to trace its direct spiritual lineage/chain (*silsilah*) to the Islamic prophet Muhammad, through Abu Bakr, the first caliph and Muhammad's companion. This lineage also indirectly connects to Ali, Muhammad's cousin, son-in-law and the Fourth Caliph, via Jafar as-Sadiq. In contrast, most other Sufi orders (turuq) trace their lineage through Ali. The first eight were formulated by Ghujdawani, and the last three were added by Baha ad- din. Remembrance (Yad kard): Always orally and mentally repeating the dhikr. Restraint (Baz gasht): Engaging in the heart repetition of the phrase "Al-kalimat at-tayyiba."Watchfulness (Nigah dasht): Being conscientious over wandering thoughts while repeating the phrase "Al-kalimat at-tayyiba." Recollection (Yad dasht): Concentration upon the Divine presence in a condition of dhawq, foretaste, intuitive anticipation or perceptiveness, not using external aids. Awareness while breathing (Hosh dar dam): Controlling one's breathing by not exhaling or inhaling in the forgetfullness of the Divine. Journeying in one's homeland (Safar dar watan): An internal journey that moves the person from having blameworthy to praiseworthy properties. This is also referred to as the vision or revelation of the hidden side of the shahada. Watching one's step (Nazar bar qadam): Do not be distracted from purpose of the ultimate journey. Solitude in a crowd (Khalwat dar anjuman): Although journey is outwardly in this world, it is inwardly with God. Temporal pause (Wuquf-I zamani): Keeping account of how one spends his or her time. If time is spent rightfully give thanks and time is spent incorrectly ask for forgiveness. Numerical pause (Wuquf-I adadi): Checking that the heart-dhikr has been repeated the requisite number of times, taking into account one's wandering thoughts. Heart pause (Wuquf-I qalbi): Forming a mental picture of one's heart

Ulugh Beg (1394-1449)
The King who was a Scientist

Ulugh Beg was the grandson of the conqueror Timur, Ulugh Beg was primarily a scientist, in particular a mathematician and an astronomer. In 1417, to push forward the study of astronomy, Ulugh Beg began building a madrasah in Rigestan Square in Samarkand, which was completed in 1420 and Ulugh Beg then began to appoint the best scientists he could find to positions there as lecturers. Ulugh Beg invited al-Kashi to join his madrasah in Samarkand, as well as around sixty other scientists including Qadi Zada. There is little doubt that, other than Ulugh Beg himself, al-Kashi was the leading astronomer and mathematician at Samarkand.

In addition to the madrasah, Ulugh Beg built an observatory at Samarkand, the construction of this beginning in 1428. The Observatory, which was circular in shape, had three levels. It was over 50 metres in diameter and 35 metres high. The director of the Observatory was Ali-Kudschi, a Muslim astronomer. Al-Kashi and other mathematicians and astronomers appointed to the madrasah also worked at Ulugh Beg's Observatory.

. The achievements of the scientists at the Observatory, working there under Ulugh Beg's direction and in collaboration with him, are discussed in detail : methods for giving accurate approximate solutions of cubic equations; work with the binomial theorem; Ulugh Beg's accurate tables of sines and tangents correct to eight decimal places; formulae of spherical trigonometry; and of particular importance, Ulugh Beg's *Catalogue of the stars,(Zij-i Sultani,)* the first comprehensive stellar catalogue since that of Ptolemy. With the circle of experts Ulug Beg plotted the coordinates of 1018 stars, devised rules for predicting eclipses and measure the stellar year to within one minute of modern electronic calculations. The catalogue was the results of a combined effort by a number of people working at the Observatory including Ulugh Beg, al-Kashi, and Qadi Zada. Tables of observations made at the Observatory, the work

