

Symposium and Expo on Queensland Muslims

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“Islam and the making of Europe”

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Distinguished guests, Ladies and gentlemen,

I feel honoured and humbled to deliver the keynote address today. I hope that what you will hear will be an incentive to keep us all working harder for the construction of a sustainable pluralistic Australian society.

The Islamic civilization has made an enormous but largely neglected contribution to the way people live in the west. The Islamic civilization is the thread that links cars, carpets and cameras and is also responsible for three-course meals, bookshops and modern medicine.

Hundreds of innovations - from chess through to windmills and cryptography - that are often popularly associated with the western world but originate from Muslim scholarship and science.

Few people would realize that their spectacles, camera or fountain pen were invented because of Muslims. The vast majority of people - because of the nature of the education system - are completely unaware of their origins. The 9th century musician and fashion designer known as Ziryab, who traveled from Iraq to Andalusia in Spain, is said to have introduced the concept of the three-course meal.

When Europe was living in the dark ages, Islamic civilisation was blossoming and the advances during this period are more relevant to the modern world than those of the Greeks, Ancient Egyptians and Aztecs.

The Moors or Muslims of Spain gave Europe an architectural and artistic heritage that is still a source of wonder to the modern world. It was in translation from Arabic, not the original Greek, that knowledge of Greek philosophy became prominent in Christian thought. Western mathematics is based on Arabic numerals and calculations, and the first effective medical school in Europe was founded by Jewish doctors who had been trained in Moorish Spain and North Africa.

What we call science arose in Europe as a result of a new spirit of inquiry, of new methods of investigation, of the methods of experiment, observation, and measurement, of the development of mathematics in a form unknown to the Greeks. That spirit and those methods were introduced into the European world by the world of Islam.

Recent research has shifted scholars' understanding about Islam's contribution to the exact sciences. According to Jan P. Hogendijk and Sabra, the bulk of Greek science, medicine and philosophy were "appropriated" by the Islamic civilisation during the eighth and ninth centuries.¹ This was achieved through a process of translation from Pahlavi, Sanskrit, Greek, and Syriac, in the course of which Arabic became the language of a rich and active scientific and philosophical tradition for many centuries.² The eleventh and twelfth centuries marked the period of translating the Arabic scientific works from Arabic into Latin, and in turn were appropriated into the Latin medieval culture.³ It is now known that between AD 800 and 1450, the most important centres for the study of what is now called the exact sciences were located in the vast multinational Islamic world."⁴

Ahmed Djebbar, professor of History of Mathematics in North Africa and Muslim Spain, explains that the originality of Islamic science was not the fruits of chance meetings, but the deliberate results of a massive movement of scientific and philosophical translation,

¹ Jan P. Hogendijk and Abdelhamid Sabra (eds.), *The Enterprise of Science in Islam: New Perspectives* (Cambridge: The MIT Press, 2003), p.vii.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.* According to Hogendijk and Sabra the exact sciences denote "the mathematical sciences of arithmetic, geometry and trigonometry, and their applications in various fields such as astronomy, astrology, geography, cartography, and optics, to mention only some of the more prominent examples."

undertaken by professionals – sometimes rivals – supported by power and stimulated by the research itself.⁵ This movement resulted in the creation of a library on the scale of the world of its time.⁶ Hence, for the first time scientific traditions from different backgrounds and languages became elements of one science, whose language was Arabic, and found ways of reacting together to bring about new methods, and sometimes even new disciplines,⁷ such as trigonometry, algorithms and algebra.

PHILOSOPHY

Abu'l-Walid Ibn Rushd, better known as Averroes, born in Spain in 1126, stands out as a towering figure in the history of Arab-Islamic thought, as well as that of West-European philosophy and theology. In the Islamic world, he played a decisive role in the defence of Greek philosophy against the onslaughts of the Ash'arite theologians and the rehabilitation of Aristotle.

In the Western world, he was recognized, as early as the thirteenth century, as the Commentator of Aristotle, contributing thereby to the rediscovery of the Master, after centuries of near-total oblivion in Western Europe. That discovery was instrumental in launching Latin Scholasticism and, in due course, the European Renaissance of the fifteenth century.

Ibn Rushd's works were taught in the universities of Christian Europe, unleashing a movement in the West that led to the victory of Aristotelian ideas over the once prevailing Platonic thought. These had an important hand in paving the way for the European Renaissance.

MEDICAL SCIENCE

Islamic medicine was built on tradition, mainly the theoretical and practical knowledge developed in Greece and Rome. For Islamic scholars, Galen and Hippocrates were pre-

⁵ Ahmed Djebbar, *Une Histoire de la science arabe, entretiens avec Jean Rosmorduc (A History of Arab Science -- Conversations with Jean Rosmorduc)* (Paris: Seuil, 2001), in David Tresilian, "Creeker than the Greeks," *Al-Ahram Weekly Online*, 10 - 16 January 2002, Issue No.568. <http://weekly.ahram.org.eg/2002/568/bo5.htm> p.xi.

