

# Contributions from across Muslim Civilisation

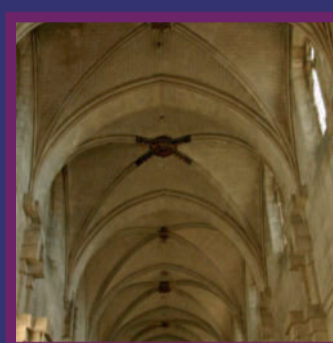


Welcome to the Golden Age of Muslim civilisation, during which scholars of different faiths and cultures worked together building and improving upon ideas of earlier worldwide scholars and making advances in science, mathematics, medicine, engineering, architecture and more. Muslim civilisation stretched over three continents, as far west as southern Spain and as far as eastern China.

Cities in the Middle East and Spain became global centres of culture, trade and learning. Their atmosphere of tolerance and creativity stimulated groundbreaking advances in many fields, so explore the map below to see some of what happened, where - and when!

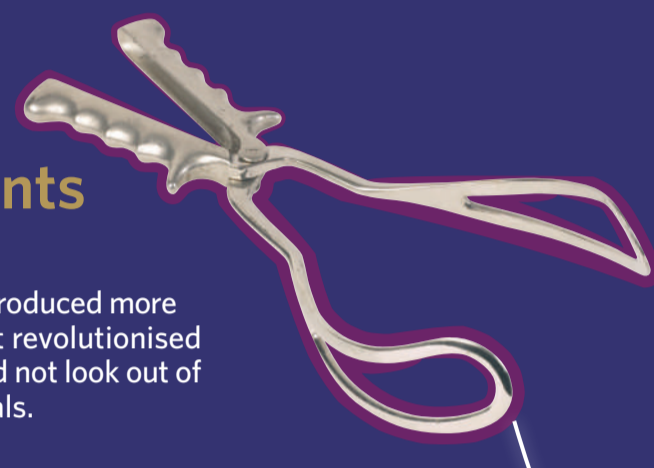
## Gothic Rib Vaulting

(1000)  
The thousand-year-old Bab Mardum Mosque in Toledo uses unusual vaulting with interesting ribs. This style and others were later used in Gothic structures throughout Europe.



## Surgical Instruments

Al-Zahrawi (936-1013)  
Cutting edge surgeon Al-Zahrawi introduced more than two hundred surgical tools that revolutionised medical science. Some of these would not look out of place in today's 21<sup>st</sup> century hospitals.



## Exploration

Ibn Battuta (1304-1368/70)  
Ibn Battuta travelled more than seventy five thousand miles in twenty nine years through more than forty modern countries, compiling one of the best eye-witness accounts of the customs and practices of the medieval world.



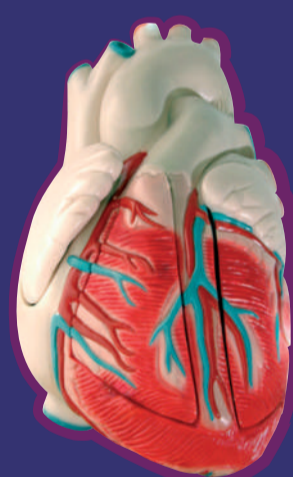
## Foundation of Sociology and Economics

Ibn Khaldun (1332-1406)  
This man traced the rise and fall of human societies in a science of civilisation, recording it all in his famous al-Muqaddimah or 'Introduction [to a History of The World]', which forms the basis of sociology and economic theory.



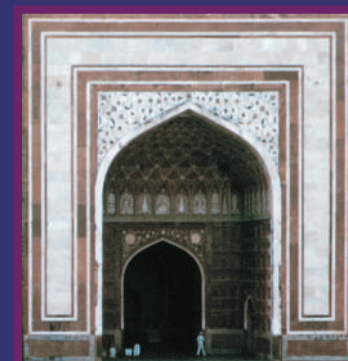
## Blood Circulation

Ibn al-Nafis (1210-1288)  
Ibn al-Nafis first refuted the Greek perception of blood circulation as held by Galen. Then, he gave another explanation, which impacted on subsequent Western scholars, following the translation of his work into Latin. The city of Padua in Italy was central to this revolution.



## Pointed Arch

(Ninth century)  
The pointed arch, symbol of the Gothic, appeared in the Muslim world about the 8th century. It spread especially in Egypt in the 9th century. Europe borrowed it through Sicily and the Crusades.



