

# Al-Andalus

**Al-Andalus** (Arabic: الأندلس, trans. *al-'Andalus*, Spanish: *Al-Ándalus*) was the Arabic name given to a nation and territorial region also commonly referred to as Moorish Iberia. The name describes parts of the Iberian Peninsula and Septimania governed by Muslims (given the generic name of Moors), at various times in the period between 711 and 1492, although the territorial boundaries underwent constant changes with constant attacks from the Christian Kingdoms.<sup>[1] [2] [3]</sup>

Following the Muslim conquest of Hispania, Al-Andalus was divided into five administrative areas roughly corresponding to Andalusia, Galicia and Portugal, Castile and León, Aragon and Catalonia, and Septimania.<sup>[4]</sup> As a political domain or domains, it successively constituted a province of the Umayyad Caliphate, initiated by the Caliph Al-Walid I (711–750); the Emirate of Córdoba (c. 750–929); the Caliphate of Córdoba (929–1031); and the Caliphate of Córdoba's *taifa* (successor) kingdoms. Rule under these kingdoms saw the rise in cultural exchange and cooperation between Christians, Muslims, and Jews. Under the Caliphate of Córdoba, al-Andalus was a

beacon of learning, and the city of Córdoba became one of the leading cultural and economic centres in both the Mediterranean Basin and the Islamic world.

In succeeding centuries, Al-Andalus became a province of the Berber Muslim dynasties of the Almoravids and Almohads, subsequently fragmenting into a number of minor states, most notably the Emirate of Granada. With the support of local inhabitants of the Iberian Peninsula the Almoravids deposed of the *taifa* Muslim princes, after helping to repel Christian attacks on the region by Alfonso VI. Rule under the Almoravids and Almohads saw a decline in cultural and social exchange and increased persecution of religious minorities, with a return to more fundamentalist forms of Islam.

For much of its history, Al-Andalus existed in conflict with Christian kingdoms to the north, which at first were forced into subservience but eventually overpowered their Muslim neighbors to the South. In 1085, Alfonso VI of León and Castile captured Toledo, precipitating a gradual decline until, by 1236, with the fall of Córdoba, the Emirate of Granada remained the only Muslim-ruled territory in what is now Spain. The Portuguese *Reconquista* culminated in 1249 with the conquest of the Algarve by Afonso III. In 1238, the Emirate of Granada officially became a tributary state to the Kingdom of Castile, then ruled by King Ferdinand III. On January 2, 1492, Emir Muhammad XII surrendered the Emirate of Granada to Queen Isabella I of Castile, who along with her husband King Ferdinand II of Aragon were the "Catholic Monarchs". The surrender concluded Al-Andalus as a political entity, but the cultural and social contributions under Muslim rule still persist in the region.



Islamic period garden in Granada, Al-Andalus

## Etymology of Al-Andalus

The etymology of the word "Al-Andalus" is disputed. Furthermore, the extent of Iberian territory encompassed by the name changed over the centuries. As a designation for Iberia or its southern portion, the name is first attested by inscriptions on coins minted by the new Muslim government in Iberia circa 715 (the uncertainty in the year is due to the fact that the coins were bilingual in Latin and Arabic and the two inscriptions differ as to the year of minting).<sup>[5]</sup>

At least three specific etymologies have been proposed in Western scholarship, all presuming that the name arose after the Roman period in the Iberian Peninsula's history. Their originators or defenders have been historians. Recently, linguistics expertise has been brought to bear on the issue. Arguments from toponymy (the study of place names), history, and language structure demonstrate the lack of substance in all preceding proposals, and evidence has been presented that the name predates, rather than postdates, the Roman occupation.<sup>[6]</sup>

A major objection to all earlier proposals is that the very name *Andaluz* (the equivalent of *Andalus* in Spanish spelling) exists in several places in mountainous areas of Castile.<sup>[7]</sup> Furthermore, the fragment *and-* is common in Spanish place names, and the fragment *-luz* also occurs several times across Spain.

## Older proposals

The name "Andalusia" or "Vandalusia" was traditionally believed to be derived from "Vandal" (the Germanic tribe that colonized parts of Iberia from 407 to 429). However, there is no historical reference to support this. The proposal is sometimes associated with the 19th century historian Reinhart Dozy,<sup>[8]</sup> but it predates him and he recognized some of its shortcomings. Although he accepted that "Al-Andalus" derived from "Vandal", he believed that geographically it referred only to the harbor from which the Vandals departed Iberia for Africa—the location of which harbour was unknown.<sup>[9]</sup>

Another proposal is that "Andalus" is an Arabic language version of the name "Atlantis". This idea has recently been defended by the Spanish historian Vallvé, but purely on the grounds that it is allegedly plausible phonetically and would explain several toponymic facts (no historical evidence was offered).<sup>[10]</sup>

Vallvé writes:

Arabic texts offering the first mentions of the island of Al-Andalus and the sea of al-Andalus become extraordinarily clear if we substitute these expressions with "Atlantis" or "Atlantic". The same can be said with reference to Hercules and the Amazons whose island, according to Arabic commentaries of these Greek and Latin legends, was located in *jauf* Al-Andalus—that is, to the north or interior of the Atlantic Ocean.

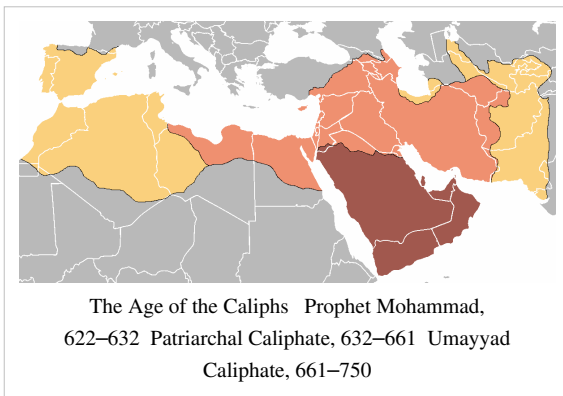
The "Island of Al-Andalus" is mentioned in an anonymous Arabic chronicle of the conquest of Iberia composed two to three centuries after the fact.<sup>[11]</sup> It is identified as the location of the landfall of the advance guard of the Moorish conquest of Iberia. The chronicle also says that "Island of al-Andalus" was subsequently renamed "Island of Tarifa". The preliminary conquest force of a few hundred, led by the Berber chief, Tarif abu Zura, seized the first bit of land that is encountered after crossing the Strait of Gibraltar in 710. The main conquest force led by Tariq ibn Ziyad followed them a year later. The landfall, now known in Spain as either Punta Marroquí or Punta de Tarifa, is in fact the southern tip of an islet, presently known as Isla de Tarifa or Isla de las Palomas, just offshore of the Iberian mainland.

