The Evolution of Arab Science – A Social Perspective

Lecture By: Ahmed Abdulla Al-Rab'i
Presented in Arabic
19 February 2007

In the attempt to explain the phenomenon of science, we are confronted by so many questions that need answers. This is as true of Islamic civilization as it is in any other civilization. The phenomena of evolution and the decline, rise and collapse of civilizations, form two philosophical questions. However, when these are related to science, then the case is much more difficult. In an attempt to do that, I will “throw some stones in the lake”. Since the issue is part of extensive research, including a large number of texts, reference sources and information, this is an invitation for discussion.

The first issue is the examination of the deep roots of the evolution of the phenomenon of Arab Science. Was this science at its historical moment of revelation during the 9th and 10th centuries a marginal phenomenon? Was it exclusively limited to circles of scientists working on astronomy, medicine and other sciences, or was it a deeply-rooted phenomenon affecting the economic and social structure of that civilization. Was this just repetition and explanation, or as Dr. Abdulla Al-Omar described it, was it just the Arab world acting like a policeman, whose role was to protect the treasure inherited from Greece? Is it true that our responsibility was to protect and present it to others?

In all likelihood, the role extended beyond “protection”, and that the treasure was researched, investigated and criticised. Therefore, it ceased to be a marginal phenomenon, interesting only a limited number of people. But, is it really a phenomenon deeply rooted? Is it related to the conflict between what we call the sciences of “predecessor and that of contemporaries” or between the sciences of “Satan” and the “sciences of God” between the traditional religious institutions of the time, as represented by Imam Ahmed ibn Hanbal, a great figure, followed by Ibn Taymiya and al-Ghazali, in opposition to “Satan’s sciences,” an expression used by Al-Ghazali, (figure 1) Al-Amiri and other contemporaries. Is the issue deeply rooted in the socio-political balance? Is it related to political power and the development of economic and social power in society? Or is it just a limited and marginal phenomenon?

When discussing any phenomena related to Arab Islamic heritage, especially in the domain of science, we
always suffer anxiety. Some express it explicitly, while others use innuendos to express the nature of this anxiety. I think this anxiety has taken two forms in our contemporary life. These forms are embodied in the liberal conflict between the traditional trend and the liberal trend, our attitude towards the other and the west, to terrorism, to the parties, to the war or conflict between “Satan and God”, and the conflict between ‘right and wrong’. I think that the reason behind all these arguments is the state of anxiety in which we are living.

In geography we take the role of listeners, of individuals that belong to a weak, defeated, disunited nation confronting powerful and flourishing nations. Others stitch what we wear, plant what we eat, and produce what we consume. All our medicine, our instruments, our lives are produced by others. We live at the margin of a contemporary-modern civilization.

Just imagine if three great countries, namely US, Canada and Australia stopped sending us wheat, which is a main food. What will happen then in the large Arab states? There will be a major problem! Therefore, we are in a state of tension with the others who are stronger. In a state of tension with the others who are stronger. How can we deal with the others who are stronger? Shall we hate them? Fight with them? Defeat them?... or rather be defeated by them? Shall we open the door for him to solve our problem or explode, as happened on September 11, causing him embarrassment, and defeat him? As you can see we are in state of tension with the other, vis-à-vis geography.

In history, we try to hide this inconsistency or to refer to it in a simplified manner, trying to hide our weaknesses in an attempt to lighten the effect of the crisis between our present and our history. We are in constant tension with our history. We are no backward, but once we were quite advanced. We are now behind in philosophy, intellectual activity and in art.

Looking at the past, we can see the idea of Ibn Sina (figures 2), Al-Kindi and Al-Farabi (figures 3) It was the age of music, books, art and culture, an age of advancement in all aspects of life. Nowadays we are backward, while they have advanced. Such conditions cause us to deal with our history in anxiety.

The relationship of nations to their past can be a major philosophical problem. Is it a blessing or a curse? Could it be a big burden?

Did the Americans who created a huge military and economic compound at that most significant centre of civilization come from no history? There is nothing that can be called the “American culture”, but in the United States cultures from different places came together to establish a rich civilization. The Japanese are also a great nation, one with roots that go back thousands of years. They have also established one of the largest industrial compounds in the world and represent a great civilization.

