

The influence of Arabic sciences on the medieval Europe

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Where, when and Who

- Time Span 600, 1500 A.C.
- Arabs, Persians, Assyrians, Egyptians, Moroccans, Greek, Indian, Spanish, Berbers...
- Muslims, Jews, Christians, Sabians...



The Golden Era: Why?

- Internal reasons
- External reasons



External reasons

- Vast geographical expansion
- Trading Empire
- Transportations: huge advanced road network always busy with caravans
- Exchange of resources



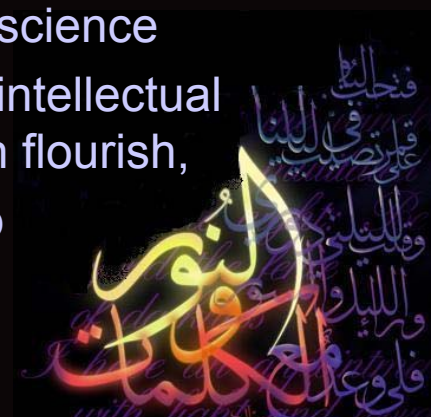
Internal reasons

- Diversity, Arabs, Persians, Assyrians, Egyptians, Moroccans, Greek, Indian, Spanish
- Common language, Arabic
- Advanced state economy, taxes applied on:
 - Agriculture
 - Trade
 - Economy
 - Art and handcrafts



Internal reasons, Support from the caliphs and the state.

- Building scientific institutions, Universities, libraries, Observatories ...etc.
- Giving an advanced positions to scientists
- Boosting motivation by giving prizes and awards for scientists
- Assigning lots of funding money for science
- Providing a free atmosphere where intellectual freedom can be practiced, ideas can flourish, brains can storm without censorship



The decline, external reasons

- Roaming the sea
 - Trading went from land to sea, the importance of the silk road declined
 - The shift of economic power from Arabic/Islamic countries towards Europe
 - Discovering the new world.
- Invasions
 - Crusades
 - Mongols
 - The Ottomans



The decline: internal reasons

- Breaking the State to States
- Degrading of freedoms
- Increasing the taxes
- Corruption, *political, administrative and economical*

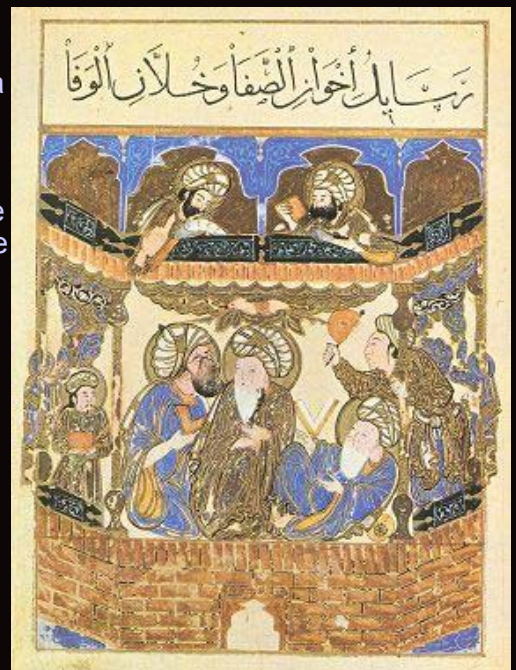




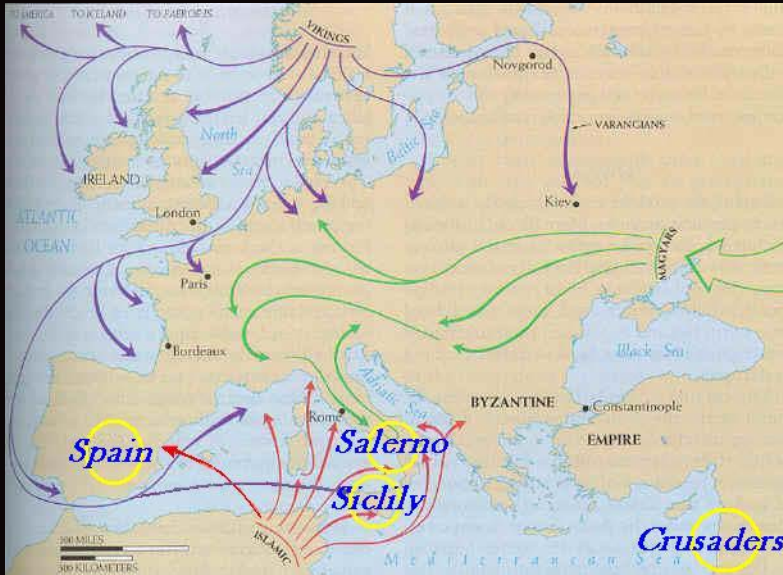
Scientific societies and periodicals: *Ikhwan Al Safa (Brethren of Purity)*