This testimony of the Arab chronicle, the modern name "Isla de Tarifa", and the above mentioned toponymic evidence that "Andaluz" is a name of pre-Roman origin taken together lead to the supposition that the "Island of Andalus" is the present day Isla de Tarifa, which lies just offshore from the modern day Spanish city of Tarifa. The extension of the scope of the designation "Al-Andalus" from a single islet to all of Iberia has several historical precedents.

In the 1980s, the historian Halm, also rejecting the "Vandal" proposal, originated an innovative alternative.<sup>[12]</sup> Halm took as his points of departure ancient reports that Germanic tribes in general were reported to have distributed

conquered lands by having members draw lots, and that Iberia during the period of Visigothic rule was sometimes known to outsiders by a Latin name, *Gothica Sors*, whose meaning is 'Gothic lot'. Halm thereupon speculated that the Visigoths themselves might have called their new lands "lot lands" and done so in their own language. However, the Gothic language version of the term *Gothica Sors* is not attested. Halm claimed to have been able to reconstruct it, proposing that it was *\*landahlauts* (the asterisk is the standard symbol among linguists for a linguistic form that is merely proposed, not attested). Halm then suggested that the hypothetical Gothic language term gave rise to both the attested Latin term, *Gothica Sors* (by translation of the meaning), and the Arabic name, Al-Andalus (by phonetic imitation). However, Halm did not offer evidence (historical or linguistic) that any of the language developments in his argument had in fact occurred.

## Emirate and Caliphate of Córdoba



The interior of the Cathedral of Cordoba, formerly the Great Mosque of Córdoba. The cathedral is one of the finest examples of Arab-Islamic architecture in the Umayyad style. An Islamic Mosque (742) built on the site of the Visigothic Christian 'Saint Vincent basilica' (600) then reconquered for the Christian *Catedral de Nuestra Señora de la Asunción* in 1236.

Under the orders of the Great Umayyad Caliph Al-Walid I, Tariq ibn-Ziyad led a small force that landed at Gibraltar on April 30, 711. After a decisive victory at the Battle of Guadalete on July 19, 711, Tariq ibn-Ziyad brought most of the Iberian Peninsula under Muslim occupation in a seven-year campaign. They crossed the Pyrenees and occupied parts of southern France, but were defeated by the Frank Charles Martel at the Battle of Poitiers in 732. However Poitiers did not stop the progress of the Berber Arabs and in 734 Avignon was conquered, Arles was attacked and the whole of Provence was overrun. In 737, the Muslims reached Burgundy, where they captured a large quantity of slaves to take back to Iberia. Berbers of the Maghrib, in 739, revolted against their Arab masters; before a year's time, the revolt spread through Iberia. Berbers had lost their independence and their rebellion caused complete chaos that caused economic dislocation.<sup>[13]</sup> Charles Martel responded with continuous campaigns against the Muslims in the south of Gaul between 736 and 739 and twenty years later, in 759, the Franks under the leadership of Pepin the Short expelled the Muslims from

Septimania which was one of the five administrative areas of Al-Andalus.<sup>[14]</sup>

The Iberian peninsula, except for the Kingdom of Asturias, became part of the expanding Umayyad empire, under the name of *Al-Andalus*. The earliest attestation of this Arab name is a dinar coin, preserved in the Archaeological Museum in Madrid, dating from five years after the conquest (716). The coin bears the word "al-Andalus" in Arabic script on one side and the Iberian Latin "Span" on the obverse.<sup>[15]</sup>

At first, al-Andalus was ruled by governors appointed by the Caliph, most ruling for periods of under three years. However, from 740, a series of civil wars between various Muslim groups in Iberia resulted in the breakdown of Caliphal control, with Yūsuf al-Fihri, who emerged as the main winner, effectively becoming an independent ruler.

In 750, the Abbasids overthrew the Umayyads for control of the great Arab empire. But in 756, the exiled Umayyad prince Abd-ar-Rahman I (later titled *Al-Dākhil*) ousted Yūsuf al-Fihri to establish himself as the Emir of Córdoba. He refused to submit to the Abbasid caliph, as Abbasid forces had killed most of his family. Over a thirty year reign, he established a tenuous rule over much of al-Andalus, overcoming partisans of both the al-Fihri family and of the Abbasid caliph.<sup>[16]</sup>

For the next century and a half, his descendants continued as emirs of Córdoba, with nominal control over the rest of *al-Andalus* and sometimes even parts of western North Africa, but with real control, particularly over the marches along the Christian border, vacillating depending on the competence of the individual emir. Indeed, the power of emir Abdallah ibn Muhammad (circa 900) did not extend beyond Córdoba itself. But his grandson Abd-al-Rahman III, who succeeded him in 912, not only rapidly restored Umayyad power throughout al-Andalus but extended it into western North Africa as well. In 929 he proclaimed himself Caliph, elevating the emirate to a position competing in prestige not only with the Abbasid caliph in Baghdad but also the Shi'ite caliph in Tunis—with whom he was competing for control of North Africa.

The period of the Caliphate is seen as the golden age of al-Andalus. Crops produced using irrigation, along with food imported from the Middle East, provided the area around Córdoba and some other *Andalusī* cities with an agricultural economic sector by far the most advanced in Europe. Among European cities, Córdoba under the Caliphate, with a population of perhaps 500,000, eventually overtook Constantinople as the largest and most prosperous city in Europe.<sup>[17]</sup> Within the Islamic world, Córdoba was one of the leading cultural centres. The work of its most important philosophers and scientists (notably Abulcasis and Averroes) had a major influence on the intellectual life of medieval Europe.

Muslims and non-Muslims often came from abroad to study in the famous libraries and universities of *al-Andalus* after the reconquest of Toledo in 1085. The most noted of these was Michael Scot (c. 1175 to c. 1235), who took the works of Ibn Rushd ("Averroes") and Ibn Sina ("Avicenna") to Italy. This transmission was to have a significant impact on the formation of the European Renaissance.