In the first case there is a nation without a past but with a remarkable present. In the case of Japan, it is a nation steeped in history from which it benefits and progresses.

The question is: Does history place a heavy burden on people, does it hinder their progress? Could a nation be set back because of certain sayings or religious legal advice (fatwa) from the past? Can history have a positive role? How can we be selective in reading history? Will this lead us to progress or in the opposite direction?

“Breaking with scientific heritage” is a prejudiced school that adopts a simple solution regarding the Islamic past. It considers the past a negative time, when science relied mainly on copying Aristotelian thought, adding no innovations. Consequently, the best solution is to cut relations with the past, with all its jurisprudence, literature, poetry and philosophy: since it is a waste of time to think of the past, we have to quit it. Replace Arabic letters with Latin ones, adopting secularism following the Turkish model, these are some of the solutions for our problem. It is breaking with the past and belonging only to the new.

The other school is completely opposite the first. I call it “Escaping to Scientific Heritage”. It is a school that pays much respect to the past. It considers our Arab Islamic heritage an immaculate source from which we can always find meaning. Our past is a white dress without any dark spots. No remarks are raised against the Prophet’s companions’ or against philosophers. Working from the idea that this nation has already solved all the problems and answered all the questions, the solution is to go back to the past, borrow from predecessors, and leave out the present. In this way progress can be made.

One example of this is the “conference on the miraculous nature of the Holy Qur’an” held in Kuwait. It is an example of intellectual deterioration, when, at the end of the conference, the Qur’an is recommended as a treatment for all diseases from cancer, diabetes to hypertension, as if it is a specialized medical document. This is a disaster on both religious and moral levels.

One of the greatest dangers is to associate the Qur’an, a book of faith, to changeable scientific theories, relating Qur’an verses to research theories in the different medical domains. What will happen to future generations when they discover that this scientific theory is wrong? This is probable, as everyday there is something new in science; its evolution depends on trial and error. Shall we then tell our future generations that there is an error in Qur’an? This link is absolutely illogical and misleading. The belief that the past has an answer for all questions is a kind of escape from facts and from science.

We have thus defined the two schools. One rejects our history, thinking that the solution lies in ignoring the past. The second imbues our history with pride; positing that the past can solve all our problems, we just have to copy it. It is not important to be accurate or to remember the Prophet’s saying “God likes that you seek perfection in whatever you do”. Perfection is not important (according to this school), imitation stresses form only.

As a result we are confronting two problems imposing themselves on the studies of our scientific heritage, which flourished after World War II in the context of the world’s imperialism, nationalism, identity, modernity, and Zionism. All this leads to inconsistencies; we cannot read matters peacefully. We have contradictory readings between past and present.

We stop the attempts of many scientists to interpret Arab history from single point of view. A complicated historical phenomenon cannot be interpreted by a simple cause and effect method. It is much more complicated. For a long time we suffered from a one-sided interpretation of heritage, deducing generalized models, whether from our heritage or our present. Some would believe that the Caliph’s disease was the incentive for all medical and scientific activity! Others may consider Al-Ghazali’s book or Ibn Tamera’s attitude from science was enough reason to hold Islamic scientific activity. This is an over-simplified outlook. I have an opposite point of view, I think that Bin Tamika was a victim of contemporary (saliAl) warding office i.e. restoring to the past.

How can the author of “Dissolving the tension between Reason and Copying” in 11 volumes, three of which dedicated to criticising Aristotle, be just a legal advisor to contemporaries?

In a story cited in Bin al-Nadri’s “Al-First” attempting to explain the burst of science in this great form in Baghdad at that time, he finds an interpretation for the active movement of translation of sciences in a dream by Caliph al-Mamun, in which he had a dialogue with Aristotle when asked by the Caliph about beauty. Aristotle said it is the beauty of reason, of jurisprudence and what’s appreciated by the public. Bin al-Nadri thinks that this was among the most encouraging incentives for book-publishing at the time. This is an over-simplification of a complicated phenomenon. Why should the Caliph dream of Aristotle? The entire atmosphere was an atmosphere of science and culture.