Animal rights, representatives from the animal kingdom bring a court case against the human race whom they accuse of abusing their position. The animals point out that before the creation of man they roamed the earth in peace and harmony



Knowledge transfer to Europe



- Sicily
- Spain
- Salerno
- Crusades



Sicily

- The Arabs in Sicily: (652 - 1061 AD)
- The Normans in Sicily: (1060 - 1194 AD)
- Frederick II is crowned king of Sicily: 1198
- 1231 Frederick II articulates his political vision in the ***Liber Augustalis*** which creates the conceptual structure of the "secular" State



The Cathedral of Santa Maria la Nuove



Crusaders wars



"I was taught by my Arab masters to be led only by reason, whereas you were taught to follow the halter of the captured image of ancient authority" Adelard of Bath



Averroes (1126 A.D.)

- *The deepest truths must be approached by means of rational analysis and that philosophy could lead towards the truth.*
- *Accepted revelation and attempted to harmonize religion with philosophy.*
- *The supremacy of the human intellect did not allow for the possible contradiction between science and revelation.*



Influence of Islam on Astronomy; religious rituals needs

- The need to determine the direction of Makkah
- Islamic lunar calendar
- Condemning Astrology (*Astrologers are layers even if they what they predict come true*)



Influence of Islamic; intellectual stimulation

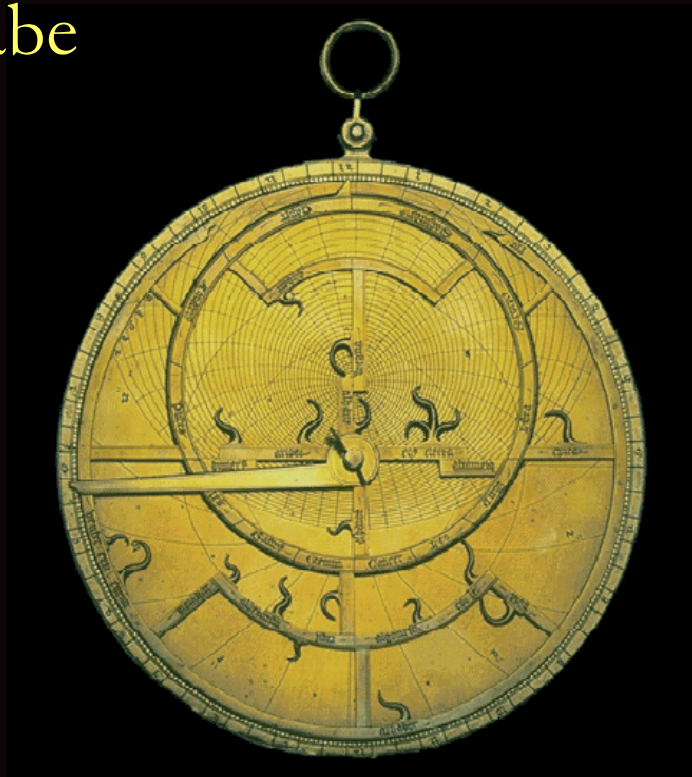
- Urging people to read and learn on every occasion (“Seek for science, even in China”)
- Muslims are urged to look into everything in the universe, observe the phenomena , to travel, investigate, explore and understand them
- Attributes were made to people of knowledge
- Learning is obligatory
- No Authority



Astronomy, Observatories

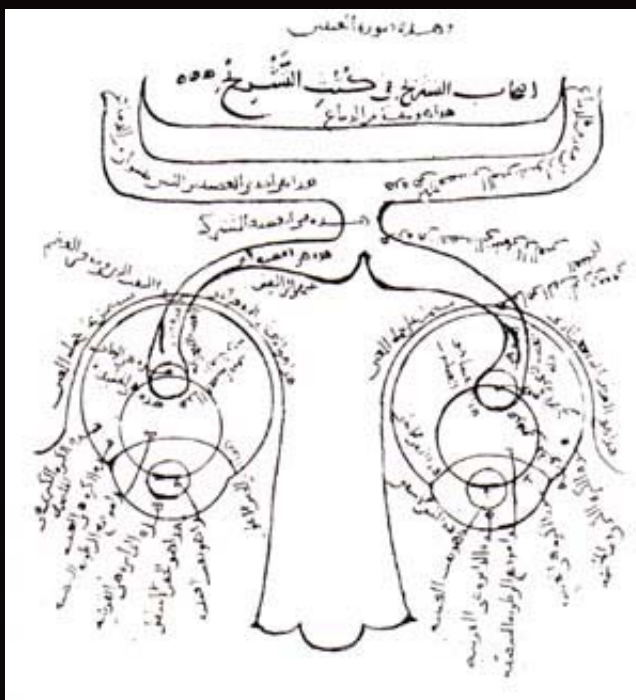


Astrolabe



فَنَحْنُ الْيَوْمَ
قَدْ تَصَدَّقْنَا
وَاللَّيْلُ وَالنَّجْمُ
وَاللَّيْلُ وَالنَّجْمُ
فَالْيَوْمَ وَاللَّيْلُ
وَاللَّيْلُ وَالنَّجْمُ
with light

