Decline of Islamic Science

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(Review of "The Making of Islamic Science"
by Muzaffar Iqbal, chapter 5)

Two questions

about the change of Islamic Science

1

What was the role of Islam in the transmission of science to Europe?

2

Was Islam responsible for the decline of science in Islamic civilization?

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Two narratives

Scientific Revolution of the seventeenth century was a direct result of the transmission of Islamic science to Europe

few Arabic works of Greek origin were translated from Arabic into Latin, but that they were of little use for the rapidly developing science in Europe.

Both are errornous

3 phases of translation to Europe

1st phase

- Gerbert of Aurillac
- Late 10th century
- Small individual efforts

2nd phase

- Central process
- 11th -14th century
- Small number of translators
- Patronized

3rd phase

- Change of perspective
- 17th -18th century
- Institutionalized and university-based

A result of small and individual efforts.

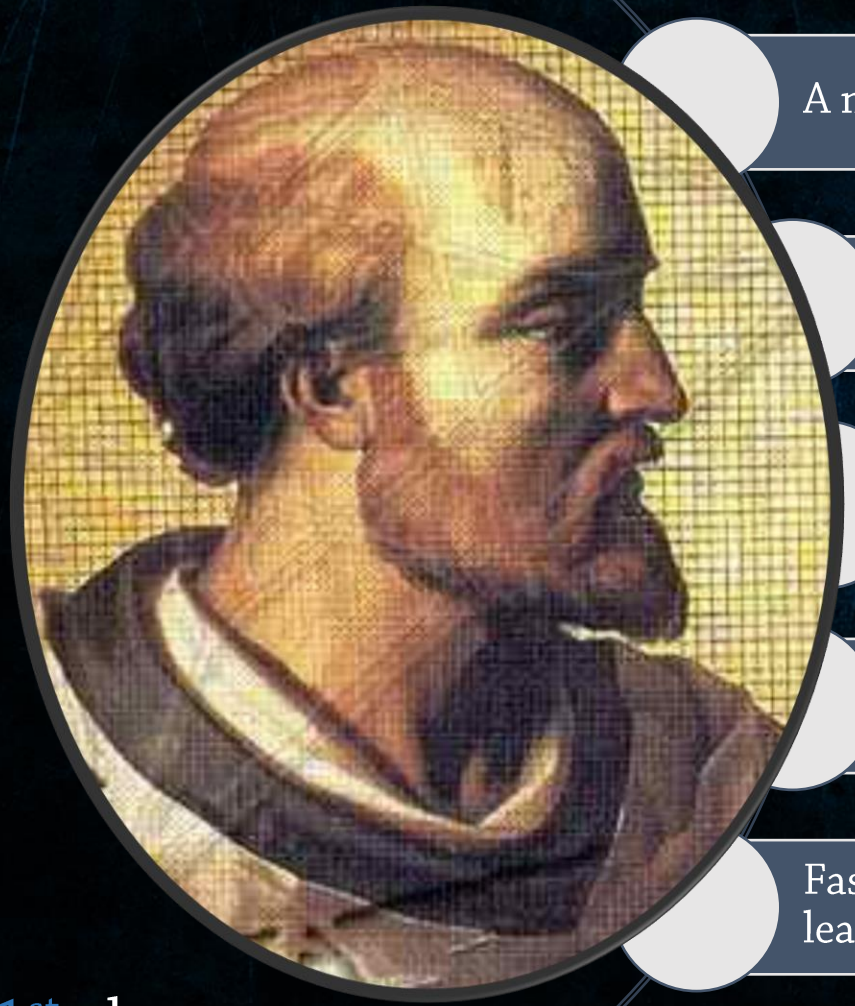
The individual most responsible for supporting and spreading is Gerbert of Aurillac.

Gerbert's interest in Islamic scientific manuscripts was sustained over a long period of time.