In more than one reference the evolution of geography as a science is explained either in light of the personal interest of a certain Caliph or due to the translation of Ptolemy. However, when we see the Islamic state with its extensive armies and boats sailing in the middle of seas, passengers writing their observations about countries we have to ask how could such a nation grow without geographic knowledge? Is it an objective need or just a ruler’s wish?

A country of that type should have developed its geographical knowledge. Without an accurate record of topography, population conditions, nature of economic activity, and more, it becomes difficult to levy taxes or to invade other countries. When Bin Otaiba al-Baghill conquered Bukhara he did not know what exactly he should do. He went to ask the Caliph in Basra, who answered him saying: “You have to send a map of Bukhara and the neighboring towns, so that you can make progress in your conquest.”

Ibn Hawqal in his book “Al Masalek and Al-Mamalek” sets the relation between geographical knowledge and taxation and commerce saying, “for
each piece of land I made an image describing the form of that territory. I mentioned its surroundings, towns and cities, adjacent territories, heights, rivers and seas. I also mentioned the information needed for taxation, and the roads that can promote commerce."

Interest in geography is not simply a fascination or a hobby or the result of reading Ptolemy’s book. It is a fine science, required by the movement of life, society and economics. There are social and economic needs that necessitate that science. In his famous book Al-Maqdisi meets someone called Hazem on the coast of Eden. He was the head of merchants and his books used to travel as far as extreme borders. Hazem was well-informed on the Chinese sea and Al-Maqdisi asked him to give a description of that sea. He levelled the sand with his palm and drew an image of the sea in front of Al-Maqdisi, pointing out its features, gulls and reefs.

Hundreds of similar examples prove that geographical knowledge at that time was not the outcome of personal interest or just for entertainment. It was part of social and political needs of that age.

Muslim mathematicians combined together the three main branches of mathematics identified by Abu Khamel al-Misri, Al-Kharqi, Al-Sama’i’wal and al-Tusi. In 1575, Kennedy presented many examples in his important and famous research on how astrological knowledge was transformed into mathematical knowledge. In a famous study by Kennedy and Roberts that year they pointed out that: "the astronomical information suggested by al-Tusi in his treatise tracing the movements of the moon, Venus and higher planets (Mars, Jupiter, Saturn) was just the beginning to the developments by the astrologers of Maratha observatory headed by Qutub-ud-din Al-Shirazi, followed by Ibn al-Shatir in Damascus." The two scholars discovered that the astronomical knowledge presented by Copernicus is close to that of Ibn al-Shatir to a great extent and that the mechanical feats employed by Ibn al-Shatir are the same used by Al-Tusi. This question is not mere commentary or translation or personal interest. It is research and evolution of study.

In the field of medicine and medical care, some thought that the Caliph in Baghdad used to have two to five special physicians. However, in Baghdad, medical care and hospitals included 831 registered licensed physicians, in addition to the famous physicians of the time. A good example of preventive medicine and psychopathological medicine can be found in a letter of Sinan bin Thabet: "Thinking of countryside physicians, I recommend sending doctors with medicine boxes and syrups around the countryside, staying at every point as long as need requires, treating the sick and then moving to another point. Will you ask them to go to the villages and towns where epidemics are common?"

Here we have an image of mobile medicine, starting from Baghdad in three parallel lines to ensure the coverage of all the countryside. They would stay in each region or town for three to four days treating the sick. He also wrote "I thought, may God extend your life, about prisoners, being vulnerable to diseases because of their large numbers and the austerity of their conditions, and that they are not allowed to act according to their welfare or to meet doctors who can advise them on whatever they are exposed to. Therefore we have to allow doctors to see them everyday carrying medicines and syrups."

As we come to important sciences like mechanics, river science, clock manufacture, we must mention here Abu’l Hassan Ibn al-Haytham, figure 4. He was noted in Arab-Islamic figure, but also an international character, and any math book will have a chapter about him. This outstanding mathematician left Baghdad heading to Cairo in order to contribute to building a dam on the Nile in Aswan, which would be called the High Dam in modern times.