Optics



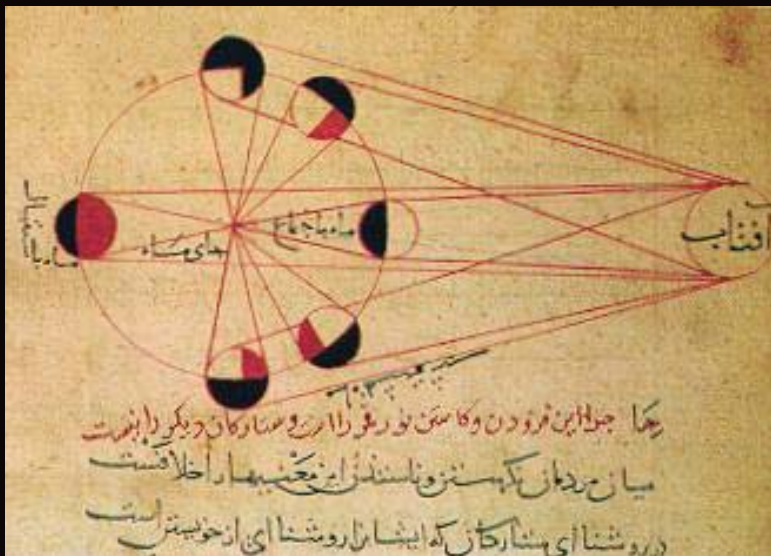
فَنَحْنُ الْيَوْمَ
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فَالْيَوْمَ وَاللَّيْلُ
وَاللَّيْلُ وَالنَّجْمُ
with light

Al Biruni, (973 - 1048)

- Whatever the subject one should use every available source in its original form, investigate the available work with objective scrutiny, and carry out research through direct observation and experimentation
- Discussed that the earth rotated on its axis and made accurate calculations of latitude and longitude
- The first to conduct elaborate experiments related to astronomical phenomena



AL Biruni



**"I serve
knowledge for
the sake of
knowledge
and not for
money"**



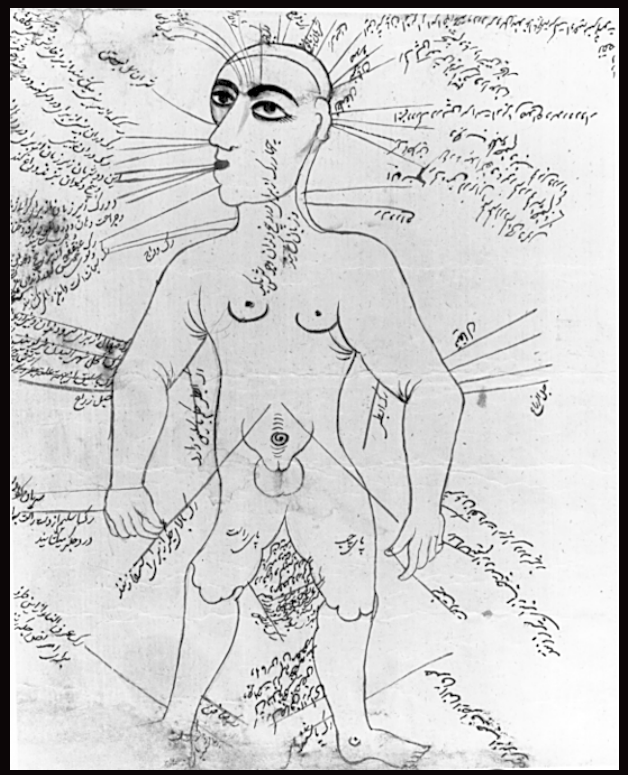
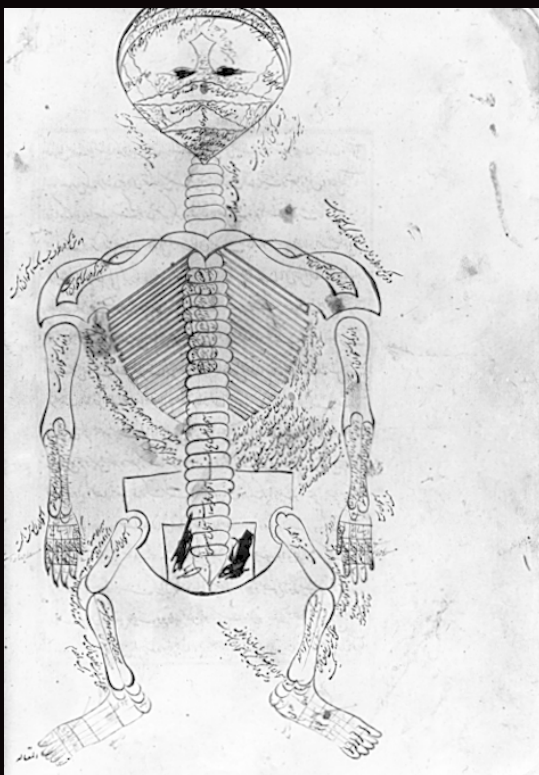
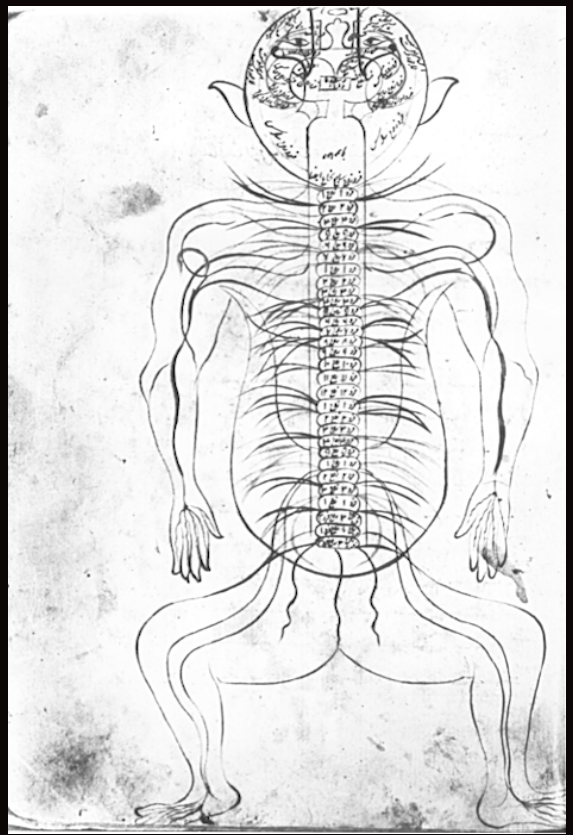
Medicin