We can find the information about the earliest period of translation activity from Arabic into Latin from his letters

1st phase

Gernert of Aurillac (*ca.* 946–1003)



- A man born of poor parents in or near the village of Aurillac in south-central France
- Rise to the Papacy as Pope Sylvester II (999–1003)
- In 967, Borrell II, the count of Barcelona requested the abbot to allow Gerbert to come to Catalan Spain for further education.
- In Spain, Gerbert first came into contact with a mathematics far superior to anything he had learned so far.
- Fascinated by the Islamic mathematical tradition and Arabic numerals, he quickly learned the use of an abacus, which he later introduced to Latin Europe outside Spain.

1st phase

2nd phase

The early tenth-century translations planted the seeds of what became a major intellectual tradition in the next two centuries

This second phase of translation activity produced a steady flow of Latin translations by a small number of translators.

Earlier translations of this second phase were done without a scheme or definite plan, but as translated texts began to circulate specific needs arose for the translation of works referenced in earlier translations.

The future European discourse on Islamic scientific tradition was shaped to a certain extent by what was translated at this time

Fall of Toledo

During the 712–1085, Toledo had become an important center of learning in Islamic Spain.

The fall of Toledo (*Tulaytulah)* in 1080 resulted in the availability of an excellent library to translators

Raymond I, the new archbishop of Toledo (1126–1151), patronized the translation movement and gathered a small group of translators headed by Archdeacon Dominico Gundislavi (Gundislavo).

Many important contributions of the Islamic scientific and philosophical traditions had yet to appear.

No substantial link between the translators and the Muslim scholars who lived in the eastern parts of the Muslim world [Most of translation activity was based on what was available in Spain]

2nd phase

Academic growth in Europe

A new Europe was emerging from the ruins of the Roman Empire through a complex process of intermingling of populations, Viking settlements, and unprecedented economic growth.

Along with the emergence of stable monarchies and population explosion, there arose a chain of new schools throughout Western Europe with far broader aims.

The number of students and teachers in these schools increased rapidly and some became large enough to require organization and administration, leading to the emergence of the universities.

This second phase of the translation movement was contemporaneous to the founding of several new universities in Europe.

There were minor differences in emphasis, but almost all universities taught the same subjects from the same texts

The common curriculum resulted in acquirement of universal set of Greek and Arabic texts as well as a set of problems that facilitated a high degree of student and teacher mobility across the continent

This demonstrates an important parallel between medieval Europe and the Muslim world, where Arabic was the universal language of scholarship

2nd phase

List of translated books

Author	Book Title (Original)	Title Translated (Latin/English)	Translator
Al-Khwarizmi	Astronomical tables	Ezich Elkauresmi per Athelardum bathoniensem ex aribico sumptus	Adelard of Bath
Abu Ma'shar	Kitab al-madkhal al-Saghir (Shorter Introduction to Astonomy)	Ysagoga minor Iapharis matematici in astronomicam per Adhelardum bathoniensem ex Arabic sumpta	
Ibn Sina	Risala (maqala) fi-l-nafs	De anima	Gundisalvo
Al-Ghazali	Maqasid al-falasifa	The Aims of the Philosophers	
Al-Farghani	'Ilm al-nujum	De Scientia astorum	John of Seville
Abu Ma'shar	Kibtab al-Madkhal al-kabir ila 'ilm ahkam al-nujum	Great Introduction to the Science of Astrology	
Qusta bin Luqa	Kitabl al-Fasl bayn al-ruh wa-l-nafs	De differentia spiritus et anime	
Al-Khwarizmi	Algebra	Algebra	Robert of Chester
Al-Kindi	The Book on the Astrolabe	De iudiciis astrorum	
Al-Battani	Zij al-sabi	De motu stellarum	Plato of Tivoli
Ibn Sina	Al Qanun fi'l -tibb	Canon of Medicine	Gerard of Cremona

2nd phase

Gerard of Cremona

Among the greatest translators was Gerard of Cremona (d. 1187), an Italian who came to Spain in the late 1130s or early 1140s in search of Ptolemy's *Almagest*

Gerard is, nevertheless, one of the most important transmitters of knowledge from one civilization to another

Over the next three decades, Gerard was to produce over 80 translations of scientific and philosophical texts from Arabic, no doubt with the help of a team of assistants.