## First Taifa period

The Córdoba Caliphate effectively collapsed during a ruinous civil war between 1009 and 1013, although it was not finally abolished until 1031. *Al-Andalus* then broke up into a number of mostly independent states called *taifas*. These were generally too weak to defend themselves against repeated raids and demands for tribute from the Christian states to the north and west, which were known to the Muslims as "the Galician nations",<sup>[18]</sup> and which had spread from their initial strongholds in Galicia, Asturias, Cantabria, the Basque country and the Carolingian *Marca Hispanica* to become the Kingdoms of Navarre, León, Portugal, Castile and Aragon and the County of Barcelona. Eventually raids turned into conquests, and in response the *taifa* kings were forced to request help from the Almoravids, Islamic rulers of the Maghreb. Their desperate maneuver would eventually fall to their disadvantage, however, as the Moravids they had summoned from



The Caliphate of Cordoba c. 1000 at the apogee of Al-Mansur.



The Caliphate broke up into many *taifa* states in 1031. (The northern areas shown here in white, red, yellow and dark blue were Christian)



the south went on to conquer many of the *taifa* kingdoms.



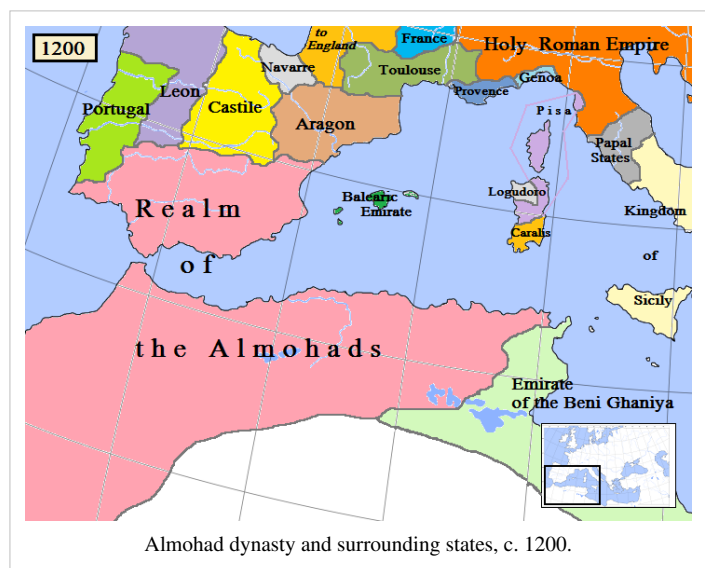
Map showing the extent of the Almoravid empire

## Almoravids, Almohads and Marinids

In 1086 the Almoravid ruler of Morocco Yusuf ibn Tashfin was invited by the Muslim princes in Iberia to defend them against Alfonso VI, King of Castile and León. In that year, Yusuf ibn Tashfin crossed the straits to Algeciras and inflicted a severe defeat on the Christians at the az-Zallaqah. By 1094, Yusuf ibn Tashfin had removed all Muslim princes in Iberia and annexed their states, except for the one at Zaragoza. He regained Valencia from the Christians.

The Almoravids were succeeded in the 12th century by the Almohads, another Berber dynasty, after the victory of Abu Yusuf Ya'qub al-Mansur over the Castilian Alfonso VIII at the

Battle of Alarcos. In 1212 a coalition of Christian kings under the leadership of the Castilian Alfonso VIII defeated the Almohads at the Battle of Las Navas de Tolosa. The Almohads continued to rule Al Andalus for another decade, but with much reduced power and prestige; and the civil wars following the death of Abu Ya'qub Yusuf II rapidly led to the re-establishment of *taifas*. The *taifas*, newly independent but now weakened, were quickly conquered by Portugal, Castile and Aragon. After the fall of Murcia (1243) and the Algarve (1249), only the Emirate of Granada survived as a Muslim state, but only as a tributary of Castile. Most of its tribute was paid in gold from present-day Mali and Burkina Faso that was carried to Iberia through the merchant routes of the Sahara.



Almohad dynasty and surrounding states, c. 1200.

The last Muslim threat to the Christian kingdoms was the rise of the Marinids in Morocco during the 14th century, who took Granada into their sphere of influence and occupied some of its cities, like Algeciras. However, they were unable to take Tarifa, which held out until the arrival of the Castilian Army led by Alfonso XI. The Castilian king, helped by Afonso IV of Portugal and Peter IV of Aragon, decisively defeated the Marinids at the Battle of Salado in 1340 and took Algeciras in 1344. Gibraltar, then under Granadian rule, was besieged in 1349–1350, Alfonso XI along with most of his army perished by the Black Death. His successor, Peter of Castile, made peace with the Muslims and turned his attention to Christian lands, starting a period of almost 150 years of rebellions and wars between the Christian states that secured the survival of Granada.

In 1469 the marriage of Ferdinand of Aragon and Isabella of Castile signaled the launching of the final assault on the Emirate of Granada (Gharnatah). The King and Queen convinced the Pope to declare their war a crusade. The Christians crushed one center of resistance after another and finally, in January 1492, after a long siege, the Moorish sultan, Muhammad XII, surrendered the fortress palace, the renowned Alhambra, itself.

## Society



A manuscript page of the Qur'an in the script developed in al-Andalus, 12th century.

The society of Al-Andalus was made up of three main religious groups: Christians, Muslims and Jews. The Muslims, though united on the religious level, had several ethnic divisions, the main being the distinction between the Berbers and the Arabs. Mozarabs were Christians that had long lived under Muslim rule and so had adopted many Arabic customs, art and words, while still maintaining their Christian rituals and their own Romance languages. Each of these communities inhabited distinct neighborhoods in the cities. In the 10th century a massive conversion of Christians took place, and *muladies* (Muslims of ethnic Iberian origin) plus Arabs and Berbers comprised eighty percent of the population of Al-Andalus by around 1100.,<sup>[19] [20]</sup>

The Berbers, who made up the bulk of the invaders, lived in the mountainous regions of what is now the north of Portugal and in the Meseta Central, while the Arabs settled in the south and in the Ebro Valley in the northeast. The Jews worked mainly as tax collectors, in trade, or as doctors or ambassadors. At the end of the fifteenth century there were about 50,000 Jews in Granada and roughly 100,000 in the whole of Islamic Iberia.<sup>[21]</sup>

## Non-Muslims under the Caliphate

### Treatment of non-Muslims

The non-Muslims were given the status of *ahl al-dhimma* (the people under protection), adults paying a "Jizya" tax, equal to one Dinar per year with exemptions for old people, women, children and the disabled, whenever there was a Christian authority in the community. When there was no Christian authority, the non-Muslims were given the status of *majus*.<sup>[22]</sup>

The treatment of non-Muslims in the Caliphate has been a subject of considerable debate among scholars and commentators, especially those interested in drawing parallels to the coexistence of Muslims and non-Muslims in the modern world. María Rosa Menocal, a specialist in Iberian literature, has argued that "tolerance was an inherent aspect of Andalusian society".<sup>[23]</sup> In her view, the Jewish and Christian dhimmis living under the Caliphate, while allowed fewer rights than Muslims, were much better off than minorities in Christian parts of Europe.

