

# Architectural association in Islamic and Gothic architecture

## AR2A011 Architectural History Thesis MSc Architecture, Technical University of Delft

Anwar Lemnawar

4727576

21-3-2022

Didem Yerli

---

**Abstract:** In this history thesis the impact of Islamic/Middle Eastern architecture on so-called Western architecture will be explored with the main focus on the Gothic style during the 12th and 16th century in Western Europe. During architectural studies the impact of non-Western architecture on Western architecture is often neglected. Most western sources on the subject are old and are powered by orientalism which is important for the perception of these sources. The exact moment that an architectural concept originated is impossible to say as architectural influence is a constant motion of inspiration, although an estimate of when it emerged can be made. Based on the findings from the literature and case study analysis, it can be concluded that Islamic architecture had an influence on the architectural Gothic style during the Middle Ages. The Islamic architecture itself was a synthesis of different architectural influences due to the variation of the Middle East. Both architectural styles share similarities in characteristics that were transferred through various methods. Gothic architecture and Islamic architecture both want to show the godly through nature, this concept manifests itself in the usage of ornamentations. This influence is shown through historical examples and first examples in the world that show certain concepts and techniques that originated from the Middle East region.

---

**Key Words:** Islamic Architecture, Gothic Architecture, Middle Eastern architecture, byzantine architecture, Architectural influence, The history of Gothic architecture, Gothic architecture

# Introduction

Starting from my high school years, which was followed by a degree on Architecture at TU Delft, till my master studies I have learned about architectural styles. During my education I learned about almost every influential "Western" architectural style. Over the years I noticed that all the styles we learn are mostly about western architectural forms as I was studying in a Western country. So I started to wonder if there is any academic work, focus and framing on the rich history of the East. In my bachelor I did research about what the core concepts of this architectural style is and came to the conclusion that the information was hard to find without digging deeper than usual.

During the Middle Ages, Europe was in its darkest period, since the fall of the roman empire there were little scientific and cultural advancements during that time. A lot of information went lost and it was as if western society started from scratch. While the Islamic/ Arabic nations where in their golden age cultural and scientific advancements were on an all time high. I started to wonder if the Islamic architecture had any influence on the Western architecture that we now in these periods. I think it is important to understand that Non-Western architecture had or could have an influence on Western architecture, this leads to a better understanding of the differen styles and how different styles interact with eachother. These benefits could lead to more usage of these influences and a better formation of architectural styles in the future.

To get an answer to the question how did Islamic architecture influence the architectural Gothic style during the middle ages? I am going to do research through sources about the historical background of these 2 styles. I will try to gather all the information from papers, scientific journals and books to give an accurate description of the historical background and to also conduct an analysis of the architectural styles and their case studies. From this information it will be possible for me to answer all the sub questions and thereon out give a clear answer to the research question

How did so called Eastern architecture influence the architectural Gothic style between the 12th and 16th century in Western Europe?

1. How to frame architectural influence?
2. How did so called Eastern architecture originate?
3. What are the characteristics of so called Eastern architecture?
4. What are the characteristics of Gothic architecture?
5. How did this transfer of knowledge happen? (crusades?, trades?)
6. Form studies in iconic buildings.

Due to the fact that most buildings that there is information on is focussing I will focus on Islamic architecture in this research. The definition of Islamic architecture for this study will be the architecture of buildings that are facilitating the practising of Islam.

# Index

## Chapter 1: The history of Islamic architecture p 4-7

### 1.1 The term Islamic architecture p 4.

### 1.2 The birthplace of Islamic architecture p 4-6

#### 1.2.1 Pre Islamic era

#### 1.2.2 Islamic era

### 1.3 Architectural influence p 6

## Chapter 2: The relation between Gothic Architecture and Islamic architecture p 8-14

### 2.1 The essence of Islamic architecture p 8-10

#### 2.1.1 ribbed vaults

#### 2.1.2 Arches

#### 2.1.3 Mosaics

#### 2.1.4 Ornaments/decoration

#### 2.1.5 Domes

#### 2.1.6 Minarets

#### 2.1.7 Courtyards with riwaq

### 2.2 The essence of Gothic architecture p11-14

#### 2.2.1 Arches

#### 2.2.2 Big windows with stained glass

#### 2.2.3 Vaulted ceilings

#### 2.2.4 Arcade

#### 2.2.5 Buttress

#### 2.2.6 Ornate decorations

## Chapter 3: Transmission from the east to the west p 15-17

### 3.1 Trading connection

### 3.2 Pilgrimage and Crusades

### 3.3 Conquest

## Chapter 4: Form studies in iconic buildings p 18-25

## Chapter 5: Discussion p 26

## Conclusion p 27

## Biography p 28

# Chapter 1:

## The history of Islamic architecture

### 1.1 The term Islamic architecture

The term Islamic architecture is a general term that tries to describe different types of architecture of different cultures in one big umbrella term. To understand what the meaning of this term is it is important to know the context of the word and what the social political influences are on this term.

