

Institute of Medieval and Post-Medieval Studies

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IMPMS Presentation at Annual Dinner by Muslim Employee Resources Group of American Airlines Mr. Edward Thomas

The annual dinner event organized by the Muslim Employee Resource Group (MERG) of American Airlines took place on October 1, 2009. Although scheduled well after the first day of EID following the holy month of Ramadan, it was billed as an EID dinner since that celebration continues for some days. The dinner was provided by a Moroccan restaurant. The program included remarks by the director of the American Airlines Human Resources office and the president and a couple of other officers of MERG, a keynote address by Dr. Merve Kavakci on Giving in Islam, and a DVD projection of President Barack Obama's speech at an EID dinner in Washington.

The organizers had also asked Dr. Basheer Ahmed, the IMPMS president, to speak on the great scholars of Islamic civilization during the Medieval period. Since he was to be out of town on October 1st, I gave a short presentation on that subject in his stead. Noting that Islamic Civilization was the world leader in mathematics, sciences, astronomy, medicine and other fields from about the 8th to the 16th century, I suggested that, had Nobel prizes existed then, Muslims probably would have won most of them. I then described briefly the contributions of Al-Khwarizmi, who passed on from India to Europe the numbering system we call Arabic numerals (including the all-important zero), and who also gave the world the first book of algebra, a name derived from the Arabic word al-jabr. Then I spoke a little about Ibn Sina (known as Avicenna in the West) a great philosopher and physician whose Canon of Medicine was still in use in European medical schools in the 17th century – six centuries after his death! I also mentioned Omar Khayyam, whom the West knows as a poet, but who is better known in the Muslim world as a great mathematician and astronomer. The Muslim world is again producing great thinkers, one of whom, Abdus Salam of Pakistan, won a Nobel prize in Physics in 1979. On a table at the entrance/exit of the meeting room I left a handout sheet on him, as well as material and membership forms on IMPMS.

A Great Medieval Scholar
We will give a brief description of the contribution of one great medieval scholar in each Newsletter.

Muhammad Ibn Musa Al-Khwarizmi
by
Edward Thomas

Muhammad ibn Musa al-Khwarizmi (c. 780-850) gets the name by which we know him from the area of his family origin, Khwarizm, south of the Aral Sea. Today that region is in Uzbekistan, in a province with the same name, though spelled a bit differently: Xorazm. It is a long way from the place where he did the work that makes him one of the greatest mathematicians of all time, Baghdad. There he worked at a translation and research center established by the caliph of the time called the House of Wisdom. There he studied Arabic translations of books written in Sanskrit and Greek. For one of the books he wrote himself no surviving manuscript has been found, but we do have a Latin translation with the title *Algoritmi de numero Indorum*. The first word in that title is obviously a somewhat garbled rendering of the name Al-Khwarizmi, and so it is that we got the word "algorithm." The rest of the title means "on Indian numbers." It was al-Khwarizmi who thus passed on to Europe what we call "Arabic numerals," including the zero essential to our decimal system (which he wrote as a dot, and as it is still written in many countries).

Al-Khwarizmi's other best known work has the long Arabic title (as transliterated) *al-kitab al-mukhtasar fi hisab al-jabr wa'l-muqabala* ("The compendious book on Calculation by Completion and Balancing"). Once the book was translated into Latin in the 12th century, it quickly acquired the simple title *al-jabr*, which corresponds to the English word "completion" in the above translation. Thus did **algebra** reach the West.

If you could look at al-Khwarizmi's book, you would find that it doesn't look like the algebra texts you may recall from high school. He does not use letters like x or y nor plus or minus signs, nor exponents or square root symbols. He just uses full words. Here is an example he gives (adapted here from a full English translation in order to shorten it and make it more understandable): What number squared, then added to ten of the same number, equals thirty-nine? Here is the solution: Take half of the ten, multiply that by itself, add the result to thirty-nine, then take the square root of that sum, then subtract from that result half of the ten. That is your answer.

If you like math, try to write this problem in our way, with an equation, and solve the equation. It's what we call a quadratic equation. We'll show it in the next IMPMS Newsletter.

IMPMS Dinner & Scholarly Presentation Building Peace by Recovering Lost Islamic History Speaker

Michael Hamilton Morgan

Saturday, December 12th, 2009 at 6:00 pm

FUN ASIA, Banquet Hall

1210 E. Beltline Rd., Richardson, TX 75081

TICKET: \$40.00

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Lost History
**The Enduring Legacy of Muslim Scientists, Thinkers
and Artists**
Michael Hamilton Morgan
-Book Review by Basheer Ahmed, MD

The impetus for the book came after the September 11th, 2001 attack on the World Trade Center, as the author felt a need at the beginning of the 21st century to share this forgotten, ignored, suppressed and misunderstood Islamic history with a wider community.