- First hospital at Baghdad about 805.
- 34 more hospitals had sprung up within a decade.
- Medical schools and libraries attached to Hospitals.
- Hospitals set examinations for their students, and issued diplomas
- Traveling clinics
- One of the first pharmacological treatises was composed by Jabir ibn Hayyan (ca. 776)
- At the start of the ninth century, the first private apothecary shops opened in Baghdad



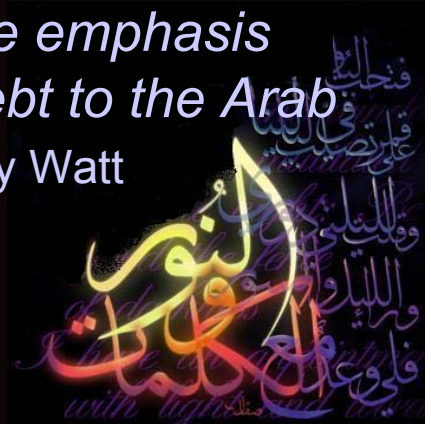
Sultan Al-Mu'ayyad's Maristan
In Cairo, Egypt





Islamic world and the western renaissance

- *Because Europe was reacting against Islam it belittled the influence of Saracens [Muslims] and exaggerated its dependence on its Greek and Roman heritage. So today an important task for us is to correct this false emphasis and to acknowledge fully our debt to the Arab and Islamic world" W. Montgomery Watt*



Setting the Record Straight

First mention for man in flight Roger Bacon , Leonardo da Vinci	Ibn Firnas 800's A.D
<i>Glass lenses, Clock, pendulum</i> (Galileo)	Ibn Firnas (800), Ibn Yunus al-Masri (10 th c)
Newton (17 th) c white light consists of various <i>rays of colored light</i> , <i>Study of lenses and prism</i> , <i>Gravity</i>	al-Haytham (11 th c)
finite nature of matter :Antione Lavoisier 18th c	al-Biruni (d. 1050)
Utilize algebraic symbols (x, y..etc), The difficult cubic equations (x to the third power), use of decimal fractions, negative numbers, logarithms, binomial theorem	9 th C, Muslim mathematicians used variables in equations and solved Cubic equations as well as numerous equations of even higher degrees and used negative numbers, invented logarithms and produced logarithmic tables
<i>Ethnography, geography, chemistry, geology, experimental science, anesthesia, circulatory system, Pathology</i>	

Moral of the story

- Civilizations may:
 - Fuse → flourish
 - Clash → destroy each other
- Arabic/Islamic contribution to science is still a shaded area of the history of science
- Combination of various schools of thought leads to discovery