Orientalism according to Edward Said (1992), the scholar who coined the term, is a term that describes the prejudice and bias Western scholars have against eastern cultures, in particular Arabic and Islamic cultures. The "orient" as they called it is usually seen as violent and uncivilized which played a significant role in the research and documentation of these cultures by Western scholars. The studies are mostly used to polarize and show the cultural dominance of the west and compares the eastern cultures with the Western culture. In these comparisons the Eastern cultures are seen as inferior and the Western culture as superior. These eastern cultures were abstracted and reduced to a group that minimized the complexity in these cultures and the subcultures that exist within this culture. This fact is especially seen in the architectural studies and terminology of architecture in the middle east.

The term that is used to describe architecture in the middle east is Islamic architecture. This is an example of the orientalism that deduced Arabic architecture into Islamic architecture where the differences in Arabic architecture are actually ignored. There were great civilizations during the middle ages in the middle east and in all the architectural analysis they are all grouped into Islamic architecture without a clear distinction. The architecture in Morocco is not the same as in Iran but with the naming of Islamic architecture it is seen as the same. If the Western equivalent is shown it becomes clear that orientalism had a huge role in defining Arabic architecture and Islamic architecture. In the west there is early Christian, Romanesque, Gothic, Baroque, Rococo, Neoclassical and multiple

other styles do describe the architecture of churches. In Islamic architecture there are no clear distinctions that are made until recently. The description of these architecture styles mostly describe more than only the building style of a church it embodies the beliefs and the way people should live during a specific time period. In the analysis of Islamic architecture which is available in the academic space is vastly limited in this depth.

According to Abdelaziz et al (2019) there were three different phases in orientalism divided in: 18th century orientalism, 19th century orientalism and New orientalism. During the 18th century most people that travelled to the east did so for trade and diplomatic purposes. Because this was their main focus all the information they got about Islamic architecture was seen as background information therefore there was a lack of important details, pictures and drawings. Later during the 19th century mostly British architects visited the middle east with the main purpose being to study the heritage remnants. During this era Islamic architecture was not believed as an official style which led to the same results of poorly documented research about Islamic architecture. (Crimson, 1996)

The new orientalism as Abdelaziz et al (2019) called it was the era after the 19th century in this new orientalism the analysis were more in depth but still were used mainly to display that Islamic architecture was inferior to Western architecture. The main issue stays just as Edward Said mentioned in his work The orient is seen as an entity whereby its culture is confined within its religion.

### 1.2 The birthplace of Islamic architecture

Islamic architecture is the architectural style that is used in buildings that are used for religious purposes within Islam. Islam is the youngest Abrahamic religion which started in Medina during 610 A.D. . Eventually Islam spread through the Middle East, Africa and parts of Europe (see figure 3). Islamic architecture originated in the Middle East. What is the Middle East exactly? in order to explain this the definition for the middle east





Figure 1: The definition of the middle east made by author (Lemnawar, 2022)

has to be clarified. In figure 1 the definition of the middle east can be seen. To know how the Islamic architecture was born the context needs to be clear.

### 1.2.1 Pre Islamic era

According to Goldschmidt and Davidson (2010) in their book *A Concise History of the Middle East*, the Middle East was extremely rich in history and all the main breakthroughs to civilization occurred in this region. The middle east was where the transformation of hunting and gathering to farming started. The first churches and mosques were built in this region. The middle east has a harsh climate people had to overcome it is hot and dry and rainfall is rare to come by. Eventually people learned how to regulate waterflow to grow their agricultural fields, these harsh climates also made it necessary for some people to be nomadic and move up and down the mountains with their cattle (horses, camels, goats and donkeys). These developments made it necessary for people to have governments that to organize the regulation of the waterflow and protection from outsiders most of the time provided by the nomadic people. Because of the civilizations and port cities in the middle east it became the crossroad between Asia and east Africa. This made the middle east a source of knowledge as there was a lot of transferring of different ideas from different cultures. The environment had an abundance of stone and sand which made it the main building material in the region.

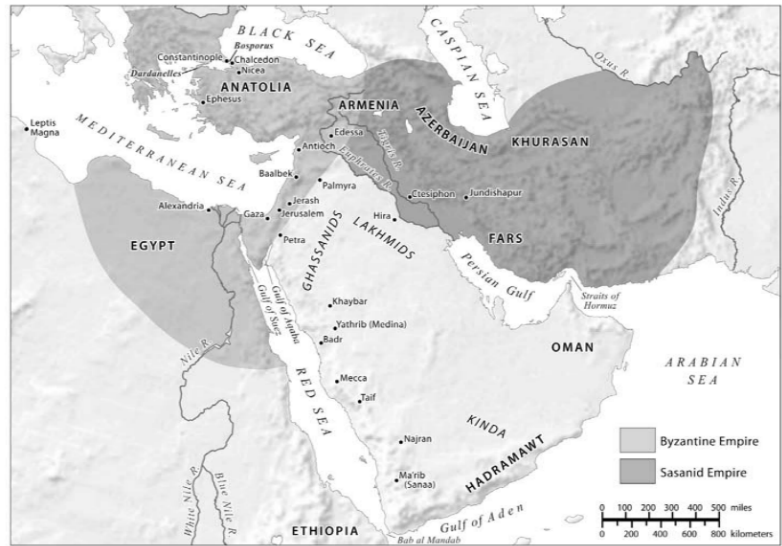


Figure 2: The roman and persian empires before the Islamic era in the middle east. (Goldschmidt and Davidson, 2010)

Before the Islamic era the Romans and Persians were the big empires that were present at the time. During these ages emperor Constantine became a Christian and this made Christianity spread in Europe and the middle east. This empire changed in the byzantine empire.