Jews constituted more than 5% of the population.<sup>[24]</sup> Al-Andalus was a key center of Jewish life during the early Middle Ages, producing important scholars and one of the most stable and wealthy Jewish communities. Bernard Lewis takes issue with this view, arguing its modern use is ahistorical and apologetic. He argues that Islam traditionally did not offer equality nor even pretended that it did, arguing that it would have been both a "theological as well as a logical absurdity".<sup>[25]</sup> However, even Bernard Lewis states:

Generally, the Jewish people were allowed to practice their religion and live according to the laws and scriptures of their community. Furthermore, the restrictions to which they were subject "were social and symbolic rather than tangible and practical in character. That is to say, these regulations served to define the relationship between the two communities, and not to oppress the Jewish population.

— Bernard Lewis, *The Jews of Islam* (1984),

[26]

Naturally, toleration varied according to who ruled; when the Almohads took Cordoba in 1148 they gave the Jews there the choice of conversion, exile or death, with Jews like Maimonides choosing exile.<sup>[27]</sup>



A later illustration, depicting the Jewish Soldiers fighting alongside the forces of Muhammed IX, Nasrid Sultan of Granada, at the Battle of La Higuera, 1431.

### Rise and fall of Muslim power

The Caliphate treated non-Muslims differently at different times. The longest period of tolerance began after 912, with the reign of Abd-ar-Rahman III and his son, Al-Hakam II where the Jews of Al-Andalus prospered, devoting themselves to the service of the Caliphate of Córdoba, to the study of the sciences, and to commerce and industry, especially to trading in silk and slaves, in this way promoting the prosperity of the country. Southern Iberia became an asylum for the oppressed Jews of other countries.<sup>[28] [29]</sup>

Christians, braced by the example of their coreligionists across the borders of *al-Andalus*, sometimes asserted the claims of Christianity and knowingly courted martyrdom, even during these tolerant periods. For example, 48 Christians of Córdoba were decapitated for religious offences against Islam. They became known as the Martyrs of Córdoba. These deaths played out, not in a single spasm of religious unrest, but over an extended period of time; dissenters were fully aware of the fates of their predecessors and chose to protest against Islamic rule.<sup>[30]</sup>

Under the Almoravids and the Almohads there may have been intermittent persecution of Jews,<sup>[31]</sup> but sources are extremely scarce and do not give a clear picture, though the situation appears to have deteriorated after 1160.<sup>[32]</sup>

During these successive waves of violence against non-Muslims, many Jewish and even Muslim scholars left the Muslim-controlled portion of Iberia for the then-still relatively tolerant city of Toledo, which had been reconquered in 1085 by Christian forces. Some Jews joined the armies of the Christians (about 40,000), while others joined the Almoravids in the fight against Alfonso VI of Castile.

The 11th century saw Muslim pogroms against Jews in Al-Andalus; those occurred in Córdoba in 1011 and in Granada in 1066.<sup>[33] [34] [35]</sup>

The Almohads, who had taken control of the Almoravids' Maghribi and Andalusian territories by 1147,<sup>[36]</sup> far surpassed the Almoravides in fundamentalist outlook, and they treated the *dhimmis* harshly. Faced with the choice of either death or conversion, many Jews and Christians emigrated.<sup>[37] [38]</sup> Some, such as the family of Maimonides, fled east to more tolerant Muslim lands,<sup>[37]</sup> while others went northward to settle in the growing Christian kingdoms.<sup>[39]</sup>

Medieval Spain and Portugal was the scene of almost constant warfare between Muslims and Christians. Periodic raiding expeditions were sent from Al-Andalus to ravage the Christian Spanish and Portuguese kingdoms, bringing back booty and slaves. In raid against Lisbon in 1189, for example, the Almohad caliph Yaqub al-Mansur took 3,000 female and child captives, while his governor of Córdoba, in a subsequent attack upon Silves in 1191, took 3,000 Christian slaves.<sup>[40]</sup>

The last Muslim bastion, Nasrid Granada fell around 1492. By this time the Moors in Castile numbered "half a million within the realm, 100,000 had died or been enslaved, 200,000 emigrated, and 200,000 remained as the residual population. Many of the Muslim elite, including Muhammad XII, who had been given the area of the Alpujarra mountain as a principality, found life under Christian rule intolerable and passed over into North Africa"<sup>[41]</sup>



Image of a Jewish cantor reading the Passover story in *al-Andalus*, from a 14th century Spanish Haggadah.



## Culture

C.W. Previte-Orton writes in his Cambridge medieval history,<sup>[42]</sup>

The brilliant Saracenic civilization of Moslem Spain rendered the Moors, even during their declines under the *Reyes de Taifas*, the most cultured people of the West.

Many tribes, religions and races coexisted in al-Andalus, each contributing to the intellectual prosperity of Andalusia. Literacy in Islamic Iberia was far more widespread than any other country of the West.<sup>[43]</sup>

From the earliest days, the Umayyads wanted to be seen as intellectual rivals to the Abbasids, and for Córdoba to have libraries and educational institutions to rival Baghdad's. Although there was a clear rivalry between the two powers, freedom to travel between the two Caliphates was allowed, which helped spread new ideas and innovations over time.

## Philosophy

### Andalusian philosophy

The historian Said Al-Andalusi wrote that Caliph Abd-ar-Rahman III had collected libraries of books and granted patronage to scholars of medicine and "ancient sciences". Later, *al-Mustansir* (Al-Hakam II) went yet further, building a university and libraries in Córdoba. Córdoba became one of the world's leading centres of medicine and philosophical debate.

However, when Al-Hakam's son Hisham II took over, real power was ceded to the *hajib*, al-Mansur Ibn Abi Aamir. Al-Mansur was a distinctly religious man and disapproved of the sciences of astronomy, logic and especially astrology, so much so that many books on these subjects, which had been preserved and collected at great expense by Al-Hakam II, were burned publicly. However, with Al-Mansur's death in 1002 interest in philosophy revived. Numerous scholars emerged, including Abu Uthman Ibn Fathun, whose masterwork was the philosophical treatise "Tree of Wisdom". An outstanding scholar in astronomy and astrology was Maslamah Ibn Ahmad al-Majriti (died 1008), an intrepid traveller who journeyed all over the Islamic world and beyond, and who kept in touch with the Brethren of Purity. Indeed, it is said to have been he who brought the 51 "Epistles of the Brethren of Purity" to *al-Andalus* and who added the compendium to this work, although it is quite possible that it was added later by another scholar of the name al-Majriti. Another book attributed to al-Majriti is the *Ghayat al-Hakim* "The Aim of the Sage", a book which explored a synthesis of Platonism with Hermetic philosophy. Its use of incantations led the book to be widely dismissed in later years, although the Sufi communities kept studies of it.