These translations are not of high quality, but their importance lies in the introduction of a vast corpus of Islamic scientific and philosophical texts to Latin scholars.

2nd phase

Castillian Translation

The most important work of this century was *The Alfonsine Tables*, drawn up at Toledo around 1272 by order of the king of Castile and León, Alfonso X (d. 1284).

Alfonso was the son of Ferdinand III (d. *ca.* 1252), the conqueror of some of the most important cities of Muslim Spain including Cordoba, Murcia, and Seville.

Alfonso patronized translations from Arabic into Castilian, making it a new vehicle for scientific communication.

2nd phase

Date	Arabic Title	Castillian/English	Translator
ca. 1265	Kitāb al-miʿrāj	The Book of Muhammad's Ladder	Abraham of Toledo
1254	An unknown work by Abū l-Ḥasan ʿAlī ibn Abī l-Rijāl	Libro complido en los iudizios de las estrellas	Judah ben Moses ha-Cohen
1256	The star catalogue for 964 by Abū l-Ḥusain ʿAbd al-Raḥmān ibn ʿUmar al-Sufi	Libro de las estrellas de la ochaua esfera	Judah ben Moses ha-Cohen with the help of Guillem Arremon Daspa
1259	A treatise on the use of a celestial globe written in the ninth century by Qusta ibn Luqa	Libro de la Alcora	Judah ben Moses ha-Cohen, in collaboration with Johan Daspa
1259?	The treatise on the astrolabe by Abū l-Qasim ibn al-Samh (d. 1035), a disciple of Maslama al-Majriti	Libro del astrolabio redondo	Book I was compiled by Isaac ben Sid
ca. 1258	A treatise by Ibn al-Khalaf on the construction and use of a universal astronomical instrument using meridian projections	Libro de la lamina universal	Compiled by Isaac ben Sid
1255–1256	Treatise by Azarquiel on the construction and use of a saphea of the zarqaliya type	Libro de la açafeha	First by Fernando de Toledo, next by Bernardo "el aravigo" and Abraham of Toledo
1259	An astrological treatise from eighth-century al-Andalus	Libro de las cruces	Judah ben Moses ha-Cohen with the help of Johan Daspa
After 1270	Ibn al-Haytham's Kitāb fī hay'at al-ʿalam	On the Configuration of the World	Abraham of Toledo

Context: Islam's distorded image in Europe

Dante's Canto: Mohammed in 8th circle of hell

Islam, for most Europeans of that time, was a dangerous, hostile, and even pagan cult. This come from another translation movement that began somewhat prior to the translation of scientific texts and focused instead on Islamic texts

In many writings of this period, the Prophet Muhammad appears as an idol worshipped by Saracens; in others he is depicted as a magician; in still others he is a possessed man. In the epics of the Crusades, the Prophet of Islam appears as a heathen god

These popular texts had an audience not trained in theological intricacies, and their authors and minstrels used imaginative powers to exaggerate and hyperbole for their readership;

2nd phase

Context: Crusades

Crusades began when Seljuk army began entering Asia minor and defeat Byzantium in Battle of Manzikert (1071).

Emperor Alexius I of Byzantyne, feeling threatened by the Seljuk* army, appealed to Pope Urban II for help.

