AHST 2331-001 (21573)
Understanding Art
Dr. Charissa N. Terranova
Spring 2019
Tuesdays and Thursdays 11:30-12:45
ATC 1.102

Tuesday February 12, 2019
Mosque of Cordoba: Spolia and Repetition of Forms

- Palimpsest
- Adaptive Reuse
- The tides of time
- The sublimity of time
- Andalusia
- Moorish Math
- Spolia
- Accretive development
- Romans
- Visigoths
- Umayyad (or Omayyad) Caliphate

The Mosque–Cathedral of Córdoba, also known as the Great Mosque of Córdoba (in Spanish, Mezquita de Córdoba), whose ecclesiastical name is the Cathedral of Our Lady of the Assumption, is the Catholic cathedral of the Diocese of Corodoba dedicated to the Assumption of the Virgin Mary and located in the Spanish region of Andalusia.

Temple/Church/Mosque/Church

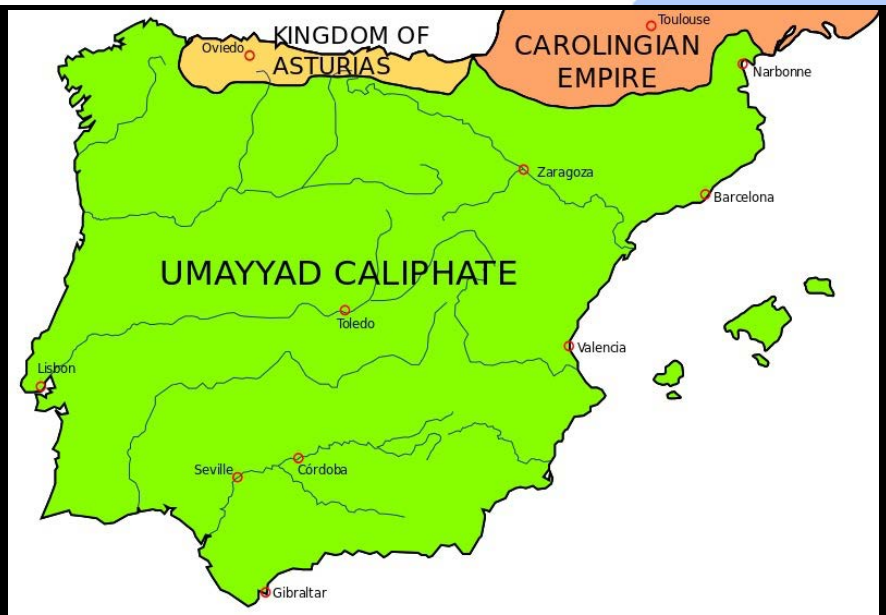
ARCHITECTURAL PALIMPSEST

RELIGIOUS PALIMPSEST

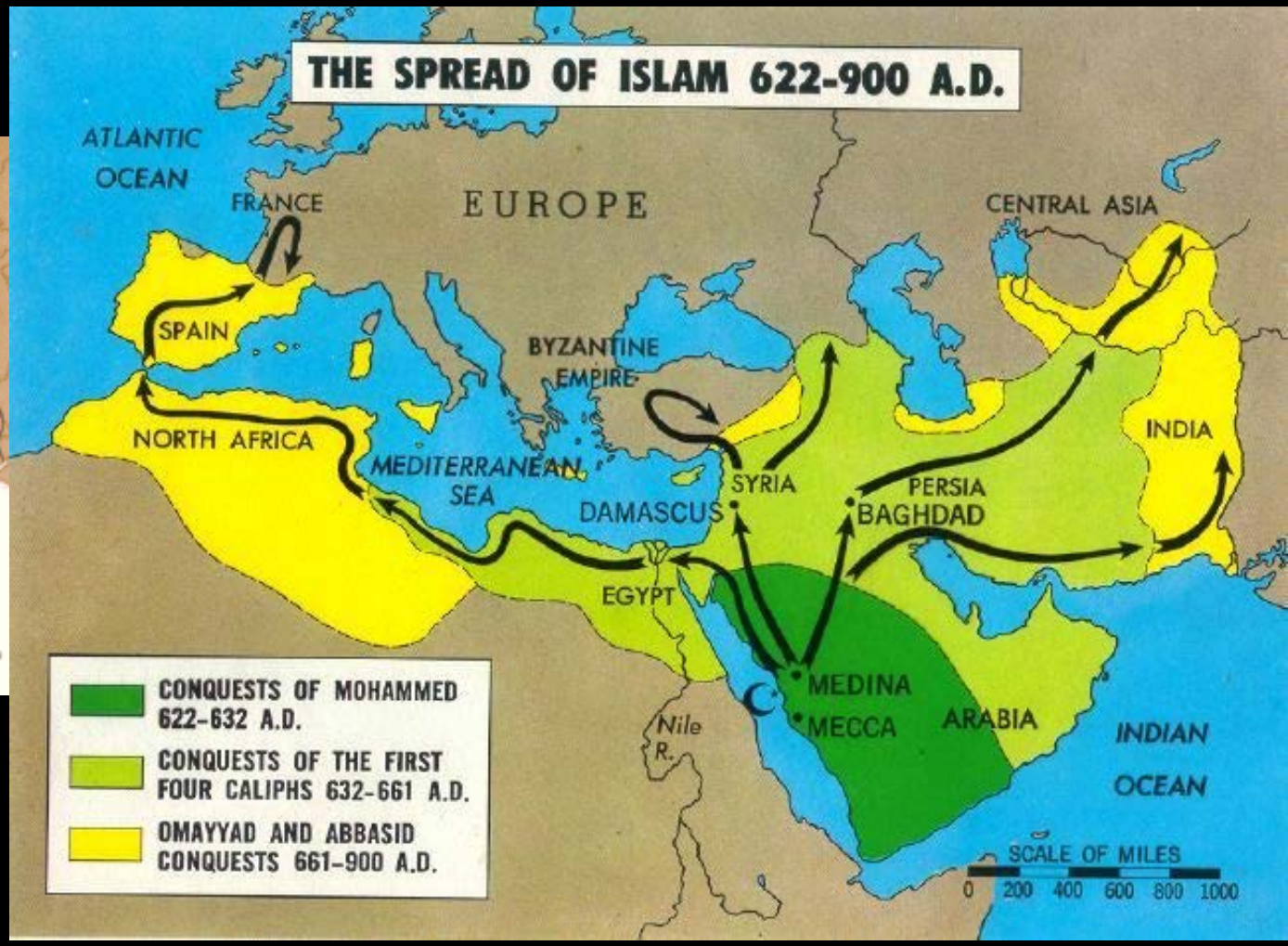
Umayyad Caliphate 8th Century

Mosque of Córdoba, 987 CE

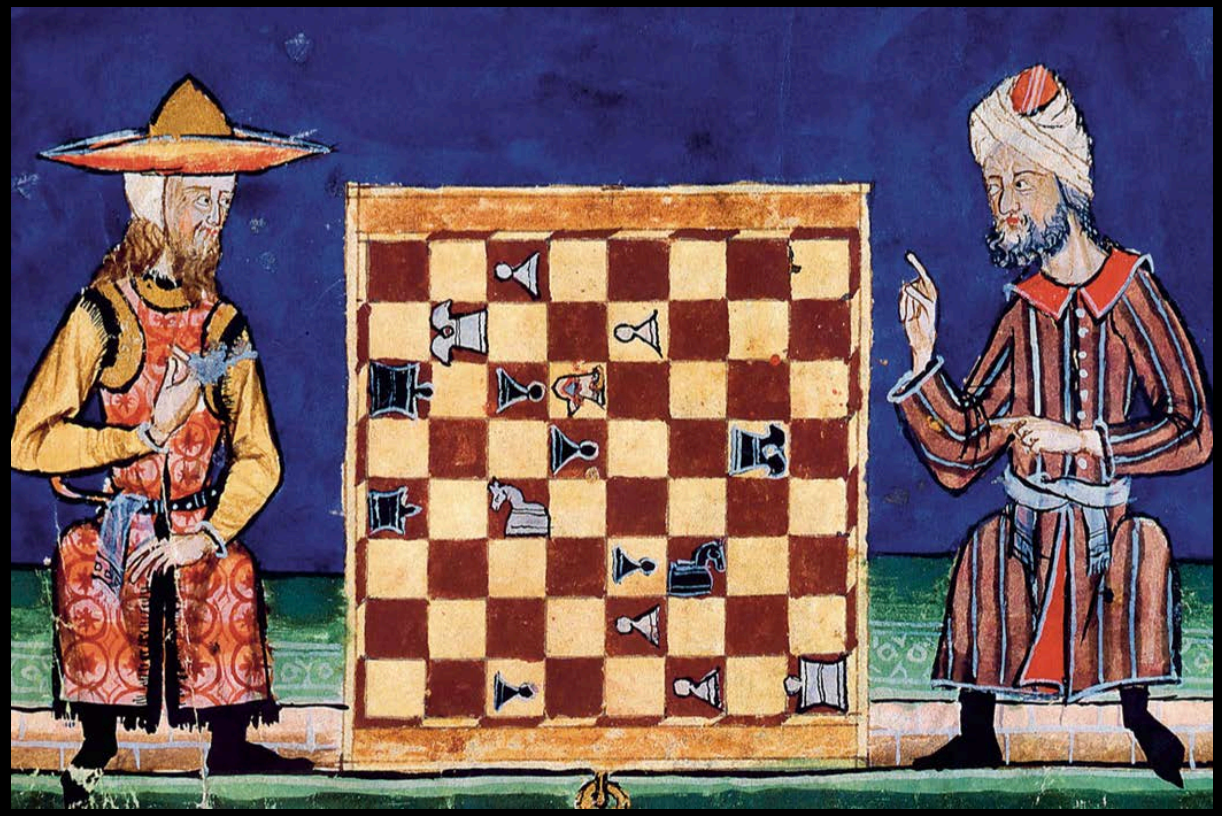
The Great Mosque of Cordoba was the most important public project of Abd al Rahman I the last surviving Umayyad. Córdoba was the capital of the Spanish Muslim dynasty of the Ummayads (756-1031). Cordoba's period of greatest glory began in the 8th century after the Moorish conquest, when some 300 mosques and innumerable palaces and public buildings were built to rival the splendors of Constantinople, Damascus and Baghdad. In the 13th century, under Ferdinand III, the Saint, Cordoba's Great Mosque was turned into a cathedral and new defensive structures were erected. The cathedral at the center of the mosque was built in the 16th century.



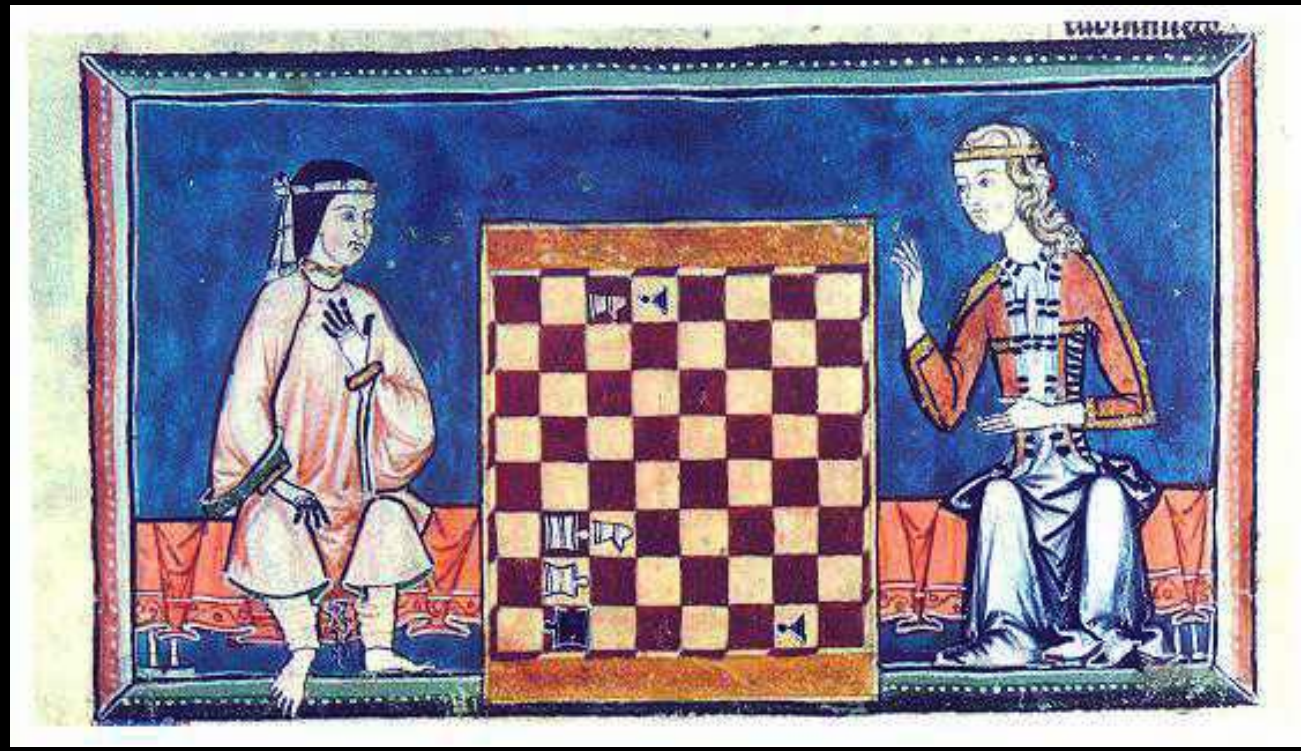

Age of the Caliphs
Expansion under the Prophet Mohammad, 622-632
Additions during the Patriarchal Caliphate, 632-661
Additions during the Umayyad Caliphate, 661-750
Peripheral peoples
Present international boundary
BYZANTINE EMPIRE
ISLAMIC CALIPHATE
Mediterranean Sea
Black Sea
Caspian Sea
Arabian Sea
Red Sea
KINGDOM OF DONGOLA


THE SPREAD OF ISLAM 622-900 A.D.
ATLANTIC OCEAN
EUROPE
FRANCE
SPAIN
NORTH AFRICA
MEDITERRANEAN SEA
BYZANTINE EMPIRE
CENTRAL ASIA
INDIA
PERSIA
BAGHDAD
SYRIA
DAMASCUS
EGYPT
MEDINA
MECCA
ARABIA
Nile R.
INDIAN OCEAN
CONQUESTS OF MOHAMMED 622-632 A.D.
CONQUESTS OF THE FIRST FOUR CALIPHS 632-661 A.D.
OMAYYAD AND ABBASID CONQUESTS 661-900 A.D.
SCALE OF MILES
0 200 400 600 800 1000

Medieval Convivencia [711 to 1492], is a period of Arab domination and intellectual ferment in Spain. The concept of Convivencia refers to the way in which Christians, Muslims and Jews lived together in Medieval Iberia, or Spain.



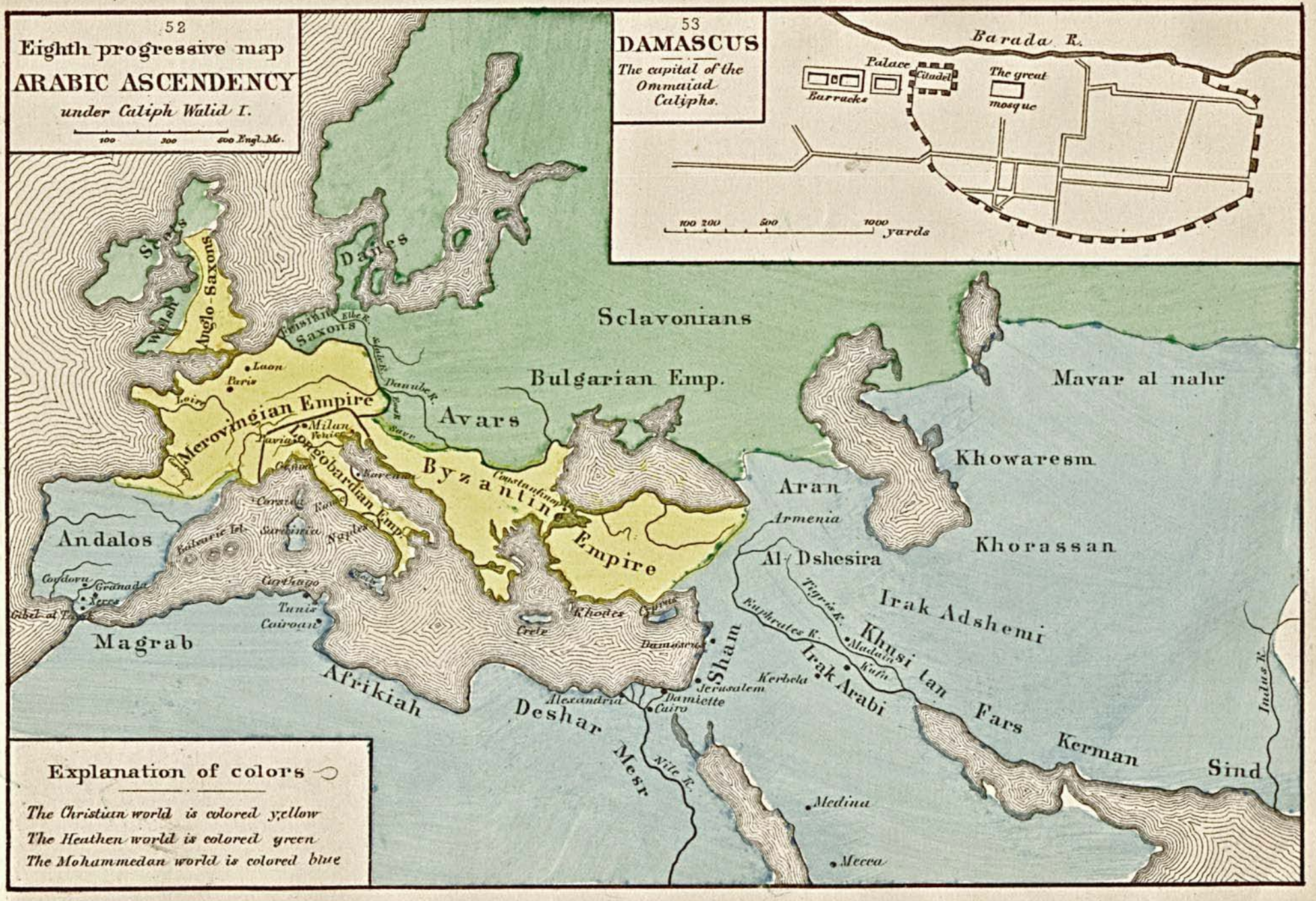
A Jew and a Muslim playing chess, The Book of Games, commissioned by Alphonse X of Castile, thirteenth century.



Muslim and Christian women play chess. The Book of Games, commissioned by Alphonse X of Castile, thirteenth century.