In 732 C.E., when the rapid expansion of Muslim empire was halted, in the northern part of France, the energies of Muslims, turned to inventions and creations. Under Caliph Al Mamoon (813-833 A.D.), Baghdad became the center for learning. He established the great learning center “House of Wisdom”, where all the existing scholarly work of Greek, Roman, Persian and Hindu classics was translated into Arabic and laid the foundation of Modern Mathematics, Astronomy, Chemistry, Philosophy and Medicine. Baghdad over the next four centuries grew into a global intellectual center with Universities, Urban Hospitals and Observatories. During these four centuries Cordoba in Spain became the most advanced learning center for Europe under the Islamic Empire. It had learning institutions, libraries, hospitals and a high public literacy rate. Its libraries contained more books than the rest of Europe.

In the next chapter Morgan writes about al-Khwarizmi, whose translated work became the core of mathematics and astronomy text books in Europe and the Muslim world. Al-Khwarizmi’s greatest breakthrough was placing the Zero at the center of the mathematical universe and developing the concept of positive and negative values. He is also recognized as the father of Algebra.

Chapter four features the Persian Omar Khayyam, who, besides being a renowned poet, was a mathematical and astronomical genius. In 1079, Omar Khayyam calculated, the length of the Solar Year to be 365.24219858156 days. Omar Khayyam also determined that the Earth revolves on its axis and heavenly bodies do not orbit the earth.

Chapter six, entitled Healer and Hospitals, discusses the contributions of the world-renowned Al-Zahrawi of Cordoba, who developed the forceps for delivery in 1005. He describes Al-Zahrawi as the Andalusian master surgeon who was the Muslim lord of Obstetrics, Dentistry and Pharmaceuticals. His 30-volume compendium Al-Tasrif describes all inventions, and in the next 300 years all his work was translated into European languages and used as text books in medical schools. He was the inventor of about 100 surgical instruments.

Al-Razi, another physician of Baghdad, wrote 200 books on Medicine. He questioned the teaching and traditions of Galen. He was the first physician to differentiate between smallpox and measles. He invented laboratory equipment and discovered medications for treat-

ment of common ailments. He initiated the formal training programs for physicians.

Ibn Sina, who is known in the west as Avicenna and the prince of physicians, had a profound influence on Europe for six centuries as the greatest medical thinker of all time. His famous encyclopedic work on medicine, “Qanoon-Fi-Al-Tibb” (The Canon Of Medicine) was translated into many European languages and used as text books for six hundred years until the 16th century. Al-Razi’s work and the Canon of Avicenna did more to develop European medicine and thought than any other body of work. Ibn Sina concluded that TB is an infectious disease and the hook worm causes intestinal ailments. He set down scientific rules for testing and rating the effectiveness of drugs in treating various conditions – rules for standard clinical drug trials.

Another physician, Ibn Zuhr (Avenzoar), emerged in Seville, Spain. He acquired fame for his animal experiments, including trying tracheostomy on goats and subsequently on humans. The author then describes the work of Ibn al-Nafis in Cairo, the head of Al-Mansoori hospital and the dean of the school of medicine. In 1284, he made the discovery of the true anatomy and functioning of the heart and how blood flows through it to the lungs, where it mixes with the air. Some 350 years later, in 1628, William Harvey began to expand his ideas regarding the circulation of blood.

In the final chapter, Mr.Morgan highlights the qualities of Muslim leadership using the examples of the first Caliphs, Abu-Bakar to Ali, who champion the ethos of social fairness and justice and tolerance of diversity in faith, nationality and ethnicity. The fourth Caliph, Ali, set down in writing a detailed template for enlightened leadership which later surfaced in the Umayyad and Abbasid Caliphates.

Michael Hamilton Morgan
Former Diplomat & Economist

Author of the book “*Lost History: the Enduring Legacy of Muslim Scientists, Thinkers and Artists*”. Spoke at the World Economic Forum, Arab Business Council, British Parliament, Georgetown University and the annual convention of ISNA in Chicago. Founder of “New Foundations for Peace”, to teach leadership skills to young people worldwide. Awarded Egypt's National Medal for the Arts & Sciences in 2009.