A prominent follower of al-Majriti was the philosopher and geometer Abu al-Hakam al-Kirmani. A follower of his in turn was the great Abu Bakr Ibn al-Sayigh, usually known in the Arab world as Ibn Bajjah, "Avempace"



The interiors of the Alhambra in Spain are decorated with arabesque designs.



Averroes, founder of the Averroism school of philosophy, was influential in the rise of secular thought in Western Europe.

The Andalusian philosopher Averroes (1126–1198) is considered the father of secular thought in Europe and possibly the most important among them. He was the founder of the Averroism school of philosophy, and his works and commentaries had an impact on the rise of secular thought in Western Europe.<sup>[44]</sup> He also developed the concept of "existence precedes essence".<sup>[45]</sup>

Another influential Andalusian philosopher who had a significant influence on modern philosophy was Ibn Tufail. His philosophical novel, *Hayy ibn Yaqdhan*, translated into Latin as *Philosophus Autodidactus* in 1671, developed the themes of empiricism, tabula rasa, nature versus nurture,<sup>[46]</sup> condition of possibility, materialism,<sup>[47]</sup> and Molyneux's Problem.<sup>[48]</sup> European scholars and writers influenced by this novel include John Locke,<sup>[49]</sup> Gottfried Leibniz,<sup>[50]</sup> Melchisédech Thévenot, John Wallis, Christiaan Huygens,<sup>[51]</sup> George Keith, Robert Barclay, the Quakers,<sup>[52]</sup> and Samuel Hartlib.<sup>[53]</sup>

### Jewish philosophy and culture

With the relative tolerance of *al-Andalus* and the decline of the previous centre of Jewish thought in Babylonia, *al-Andalus* became the centre of Jewish intellectual endeavours. Poets and commentators like Judah Halevi (1086–1145) and Dunash ben Labrat (920–990) contributed to the cultural life of *al-Andalus*, but the area was even more important to the development of Jewish philosophy. A stream of Jewish philosophers, cross-fertilizing with Muslim philosophers, (see joint Jewish and Islamic philosophies) culminated in a widely celebrated Jewish thinker of the Middle Ages, Maimonides (1135–1205), though he did not actually do any of his work in *al-Andalus*, as, when he was 13, his family fled persecution by the Almohads.

## Enduring influence on Iberian Peninsula

### Science legacy

#### Astronomy

In the 11th–12th centuries, astronomers in Al-Andalus took up the challenge earlier posed by Ibn al-Haytham, namely to develop an alternate non-Ptolemaic configuration that evaded the errors found in the Ptolemaic model.<sup>[54]</sup> Like Ibn al-Haytham's critique, the anonymous Andalusian work, *al-Istidrak ala Batlamyus (Recapitulation regarding Ptolemy)*, included a list of objections to Ptolemaic astronomy. This marked the beginning of the Andalusian school's revolt against Ptolemaic astronomy, otherwise known as the "Andalusian Revolt".<sup>[55]</sup>

In the late 11th century, al-Zarqali (Latinized as Arzachel) discovered that the orbits of the planets are elliptic orbits and not circular orbits,<sup>[56]</sup> though he still followed the Ptolemaic model.

In the 12th century, Averroes rejected the eccentric deferents introduced by Ptolemy. He rejected the Ptolemaic model and instead argued for a strictly concentric model of the universe. He wrote the following criticism on the Ptolemaic model of planetary motion:<sup>[57]</sup>

"To assert the existence of an eccentric sphere or an epicyclic sphere is contrary to nature. [...] The astronomy of our time offers no truth, but only agrees with the calculations and not with what exists."

Averroes' contemporary, Maimonides, wrote the following on the planetary model proposed by Ibn Bajjah (Avempace):

"I have heard that Abu Bakr [Ibn Bajja] discovered a system in which no epicycles occur, but eccentric spheres are not excluded by him. I have not heard it from his pupils; and even if it be correct that he discovered such a system, he has not gained much by it, for eccentricity is likewise contrary to the principles laid down by Aristotle ... I have explained to you that these difficulties do not concern the astronomer, for he does not profess to tell us the existing properties of the spheres, but to suggest, whether correctly or not, a theory in which the motion of the stars and planets is uniform and circular, and in agreement with observation."<sup>[58]</sup>

Ibn Bajjah also proposed the Milky Way galaxy to be made up of many stars but that it appears to be a continuous image due to the effect of refraction in the Earth's atmosphere.<sup>[59]</sup> Later in the 12th century, his successors Ibn Tufail and Nur Ed-Din Al Betrugi (Alpetragius) were the first to propose planetary models without any equant, epicycles or eccentrics. Al-Betrugi was also the first to discover that the planets are self-luminous.<sup>[60]</sup> Their configurations, however, were not accepted due to the numerical predictions of the planetary positions in their models being less accurate than that of the Ptolemaic model,<sup>[61]</sup> mainly because they followed Aristotle's notion of perfect circular motion.

### Earth sciences

In the late 11th century, Abu 'Abd Allah Muhammad ibn Ma'udh, who lived in Al-Andalus, wrote a work on optics later translated into Latin as *Liber de crepusculis*, which was mistakenly attributed to Alhazen. This was a short work containing an estimation of the angle of depression of the sun at the beginning of the morning twilight and at the end of the evening twilight, and an attempt to calculate on the basis of this and other data the height of the atmospheric moisture responsible for the refraction of the sun's rays. Through his experiments, he obtained the accurate value of 18°, which comes close to the modern value.<sup>[62]</sup>

In the early 13th century, the Andalusian-Arabian biologist Abu al-Abbas al-Nabati developed an early scientific method for botany, introducing empirical and experimental techniques in the testing, description and identification of numerous materia medica, and separating unverified reports from those supported by actual tests and observations.<sup>[63]</sup> His student Ibn al-Baitar published the *Kitab al-Jami fi al-Adwiya al-Mufrada*, which is considered one of the greatest botanical compilations in history, and was a botanical authority for centuries. It contains details on at least 1,400 different plants, foods, and drugs, 300 of which were his own original discoveries. The *Kitab al-Jami fi al-Adwiya al-Mufrada* was also influential in Europe after it was translated into Latin in 1758.<sup>[64]</sup> <sup>[65]</sup>