Roman Empire ca. A.D. 180
North Sea
Atlantic Ocean
Black Sea
Mediterranean Sea
BRITANNIA INFERIOR
BRITANNIA SUPERIOR
Londinium
GERMANIA
GERMANIA INFERIOR
Augusta Treverorum
GERMANIA SUPERIOR
Lutetia (Paris)
BELGICA
LUGDUNENSIS
RAETIA
NORICUM
Vindobona
PANNONIA SUPERIOR
PANNONIA INFERIOR
DACIA
Sarmizegetusa
Sinope
ARMENIA
ALPES PENNINAE
Aquileia
Sirmium
MOESIA INFERIOR
MOESIA SUPERIOR
Byzantium (Constantinople)
BITHYNIA AND PONTUS
CAPPADOCIA
COMMAGENE
Lugdunum
ALPES COTTIAE
Mediolanum
ILLYRICUM
THRACIA
GALATIA
AQUITANIA
Burdigala
Nemausus (Nîmes)
NARBONENSIS
ALPES MARITIMAE
Genua
ITALIA
Tarsus
SYRIA
Antiochia
ASIA
PAMPHYLIA
CILICIA
Tolosa
Massilia
Narbo
Roma
MACEDONIA
Ephesus
LYCIA
Damascus
CYPRUS
CORSICA
Capua
Pompeii
Neapolis
Tarentum
EPIRUS
Athenae
Corinthus
ACHAEA
TARRACONENSIS
Caesaraugusta
Tarraco
SARDINIA
JUDAEA
Hierosolyma (Jerusalem)
LUSITANIA
Toletum
Saguntum
BALEARIC IS.
CRETE
SICILY
Syracusae
Emerita Augusta
Corduba
BAETICA
Carthago Nova
Carthago
Alexandria
ARABIA
Memphis
Caesarea
Cirta
Gades
Cyrene
NUMIDIA
MAURETANIA
CYRENAICA
AEGYPTUS
AFRICA


ATLANTIC OCEAN
KINGDOM OF THE FRANKS
OSTROGOTHS
Milan
Po R.
Rhône R.
Ravenna
Massilia
Spalato
Sirmium
Danube R.
Cherson
BLACK SEA
CASPIAN SEA
Trebizond
KINGDOM OF THE VISIGOTHS
Toledo
Cordova
Rome
Taranto
Thessalonica
Constantinople
Ankara
ANATOLIA
Iconium
Athens
Edessa
Nineveh
Tigris R.
DOMINIONS OF THE SASSANIDS
Antioch
Euphrates R.
Ctesiphon
MEDITERRANEAN SEA
Carthage
Syracuse
Damascus
PERSIA
Jerusalem
Yarmuk R.
Yarmuk
Alexandria
ARABIA
Nile R.
THE BYZANTINE EMPIRE UNDER JUSTINIAN
Empire at his accession, 527
Empire at his death, 565
0
200
400
MILES



"*The Eighth Progressive Map: Arabic Ascendency*"; From "An Historical Atlas Containing a Chronological Series of One Hundred and Four Maps, at Successive Periods, from the Dawn of History to the Present Day." by Robert H. Labberton. Sixth Edition. 1884.

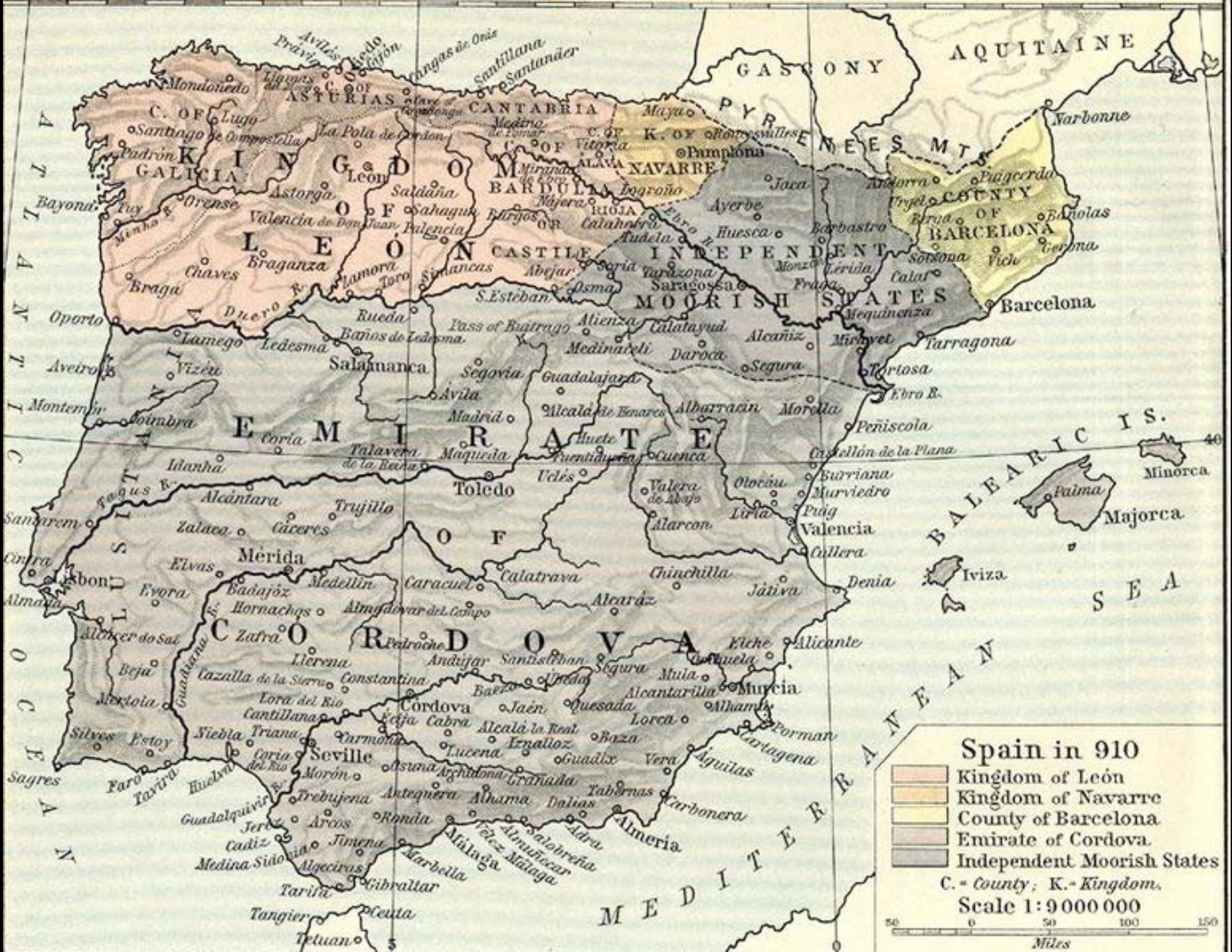
This map illustrates the immense territorial expansion of the Islamic Empire that took place under Al-Walid I, who ruled from 705-715 C.E. during the Umayyad Caliphate. This period is often considered to be the “Arab Golden Age” and this assertion is certainly true from the standpoint of geographical extent; even the Ottoman Empire did not equal the Umayyad Caliphate in size.

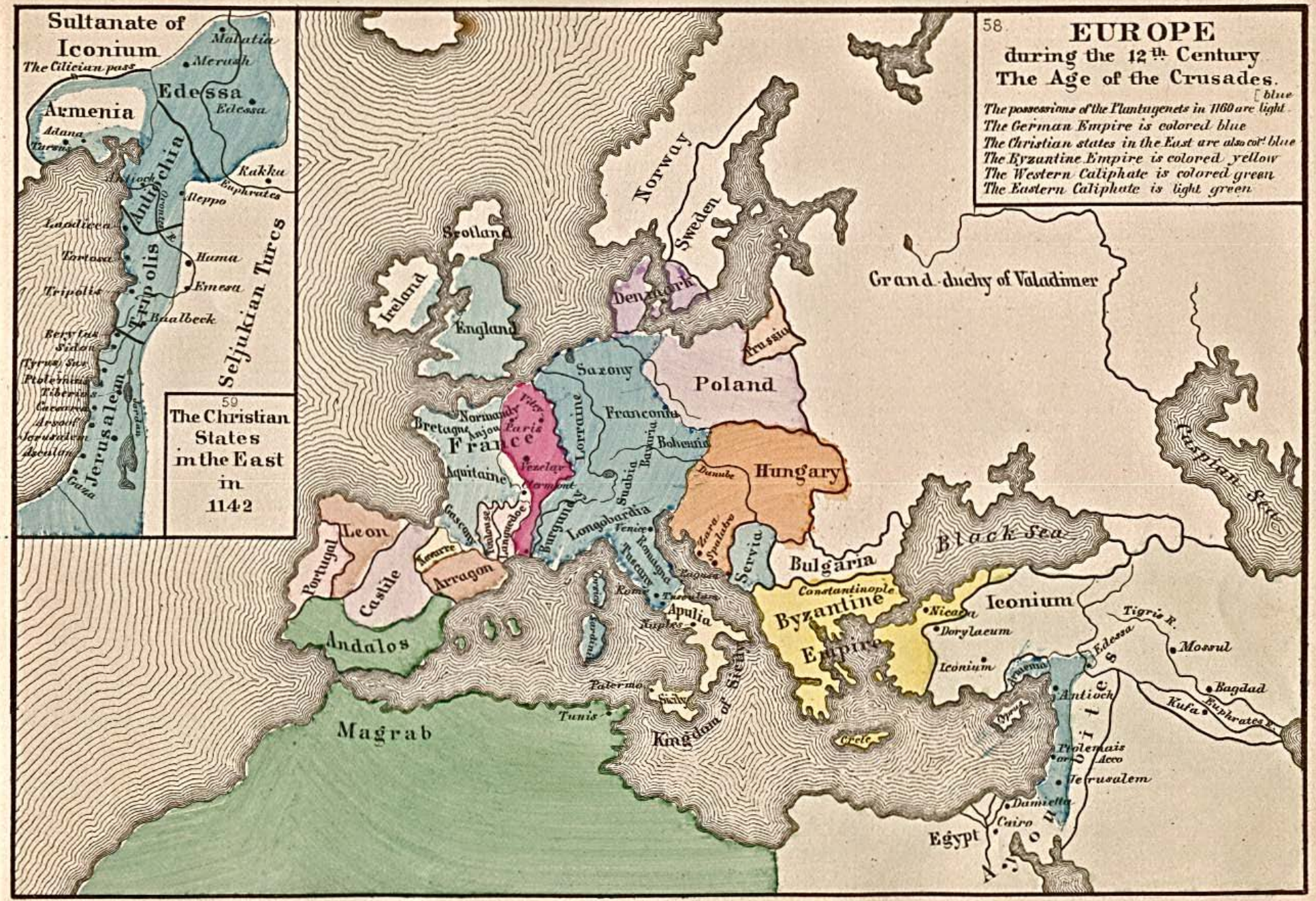
Thus, we are given a view of the geo-political power dynamics of the early eighth century.

NOTE:

- Europe hedged in by tribes from the North
- Surrounding Islamic empire


EUROPE
at the death of
Charlemagne
814
NORTHMEN
Finnish Tribes
Bashkirs
White Bulgarians
Novgorod
Morduines
Turkish Tribes
Petcheneges
Swedes & Goths
Baltic Sea
ESTHLAND
North Sea
Picts
Scots
Strad Clud
Northumbria
Ireland
Jutland
DANES
Pomore Wends
Pruzzi
SLAVONIC TRIBES
KINGDOM of the CHAZARS
Caspian Sea
Welsh
Mercia
England
East Anglia
Middlesex
Lundenwic
Kent
Sussex
West Welsh
Wessex
Frisia
Saxonia
Wiltzes
Poles
Kiev
R. Dnieper
Atelcusu
Land of the Turks (Magyars)
Tournais
Aux la Chapelle
Cologne
Mainz
Serbs
Bohemia
Czechi
Austria
Soissons
Rouen
Paris
Riems
Verdun
Chalons
Metz
Alsatia
Strasburg
Bavaria
Vienna
Britannia
Neustria
Orleans
Tours
Alemannia
FRANKISH EMPIRE
Alania
Iberia
Albania
Poitiers
Autun
Rinetia
Carinthia
Chalons
Lyons
Vienne
Burgundi
R. Rhone
Aquitania
Milan
Verona
Venice
Pavia
Ravenna
Chrobatia
FIRST BULGARIAN EMPIRE
Euxine or Black Sea
R. Danube
Bordeaux
Oviedo
Gallicia
Kingdom of Asturias
Eauze
Vasconia
(in rebellion)
Toulouse
Gothia
Arles
Genoa
ITALY
Florence
Ancona
Servia
Dalmatia
Adriatic Sea
Serdica
Thrace
Armenia
Armeniacs
Constantinople
Hadrianopolis
Macedonia
Thessalonica
Pamplona
Marca Hispanica
Narbonne
Marseilles
Corsica
Rome
Duchy of Beneventum
Naples
Opsikion
Anatolics
Jazira
Thughur
Aleppo
R. Euphrates
Saragossa
Barcelona
Lisbon
Toledo
Minorca
Majorca
Ibiza
Emirate of Cordova
Cordova
Xeres
Carthagena
Sardinia
Thracesians
Cibyrrhaeots
Cephallenia
Heglas
Athens
Peloponnesus
Antioch
Emesa
Syria
Damascus
Jerusalem
CALIPHATE OF THE ABBASIDS
MEDITERRANEAN SEA
Sicily
EAST ROMAN EMPIRE
Cyprus
Crete
Tunis
Rustamids
Aghlabids


Spain in 910
Kingdom of León
Kingdom of Navarre
County of Barcelona
Emirate of Cordova
Independent Moorish States
C. = County; K. = Kingdom.
Scale 1:9 000 000
Miles
AQUITAINE
GASCONY
PYRENEES MTS
KINGDOM OF LEÓN
GALICIA
ASTURIAS
CANTABRIA
CASTILE
K. OF NAVARRE
COUNTY OF BARCELONA
INDEPENDENT MOORISH STATES
EMIRATE OF CORDOVA
ATLANTIC OCEAN
MEDITERRANEAN SEA
BALEARIC IS.
Minorca
Majorca
Iviza
Narbonne
Barcelona
Tarragona
Tortosa
Valencia
Toledo
Mérida
Cordova
Seville
Granada
Almería
Murcia
Salamanca
Pamplona
Saragossa
Oporto
Lisbon
Gibraltar
Tangier
Ceuta


58
EUROPE
during the 12th Century
The Age of the Crusades.
The possessions of the Plantagenets in 1160 are light blue
The German Empire is colored blue
The Christian states in the East are also col.d blue
The Byzantine Empire is colored yellow
The Western Caliphate is colored green
The Eastern Caliphate is light green
Sultanate of Iconium
Malatia
Merush
The Cilician pass
Edessa
Edessa
Armenia
Adana
Tarsus
Rakka
Euphrates
Aleppo
Antiochia
Seljukian Turcs
Laodicea
Tortosa
Huma
Emesa
Tripolis
Tripolis
Baalbeck
Berytus
Sidon
(Tyrus) Sur
Ptolemais
Tiberias
Caesarea
Arsouf
Jerusalem
Jordan
Ascalon
Gaza
59
The Christian States in the East in 1142
Norway
Sweden
Scotland
Ireland
England
Denmark
Grand duchy of Valadimer
Prussia
Saxony
Poland
Normandy
Paris
Bretagne
Anjou
France
Lorraine
Franconia
Bavaria
Bohemia
Aquitaine
Vezelay
Clermont
Swabia
Danube
Hungary
Caspian Sea
Burgundy
Longobardia
Venice
Gascony
Toulouse
Leon
Portugal
Castile
Navarre
Arragon
Ravenna
Tuscany
Rome
Apulia
Naples
Zara
Spalatro
Ragusa
Servia
Bulgaria
Black Sea
Constantinople
Byzantine Empire
Iconium
Nicaea
Dorylaeum
Iconium
Andalos
Palermo
Sicily
Kingdom of Sicily
Tunis
Magrab
Crete
Tigris R.
Mossul
Edessa
Bagdad
Kufa
Euphrates R.
Antioch
Syria
Ptolemais or Acco
Jerusalem
Damietta
Cairo
Egypt
Arabia


SPAIN
Political Map
LEGEND
International Boundary
Autonomous Community Boundary
National Capital
Autonomous Communities Capital
Other City
Bay of Biscay
FRANCE
A Coruña
Santiago de Compostela
GALICIA
ASTURIAS
Oviedo
Santander
CANTABRIA
BASQUE COUNTRY
Donostia-San Sebastián
Bilbao
León
Vitoria-Gasteiz
Pamplona
Logroño
NAVARRA
LA RIOJA
Burgos
ANDORRA
Valladolid
CASTILE AND LEÓN
Zaragoza
CATALONIA
Salamanca
ARAGON
Barcelona
PORTUGAL
MADRID
Madrid
Balearic Sea
Sant Carles de la Ràpita
Toledo
EXTREMADURA
CASTILE LA MANCHA
Badajoz
Merida
Valencia
Mallorca
Menorca
Palma de Mallorca
Mahón
VALENCIA
Ibiza
Ibiza
BALEARIC ISLANDS
Cordoba
Huelva
Seville
Jaén
MURCIA
Alicante
Murcia
ANDALUSIA
CANARY IS.
Santa Cruz de Tenerife
Granada
Las Palmas
ATLANTIC OCEAN
Cádiz
Málaga
Mediterranean Sea
GIBRALTAR (U.K.)
Strait of Gibraltar
CEUTA
MELILLA
0 50 100 Km
0 25 50 Miles
Note : Melilla & Ceuta are Autonomous Cities of Spain
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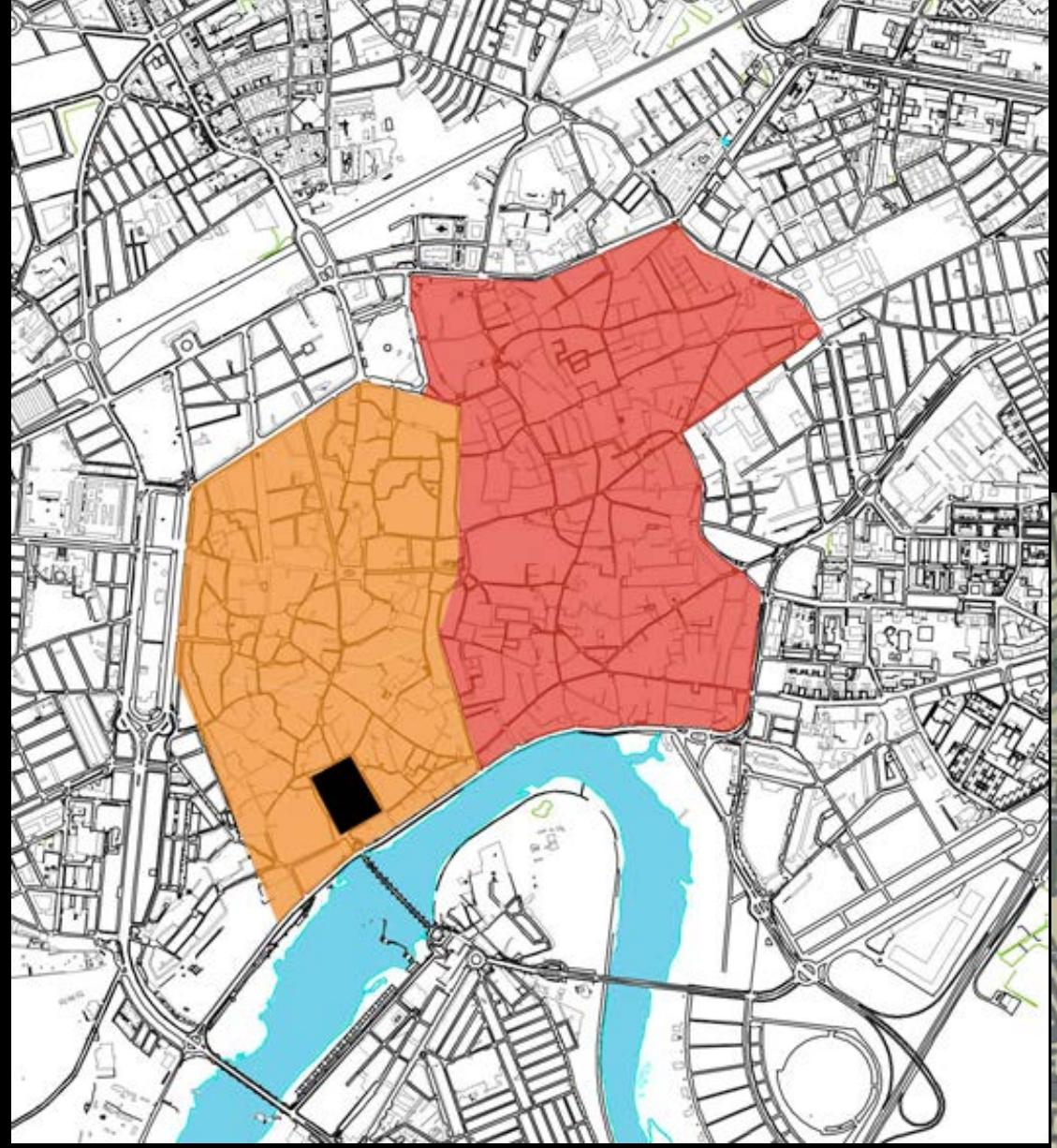
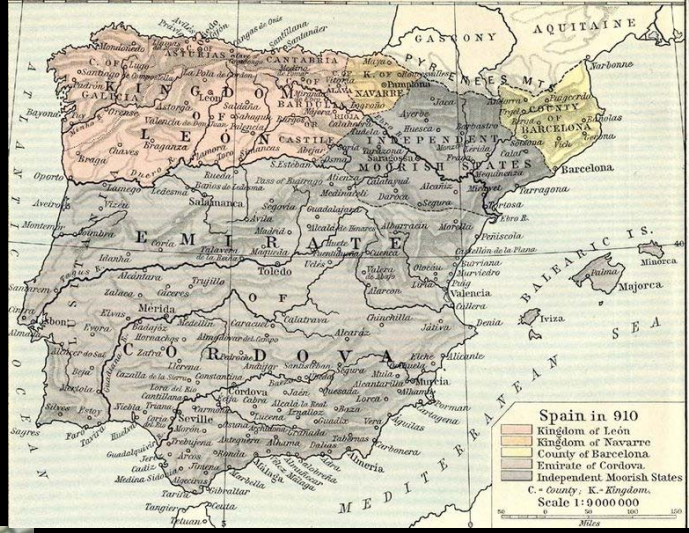
(Updated on 17th October, 2014)