contained calendar calculations and results in trigonometry. Observations made at the Observatory brought to light a number of errors in the computations of Ptolemy which had been accepted without question up to that time. Data from his Observatory allowed Ulugh Beg to calculate the length of the year as 365 days 5 hours 49 minutes 15 seconds, a fairly accurate value. He produced data relating to the Sun, the Moon and the planets. His data for the movements of the planets over a year is, like so much of his work, very accurate *... the difference between Ulugh Beg's data and that of modern times relationg to* [*Saturn, Jupiter, Mars, Venus*] *falls within the limits of two to five seconds.* Ulugh Beg's politics were not up to his science and, after his father's death in 1447; he was unable to retain power despite being an only son. He was eventually put to death at Samarkand at the instigation of his own son 'Abd al-Latif. His tomb was discovered in 1941 in the mausoleum built by Timur in Samarkand. It was discovered that Ulugh Beg had been buired in his clothes which is known to indicate that he was considered a martyr. The injuries inflicted on him were evident when his body was examined....

Like Galileo (2 centuries later) he challenged religious orthodoxy with statement of bold secularity "Religions dissipate like fog, kingdoms vanish but the works of scientist remain for eternity". Although Ulug Beg was supported by the official clergy and built various madrasah and mosque, but he failed to diffuse the growing hostility and power of Sufi Dervishes. In 1949 his son seized his power and by the decree of court he was sent to Mecca but just outside Samarkand he was beheaded. His observatory was raised to the ground and later on his head was displayed on the top of the Madrasah. All the scientists working with him ran away to different parts of the world. However his work was published and was translated in Europe and it was recognized that his contributions in Astronomy were super ceded by Tyco Brass discoveries around 1600. The remains of the observatory were remained underground and were rediscovered in 1908 by Russian archeologist. In 1999, Uzbekistan celebrated 600th anniversary of the birth of Ulug Beg by restoring the beautiful building that survived him.

<u>GREAT SCHOLARS FROM UZBEKISTAN-Contd..</u>

MUHAMMAD BIN MUSA AL-KHWARIZMI (Algorizm)
(770 - 840 C.E.)

Abu Abdullah Muhammad Ibn Musa **al-Khwarizmi** was born at Khwarizm (Kheva), a town south of the river Oxus in present day Uzbekistan.

Abu Jafar Muhammad ibn Musa al-Khwarizmi was born in Khwarezm. Most of his education and research work was in Baghdad, in the early ninth century. Baghdad at that time was at cultural crossroads, and, under the patronage of the Abbasid caliphs. The so-called House of Wisdom at Baghdad, produced a Golden Age of Arabic science and mathematics. In Baghdad, scholars encountered and built upon the ideas of ancient Greek and Indian mathematicians**.**

Al-Khwarizmi's most important work was *[al-Kitab al-mukhtasar fi hisab](#)* & *[al-jabr w'al-muqabala](#)* or *The Compendious Book on Calculation by Completion [or Restoring] and Balancing. This* book is an explanation of the solution to quadratic and linear equations of six varieties. *Al-jabr* refers to the process of moving a subtracted quantity to the other side of an equation; *al-muqabala* involves subtracting equal quantities from both sides of an equation.

Textbook of Algebra *Hisab al-jabr w'al-muqabala* was translated into Latin(Robert Chestetr) in 1145 as *Liber algebrae et almucabala*, from which we have the word "algebra" for the whole process. But don't expect al-Khwarizmi's *al-jabr* to look anything like our algebra. Al-Kwharizmi's book is written entirely in prose, with none of the symbols we use today.

Al-Khwarizmi explained the use of ZERO (Sifr-the original concept was given by Indian mathematicians). He developed the decimal system. Developed several arithmetical procedures including operations on fractions. He developed in detail Trigonometric tables containing Sine functions and tangent functions. Developed calculus of two errors, which led him to the concept of *differentiation.*

Al-Khwarizmi also wrote books on mathematics, Geography and astronomy which were translated later into Latin.

WHY STUDY ALGEBRA?

When the brain is stimulated to think, the hair-like dendrites of the brain grow more extensive and more complex enabling more connections with other brain cells. We often hear that we use only a small percentage of our brain's capacity. The study of algebra is a way to increase our use of this marvelous muscle. By studying algebra, more "highways" are "built" upon which future "cargo" is transported -- cargo other than algebra.