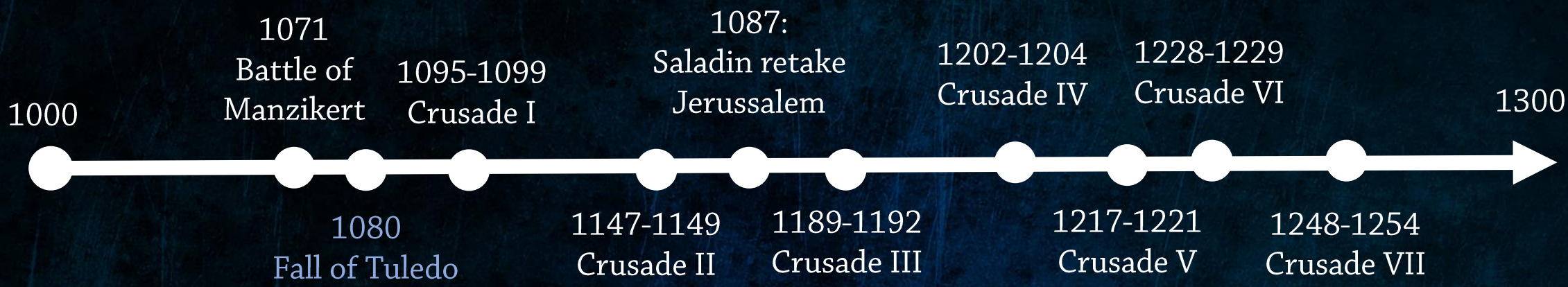
In 1095, at Council of Clermont, Urban II gave the call for the holy war and the Papal battle cry *Deus vult*! ("God wills it!") resounded throughout Europe.

In 1099, Godfrey of Bouillon captured the city; his men massacred almost the entire Muslim and Jewish population of the holy city. In 1187 Salah al-Din (d. 1193) recaptured Jerusalem.

It was also during this time that the average European learned the most horrible details about Islam and its Prophet in a climate already charged with hatred and mistrust.

2nd phase

Context: Crusades



Crusade I: Aimed to recapture Jerusalem and the Holy Land. It resulted in the capture of Jerusalem and the establishment of Crusader states in the Levant.
Crusade II: Launched in response to the fall of Edessa, it was largely unsuccessful in achieving its goals.
Crusade III: Following Saladin's capture of Jerusalem, this crusade saw figures like Richard the Lionheart attempt to regain the city, achieving some limited success but ultimately failing to recapture Jerusalem.
Crusade IV: Deviated from its original goal of Jerusalem, ultimately leading to the sack of Constantinople.
Crusade V: This crusade targeted Egypt in an attempt to weaken the Muslim forces.
Crusade VI: Led by Holy Roman Emperor Frederick II, this crusade achieved some territorial gains through diplomacy rather than military force.
Crusade VII: Led by King Louis IX of France, this crusade was aimed at Egypt and was ultimately unsuccessful.

2nd phase

3rd phase

This phase differs from the first two phases in many important respects. Its scope is much wider, both geographically as well as in terms of material.