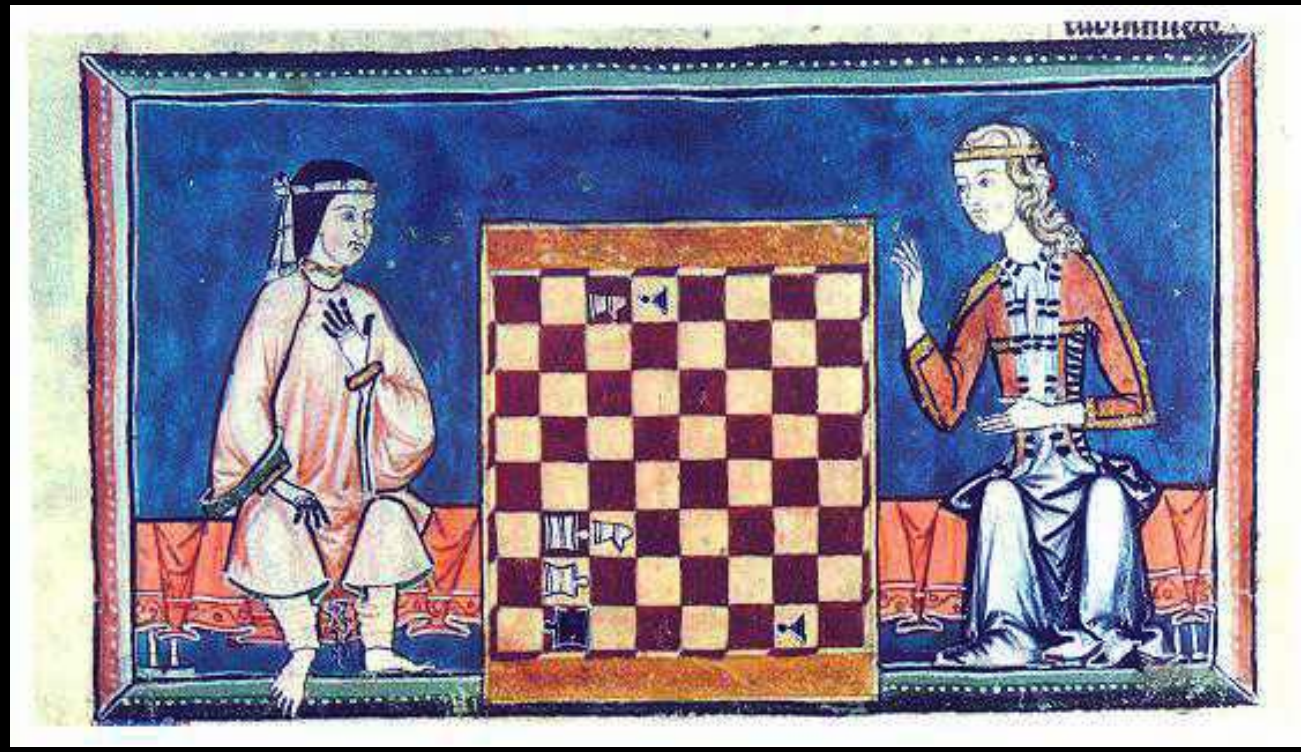
Orange: limits of roman city
Red: Muslim enlargements
Black: Great Mosque



By 800 Cordoba supported over 200,000 residents. During the apogee of the caliphate (1000 AD), Córdoba had a population of about 500,000 inhabitants. In the 10th and 11th centuries Córdoba was one of the most advanced cities in the world, and a great cultural, political, financial and economic center. The Great Mosque of Cordoba dates back to this time.

Medieval Convivencia [711 to 1492], is a period of Arab domination and intellectual ferment in Spain. The concept of Convivencia refers to the way in which Christians, Muslims and Jews lived together in Medieval Iberia, or Spain.

The economy of the caliphate was diverse and successful, with trade predominating. Muslim trade routes connected al-Andalus with the outside world via the Mediterranean. Industries revitalized during the caliphate included textiles, ceramics, glassware, metalwork, and agriculture. The Arabs introduced crops such as rice, watermelon, banana, eggplant and hard wheat. Fields were irrigated with water wheels.



Muslim and Christian women play chess. The Book of Games, commissioned by Alphonse X of Castile, thirteenth century.

Cosmopolitan Cordoba

Ziryab was Chief Entertainer of the Court of Cordoba in 822 CE and started a musical conservatory. He revolutionized medieval music, lifestyle, fashion, hairstyles, furniture and even tableware. He transformed the way people ate, socialized, and relaxed. Born 789 AD, Ziryab was a significant personality in Islamic culture but remains anonymous in European history in spite of his single-handedness in laying down the groundwork for traditional Spanish music. He was an educated North African slave.

Cosmopolitan Cordoba

The caliphate had an ethnically, culturally, and religiously diverse society. A minority of ethnic Muslims of Arab descent occupied the priestly and ruling positions, another Muslim minority were primarily soldiers and native Hispano-Gothic converts (who comprised most of the Muslim minority) were found throughout society. Jews comprised about ten percent of the population: little more numerous than the Arabs and about equal in numbers to the Berbers. They were primarily involved in business and intellectual occupations. The indigenous Christian majority were Catholic Christians of the Visigothic rite, who spoke a variant of Latin close to Spanish or Portuguese with an Arabic influence. The Christians were the lower strata of society, heavily taxed with few civil rights and culturally influenced by the Muslims.


Puerta de Almodóvar
14
15
16
17
18
13
11
12
Pl. Benavente
Pl. Card Salazar
Pl. Maimónides
Pl. Judá Leví
Mezquita Catedral
Pta. del Puente
Pl. la Concha
Buen Pastor
La Hoguera
Judería
Cardenal Herrero
Encarnación
Rey
Heredia
Luque
Romero
Almanzor
Fernández Ruano
Torres
Cairuán
S. Vicente de Paúl
Drr. S. Ochoa
Dtr. B. Soler
M.V. Iglesias
Doctor Fleming
Dtr. J. Díaz
Doctor Marañón
Doctor Barraquer
Terrones
M. Roa
Caballerizas Reales
Amador de los Ríos
Campo Santo de los Mártires
Tomás Conde
Manríquez
Torrijos
Magistral Glez. Francés
M. Rucker
Caldereros
Deanes
Puente Romano
1
2
5
6
7
8
9
10
19
20
21

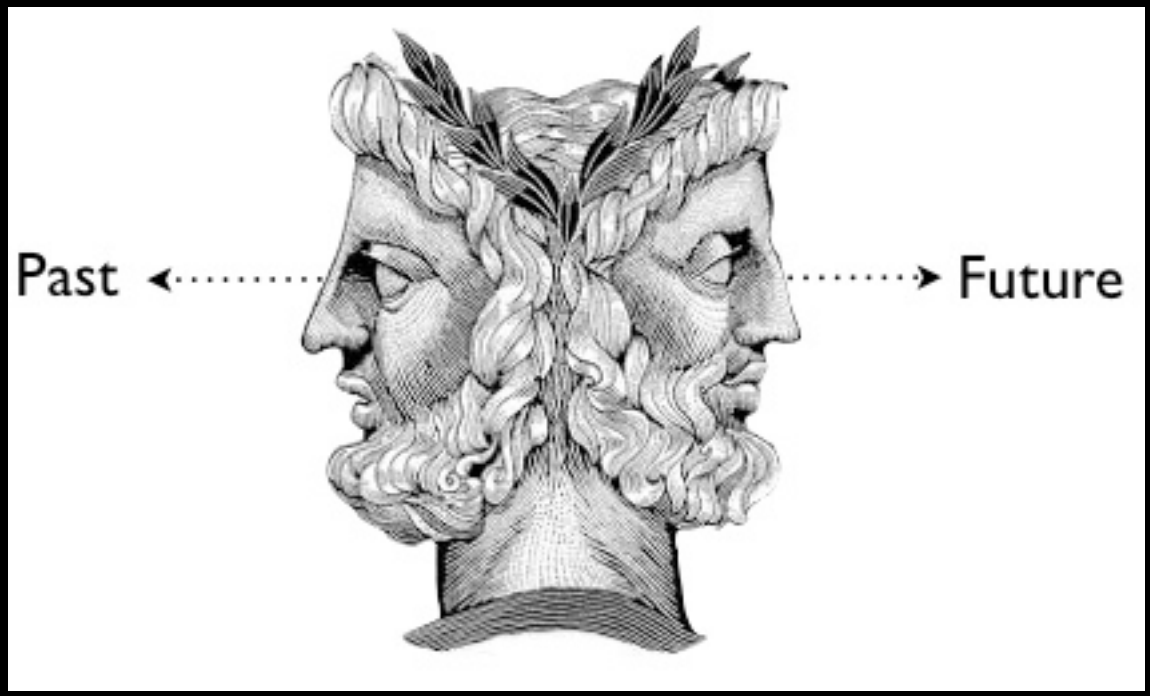

Moorish walls
La Axerquia
Roman Walls
La Medina
La Villa
Christian Walls

Guadalquivir River: Its name comes from the Arabic wadi al-kabir, meaning “great river”, and it is 408 miles long.

TEMPLE

THE GUADALQUIVIR RIVER ON THE ANCIENT ROMAN BRIDGE: Cordoba is an ancient dwelling place, settled long before the Romans built their monumental city.

MASSIVE GATEWAY TO HONOR THE ROMAN GOD JANUS: The Romans built their temple to Janus, the god of beginnings and endings and doorways, near this ancient doorway opposite the bridge on the mighty Guadalquivir.



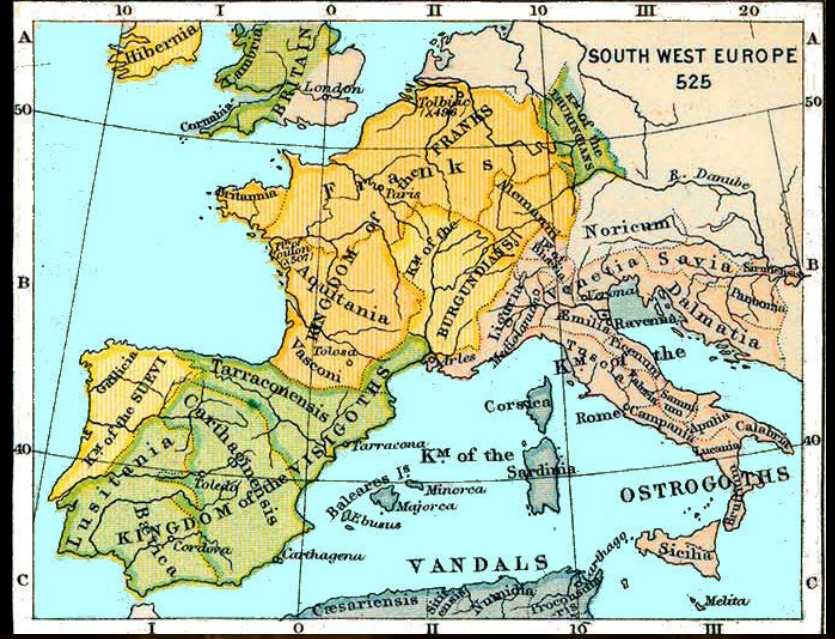
In ancient Roman religion and mythology, Janus is the god of beginnings and transitions, thence also of gates, doors, doorways, endings and time. He is usually a two-faced god since he looks to the future and the past. The Romans dedicated the month of January to Janus. His most apparent remnant in modern culture is his namesake, the month of January.

CHURCH

The Basilica of Saint Vincent the Martyr was the original seed that was later transformed into the Umayyad Mosque, as the Moors built the original Alhama Mosque over its foundations. It is estimated that the church was built in the mid-6th century and subsequently became the main place of worship for Christians in the city. After the Saracen invasion of Cordoba, Muslims needed a place to pray and worship, so they came to an agreement with the local Christians to share the temple. It was decided that they would respect the sanctity of the original church while, in return, the Catholic congregation would pay a certain amount in tributes. Towards the end of the reign of Abd ar-Rahman I, the need to extend the Alhama Mosque became apparent due to an increase in size of the Omeyan city of Cordova, which led to the need of a more spacious temple in order to satisfy the spiritual needs of the Muslim community.

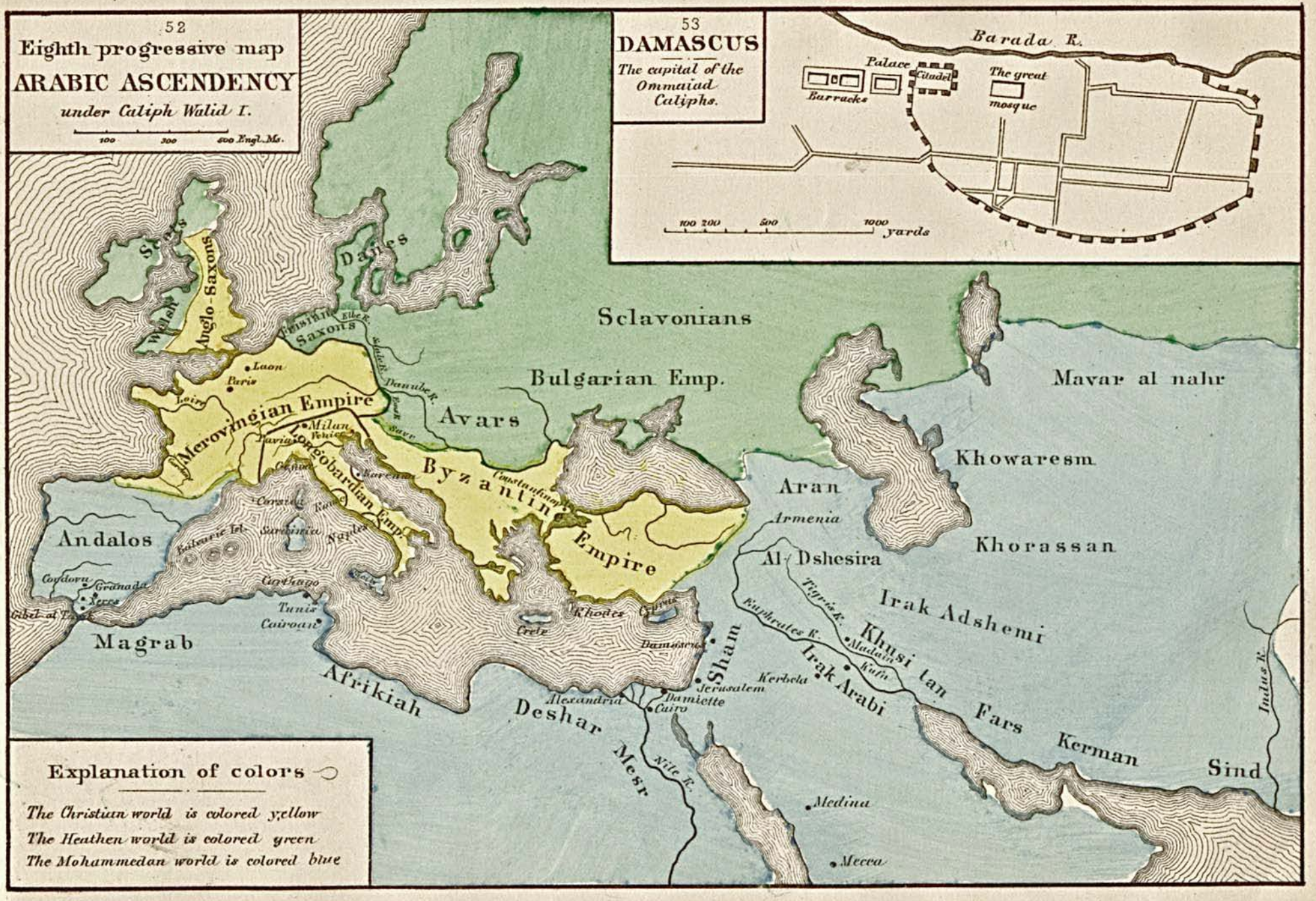
Right: Map of Visigothic Kingdom, 525

Below: Visigothic pieces from San Vicente in the Great Mosque of Córdoba, 6th-8th c.



MOSQUE

Left: Hypostyle hall: The **hypostyle hall** was a large room with columns.
Below: Map of Andalusia in 10th c.



