

# The Middle Ages

## 1. Arab sciences (in orient)

In the Middle Ages, the Greek sciences were preserved, notably through the translation into Arabic of numerous books found in the Library of Alexandria. These sciences were then enriched and disseminated by Arab-Muslim civilization, which experienced a golden age (Al-Khawarizmi, Avicenna, Averroes).

We owe him numerous works in astronomy, geography, optics, medicine and mathematics (mainly algebra, combinatorial analysis and trigonometry).

**Table 1. Brief chronology of Arab civilization.**

622/750	Conquest period. Umayyad Caliphate (Damascus).
750/936	Abbasid Caliphate (Baghdad). Calies Mansur, Harun al-Rashid, Al-Ma'mun. Development of arts and sciences.
936/1055	Domination of the Iranian Shi'ites (Buyid dynasty).
936/1171	Fatimid rule in Africa and Egypt (Cairo). Egypt reconquered by Saladin (1171).
756/XI century	Umayyad Caliphate of Cordoba. Apogee of Muslim Spain. Capture of Cordoba by the Christians (1236).
1055/v. 1258	Effective rule of the Turkish Saljuqs in the East (the Sultan reigns on behalf of the Caliph). Last caliph executed by the Mongols (1258).
13th - 14th centuries	Mongol domination in the East. Saljûqid vassal states.
14th century/1918	Formation of the Ottoman Empire (Turks): Balkans, Iraq, North Africa.

	Capture of Constantinople (1453). Siege of Vienna (1682).
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### - Character of Arabic science

Firstly, Arab science is not just the science of the Arab peoples, but science in Arabic, which includes many Persian and even non-Muslim (Jewish) scholars. In fact, during the first century of ISLAM, the majority of scholars in Muslim territory were Christians. To a certain extent, the Islamic religion was more favorable to the development of scientific knowledge than the Christian religion at the same time. Not only was astronomical knowledge important in determining the precise start of the Ramadan and the direction of Mecca, but the Qur'an encourages the study of Nature: "Whoever walks in search of science [ilm], God walks with him on the path to Paradise."

**Table 2. Main figures in Arab science.**

Geber Ibn-Hayyan (8 <sup>th</sup> century)	A leading figure in Arab and Western alchemy.
Al-Khawarizmi (c.800/v.847)	Author of Précis sur le calcul d'al-jabr et d'al-muqabala (algebra).
Abu Kamil (9 <sup>th</sup> century)	Disciple of Al-Khawarizmi.
Al-Battânî (9 <sup>th</sup> century)	Astronomer and mathematician.
Al-Razi (V. 854/925-935)	doctor.
Abu al-Husayn al-Sufi (Late 10 <sup>th</sup> century)	Astronomer.
Al-Bîrunî (late 10 <sup>th</sup> century)	Astronomer, geographer, mathematician.
Ibn-Al-Haytham (965-1040)	The most famous physicist in the Arab world.
Ibn-Sina (980-1037)	doctor and philosopher.
Al-Khayyam (1048-1131)	doctor, astronomer and poet.
Al-Karagi (11 <sup>th</sup> century)	Author of the sufficient book on the science of arithmetic.
Ibn Rushd (1126/1198)	Philosopher and commentator on Aristotle.
Al-Kashi (1429)	Mathematician

## 2. Science of medieval Latin Europe (in the West)

In the early Middle Ages, the sciences were structured around the liberal arts [trivium, which included grammar, rhetoric (the art of speech and argumentation) and logic], the scientific part of which consisted of the quadrivium (arithmetic, geometry, astronomy and music).

After the Viking, Arab and Hungarian invasions, the medieval West (Latin) appropriated the Greek and Arab heritage. Around the year 1000, Gerbert d'Aurillac (later Pope Sylvester II) brought back from Spain the decimal system with its zero and reintroduced the quadrivium into Western schools. In the XIIe century, from around 1120 to 1190, the works of Greek and Arab scientists and philosophers were systematically translated in Toledo and four Italian cities (Rome, Pisa, Venice, Palermo - see, for example, Al Idrissi in the latter city), based on Greek philosophical writings (Plato, Aristotle), also handed down by Arab Muslims (except Plato, which had not been lost).

The gradual spread of this knowledge throughout the West in the XIIe century led to its integration by Albert the Great into the universities then being created: Bologna, Paris (Sorbonne), Oxford, Salamanca, etc., along with the disciplines of law. At this time, there was some criticism of Aristotle's books on physics (from Roger Bacon in particular), but this had nothing to do with philosophical method.

The great plague that ravaged the West (1347-1351, then repeated in successive waves) and the Hundred Years' War in France interrupted this Renaissance, which nevertheless resumed fairly quickly in Italy and Avignon. In the XIVe and XVe centuries, the late Middle Ages already heralded the Renaissance, and brought with them a wealth of knowledge in geography and cartography, disciplines in which the west had fallen far behind.