⁶ *Ibid.*

⁷ *Ibid.*

eminent authorities,⁸ followed by Hellenic scholars in Alexandria. Muslim and non-Muslim scholars translated the voluminous writings from Greek (Hippocrates, Dioscorides, and Galen) into Arabic, thus providing virtually all of Islam's early medical students with their basic reference texts.⁹ Basing themselves upon these texts, they produced new medical knowledge. In order to make ancient medical works more accessible, understandable and teachable, these scholars ordered and made more systematic the vast and sometimes inconsistent Greco-Roman medical knowledge by writing encyclopaedias and summaries.¹⁰

The novelty of Islamic medicine does not lie in the mass of information that it conveyed to the West via Arabic translations, but in the way it helped medicine to become established as a science.¹¹ Translations of Arabic medical manuscripts gave a decisive direction to the teaching of medicine in the West.¹²

After the rather rapid assimilation¹³ of the medicines of previous civilisations, Islamic medical writings became more systematic and synthetic, with an evident urge to produce the most comprehensive and complete medical reference work yet written.¹⁴ A primary concern of Islamic medical scholars was the "organisation of the vast body of knowledge into a logical and accessible format."¹⁵

They also expanded theoretical discourses on causes and symptoms, and frequently introduced examples and procedures of an applied character.¹⁶ A considerable body of medical works was being taught systematically. Great hospitals were founded in major Islamic cities, where the teaching of medicine went on along with the care for the sick.

⁸ Turner., *op. cit.*, p.131.

⁹ *Ibid.*, p.132.

¹⁰ *Ibid*

¹¹ Danielle Jacquart, "The influence of Arabic medicine in the medieval West," in Roshdi Rashed (ed), *Encyclopaedia of the history of Arabic sciences* (London: Routledge, 1996), vol.3, p.963.

¹² Howard, *op. cit.*, p.132.

¹³ Emilie Savage-Smith, "Medicine," in Roshdi Rashed (ed), *Encyclopaedia of the history of Arabic sciences* (London: Routledge, 1996), vol.3, p.913.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ *Ibid.*

These hospitals constituted veritable schools, with a more permanent institutional character than a single practitioner with a few apprentices or pupils.¹⁷ It was in this historical background that Islamic medicine developed and advanced to become scientific, and at its zenith many towering physicians appeared.

Recognizing the importance of medical science, the Muslims raised physicians to a high social rank and rewarded them with generous emoluments.

Thus stimulated, the Muslim scientists made significant advances in the art of healing, especially in the use of curative drugs. They established hospitals far and wide, and even provided medical care in some prisons. They made careful clinical observations of diseases. They did creative work in the field of optics.

The greatest contributions of Islamic medical scientists to Europe of the middle Ages, however, were in the encyclopedic field. Abu Bakr Muhammad Ibn Zakariya al-Razi, (865-925), known in the West by the Latin name Rhazes, is known as the keenest original thinker and greatest clinician not only of Islam but of the middle Ages.¹⁸ He was the greatest original clinical and observational physician.¹⁹ Al-Razi and Ibn Sina must rank among the greatest physicians of all time.²⁰ Al Razi, wrote an important encyclopedia of medicine, *Al Havi*, which sums up the knowledge of medicine possessed by the Arabs in the tenth century as gleaned from Greek, Persian and Hindu sources. It was translated and published in Sicily in 1279 A.D. Further editions of it were printed and circulated for centuries with considerable influence in Christian Europe.

The medical doctrines of Galen, greatest of Greek physicians, as improved upon by the Arabs, dominated Europe through her Middle Ages. As the Renaissance brought a new awakening of the human intellect, Europe which had been stimulated by its contacts with Islamic culture, proceeded on its own energy and initiative toward those discoveries which have so greatly affected the health and longevity of man upon this planet.

¹⁷ Ziman, *op.cit.*, pp.152-153.

¹⁸ Phillip K. Hitti, *The Arabs – A Short History* (London: Macmillan, 1968), pp.109-110; Howard, *op. cit.*, p.135.

¹⁹ S. H. H. Nadvi, *Medical Philosophy in Islam and the Contributions of Muslims to the advancement of medical sciences* (Durban: Academia, 1983), p.30-31.

²⁰ Turner, *op. cit.*, p.135.

CHEMISTRY

Europe was indebted for all of its beginnings in alchemy and chemistry to the chemical science of the Muslims, which reached them through translation of Arabic works into Latin. In this science, as in other arts and sciences which they practiced, the Muslims developed an objective and experimental method as opposed to the purely speculative method of the Greeks.