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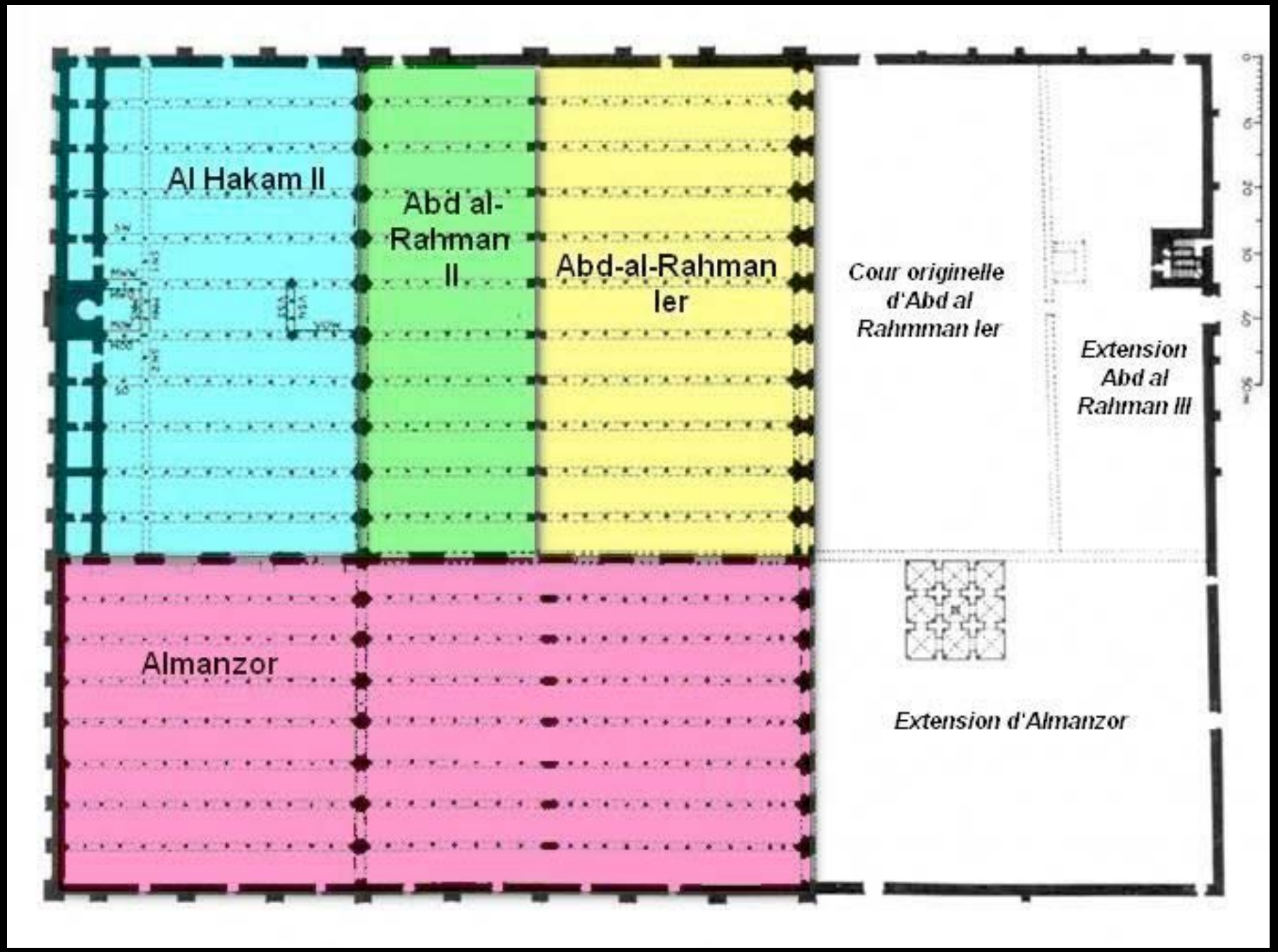
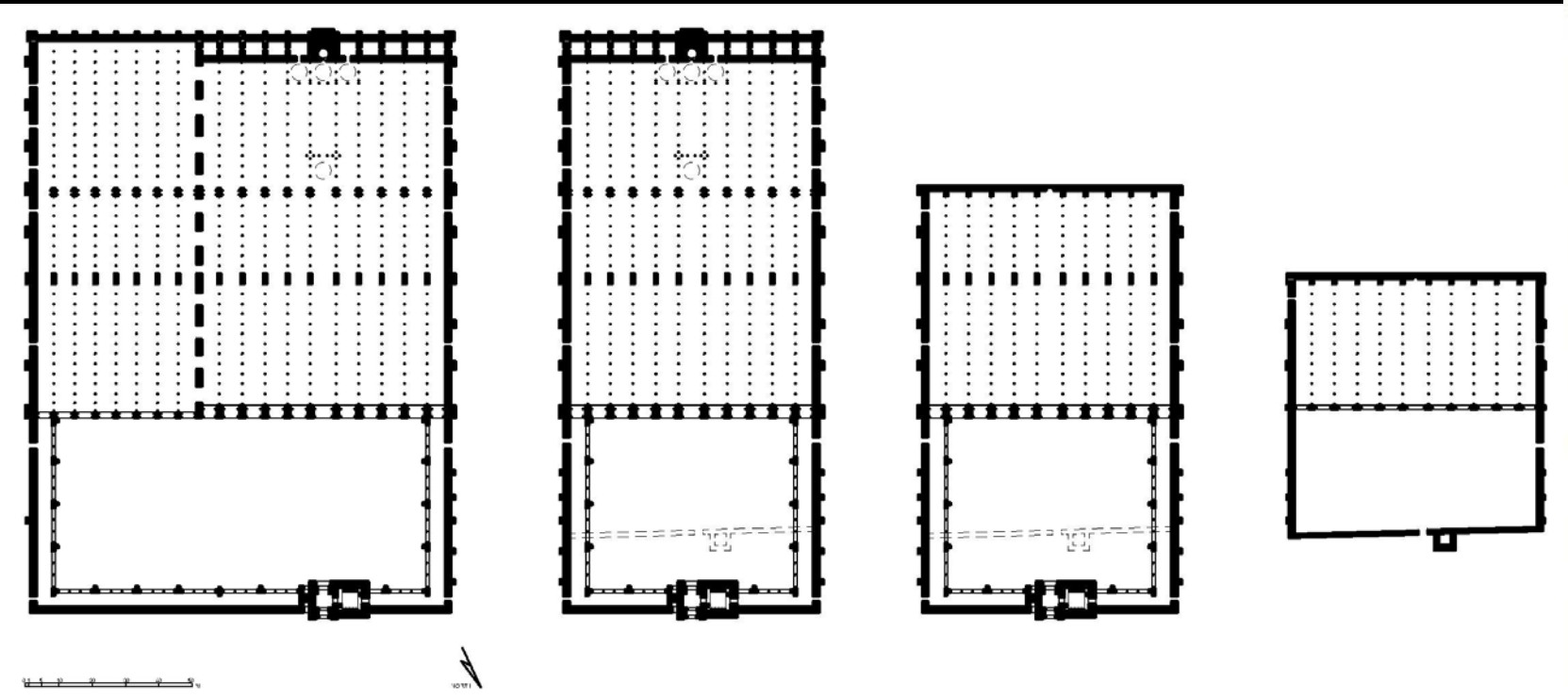
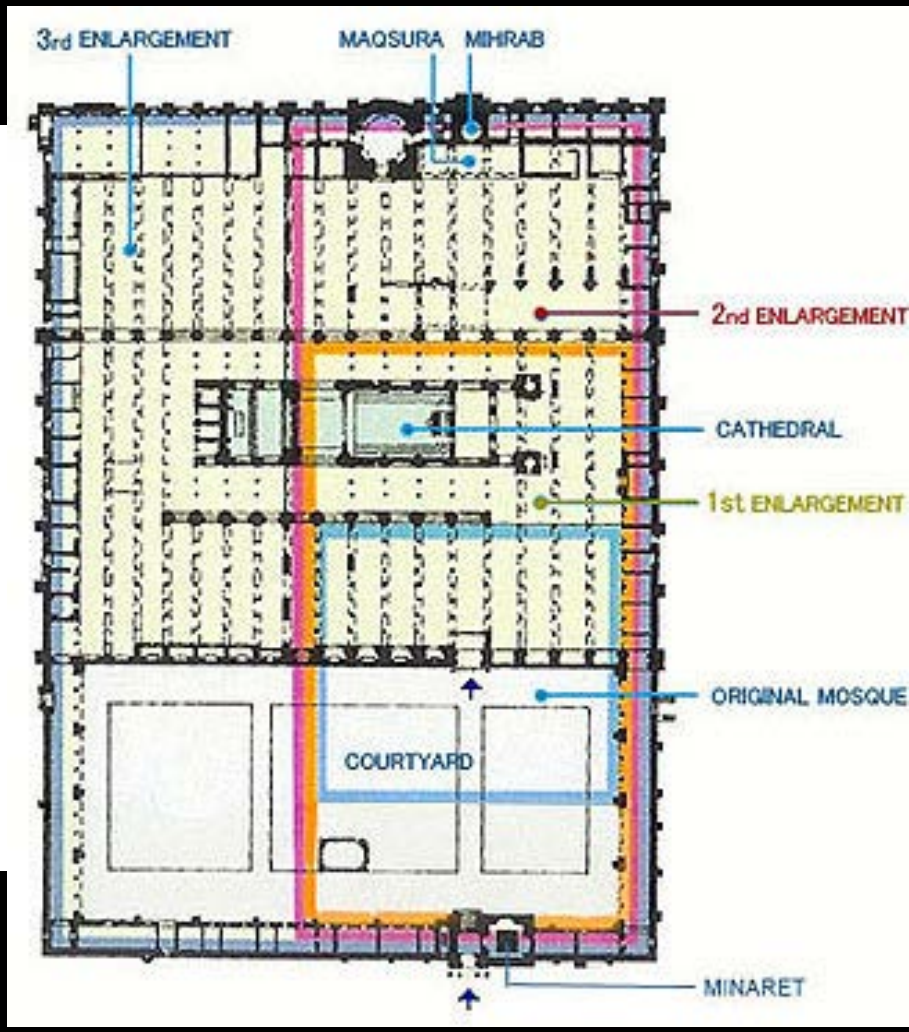
*https://www.brown.edu/Departments/Joukowsky_Institute/courses/ancientneareast/9193.html



Accretive development

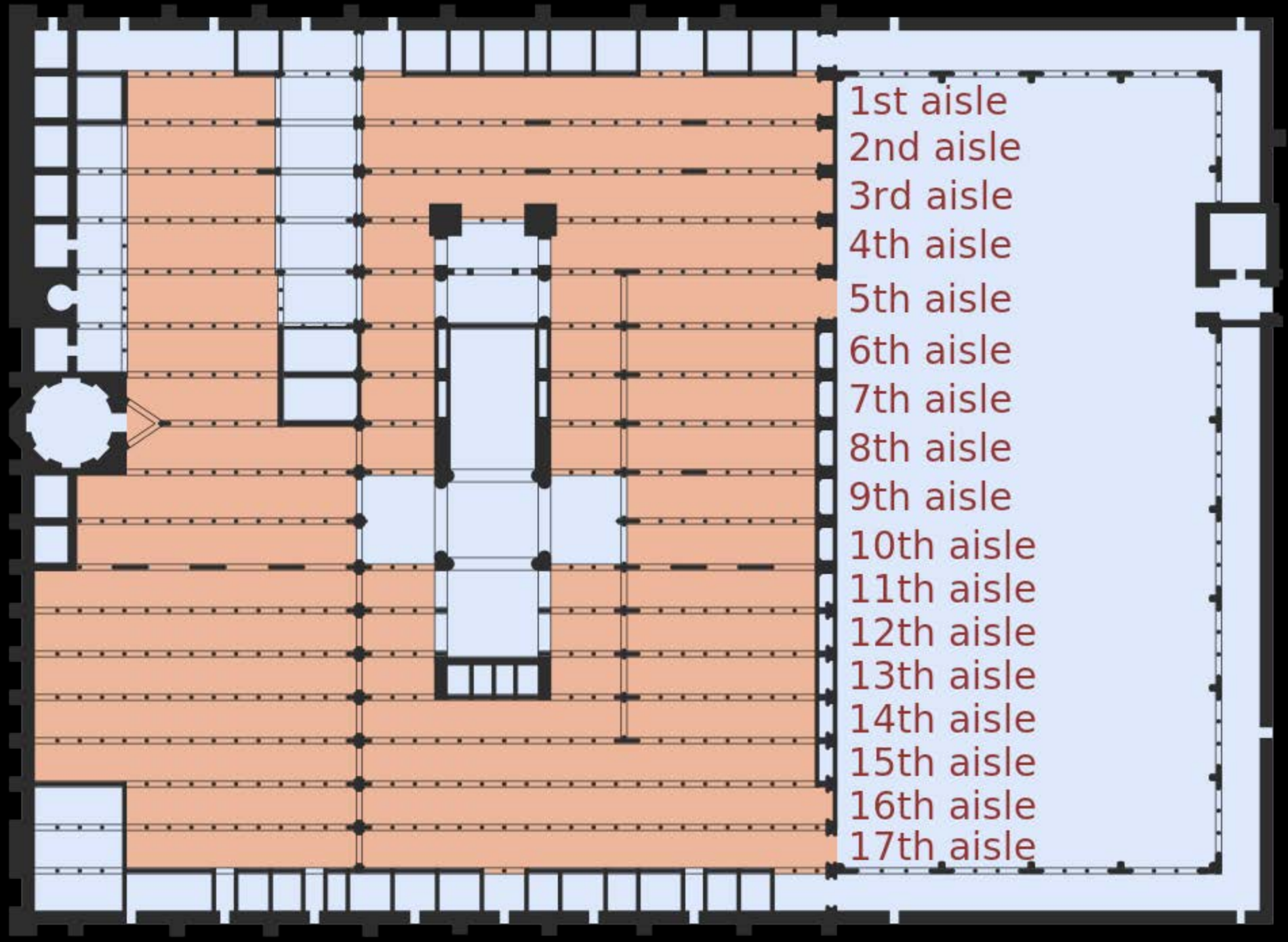




Floor plans showing four phases of development

Hypostyle Prayer Hall

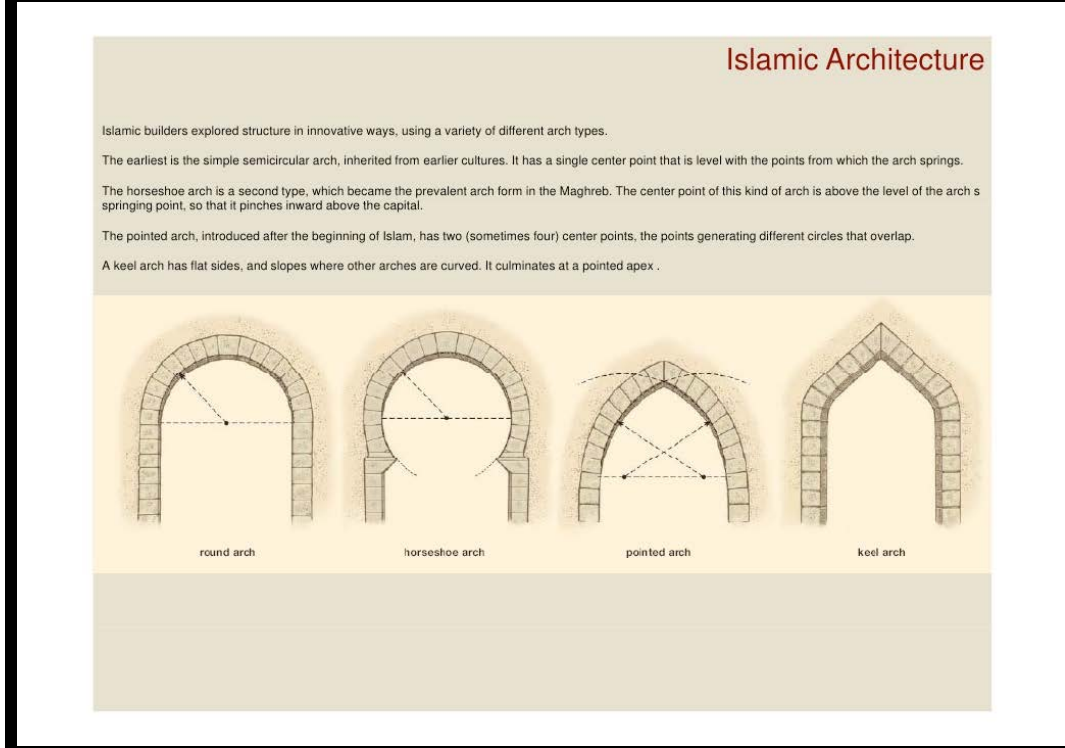
There are 856 columns of jasper, onyx, marble, and granite.

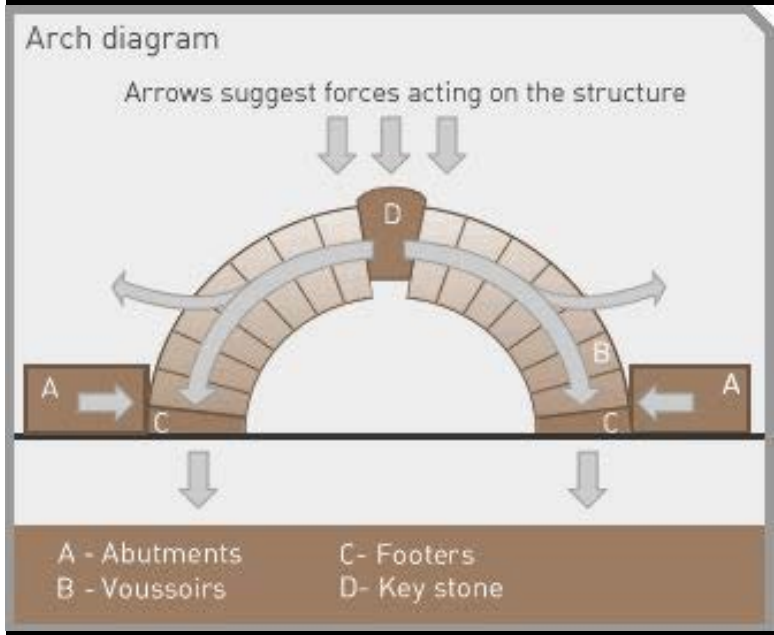


Hypostyle hall of the Mosque-Cathedral of Córdoba, Spain.

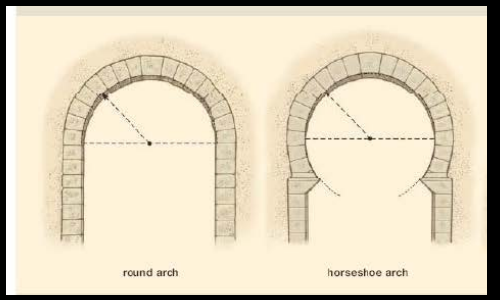
Hypostyle hall: The **hypostyle hall** was a large room with columns.