As Al-Halim heard of him and his perfection, he longed to see him, as he was reported saying: "If I were in Egypt, I would have introduced what can be beneficial concerning all conditions of the Nile, whether in the case of flood or water deficiency. I have heard that it is true that the Nile is going from high to low land in Egypt!" Hearing this, Al-Halim became more eager to meet him, sending him money, and persuading him to come to Egypt. This story continues, with Ibn al-Haytham going to Egypt, suggesting the change of the route of the river Nile in the belief that this would solve the flood problem.

Ibn al-Haytham was quite impressed by the perfection of Pharmonic monuments, but wondered how it did not strike the minds of their builders to change the route of the river? We are here concerned with how he moved from Baghdad to Cairo especially for that purpose and whether he fulfilled it - merely thinking of the matter is counted as a sign of genius.

There are many examples of bridges, installations and engineering works during this period. Such information proves that the issue of science was not a marginal issue or the outcome of a personal interest of a ruler or a person working on astronomy in a small town in Bukhara, Baghdad or Samarkand or others.

The evolution of this movement is an incentive for science. Looking at the list of Al-Kindi’s works, we find treatises on correcting the 14th article in the book of Euclid.

Here we stop at a principal point i.e. how did the people engaged in all spheres of science look at ancient Greek thought. In Europe the church kept impediment scientific development contrary to Aristotle. Anything written in the 13, 14, 15 or 16 centuries that contradicted Aristotle would be classified as wrong.

With the beginning of what is called the Renaissance, the reverence paid to Aristotle disappeared to be replaced by science. There were dozens of books on scepticism, an example of which is the treatise of Al-Kindi on the correction of the 5th and 14th articles of Euclid. We also find Thabit ibn Qurra al-Harrani writing a book correcting the 1st article from Apollonius book on geometry. Similarly al-Razi wrote his critical commentary on Galinus, who was considered the great physician, with maximum knowledge in the field of medicine.

In Andalus, Ibn al-Aflah wrote a book correcting Ptolemy’s book. Ibn Al-Haytham wrote his critique on Ptolemy saying: “The seeker of truth is not just a reader of the ancient books … He should, if his aim is to know facts, make himself a rival (to the writer), criticizing everything he reads in science books.”

About Ptolemy, Bin al-Haytham says "we found in his work many sciences and plentiful ideas, however, when we read them critically, seeking truths, we discovered many doubtful subjects and contradictions, which might distort the truth. That's why they have to be criticised.”

Abdel-Latif Al-Baghdadi wrote “Galinus is a great figure, but we cannot take what the ancient’s say for granted, whatever wisdom and mastery of mind they enjoy. Even Galinus might be quite careful in what he says, but intuition is much more true.”

Here we are not talking about one or two or ten scholars but a group of them who lived in different cities and separate places. Some had no connections with others in Baghdad, Andalusia, Aleppo, Khurasan and Merv. They were all sceptical of books from the scientific Greek heritage.

The other experience which unfolded is how science was evolved in the European era after this moment of scepticism, which was longer with Arabs than Europe. Books written on scepticism of Greek works are quite important and should be examined to compare between what is scepticism and its alternatives.

Throughout the history of mankind, tolerance was the right atmosphere for science to prosper. Baghdad used to be the capital of tolerance, not like today’s Baghdad, (which we watch on TV). It used to have a large number of intellectuals, different sects of religions and culture. It was the capital of freedom.

"In Basra there were ten unique scholars, each in his field: there was Al-Khalil bin Ahmad well-known for the science of Prosody (linguistics) (Sumi), the poet Al-Sayed bin Mohammed Al-Humrri (Shite), Saleh bin Abdel Qudus (Thawef), Sufian bin Migashi (Safarî), Bashar Bin Burd (Ibertrine, imprimatur), Hamad ‘Ajrud (atheist), the poet Bin Ras al-Genrou (Jew), Bin Nazeer (Christian theologian), Ameer, nephew of Al-Mu’ajad (Magus), Bin Sinan Al-Harani (Sabezan). They used to exchange news and poetry in their assembly.”

It was a free society. Nowadays when you go to Boston and visit MIT or Harvard, we look at the faces and we meet the American, the Chinese, the Iranian and the Arab. It is a centre of attraction which is always strong and not afraid of anyone; it does not stress the differences in religions and cultures. I think that one of the ideas we should discuss is freedom and the atmosphere of freedom where science develops.