Breaking the Boundaries

The Renaissance, the Enlightenment and the Industrial Revolution were great achievements. These developments drew on the experience of the Muslim world, India and China. Today a mathematician in Boston invokes algorithm to solve a difficult computational problem, then he/she is commemorating Al-Khwarizmi

CONCLUSION

Algebra and algorithms are enabling the building of computers, and the creation of encryption. The modern technology industry would not exist without the contributions of Muslim mathematicians like Al-Khwarizmi. George Sarton (1884-1956) from Harvard University and author of history of science wrote on Al Khwarizmi "The greatest mathematician of the time, and if one takes all the circumstances into account. One of the greatest of all time".

Abu Ali Hussain Ibn-Sina (Avicenna)

980-1037

One of the brilliant physicians of 10th century. His classical medical work was studied in the Middle East and European Universities until 16th century. Age 14 – mastered Arabic language, Quran. Philosophy, Mathematics and Logic.Age 17 – learned medicine and became an expert physician.

Wrote 200 Books-Most famous books: Al-Qanoon Fil-Tib (Cannon of Avicenna), 5 Volumes. Superseded the work of Galen and Razi ,Vol 1- Deals with Anatomy and Physiology, Vol 2- Describes Pharmacology, Vol 3- Pathology and Disease Process, Vol 4- Discusses fever, Signs and Symptoms of Disease, Vol 5- Treatment Modalities, Other famous book, Kitab-ul-Shifa, covers Philosophy, Medicine and Ethics, He described 700 medical preparations and their specific usage. He discussed contagious diseases-phthisis and TB, Described spread of disease through water, soil and human contact, He was one of the first to theorizes that small organisms may be responsible for infectious diseases, He described guinea worm infestation, " Whoever has thoroughly understood the book 'Al-Qanun', to him nothing will remain hidden of the fundamentals of the medicine". "Probably no medical work ever written has been studied so much".(Encyclopedia Britannica).

Al-Beruni

(973-1078)

Abu Rehan Mohammed bin Ahmed was born in Khwarizm, Uzbekistan. He was one of the world's outstanding astronomers, Physicians, Physicists, Mathematicians, Geographers, Geologists and Astrologers. He also mastered Greek, Syriac and Sanskrit. He was a contemporary of Ibn-Sina.

From 1017 until his death he worked under the patronage of Sultan Mahmood Ghaznawi in Afghanistan. Sultan took him to India on his expeditions where he learned sanskrit and tranlated many books of science and mathematics from sanskrit to arabic and persian. He also wrote an anthropological study of Indian culture. He was the first scientist to prove that the earth moves around the sun and rotates on its axis. He knew the earth was round 500 years before Columbus. He plotted the formation of 1029 stars and estimated the distance to the moon and the radius of earth correct to within 12 miles. His famous books are :

Al-ather Al-Baqia.

'Al-Tafhim-ki Awail Sina'at al Tanjin'

'Al-Qanun A-Masudi Fi Al-Haia Wa Al-Najum'

'Kitab al-Hind'

 He was an astronomer, Historian , Geographic and a walking encyclopedia.

Ms. Carly Fiorina, Hewlett-Packard's former Chairman and CEO

In Minneapolis, MN on Sept. 26, 2001 said, "There was once a civilization that was the greatest in the world. This civilization was driven by invention. Its architects designed buildings that defied gravity. Its doctors examined the human body, and found new cures for disease. Its astronomers looked into the heavens named the stars, and paved the way for space travel and exploration. When other nations were afraid of ideas, this civilization thrived on them, and kept them alive. When censors threatened to wipe out knowledge from past civilizations, this civilization kept the knowledge alive, and passed it on to others. While modern Western civilization shares many of these traits, the civilization I'm talking about was the Islamic World, 800-1600 CE, which included the Ottoman Empire, the Courts of Baghdad, Damascus and Cairo (She forgot Cordoba). It was leadership that harnessed the full capabilities of a very diverse population-that included Christian, Islamic and Jewish traditions.