Arcades in Mosque of Córdoba

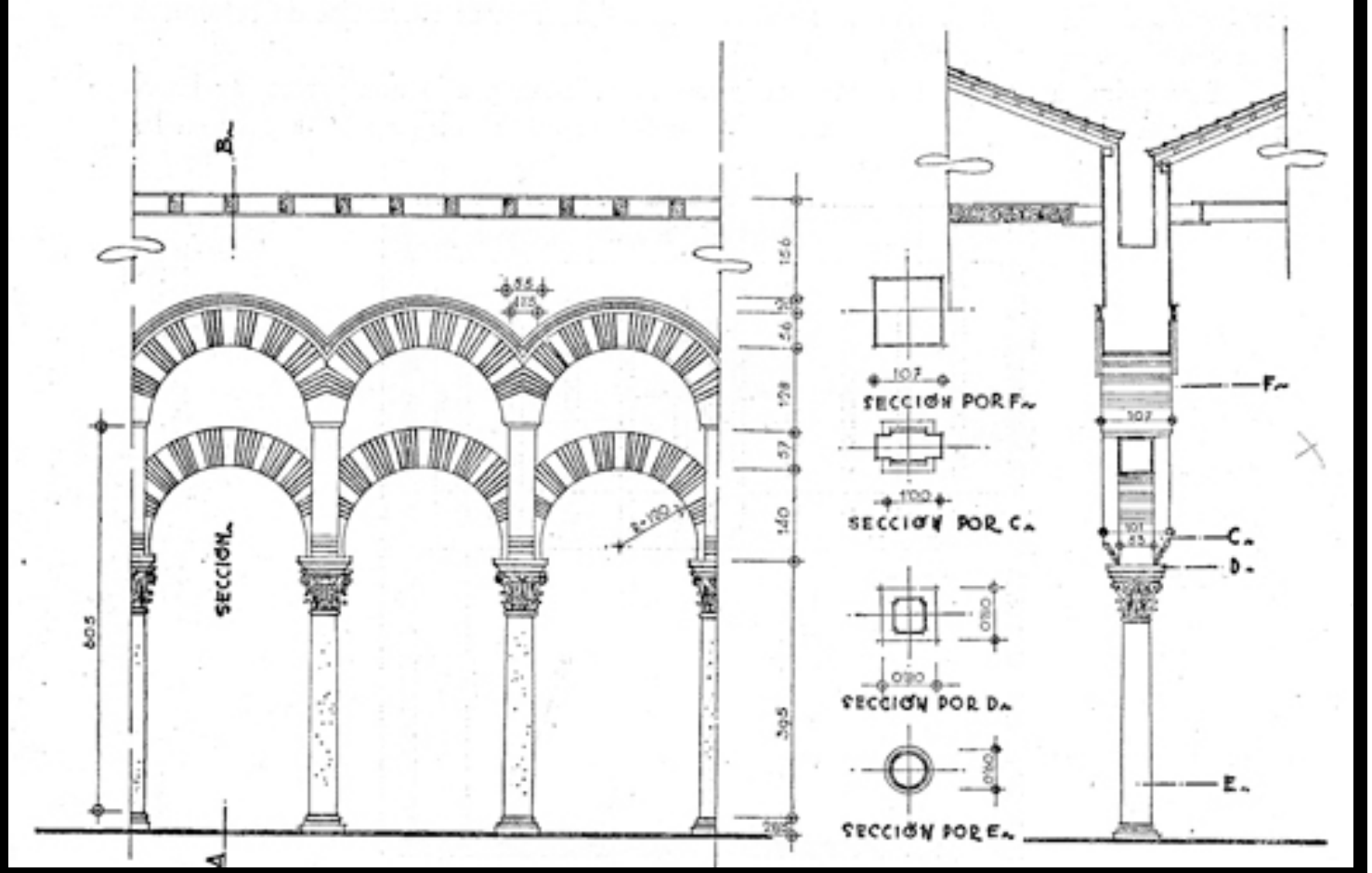




At left, the upper arch is semicircular, but the bottom is a horseshoe, following Spanish-Visigoth tradition, probably late Roman, like the alternating two colored stone blocks and brick voussoirs. The structure thus combined the new with a familiar, indigenous language of forms. Horseshoe arches were fashioned or painted with alternating voussoirs. Pillar and corbels load onto the cornice, with no Roman architectural moldings, which transmit their weight to capital and shaft, which uses buried basis as foundation.

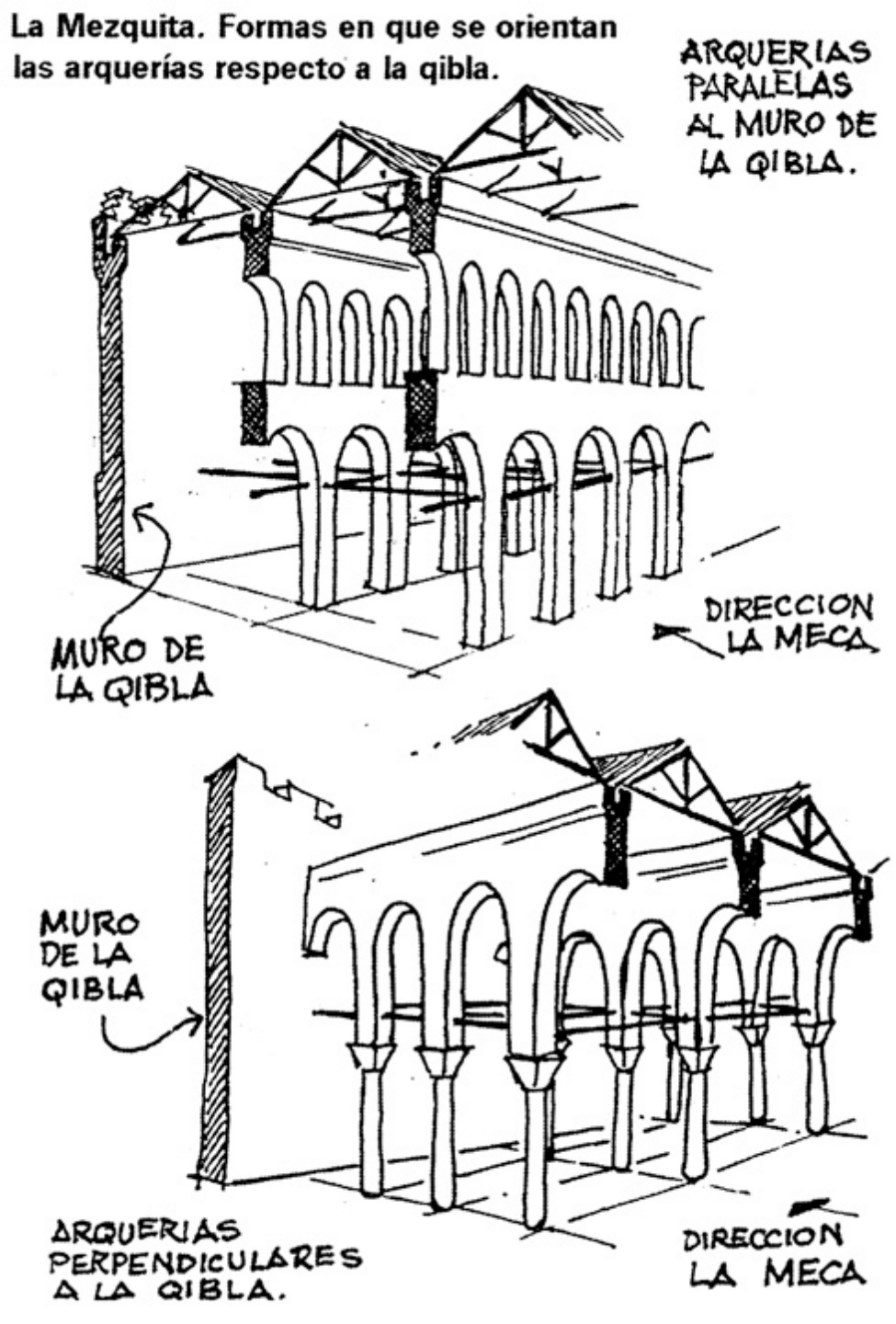


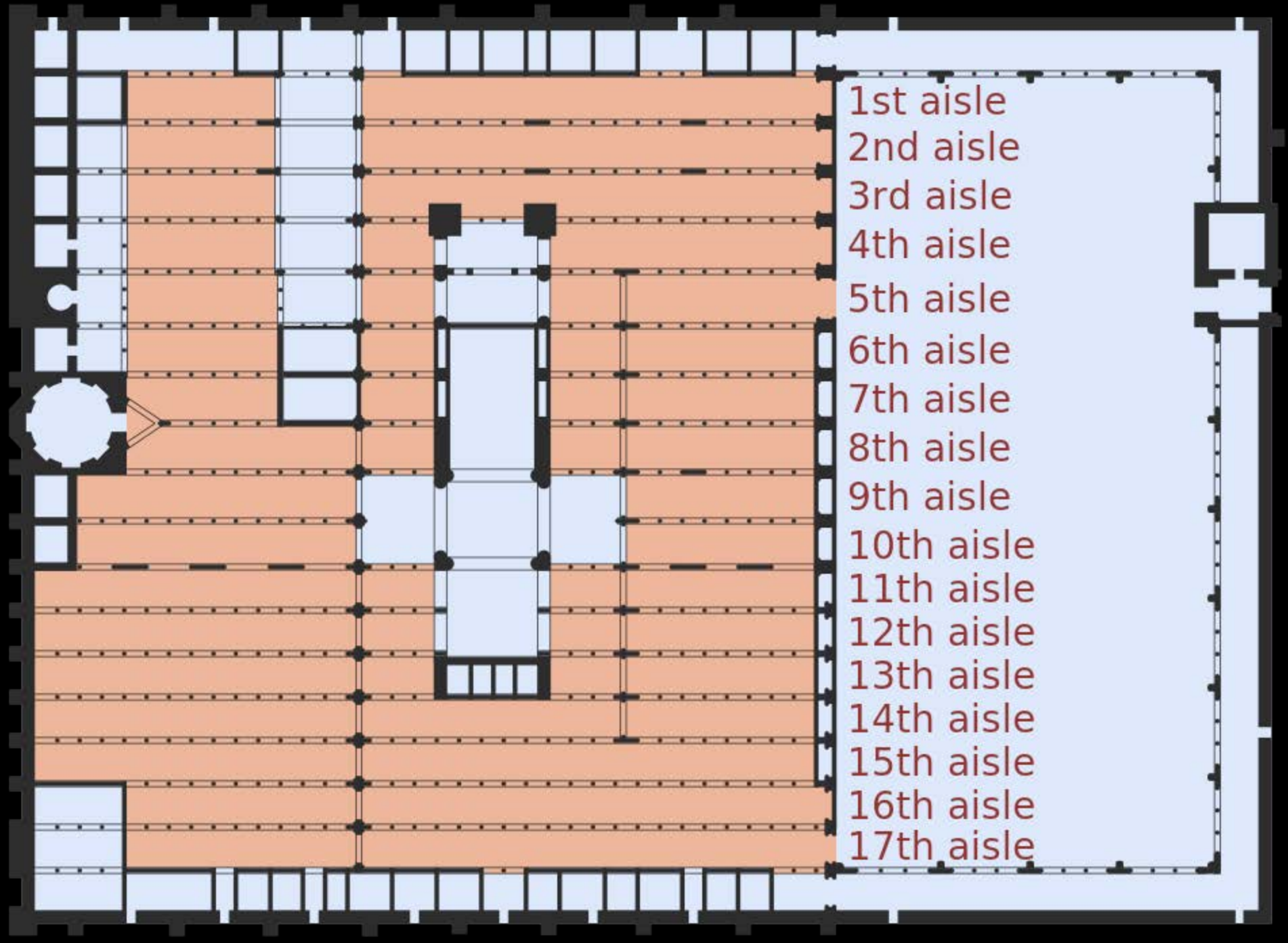
The double arches were a new introduction to architecture, permitting higher ceilings than would otherwise be possible with relatively low columns. The double arches consist of a lower horseshoe arch and an upper semi-circular arch.



Above: Elevation and section of arcades in Mosque of Córdoba

The walls in the mosque have <u>double arcades</u>. This way height can be increased without breaking proportions. The Cordoba arcades are directly inspired by the Milagros Aqueduct in Mérida, an ancient Roman aqueduct. From its ruins columns and capitals were taken [**<u>SPOLIA</u>**] as basis and inspiration for the successive enlargements. In this context (the reuse of materials and types), the Mosque is understood as a <u>system</u> composed of wall-and-aqueduct that run perpendicular to the qibla and are responsible for the spatial experience. The only perceptible direction would then be perpendicular to qibla.





Hypostyle hall of the Mosque-Cathedral of Córdoba, Spain.

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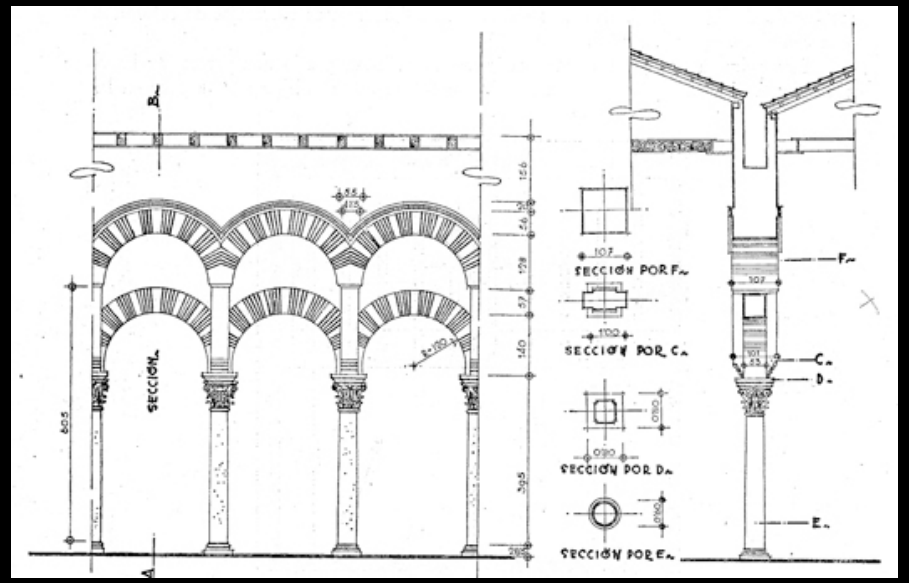


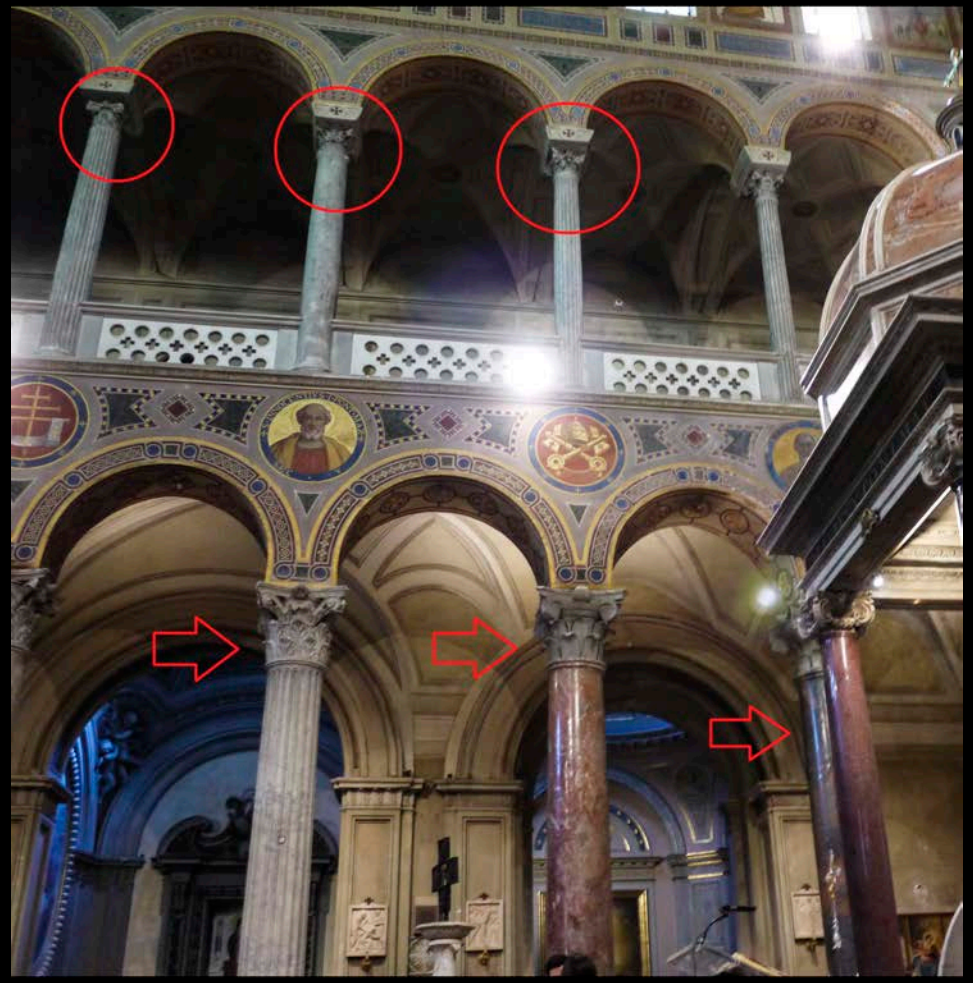
double arcades of the Mosque/Cathedral of Cordoba

Milagros or Miraculous Aqueduct in Mérida, Spain from Ancient Rome, 1st century CE

Spolia

The 856 columns were made from pieces of the Roman temple which had occupied the site previously, as well as other destroyed Roman buildings.

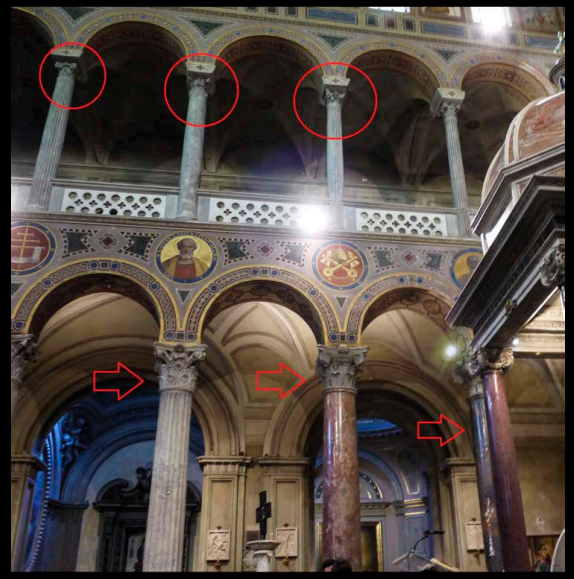
"Spolia" refers to the re-use of materials from old buildings to contruct new ones. When Rome converted to Christianity, new churches were built from the materials of closed Pagan temples.



In this photo we can see that the church columns are made from different materials, as are the "capitals" (tops). They were probably taken from decommissioned temples.

SPOLIA: **Spolia** (Latin, 'spoils'), the repurposing of building stone for new construction, or the reuse of decorative sculpture on new monuments, is an ancient and widespread practice whereby stone that has been quarried cut and used in a built structure, is carried away to be used elsewhere.