The father of Arabic chemistry and its greatest genius was Jabir, known to Europe as Geber. He made significant advances in the theory and practice of his science, developing new methods for evaporation and sublimation and perfecting the process of crystallization. His works, translated into Latin, exerted a tremendous influence in Europe until the beginning of modern chemistry.

MATHEMATICS

Islamic Mathematicians first acted as transmitters²¹ of almost all the important mathematical ideas of Mesopotamia, Egypt, Greece, India, Persia and the Hellenistic world.²² Eventually they added their own contribution, and this time an absolutely momentous one,²³ which directly influenced arithmetic, geometry, algebra, and algorithms.

Before learning of the Indian numerals and the 'dust-board' system early in the eighth century from Indian and Persian sources, the Muslims used finger computation,²⁴ also called "arithmetic of the scribes" or "secretaries" because it was intended for the use of the government bureaucracy. This Indian system was able to express any number, however large, using only ten figures including an empty place for zero, and the results were written out in words.²⁵ Though this system was much easier than, and superior to, that of the Babylonian sexagesimals system in which letters of the alphabet replaced

²¹ T. Goldstein, *Dawn of modern science* (Boston: Houghton Mifflin Co., 1980), p.120.

²² S. H., Nasr, *Islamic science: An Illustrated Study* (Westerham: Westerham Press, 1976), p.77.

²³ Goldstein, *op.cit.*, p.120.

²⁴ Nasr, *Islamic science: An Illustrated Study, op.cit.*, p.78.

²⁵ H. R. Turner, *Science in Medieval Islam: An illustrated introduction* (Austin: University of Texas Press, 1995), p.45.

numbers; the latter system was still being used especially by astronomers.²⁶

Islamic scientists recognised the importance of the Indian system and thus transformed it into the well-known Arabic numerals,²⁷ which are still in use today in the West, through which the West has been able to make its giant mathematical strides.²⁸ The Arabic numerals became:

...an intensely workable code, one so simple that literally any child can handle it, so flexible that in the hands of the mathematicians it became a vocabulary by which the most complex relations between the most astronomical quantities can be expressed...It was a revolution on a par with the invention of the computer; one was able to reduce the cosmos to a system of ten elementary symbols, from zero to nine.²⁹

To the Muslims belongs credit for rescuing the useful zero from the heart of India and putting it to work in the elaboration of the decimal system, without which the achievements of modern science would be impossible.

It was Hindu philosophic genius that first conceived the idea that 'nothing', as represented by 'zero', could have any mathematical value. Working on Hindu foundations, the Muslims elaborated what has become our present decimal system. They also introduced the so-called Arab numerals, adaptations of the ten Hindu digits, which gradually displaced the clumsy Greek symbols and the impossible Roman numerals.

Islamic mathematicians invented powerful new methods of numerical computation that reached their height with the fourteenth/fifteenth century mathematician Ghiyath al-Din al-Kashani.³⁰ And they dealt with decimal fractions, numerical series, and similar branches of mathematics related to numbers.³¹ The Arabic numerals were first transmitted and used in the West for the first time in the latter half of the twelfth century

²⁶ Nasr, *Islamic science: An Illustrated Study*, *op.cit.*, p.77.

²⁷ *Ibid.*, p.78.

²⁸ Goldstein, *op.cit.*, p.120.

²⁹ *Ibid.*, p.121.

³⁰ S. H. Nasr, *Science and Civilisation In Islam* (New York: Plume Books, 1968), p.152.

³¹ *Ibid*

through the translation of the first part of al-Khawarizmi's *The Book of Addition and Subtraction in Indian Arithmetic*, which survives as a translation only.³² By this time, many other important works in Arabic were well ahead of the West, including the work of al-Karaji (around 1000), 'Umar al-Khayyam (d.1130), as-Samaw'al (d. around 1175), and Ibn al-Haytham (d. around 1040).³³

The use of the decimal system spread gradually into Europe through the work of Leonardo of Pisa, a Christian who lived for many years in North Africa, where he picked up the Arabic system of numerals and the use of decimals. It took Europe three hundred years, however, to fully accept and become adept in the use of the decimal system.

They also invented algebra. Muhammad ibn Musa al-Khawarizmi (780-850), the greatest of all Muslim mathematicians, is known for being "instrumental in converting Babylonian and Hindu numerals into a simple and workable system that almost everyone could use."³⁴ He is also best known for originating the mathematical terms and concepts of algebra and Algorithm³⁵ (which is derived from his name al-Khawarizmi). He composed many astronomical tables and also worked on arithmetic and algebra,³⁶ and is recognised as the founder of Algebra for he initiated the subject in a systematic form and developed it to the extent of giving analytical solutions of linear and quadratic equations.³⁷

Muslim mathematicians systematized and developed the science of algebra, preserving always its links with geometry.