### Geography and exploration

Long distance travel created a need for mapping, and travelers often provided the information to achieve the task. While such travel during the medieval period was hazardous, Muslims nonetheless undertook long journeys. One motive for these was the Hajj or the Muslim pilgrimage. Annually, Muslims came to Mecca in Arabia from Islamic Iberia, Persia, Africa, and India. Another motive for travels was commerce. Muslims were involved in trade with Europeans, Indians and the Chinese, and Muslim merchants travelled long distances to conduct commercial activities.<sup>[66]</sup>

The baculus, used for nautical astronomy, originates from Islamic Iberia and was later used by Portuguese navigators for long-distance travel. The origins of the caravel ship, used for long distance travel by the Portuguese after the beginning of their overseas expansion, in the 15th century, date back to the *qarib* used by explorers from Islamic Iberia in the 13th century.<sup>[67]</sup>

According to a controversial theory, explorers from Al-Andalus may have travelled to the Americas (see Pre-Columbian Andalusian-Americas contact theories).



The caravel seems to have been influenced by Muslim vessel designs.

### Medicine

Muslim physicians from Al-Andalus contributed significantly to the field of medicine, including the subjects of anatomy and physiology. Major figures of this period included Abu al-Qasim al-Zahrawi (Abulcasis), author of the *Kitab al-Tasrif* ("*Book of Concessions*"), a 30-volume medical encyclopedia, and Ibn Zuhr (Avenzoar), who made advances in surgery.

### Psychology and sociology

Abu al-Qasim (Abulcasis), the father of modern surgery, developed material and technical designs which are still used in neurosurgery. Ibn Zuhr (Avenzoar) gave the first accurate descriptions on neurological disorders, including meningitis, intracranial thrombophlebitis, and mediastinal germ cell tumors, and made contributions to modern neuropharmacology. Averroes suggested the existence of Parkinson's disease and attributed photoreceptor properties to the retina. Maimonides wrote about neuropsychiatric disorders and described rabies and belladonna intoxication.<sup>[68]</sup>

Said Al-Andalusi (1029–1070) stated that people in all corners of the world have a common origin but differ in certain aspects: "ethics, appearance, landscape and language". He treated the history of Egypt as part of the universal history of all humanity, and he linked Egypt and Sudan to the history of the Arabs through a common ancestry.<sup>[69]</sup> They linked ancient Egypt to Muslim history through Hajar (Hagar), the wife of Ibrahim (Abraham) and mother of Ismail (Ishmael), the patriarch of the Arabs,<sup>[69]</sup> thus making Hajar the mother of the Arabs.<sup>[69]</sup>

### Agriculture

As early as the 9th century, an essentially modern agricultural system became central to economic life and organization in the Arab caliphates, replacing the largely export-driven Roman model. It started with Zakat, an Islamic tax on large land holdings,<sup>[70]</sup> which slowly broke the land monopoly of the nobility that had smothered the rural economy for centuries.<sup>[71]</sup> Cities of the Near East, North Africa, and Moorish Spain were supported by elaborate agricultural systems which included extensive irrigation based on knowledge of hydraulic and hydrostatic principles, some of which were continued from Roman times.{Glick, Thomas (1996) *Irrigation and Hydraulic Systems* pp.10}

The introduction of new crops transforming private farming into a new global industry exported everywhere,<sup>[72]</sup> including Europe, where farming was mostly restricted to wheat strains obtained much earlier via central Asia. Spain received what she in turn transmitted to the rest of Europe; many agricultural and fruit-growing processes, together with many new plants, fruit and vegetables. These new crops included sugar cane, rice, citrus fruit, apricots, cotton, artichokes, aubergines, and saffron. Others, previously known, were further developed. Several were later exported from Spanish coastal areas to the Spanish colonies in the New World. Also transmitted via Muslim influence, a silk industry flourished, flax was cultivated and linen exported, and esparto grass, which grew wild in the more arid parts, was collected and turned into various articles.

The process of getting all of these new crops was not as easy as some might assume it was. It was difficult to take these new plants and fruits to the Iberian Peninsula and in some cases it was done illegally. Bringing them was difficult in many cases because there were specific varieties of plants that were not allowed to be removed from Muslim territories that people had to smuggle out; however, in the end this process proved very helpful to the Iberian peninsula. The economic implications were enormous. By having so many new crops people began to become more healthy and due to this there was a great economic upturn in this time.<sup>[73]</sup>



## Culture legacy

### Architecture

Muslim rulers introduced a characteristically Arabic architectural style, which by the end of their rule in Iberia included elements of Arabic, Byzantine, and Visigothic architecture. These features remained highly influential in the Iberian Peninsula long after the Reconquista. Some examples of the lasting architectural contributions under the taifa include the Great Mosque of Córdoba and the Cordoban palace estate al-Rustafa. Christians and Jews adopted Arabic architectural elements into their own churches and synagogues. This became known as the Mozarabic style. Mozarabic architecture included the absence of exterior decoration, diversity of floor plans, the use of the horseshoe arch in the Islamic style, and the use of the column as support, with a capital decorated with vegetable elements. Moorish styled architecture continued to be popular long after Muslim rule was pushed out of Spain by the Reconquista. Many Christian Cathedrals were built in the Moorish architectural style. The Spanish-Moorish artistic style, that is exemplified by the Sinagoga del Tránsito, became known as the Mudejar style. Arabic architectural elements were also incorporated in what would eventually become the Romanesque style in the 12th century. Presently, cities in the southern portion of Spain contain examples of all these architectural styles, all of which incorporate Arabesque elements.

### Cuisine

Restaurants in medieval Islamic Spain served three-course meals, which were introduced in the 9th century by Ziryab, who insisted that meals should be served in three separate courses consisting of soup, the main course, and dessert.<sup>[74]</sup>

### Linguistics and literature

In the 12th century, the Andalusian-Arabian philosopher and novelist Ibn Tufail (known as "Abubacer" or "Ebn Tophail" in the West) first demonstrated Avicenna's theory of tabula rasa as a thought experiment in his Arabic novel, *Hayy ibn Yaqzan*, in which he depicted the development of the mind of a feral child "from a tabula rasa to that of an adult, in complete isolation from society" on a desert island. The Latin translation of his work, titled *Philosophus Autodidactus*, published by Edward Pococke the Younger in 1671, had an influence on John Locke's formulation of tabula rasa in *An Essay Concerning Human Understanding*,<sup>[46]</sup> which went on to become one of the principal sources of empiricism in modern Western philosophy, and influenced many Enlightenment philosophers, such as David Hume and George Berkeley.