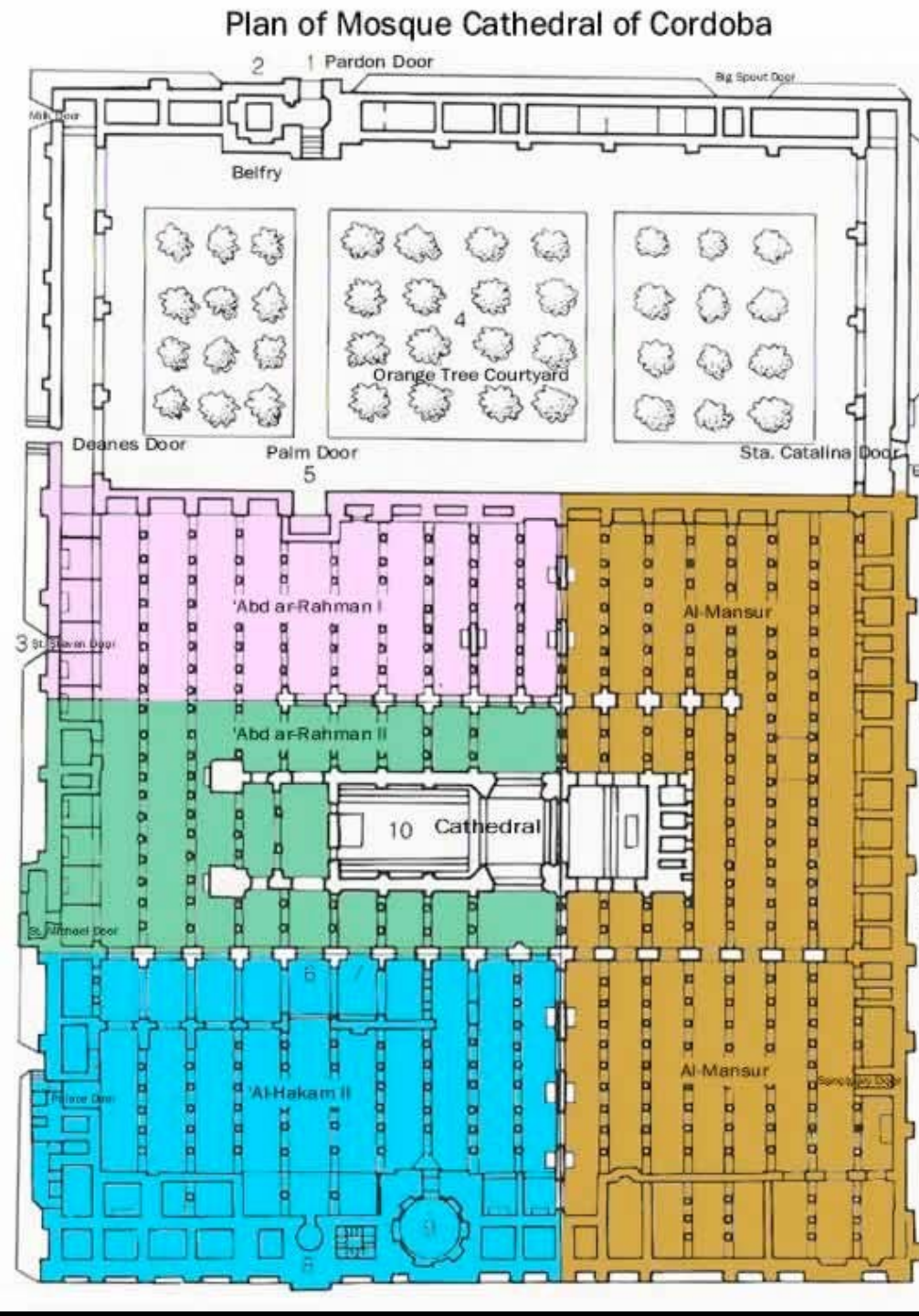
"Spolia" refers to the re-use of materials from old buildings to contruct new ones. When Rome converted to Christianity, new churches were built from the materials of closed Pagan temples.



In this photo we can see that the church columns are made from different materials, as are the "capitals" (tops). They were probably taken from decommissioned temples.

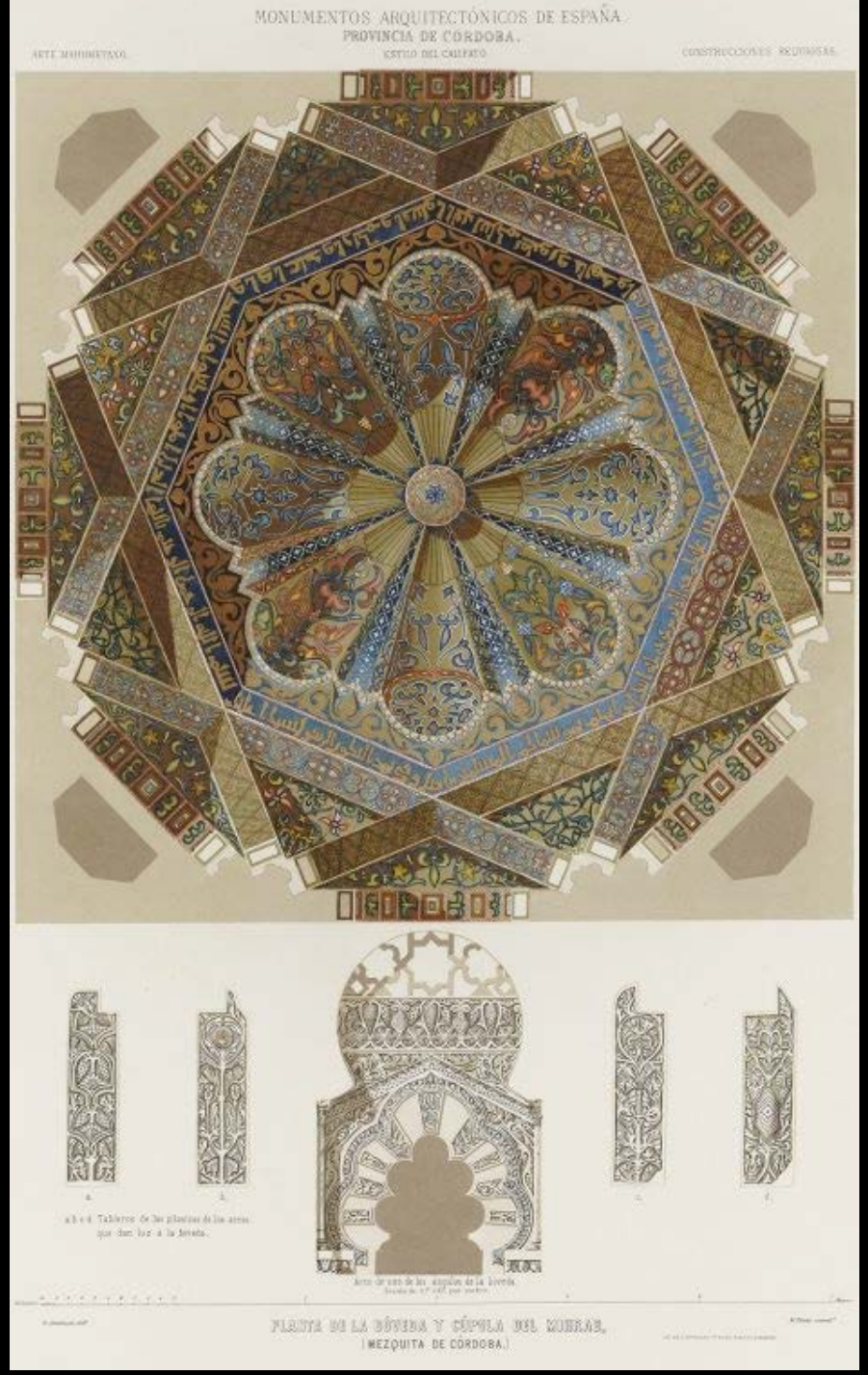
Color coding showing spolia used in the Arch of Constantine, Rome, 315 CE

(south side):
Red: Trajan
Blue: Hadrian
Green: Marcus Aurelius


Plan of Mosque Cathedral of Cordoba
2
1 Pardon Door
Belfry
Orange Tree Courtyard
Deanes Door
Palm Door
5
Sta. Catalina Door
'Abd ar-Rahman I
Al-Mansur
'Abd ar-Rahman II
10 Cathedral
'Al-Hakam II
Al-Mansur

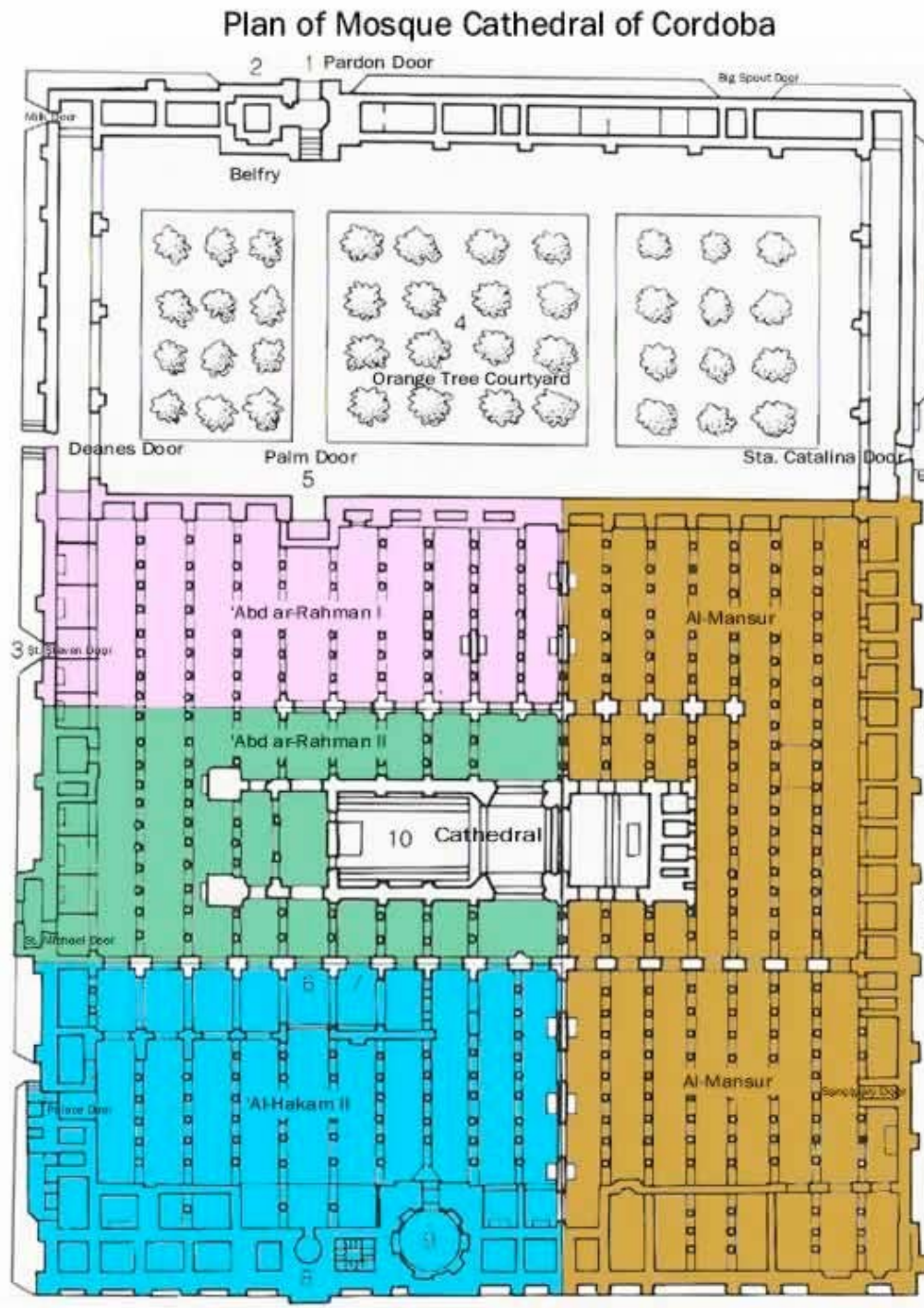
Above: Dome Over Mihrab Chapel
Right: View of Mhirab

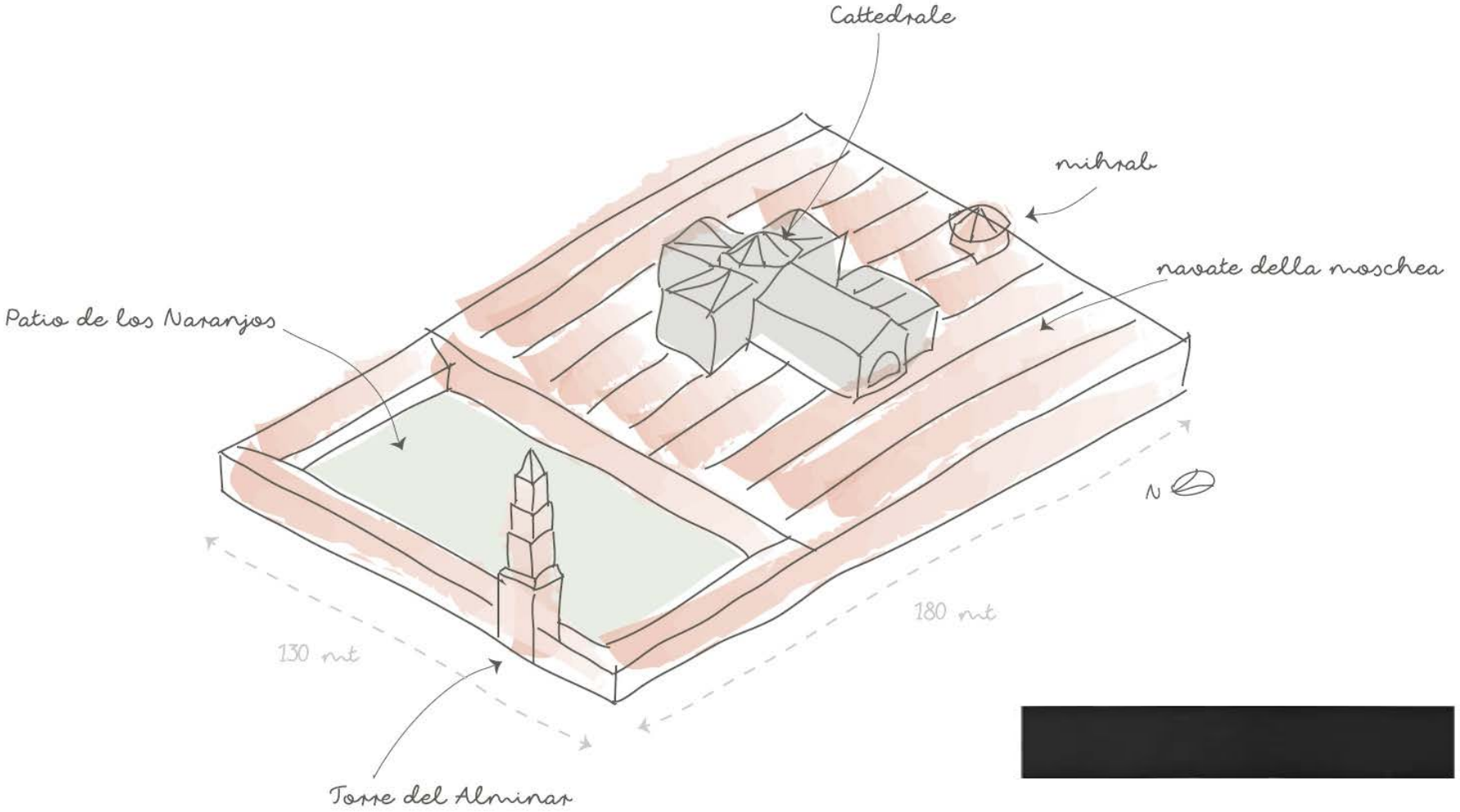
- crisscrossing ribs
- create pointed arches
- covered with gold mosaic
- a radial pattern