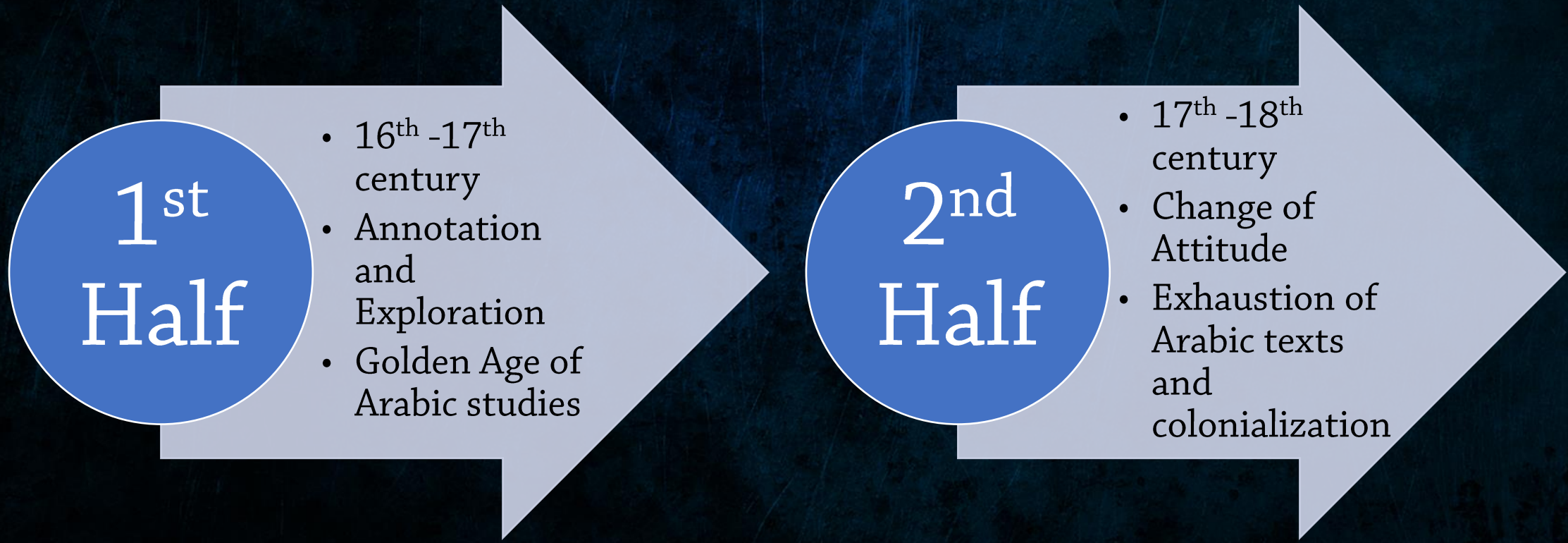
Instead of courts, this phase of translation activity was increasingly based in the newly founded universities.

Translators were now able to travel to Muslim lands other than Spain.

The translations from this phase are much more refined and critical.

The most important aspect of this phase of the translation activity was that it gave birth to a distinct enterprise: Orientalism.

3rd phase


1st Half
• 16th -17th century
• Annotation and Exploration
• Golden Age of Arabic studies
2nd Half
• 17th -18th century
• Change of Attitude
• Exhaustion of Arabic texts and colonialization

First half (16th – 17th): Exploration and Annotation

The sixteenth and seventeenth centuries have been described as the "golden age of Arabic studies in Europe".

Scores of scholars made their way East in search of instruction in the language or for Arabic manuscripts

The translation activity of this period produced annotated translations of Arabic texts, often along with the original Arabic. This marked interest in primary sources.

Through patronage, internal politics of the European academic community, and necessity, the study of Arabic did become indispensable to the late Renaissance humanists.

The teaching of Arabic became an integral part of the academic curricula through the establishment of chairs, research programs, and several ambitious projects.

Two new factors contributed to the renewed interest in the study of Arabic

- hostile interaction between the Ottomans and Europe
- the growth of interest among Western Europeans in establishing contacts with the Eastern Churches

Two motives of Arabic study

- the acquisition of scientific and philosophical texts
- Christian missionary and apologetic activities.

3rd phase

Second half (17th – 18th):
Change of Attitude

European scientific and philosophical traditions were now able to surpass the received material from Islam. Arabic texts were no more marvels of wisdom and knowledge

By the end of the 17th century, new publications had started to appear on the basis of previously translated Latin texts, which provided foundations for the emergence of Orientalism.

The propagandists of the new science began to single out Arabs as harbingers of scholasticism, mere imitators of the Greeks, whose learning was derivative and irrelevant.

By the turn of the 18th century, not only the scientific learning of Muslims but Muslims themselves were the subject of Judgments

This colonizer–colonized relationship also affected European attitudes toward Islam and Muslims.

In the meanwhile, the Muslim world itself was going through basic internal changes that drastically weakened the Islamic scientific tradition and finally choked it altogether.

3rd phase

Two questions

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Was Islam responsible for the decline of science in Islamic civilization?