*Hadith Bayad wa Riyad* (*The Story of Bayad and Riyad*) was a 13th century Arabic love story written in Al-Andalus. The main characters of the tale are Bayad, a merchant's son and a foreigner from Damascus, and Riyad, a well educated girl in the court of an unnamed Hajib (vizier or minister) of Al-Andalus who is referred to as the lady. The *Hadith Bayad wa Riyad* manuscript is believed to be the only illustrated manuscript known to have survived from more than eight centuries of Muslim and Arab presence in Spain.

### Translations

Thanks to the Toledo School of Translators, established after Toledo was reconquered by the Christian forces in 1085,<sup>[75]</sup> the work of many Islamic scholars, that previously could have only be accessed by Muslims, especially in Al-Andalus and Islamic Sicily, finally found its way into European science. These scholars most translated new scientific and philosophical texts from Arabic into Latin.

One of the most productive translators in Castile was Gerard of Cremona, who translated 87 books from Arabic to Latin, including Muhammad ibn Mūsā al-Khwārizmī's *On Algebra and Almucabala*, Jabir ibn Aflah's *Elementa astronomica*,<sup>[76]</sup> al-Kindi's *On Optics*, Ahmad ibn Muhammad ibn Kathīr al-Farghānī's *On Elements of Astronomy on the Celestial Motions*, al-Farabi's *On the Classification of the Sciences*,<sup>[77]</sup> the chemical and medical works of Razi,<sup>[78]</sup> the works of Thabit ibn Qurra and Hunayn ibn Ishaq,<sup>[79]</sup> and the works of Arzachel, Jabir ibn Aflah, the

Banū Mūsā, Abū Kāmil Shujā ibn Aslam, Abu al-Qasim, and Ibn al-Haytham (including the *Book of Optics*).

With the fall of the Emirate of Granada in 1492, the scientific and technological initiative of the Islamic world was inherited by Europeans and laid the foundations for Europe's Renaissance and Scientific Revolution.<sup>[80]</sup>

## Music

A number of musical instruments used in classical music, particularly in Spanish music, are believed to have been derived from Arabic musical instruments used in Al-Andalus: the lute was derived from the *al'ud*, the rebec (ancestor of violin) from the *rebab*, the guitar from *qitara*, naker from *naqareh*, adufe from *al-duff*, alboka from *al-buq*, anafil from *al-nafir*, exabebe from *al-shabbaba* (flute), atabal (bass drum) from *al-tabl*, atambal from *al-tinbal*,<sup>[81]</sup> the balaban, the castanet from *kasatan*, sonajas de azófar from *sunuj al-sufr*, the conical bore wind instruments,<sup>[82]</sup> the xelami from the *sulami* or *fistula* (flute or musical pipe),<sup>[83]</sup> the shawm and dulzaina from the reed instruments *zamr* and *al-zurna*,<sup>[84]</sup> the gaita from the *ghaita*, rackett from *iraqya* or *iraqiyya*,<sup>[85]</sup> the harp and zither from the *qanun*, canon from *qanun*, geige (violin) from *ghichak*,<sup>[86]</sup> and the theorbo from the *tarab*.<sup>[87]</sup> It is also commonly acknowledged by flamenco performers that the vocal, instrumental, and dance elements of modern flamenco were greatly influenced by the Arab performing arts.



The lute was adopted from the Arab world. 1568 print.

## Pottery



Tin-glazed Hispano-Moresque ware with lusterware decoration, from Spain circa 1475.

Hispano-Moresque ware was a style of Islamic pottery created in Al-Andalus, after the Moors had introduced two ceramic techniques to Europe: glazing with an opaque white tin-glaze, and painting in metallic lusters. Hispano-Moresque ware was distinguished from the pottery of Christendom by the Islamic character of its decoration.<sup>[88]</sup>

The tin-glazing of ceramics was invented by Muslim potters in 8th century Basra, Iraq.<sup>[89]</sup> The earliest tin-glazed pottery thus appears to have been made in Iraq in the 9th century.<sup>[90]</sup> From there, it spread to Egypt, Persia and Iberian Peninsula, before reaching Italy in the Renaissance, Holland in the 16th century, and England, France and other European countries shortly after.

Lusterware was invented by Jābir ibn Hayyān, who applied it to ceramic glazes in the 8th century.<sup>[91]</sup> After the production of lusterware became popular in the Middle East, it spread to Europe—first to Al-Andalus, notably at Málaga, and then to Italy, where it was used to enhance maiolica.

An albarello is a type of maiolica earthenware jar originally designed to hold apothecaries' ointments and dry drugs. The development of this type of pharmacy jar had its roots in the Islamic Middle East. It was brought to Italy by Hispano-Moresque traders by the 15th century.

## Technology legacy

### Infrastructure

Industrial water mills were built in Al-Andalus between the 11th and 13th centuries. Fulling mills, steel mills, and other mills, spread from Al-Andalus to Christian Iberia by the 12th century.<sup>[92]</sup> The first windmills were built in Sistan, Afghanistan, sometime between the 7th century and 9th century, as described by Muslim geographers. These were horizontal axis windmills with rectangle shaped blades, geared to long vertical driveshafts.<sup>[93]</sup> These were introduced to Europe through Spain. The bridge mill was a unique type of water mill that was built as part of the superstructure of a bridge. The earliest record of a bridge mill is from Córdoba in the 12th century.<sup>[94]</sup> The first forge to be driven by a hydropowered water mill rather than manual labour, also known as a finery forge, was invented in 12th century Al-Andalus.<sup>[94]</sup> Stamp mills were used by miners in Samarkand from as early as 973. They were used in medieval Persia for the purpose of crushing ore. By the 11th century, stamp mills were in widespread use throughout the Islamic world, including Al-Andalus.<sup>[94]</sup>



The world's first vertical-axe windmills were built by Islamic engineers

Many Damdams (or dams), acequias, and qanat water supply systems, and "Tribunal of Waters" irrigation systems, were built during the Islamic Golden Age and are still in use today in Islamic countries and in formerly Islamic Provinces in Europe such as Sicily and the Iberian Peninsula, particularly in the Andalusia, Aragon and Valencia Provinces of Spain. The Arabic systems of irrigation and water distribution were later adopted in the Canary Islands and Americas due to the Spanish and are still used including in Texas, New Mexico, Mexico, Peru, and Chile.<sup>[95]</sup>