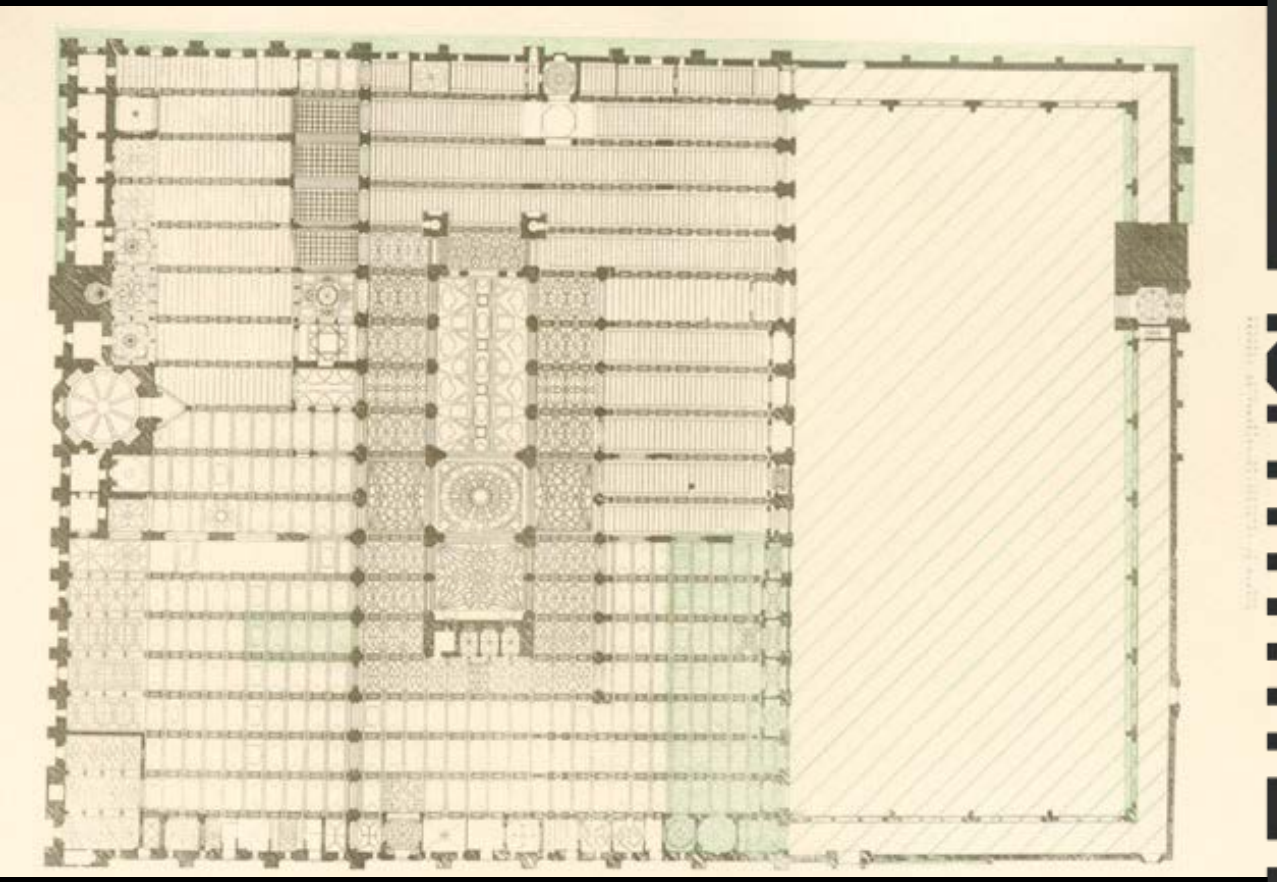


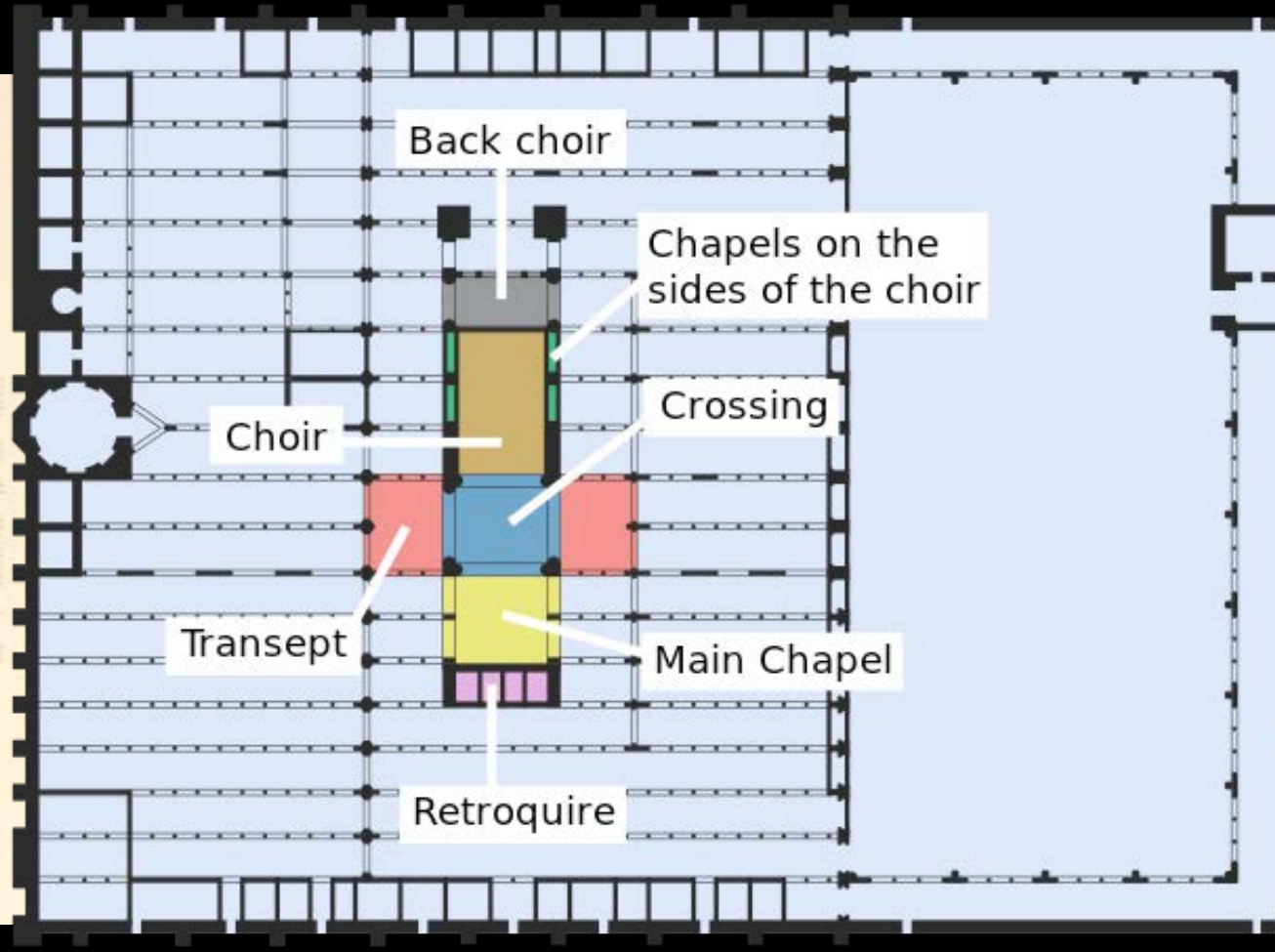
CHURCH

After conquering Cordoba in 1236, Ferdinand III king of Castile consecrated the Great Mosque as the city's cathedral. The Christian population of Cordoba used the former mosque with relatively minor changes for the next three hundred years. In the early 16th century the Bishop and Canons of the cathedral proposed the construction of a new cathedral, and proposed to demolish the mosque in order to build it. The opposition of the townspeople to the proposed destruction of the building led to the unprecedented decision, endorsed by the Holy Roman Emperor Charles V, to insert an entire Gothic "chapel" into the very heart of the former Great Mosque. The result is an uneasy and controversial juxtaposition: the soaring forms of a Gothic cathedral rise from the very center of the comparatively low, sprawling prayer hall whose architectural vocabulary is rooted in the forms of classical antiquity.

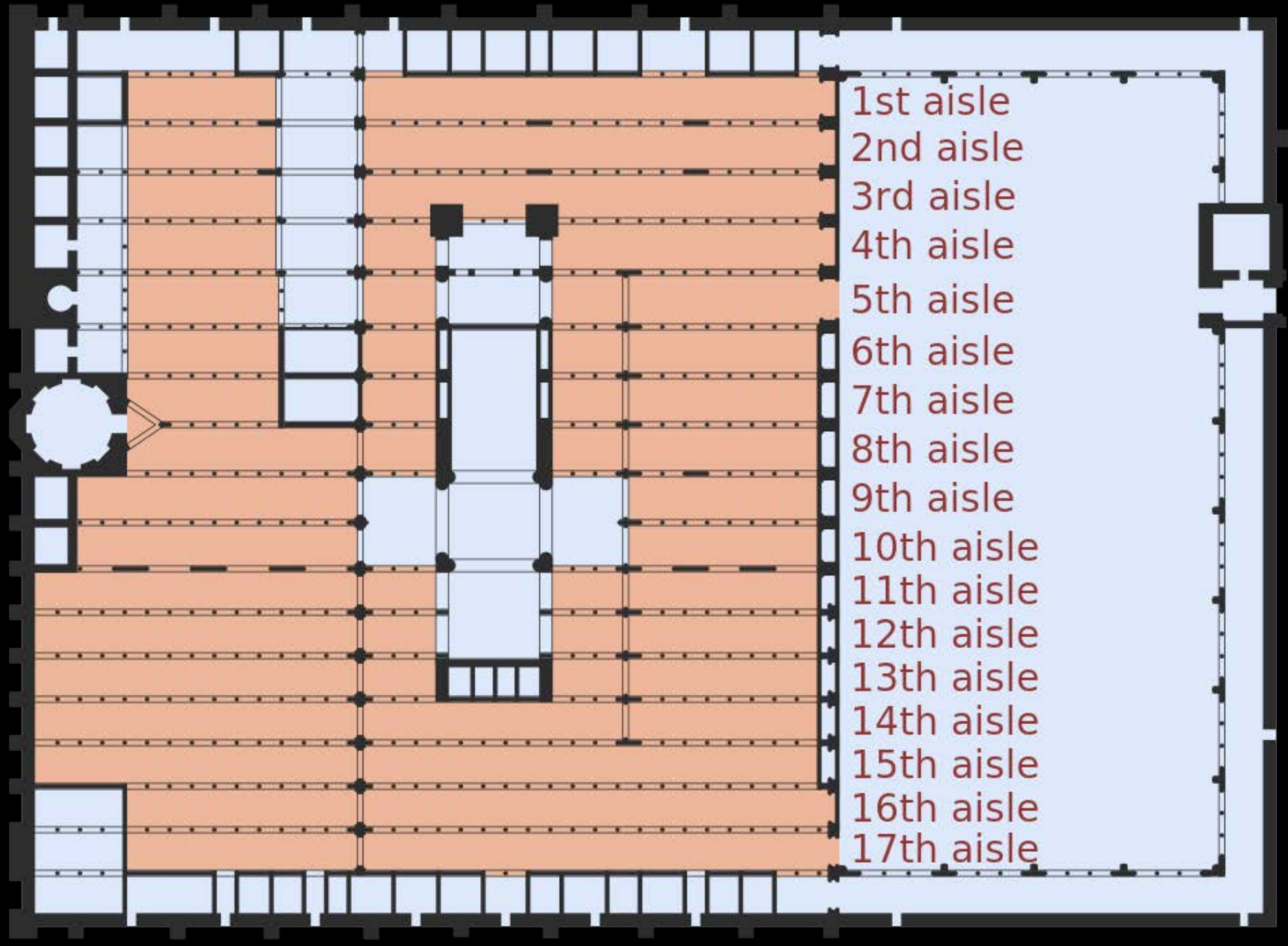



Cattedrale
mihrab
navate della moschea
Patio de los Naranjos
N
180 mt
130 mt
Torre del Alminar





1236 Reconquista Ferdinand III, king of Castile, consecrated the Great Mosque as the city's cathedral
1500-1600 Cathedral built



Hypostyle hall of the Mosque-Cathedral of Córdoba, Spain with cathedral at its center.

How does the plan of the original mosque compare with the cathedral?

A view of Cordoba Cathedral's renaissance high altar, its gothic ceiling, the baroque lectern and pulpit, and the renaissance walls of the north and south transept, which blend into Islamic arches from Almanzor's final expansion of the Mosque at the end of the 10th century.

The Sagrario Chapel Parish (Capilla del Sagrario) is in the southeast corner of the former mosque and is full of frescos.

TROMPE L'OEIL

Contrast between Almanzor's last expansion of the Mosque and Christian architecture, in the row of columns adjacent the 16th-century cathedral.

Front view of intertwined, multi-lobed arches in Villaviciosa Chapel, looking toward Al-Hakam II’s mihrab.


Photo by: mbell1975 / Flickr

INTERIOR VIEW OF THE MOSQUE AT CORDOVA.

Approximating the spirituality of **infinity** through architecture

ABSTRACTION OF FORM

ICONOCLASM, MATH, OR BOTH?

MOORISH MATHEMATICS

Zero was invented independently by the Babylonians, Mayans and Indians (although some researchers say the Indian number system was influenced by the Babylonians) some 4,000 to 5,000 years ago. Over the next centuries, the concept of zero caught on in China and the Middle East. By 773 CE, zero reached Baghdad where it became part of the Arabic number system, which is based upon the Indian system.

A Persian mathematician, Muhammed ibn-Musa al-Khwarizmi, suggested that a little circle should be used in calculations if no number appeared in the tens place. The Arabs called this circle "sifr," or "empty." Zero was crucial to al-Khwarizmi, who used it to invent **algebra** in the ninth century. Al-Khwarizmi also developed quick methods for multiplying and dividing numbers, which are known as **algorithms** — a corruption of his name.

Muhammad ibn Musa al-Khwarizmi [780-850]

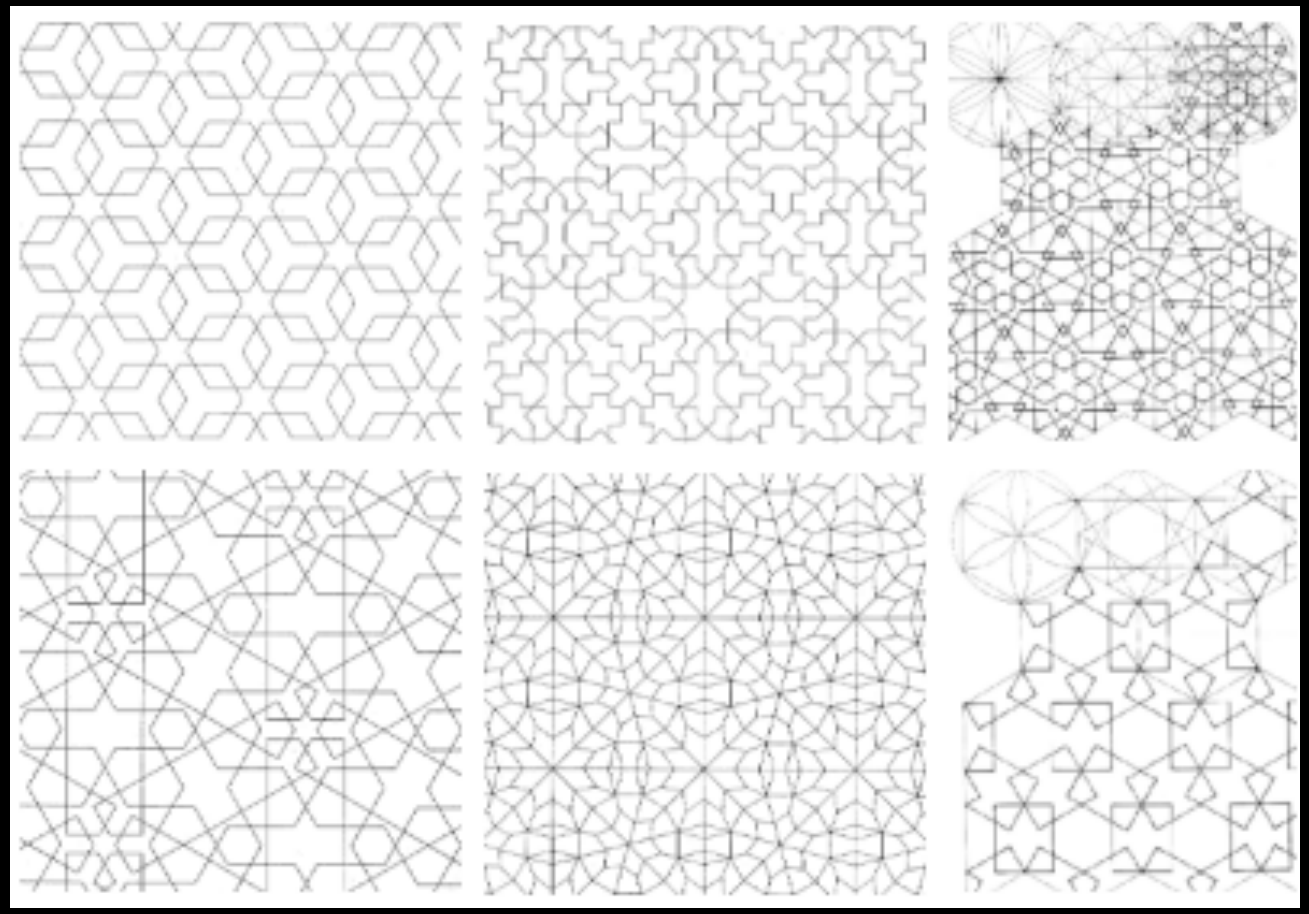
Left: Khwarizmi statute in Amir Kabir University, Tehran, Iran

Algebra doesn't have one single origin point -- it developed over time and in multiple places, with many mathematicians contributing. One of those contributors was an 8th-century scholar from Baghdad named Muhammad ibn Musa al-Khwarizmi.

Etymology of “algebra”

late Middle English: from Italian, Spanish, and medieval Latin, from Arabic *al-jabr* ‘the reunion of broken parts,’ ‘bone setting,’ from *jabara* ‘reunite, restore.’ The original sense, ‘the surgical treatment of fractures,’ probably came via Spanish, in which it survives; the mathematical sense comes from the title of a book, *ʿilm al-jabr wa'l-muḳābala* ‘the science of restoring what is missing and equating like with like,’ by the mathematician al-Ḵwārizmī

A stamp issued in honor of al-Khwarizmi by the former USSR post in 1983. The text in Cyrilic reads: 1200 Years, Mukhammad al-Korezmi.



Some examples of the complex symmetries used in Islamic temple decoration

Major Arabic mathematical works were brought to Al-Andalus by the 9th century, along with important Greek translations and commentaries. Together with a translation of Euclid's *Elements*, they became the two foundations of subsequent mathematical developments in Al-Andalus. It is clear from their own achievements that scholars in Al-Andalus followed advancements in other Muslim lands, and contributed their own.

Today, al-Khwarizmi's work exists only as a Latin translation made in Toledo, Spain, by Gerard of Cremona (d. 1187 CE). Europeans did not gain access to the mathematical knowledge found in Spain and North Africa until the 12th and 13th centuries CE. It entered Europe both through scholarly and commercial means. Fibonacci (d. 1250 CE), an Italian mathematician who traveled between Europe and North Africa, transmitted mathematical knowledge from Muslim lands to Europe and made his own discoveries.

Hindu–Arabic numeral system

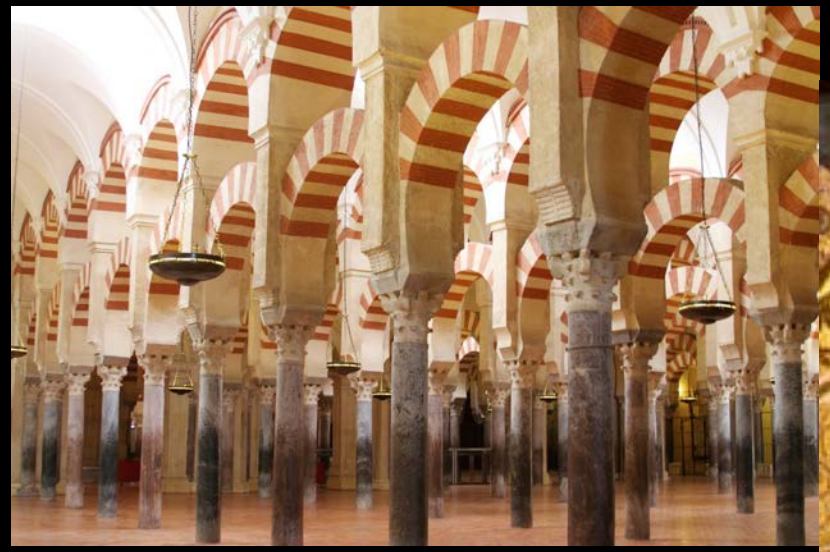
European (descended from the West Arabic)	0	1	2	3	4	5	6	7	8	9
Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩
Eastern Arabic-Indic (Persian and Urdu)	٠	١	٢	٣	۴	۵	۶	٧	٨	٩
Devanagari (Hindi)	०	१	२	३	४	५	६	७	८	९
Tamil		க	உ	ங	ச	ரு	சு	எ	அ	கூ

https://en.wikipedia.org/wiki/File:Arabic_numerals-en.svg

Today's numbers, also called **Hindu-Arabic** numbers, are a combination of just 10 symbols or digits: **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9**, and **0**. These digits were introduced in Europe within the XII century by **Leonardo Pisano** (aka FIbonacci), an Italian mathematician. L. Pisano was educated in North Africa, where he learned and later carried to Italy the now popular Hindu-Arabic numerals.

ABSTRACTION OF FORM

ICONOCLASM, MATH, OR BOTH?



- Patterns and repetition
- Geometric patterns
- Vegetal patterns

The Islamic Decorative Canon

Calligraphy

Geometric

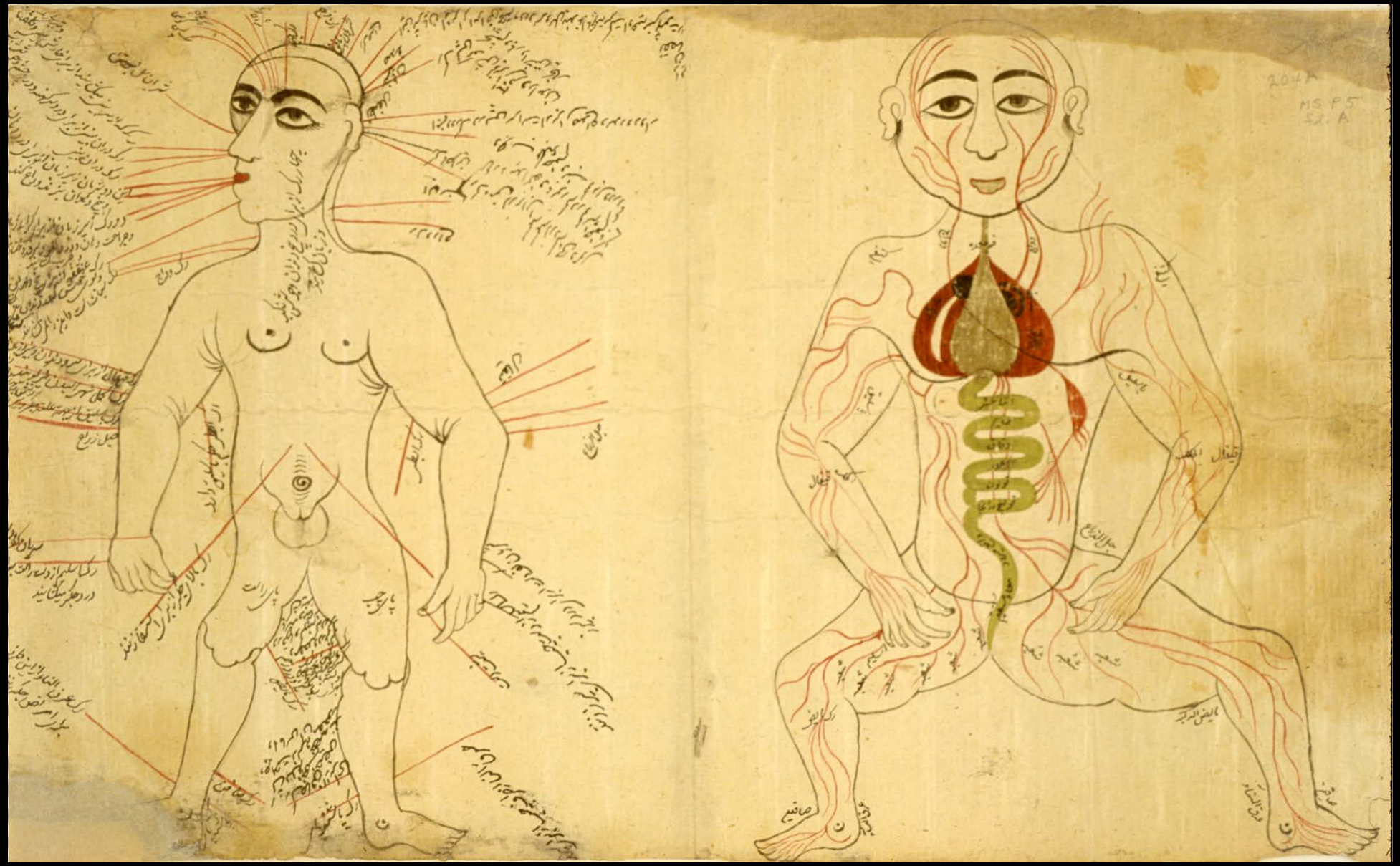
Arabesque

What might be the relationship between repetitive geometric and vegetal patterns, mathematics (algebra, algorithms, and “0”), and God or infinity?