The possible reformed question

Why did Muslim scientists not produce a scientific revolution like that which took place in Europe?

Question regarding the decline

Decline of Islamic Science

- What does it mean by the decline?
- When and where did that happen?
- Why did it happen

1. What?

"No tradition" thesis

- there was no such thing as Islamic scientific tradition, so there was no decline.
- All that Islamic civilization did was to "host" the Greek tradition
- It received through the translation movement for three centuries, during which science failed to take roots in the Muslim world because of fierce opposition from religious scholars

Marginality thesis

- It limits the practice of natural sciences in Islamic civilization to a small group of scientists who had no social, emotional, spiritual, or cultural ties with Islamic polity and who practiced their science in isolation

The two-track thesis

- It views that the Islamic scientific tradition is in opposition to what it calls the Islamic religious sciences.
- What came into the Islamic thought was received with critical appraisal and sorting; all living traditions do this.
- It sees the arrival of the new sciences like it was some kind of single body, which met opposition from the traditional Islam.

Refutal

- The Greek scientific tradition was translated into Arabic over a period of three centuries.
- This process involved numerous influential persons who had diverse temperaments, racial and intellectual backgrounds, and reasons for their involvement in this task.
- The translation movement did not solely bring Greek science but also brought Indian and Persian

2. When and where?

Different branches of science had different high periods and declines.

Mathematics developed steadily throughout the eight hundred years, as did geography and geology.

We cannot pronounce a general death sentence to all branches of science in all regions of the Muslim world at a specific date.

The need is to carefully study available data (with the understanding that we do not possess all manuscripts and instruments).

(1) 780: Al-Khawarizmi
(2) 826: Ibnu Qurra
(3) 850: Abu Kamil
(4) 940: Buzjani
(5) 953: Al-Karaji

(6) 965: Ibnu Haytham
(7) 1048: Omar Khayyam
(8) 1135: Sharaf Ad-Din
(9) 1201: Nasir Ad-Din

3. Why?

Existing literature:

(i) opposition by "Islamic orthodoxy";	(ii) a book written by Abu Hamid al-Ghazali;	(iii) the Mongol invasion of Baghdad in 1258;	(iv) the lack of institutional support for science;	(v) the disappearance of patrons; or	(vi) some inherent flaw in Islam itself.

This list of causes has been cited in respectable academic publications. Yet none of this advances our understanding of this complex question.

The most important task is to attempt to clear existing confusion and point to the possible areas of future research that can provide a more satisfactory answer.

Prevalent Views (Goldziher)

1. The first factor: “conservative religious forces.”
2. The second is the “debilitating warfare, economic failure, and the resulting loss of patronage” without which “the sciences were unable to sustain themselves”
3. The third is “In assessing this collapse, we must remember that at an advanced level the foreign sciences had never found a stable institutional home in Islam, that they continued to be viewed with suspicion in conservative religious quarters, and that their utility (especially as advanced disciplines) may not have seemed overpowering

Prevalent Views (Huff)

Four Factors in Sociological Framework (Toby Huff):

1. the role of the scientist;
2. the social norms of science;
3. the common elements of scientific communities; and
4. the comparative, historical, and civilizational study of science.

Arabic science came very close to a modern scientific revolution, but did not go "the last mile" because that "metaphysical transition would have, of course, forced an intellectual break with traditional Islamic cosmology as understood by the religious scholars, the '*ulema*'"

Unanswered, for now

We are left with a puzzle.

The enterprise of science in Islamic civilization did decline and eventually disappeared.

So far, historians, sociologists, and orientalists have not produced any satisfactory answer to the question that naturally comes to mind—why?

This is a compelling question; everyone writing on the subject is obliged to respond. What has been said, however, remains a regurgitation of what has already been said, save a few genuine insights that have yielded only partial answers.

To be continued next month on the next section:

Ch.6: Islam and Modern Science: The Colonial Era (1800–1950)

By Ilma Aliya Fiddien

Thank you