Muslim cities such as Córdoba had advanced domestic water systems with sanitary sewers, public baths, drinking fountains, piped drinking water supplies,<sup>[96]</sup> and widespread private and public toilet and bathing facilities.<sup>[97]</sup> The first street lamps were built in the Arab Empire,<sup>[98]</sup> especially in Córdoba, which also had the first facilities and waste containers for litter collection.<sup>[99]</sup>

### Aviation

In 9th century Al-Andalus, Abbas Ibn Firnas (Armen Firnas) invented a primitive version of the parachute.<sup>[100]</sup> <sup>[101]</sup> <sup>[102]</sup> <sup>[103]</sup> John H. Lienhard described it in *The Engines of Our Ingenuity* as follows:

"In 852, a new Caliph and a bizarre experiment: A daredevil named Armen Firman decided to fly off a tower in Cordova. He glided back to earth, using a huge winglike cloak to break his fall. He survived with minor injuries, and the young Ibn Firnas was there to see it."<sup>[104]</sup>

Ibn Firnas was also the first to make an attempt at controlled flight, as opposed to earlier gliding attempts in ancient China which were not controllable. Ibn Firnas manipulated the flight controls of his hang glider using two sets of artificial wings to adjust his altitude and to change his direction. He successfully returned to where he had lifted off from, but his landing was unsuccessful.<sup>[105]</sup> <sup>[106]</sup> According to Philip Hitti in *History of the Arabs*:

"Ibn Firnas was the first man in history to make a scientific attempt at flying."

Ibn Firnas' glider was possibly the first hang glider, though there were earlier instances of manned kites being used in ancient China. Knowledge of Firman and Firnas' flying machines spread to other parts of Europe from Arabic references.<sup>[100]</sup> <sup>[101]</sup> Ibn Firnas' hang glider was also the first to have artificial wings, though the flight was ultimately unsuccessful.

## Genetic Legacy of Muslim Rule

A number of studies have tried to find out the genetic impact of non-European Muslim populations on the modern Spanish and Portuguese populations, through comparison of genetic markers in Spain and Portugal with North Africa and the Near East.

## Footnotes

- [1] "Para los autores árabes medievales, el término Al-Andalus designa la totalidad de las zonas conquistadas — siquiera temporalmente — por tropas arabo-musulmanas en territorios actualmente pertenecientes a Portugal, España y Francia" ("For the medieval Arab authors, al-Andalus designates all the conquered areas — even temporarily — by Arab-Muslim troops in territories now belonging to Portugal, Spain and France"), José Ángel García de Cortázar, *V Semana de Estudios Medievales: Nájera, 1 al 5 de agosto de 1994*, Gobierno de La Rioja, Instituto de Estudios Riojanos, 1995, p.52.
- [2] "Los arabes y musulmanes de la Edad Media aplicaron el nombre de Al-andalus a todas aquellas tierras que habian formado parte del reino visigodo : la Peninsula Ibérica y la Septimania ultrapirenaica." ("The Arabs and Muslims from the Middle Ages used the name of al-Andalus to all those lands that were formerly part of the Visigothic kingdom: the Iberian Peninsula and Septimania"), Eloy Benito Ruano, *Tópicos y realidades de la Edad Media*, Real Academia de la Historia, 2000, p.79.
- [3] "Andalus, al-" *Oxford Dictionary of Islam*. John L. Esposito, Ed. Oxford University Press. 2003. Oxford Reference Online. Oxford University Press. Accessed 12 June 2006.
- [4] Joseph F. O'Callaghan, *A History of Medieval Spain*, Cornell University Press, 1983, p.142
- [5] Bossong 2002[online]:1
- [6] Bossong 2002
- [7] The village of Andaluz (41°31', -2°49') lies at the foot of Andaluz Mountain on the Duero River in the province of Soria, and within 10 km of it are the villages of Torreandaluz and Centenera de Andaluz. A brook named Andaluz is said to flow in the province of Guadalajara out of the Cueva de la Hoz ([http://www.andaduras.com/at\\_milagros.htm](http://www.andaduras.com/at_milagros.htm)) (41°00', -2°18'). Bossong[online]:10-11, but the coordinates given are according to Google Maps and differ slightly from those in Bossong.
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- [9] Bossong 2002[online]:2
- [10] Vallvé Bermejo, Joaquín. 1986. *The Territorial Divisions of Muslim Spain*. Madrid: CSIC ( Consejo Superior de Investigaciones Científicas (<http://www.csic.es>)).
- [11] Bossong[online]:3. The document in question is the Akhbar Majmu'a fi fath Al-Andalus, "Collection of traditions on the conquest of al-Andalus". It was published in Spanish translation in 1867 by Emilio Lafuente y Alcántara. Its subtitle indicates it dates from the 11th c., but several historians today say the 10th c. instead, during the rule of caliph 'Abd al-Rahman III.
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- [13] Richard Fletcher, "Moorish Spain", University of California Press, 2006, p.27
- [14] Franco Cardini, *Europe and Islam*, Wiley-Blackwell, 2001, p.9
- [15] Halm 1989:254
- [16] Roger Collins, "The Arab Conquest of Spain, 710-797", pp. 113-140 & 168-182.
- [17] Tertius Chandler. *Four Thousand Years of Urban Growth: An Historical Census* (1987), St. David's University Press ( etext.org ([http://www.etext.org/Politics/World.Systems/datasets/citypop/civilizations/citypops\\_2000BC-1988AD](http://www.etext.org/Politics/World.Systems/datasets/citypop/civilizations/citypops_2000BC-1988AD))). ISBN 0-88946-207-0.
- [18] Khaldun. *The Muqaddimah*
- [19] *Islamic and Christian Spain in the Early Middle Ages*. Chapter 5: Ethnic Relations (<http://libro.uca.edu/ics/ics5.htm>), Thomas F. Glick
- [20] "The rate of conversion is slow until the tenth century (less than one-quarter of the eventual total number of converts had been converted); the explosive period coincides closely with the reign of 'Abd al-Rahmdn III (912-961); the process is completed (eighty percent converted) by around 1100. The curve, moreover, makes possible a reasonable estimate of the religious distribution of the population. Assuming that there were seven million Hispano-Romans in the peninsula in 711 and that the numbers of this segment of the population remained level through the eleventh century (with population growth balancing out Christian migration to the north), then by 912 there would have been approximately 2.8 million indigenous Muslims (muwalladûn) plus Arabs and Berbers. At this point Christians still vastly outnumbered Muslims. By 1100, however, the number of indigenous Muslims would have risen to a majority of 5.6 million.", *Islamic and Christian Spain in the Early Middle Ages*. Chapter 1: At the crossroads of civilization (<http://libro.uca.edu/ics/ics1.htm>), Thomas F. Glick
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