## Camera Obscura

Ibn al-Haytham (965-1039)  
Ibn al-Haytham experimented with *al-Bayt al-Muzlim* (Camera obscura in Latin). His discoveries and theories helped advance the science of optics, and the future development of the camera.



## World Map

Al-Idrisi (1099-1166)  
Al-Idrisi was commissioned by the Norman King of Sicily, Roger II to make a map. He produced an atlas of seventy maps called the *Book of Roger*, showing the earth was round which was a common notion held by scholars in Muslim civilisation.



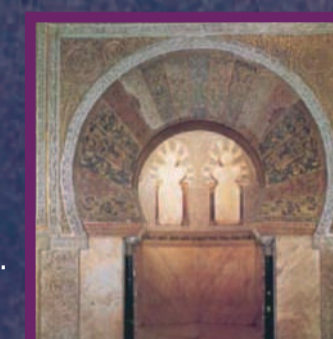
## Water-raising Machine

Al-Jazari (early 13th century)  
Al-Jazari wrote a major work on technology in 1206 in southern Turkey. He made and explained the working of many devices, such as the double reciprocating suction pump, which had a great impact on our modern technology.



## Horseshoe Arch

(715)  
Resembling a horseshoe, this arch was first used in the Umayyad Great Mosque of Damascus. In Britain, it is known as the Moorish arch and was popular in Victorian times; it was used in railway station entrances.



## Al-Nuri Hospital

(1156)  
Hospitals in Muslim civilisation provided free healthcare to all. Al-Nuri was an immense and sophisticated hospital where pharmacists, barbers, orthopaedists, oculists and physicians were all examined by 'market inspectors' to make sure they were of the highest standards.



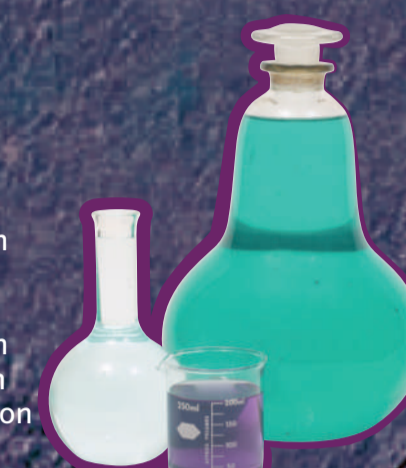
## House of Wisdom

(Early 9th century)  
It was the first learning institution of its genre in the Muslim world. In it gathered some of the earliest scholars who completed important scientific works and translations from other languages. It inspired other models in Qayrawan and Cairo. These institutions competed, which in turn simulated learning.



## Chemistry

(722-815)  
Our modern word chemistry comes from the medieval translation of the Arabic term *al-kimiya*. Arabic alchemists created new techniques for producing perfumes and essential oils. Jabir ibn Hayyan discovered vitally important acids like sulphuric, nitric and nitromuriatic acid, while Al-Razi set up a laboratory.



## Cryptology

Al-Kindi (801-873)  
Second World War problem solvers were carrying on the code-breaking tradition first written about by polymath al-Kindi from Baghdad when he described Frequency Analysis and laid the foundation of cryptography.



## Trick Devices

(9th century)  
The Banu Musa Brothers wrote a treatise on ingenious devices, operating many on hydraulic power, including an automatic organ, and also other diverse implements. Many of their inventions impacted immensely on our modern technology.



## Distillation

Jabir ibn Hayyan (722-815)  
Jabir ibn Hayyan perfected the distillation process using the alembic still, which is still used today. Chemists were producing rosewater, essential oils and pure alcohol for medical use. Today distillation has given us products from plastics to petrol.



## Shampooing

Sake Dean Mohamed (18th century)  
The Indian treatment of shampooing or therapeutic massage was introduced into the UK at Brighton by Sake Dean Mohamed, who became the "Shampooing Surgeon" to both King George IV and William IV.



$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## Algebra

Al-Khwarazmi (780-850)  
Al-Khwarazmi put algebra on a secure footing in the early 9th century while working in the House of Wisdom in Baghdad. His book *al-Jabr wa-al-muqabala* was the first treatise on algebra.

## Coffee

(8th century)  
Khalid the goat herder noticed his excitable animals had eaten red berries, which led to early Arabic drink *al-qahwa*. Coffee-drinking flourished across the Muslim world in the 1500s and spread to Europe through trade in 1637.



## Castles

(12th century)  
The invincible design of the castles of Jerusalem and modern day Syria were imitated in western lands with key features like round towers, arrow slits, barbicans, machicolations, parapets and battlements.