They continued the work of the Greeks in solid and plane geometry and developed plane and solid trigonometry, working up accurate tables for the functions and discovering many trigonometric relations.

³² Nasr., *Islamic science: An Illustrated Study*, *op.cit.*, p.78.

³³ *Ibid.*

³⁴ Turner, *op.cit.*, p.47.

³⁵ *Ibid.*

³⁶ *Ibid.*

³⁷ *Ibid.*, p.79.

ASTRONOMY

The knowledge developed by Islamic astronomers produced changes in the Latin West as regards the development of trigonometry, instruments and the Latin catalogues of stars, and also affected the growth and development of astronomical theory proper.

The introduction of Astronomy into Christian Europe has been attributed to the translation of the works of Muhammad Fargani. The Arabs were the first to build observatories; the Giralda, or Tower of Seville was erected under the superintendence of Geber, the mathematician.

Islamic astronomers corrected much of the astronomy of the Greeks and forged a new astronomy that, later on, enabled the sixteenth-century Polish astronomer Nicolas Copernicus to lay the foundation of modern astronomy.

Historians of science now tell us that fourteenth-century Muslim astronomers working at the famous al-Maragha observatory in western Iran greatly influenced Copernican astronomy. The closeness of Copernicus's astronomical findings to that of his Muslim predecessors caused recent historians of science to ask not whether, but when, where, and in what form Copernicus learned of these scientists.

ISLAM IN AUSTRALIA

The history of Islam in Australia pre-dates European settlement. From 1650, Muslim fisherman from South East Asia communicated and traded with Aborigines from Australia's north. Some inter-marriage occurred. In the 1860s, some 3000 camel drivers - with camels - came from Afghanistan and the Indian sub-continent. This group contributed to the exploration of the Australian outback, working on both the railway line between Port Augusta and Alice Springs, and the Overland Telegraph Line from Adelaide to Darwin, which connected Australia to London via India.

WHAT CAN ISLAM GIVE?

Islamic civilisation at its best has an important message for the West in the way it has retained an integrated and integral view of the sanctity of the world around us. Islamic culture in its traditional form has striven to preserve this integrated, spiritual view of the world in a way we have not seen fit to do in recent generations in the West. There is much we can learn from that Islamic world view in this respect.

We must reject a vision that posits "us" against "them" and understand that our shared citizenship is the key factor in building the society of the future together. I agree with Professor Tariq Ramadan's suggestion that we must move forward from *integration* — simply becoming a member of a society — to *contribution* — to being proactive and offering something to the society.

Australian Muslims — men and women — must make their voices heard on such issues like education, social and urban policy, or integration; they must not withdraw into religious, cultural, or social ghettos. They must no longer see themselves as a "minority." Tariq Ramadan calls for an "ethics of citizenship" that would encourage Muslims to make their decisions as citizens in the name of shared principles (competence, integrity, justice, etc.), not solely based on their religious identity.

Indeed, as Australian Muslims in the heart of our industrialized, post-modern societies confront complex scientific, economic, political, and cultural issues, we are not finding the answers that we seek from the intellectual output of the scholars living in societies where Muslims form a majority. As a result, for the first time, we are witnessing the reversal of a trend: Western Muslims — by necessity of their environments, their new understandings, and their new initiatives — are beginning to have an influence on traditional Muslim societies.

Ideas of civil society, of citizenship, of democracy, and of relations with Western secularized or non-Muslim societies are now openly discussed in many parts of the Muslim world; Western Muslims and those living in countries where Muslims are in the majority share in the central debate over what rights and freedoms citizens have. It is clear that the experience of Muslims in the West has, and will increasingly have, an impact on traditional Muslim societies.

By the same token, the presence of Muslims in Western societies is of vital interest for those societies themselves. The West today runs a substantial risk of seeing itself as a monolithic whole, as a civilization based exclusively on Greco-Roman and Judeo-Christian tradition, to whose specific nature Islam is an outsider. The presence of Muslims makes it imperative to reconsider that selective, erroneous historical construction. Over and above the dialogue of civilizations, the West must undertake a dialogue with itself and revisit the sources of its own intellectual, philosophical, and cultural tradition. People must begin to learn once again that Muslim thought, ever since the Middle Ages, has been an integral part of the construction of Western identity.

As a starting point, I would like to encourage everyone here to read the newly published book called "Reflections: Young Muslims on the Contributions of Islamic Civilisation to Humanity." This book is a compilation of small but interesting essays by Australian young men and women on Islam's contribution to humanity. These young people should be congratulated for their work and concerns for bridging the gap between Islam and the West.