Figures and the Figurative in Islamic Art

Illustration showing Mohammed (on the right) preaching his final sermon to his earliest converts, on Mount Arafat near Mecca; taken from a medieval-era manuscript of the astronomical treatise *The Remaining Signs of Past Centuries* by the Persian scholar al-Biruni

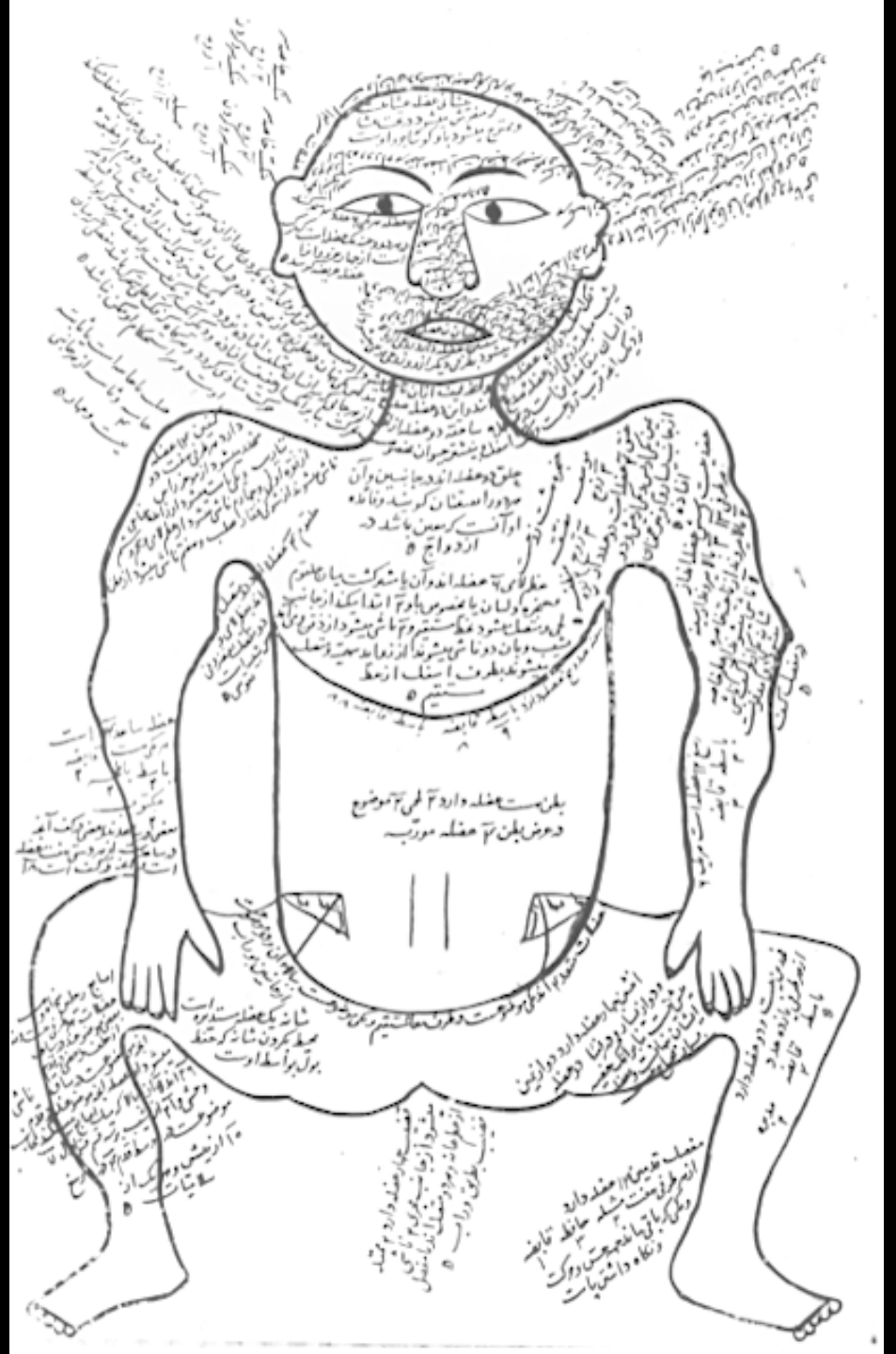
This classic image of Mohammed riding Buraq on his "Night Voyage" to Paradise has been reproduced frequently in the West over the years; this version was taken from the cover of the book *The Miraculous Journey of Mahomet* by Marie-Rose Seguy. This illustration is one of several similar Islamic illustrations from the Medieval period showing the same scene; the exact provenance of this one is (as of this writing) unknown.



Left: A loose sheet with a bloodletting figure having points labeled that were thought best for phlebotomy. Such figures are derivative from late-medieval European bloodletting figures. Undated, probably 18th century.

Right: A loose sheet with a figure, drawn frontally, showing the venous system. The figure is closely related to those usually associated with the *Tashrīḥ-i Manṣūri* treatise on human anatomy by Ibn Ilyas, who worked in Shiraz in Iran at the end of the 14th century. Undated, probably 18th century.

Illustrations of surgical instruments from a 13th-century Arabic copy of al-Zahrawi's *On Surgery*

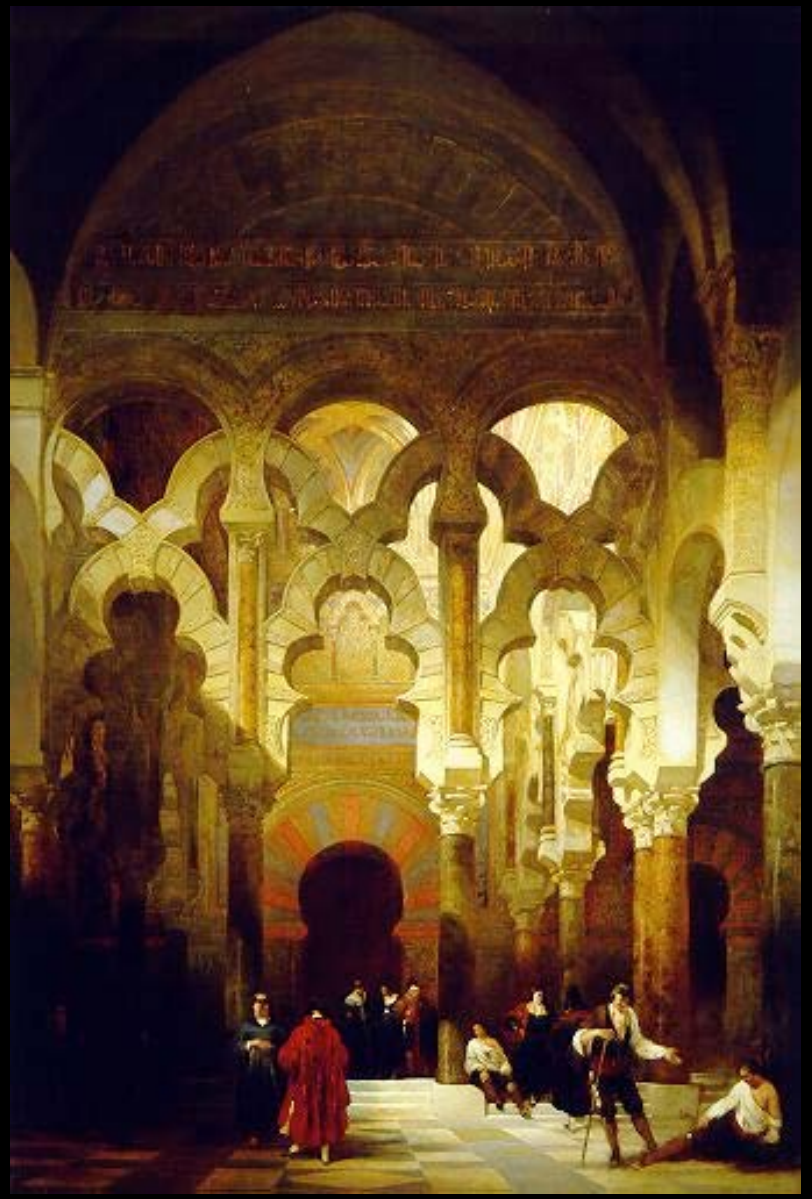


Near Left:
Muscle figure, shown frontally, with extensive text denoting muscles.
From *The Anatomy of the Human Body* (*Tashrih-i badan-i insan*) written in Persian at the end of the 14th century by Mansur ibn Ilyas. Copy completed 8 December 1488 (4 Muharram 894 H) by Hasan ibn Ahmad, a scribe working in Isfahan.

Orientalism

- In particular, Orientalist painting, representing "the Middle East ", was a genre of Academic art in the 19th century.
- ***Orientalism*** is a 1978 book by Edward W. Said which studies the cultural representations that are the bases of Orientalism, which Said defined as the West's patronizing representations of "The East" — the societies and peoples who inhabit the places of Asia, North Africa, and the Middle East. According to Said, orientalism (the Western scholarship about the Eastern World) is inextricably tied to the imperialist societies who produced it, which makes much Orientalist work inherently political and servile to power

Left: Edwin Lord Weeks, Interior of the Mosque at Cordoba, 1880

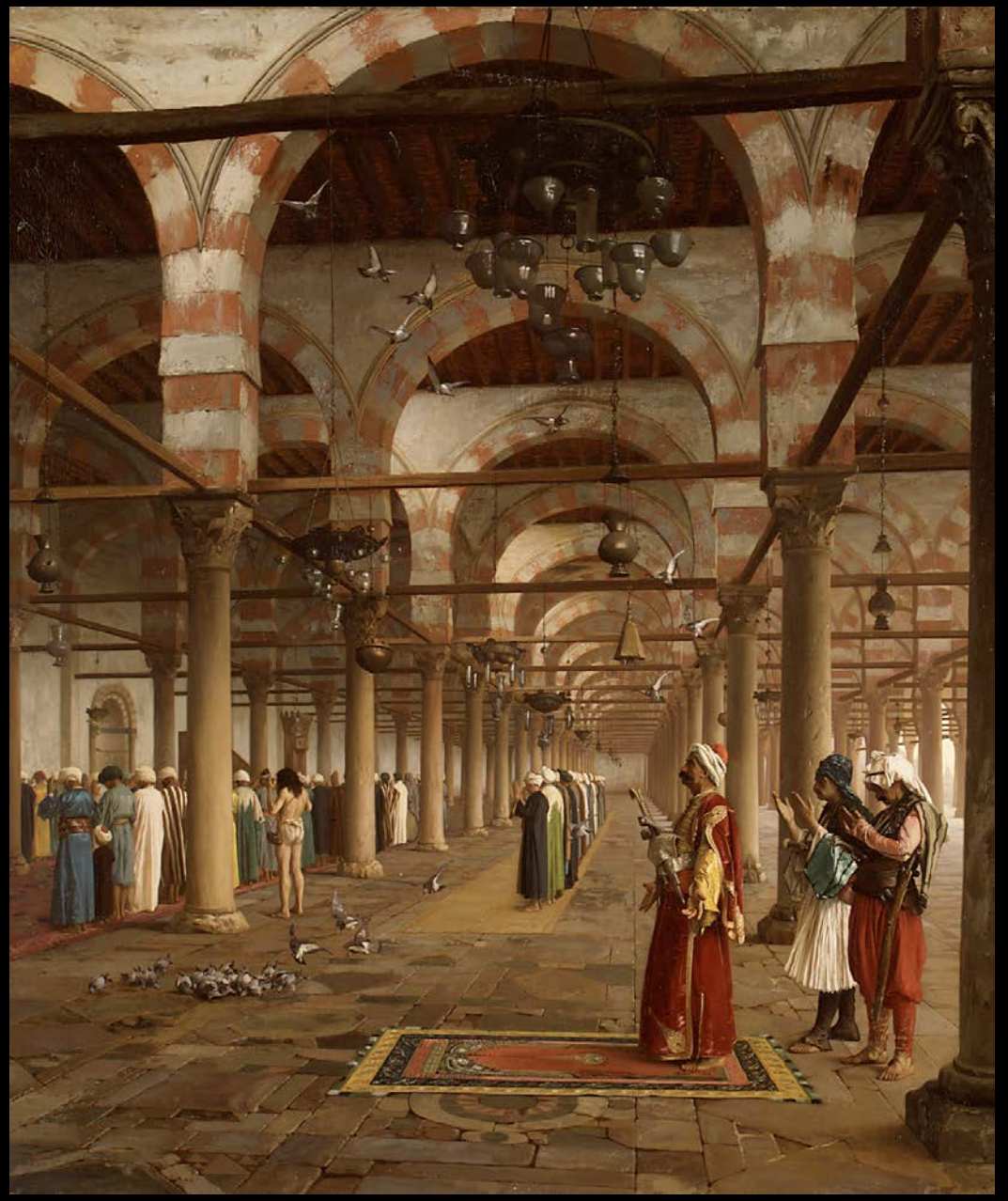


David Roberts, The Interior of the Mosque, Cordoba, 1838

David Roberts, The Sanctuary of the Koran; Mosque at Cordoba, (Scotland, 1849)

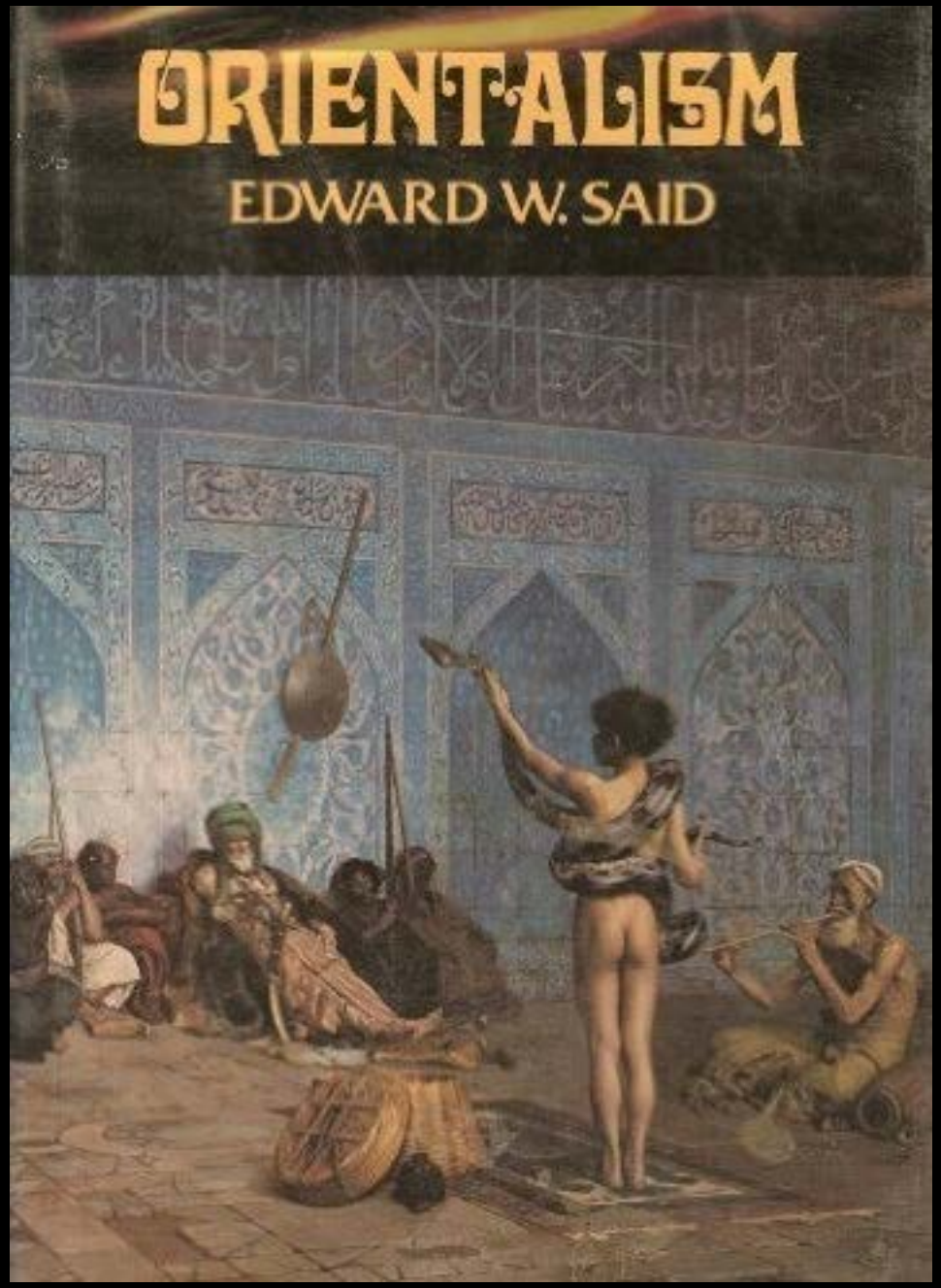
Jean-Léon Gérôme, Prayer in the Mosque, 1871

Gérôme painted this scene, which depicts the interior of the seventh-century mosque of ‘Amr in Cairo, after his visit to Egypt in 1868. The rows of worshipers, ranging from the dignitary and his attendants to the loincloth-clad Muslim holy man, face Mecca during one of the five daily prayers. It is unlikely, however, that Gérôme witnessed a service at this particular mosque, which had fallen into disuse by 1868. Rather, the image is probably a composite of sketches and photographs of various sites. Gérôme traveled widely in the Middle East; more than two-thirds of his paintings are devoted to Orientalist subjects.



Jean-Leon Gerome, Interior of a Mosque, 1870

Jean-Léon Gérôme, The Snake Charmer, c. 1879



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