There is a general image drawn by some, which was carried on by many Muslims, attributing to men
of religion an exaggerated role in impeding the evolution of science. This included important names such as Al-Ghazzali, and especially Bin Taymia, after the crisis suffered by Ahmed Bin Hanbal concerning the question of the creation of Qur’an during the age of Al-Ma’mun and the conflict that took place after the upheaval against philosophers and theologians.

The conflict between religion and science has always existed in Greece and Christian Europe. The State (in Islam) has always been a civil state; you know well that in our history there have never been any religious states. Throughout the history of Islam the state was always civil. The Prophet (pbuh) was the founder of the 1st civil state where people co-lived in peace. If someone makes a mistake, then the law is applied.

The war between men of religion on one side and scientists and philosophers on the other was the reason for the lack of scientific progress. Bin Taymi says “knowledge inherited from the Prophet (pbuh) is the real knowledge. Whatever differs from that is useless. Knowledge not inherited from the Prophet (pbuh) leads to corruption. Most scholars working on sciences not related to religious assignment are exposed to error and deviation from the current route”.

We also find Al-imam Al-Dhahabi feeling sorry for Ahmed bin Musafaq Al-Waqai since he studies non-religious sciences or (the sciences of the Greeks/ sciences of the Ancients) saying “I wish he left studying the sciences of the Ancients which are nothing but a disease or annihilation.”

In ‘Mujam al-Udaba’ Yaqut al-Hamawi mentions a character like Abi Ma’zhar Al-Falaki who was known for his antagonism to philosophy, since he was pious. On his way to pilgrimage in Makkah, he passed by the library of the Minister Ali bin Yehia, the astrologer, where he read some books on astrology, with the result that it was his last pilgrimage and he became distracted from Islam.

Bin Al-Wazir in his book entitled ‘Favouring the Ways of the Qur’an,’ lists comparisons between Greek knowledge and bids (unfair conduct from the religious point of view). He complains that in that age whoever wrote against Qur’an was “persuaded by the unfair laws of Greece”.

There are many other examples, but I think there is much exaggeration, for it is untrue that Imam Al-Ghazzali and Bin Taymia are against science. If politicians dedicate more to re-reading the works of Mohamed al-Ghazzali and Bin Taymia they would change many of their opinions. Bin Taymia was against logic. In fighting Aristotles’s thought he used to take it sentence by sentence and to record his sceptical remarks on each one. Ultimately he wrote eleven sections and three books in answer to logicians. However, without Bin Taymia, logic would not penetrate religious circles; he played an unintentional role in promoting logic.

As for Al-Ghazzali, he did not ban sciences, but he said that mathematics could be used to prove what is right and what is wrong. He recommended that logic and mathematics should be taught as primary sciences. They used to be called elementary sciences by Muslims, i.e. sciences by which education begins.

In summary, religious activity was never an obstacle in the way of science. What impedes science and civilisation is the misreading of history by contemporaries. If it is read with open-mindedness we become civilised and visa versa. Mankind went backward when Christianity was misinterpreted, creating the isolation of man, limiting his freedom, and using only the language of priests and church.

When religious reformation began, it did not come from outside, it rather used similar language to what was used before, so life evolved. This is a question in need of more investigation.

Early Symmetrically Woven Turkmen Carpets: Notes on the Structure and History of the Formation of the Technique

Lecture by: Elena Tsareva
Presented in English
23 May 2005

The Turkmen are a Turkic-speaking population of the western part of Central Asia, whose territory lies between the Amu Darya River in the east and the Caspian Sea in the west (figure 1). One of the most fascinating features of their local culture is highly developed carpet weaving that is held as a symbol of Turkmen national spirit. An important question with regard to this elaborate and deeply symbolic art is: how did it begin and when? This lecture presents some ideas as to the origin of knotting techniques of Central Asia, particularly its symmetrical variant.

Turkmen as a people formed as the result of the melting of two basic strata of the ancient population of Central Asia, which was common in origin and belonged to the Indo-European family of languages. These two lines, or strata, can be traced back to nine thousand years ago. At that very remote past local inhabitants already formed two distinct groups of Central Asian population.

In the third millennium BC South Turkmenistan dwellers formed a refined urban Margush civilization (figure 2). And it was here that in Hellenistic period, after Alexander the Great campaign, local Parthian tribes founded the famous Parthian state, with Nisa as its first capital (near modern Askhabat).

The other group was composed of ancient hunters and gatherers of the Northern zone, an area lying between the Caspian and the Aral Seas that included an enormous jointed delta of the Amu Darya and Syr Darya rivers. Followers of the mobile way of life (figure 3), inhabitants of this and arid zone were actively involved into animal breeding. Starting from the first millennium BC they became known to the Ancient Orient and Greeks under the names of Scythians, Sakai, Massagetae and other Scythian-type Iranian-speaking tribes.

Turkic-speaking tribes that gave the Turkmen their recent language and their ethnic name, started to come to the territory in masses in the last centuries of the first millennium AD. As far as is known, for the first time the name Turkmen was used in a tenth century Arabic-written manuscript, though the term was not popular for a long time, as medieval sources called the people Oghuz.

However important was Turkic invasion and influence, by that period Turkmen culture got its basic

Dr. Elena Tsareva is a senior researcher at the Kunstkamera Museum of Anthropology and Ethnography in St. Petersburg, Russia. She’s also worked as a curator of the Central Asian collections at the Russian Ethnographic Museum and has spearheaded exhibitions throughout Russia and the world. Dr. Tsareva has also published extensively on Turkmen textiles, The Parzy and other subjects related to textiles in the region.
The journal Hadeeth ad-Dar of Dar al-Athar al-Islamiyyah (DAI) is intended to share the wealth and beauty of Islamic culture contained within the extensive and comprehensive Al-Sabah Collection of Islamic art and the variety of scholarly and artistic activities associated with the collection. The collection itself, ranging from early Islam to the 18th century, is organized according to both historical period and geographical region. The reference library and the publications of DAI are closely related to the collection.

DAI has sponsored archaeological excavations in Baharia, Upper Egypt, that date to the Fatimid period. We are also involved in the Raya excavation at al-Tur in Sinai Peninsula in Egypt. At present, our annual lecture series has been revived and is a focal point for historians and other specialists in the field. It features talks by prominent international scholars on various topics of Islamic art, history, archaeology and architecture.

Dr. Yehiya Bin Jena'id
In Volume 24 we ran the wrong photo of Dr. Bin Jena'id. Here is his picture and we apologise for any inconvenience created by the error.
المحتويات

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تعمد دروي حديث الدار، التي تصدر عن جاد الآثار الإسلامية، إلى تجريب الدار بالإسلامية وما تميز بها من فنون وفوق يجمع وجمال أخلاقها في مجوعة الصحراء大象 العين الشام إلى المستطيل وأزاح الفن الإسلامي. كما تهدف إلى إشراك جمهور الفناء والهندسة الإسلامية ببعض الأسئلة الذين ينتمون للمقاولات للمجتمع.

وتصوّر مجموعة الصور ممثليت يعود تاريخها إلى الفترة المبكرة من سعد الإسلام، وحتى القرن الثاني عشر الهجري. وقد جرى توثيقها وتصفيتها لتصبح مضمّمة للأولى في الفترة التاريخية التي تغطيها والمناظر الجغرافية التي تتمحور إليها.

أما مكتب الدار فيًّضمن مراجعة ومراجعة وثائق ذات صلة ب коллبة بالمجموعة.

رتب دار الآثار الإسلامية سلسلة من المبادئ الأثرية في مدينة الهندسة، معترف بهم، والتي تعود إلى العصر العثماني. كما تقدم بدورات في المنطقة وندوات بطولية خلال بطولية سابقا، ومساحة ثقافية لطرق التواصل.

وقد دار الآثار الإسلامية مستخدمة دائمة باستخدام برامج وعمليات مبتكرة والموضوعات متعلقة إعداد سلسلة من المبادرات حول خيارات متعددة في الإسلام والأثار والهندسة المعنية وغيرها من الموضوعات التي تستثمر اهتمام المدرجات، وغيرهم من التخصصين.

للمزيد...