According to Darke (2020) the civilizations exchanged information about architecture, the Assyrians, Egyptians and the romans were convinced that their architecture should be a skill of the greatest artist and geometers.

As there was a abundance of stone the Assyrians and Egyptians quickly learned how to process these stones into building material, they also learned that volcanic ashes enforced the stones that were moulded. This information made it possible for the Pantheon to be built and the romans used stones as well with this knowledge. There were vast differences with the Western roman temples and the east roman temples because of this. In the east the focus was mostly on open air court yards enclosed with walls that lead to smaller chambers. This was done to encourage the public to be invited to this space and use it as a congregation. This was uncommon for the Iranian and roman religious architecture according to Darke (2020). This tradition got picked up by the Christians which formed into safe havens during pilgrimages. In Islam

this is also seen in the form of the Friday prayer and during funerals where the public gathers in a public space.

The region was the crossroad of multiple civilizations that made it possible for new inventions and knowledge to be shared between these different civilizations. Also the history of the middle east before Islam was rich and full of innovative traditions. They produced dozens of scriptures with knowledge about medicine, philosophy, astronomy and mathematics and much more by the likes of Ibn Sina and Al-Khwārizmī, (who introduced algebra to the world.)

### 1.2.2 Islamic era

Before the emergence of Islam the middle east was already partially inhabited by Arabs from the Arabic peninsula. The Umayyads, a Meccan clan, that was responsible for the biggest Islamic conquest had been acquiring land with their extensive trading. The Umayyads became Muslim before the Prophet's death and were rewarded with appointments to positions of power. They were the clan that ruled the biggest Islamic empire in history. These Islamic empires stretched from the middle east over north Africa to parts in Spain.

Later in history Jerusalem was in control of the Muslim dynasty, during their reign the holy sites of Christians stayed protected. According to historian Hugh Kennedy it was common for agreements that allowed Muslims and Christians both to use a holy site together. The Umayyads were responsible for most of the early Islamic buildings in Damascus and Jerusalem which makes them the main focus point in this research.



Figure 3: The expansion of the Islamic empire 632-750 . (Pinupbettu, CC BY-SA 4.0, 2019)

The Arabic society had an oral society which means it was not important to read or write like in Roman society. All the information was passed down orally and remembered perfectly. After the contact with Asia the Arabic society shifted towards a more written culture. The written history of this era was what sparked the Renaissance era as these writings concluded information about the old Greeks which was lost in Europe during this time. (Bassiouni, 2012)

### 1.3 Architectural influence

Architectural influence is one of the concepts that are crucial in this research. To understand how Islamic architecture could influence Gothic architecture. According to Holod (1988) architectural ideas could be transmitted in two ways, transmission through text, visual notations and buildings. Although Arabic and Islamic civilization used to be primarily an oral society, which means that most people memorized and gave each other information verbally without use of writing, they eventually used paper to write and draw concepts and ideas. This happened due to a capturing of Chinese traders which showed the Arabs how to construct and use paper. Bloom (1991) argues that even though drawn notes helped with the transmission of architectural knowledge/influence there is only proof of that from the 13th century there are no existing plans from before the 13th century for Islamic architecture. This opens the question how did the architectural knowledge transfer before the 13th century. Bloom (1993) argues that craftsmen learned their skills through following the example of their masters.

Visual notations in 2D or 3D has three functions:

- Serve as a tool to work an idea out before constructing it in the real world
- Serve as a tool to transfer ideas and concepts from the creator to other people
- Serve as a tool to show patrons how their completed projects will look



In the Umayyad architecture it is clear that the information of the building style has transferred as every building shares the same characteristics even though they are thousand of kilometres away from each other. Although we can conclude that there was no usage of floorplans before the 13th century this shows that the Umayyad architecture led by example and transferred their ideas through existing buildings and by passing down their knowledge to their kin.

During the building of Umayyad buildings there was a lot of mixing with roman/byzantine techniques this is explained by hiring people who are from the byzantine empire and used their knowledge in the process of building the Umayyad buildings. This allowed for the transference of knowledge and buildings to be a melting pot of styles. This could explain how architectural influence is established. (Bloom, 1991)

The second part that made the architectural influence possible between architectural styles were wars. One of the longest and most important war in this topic is the holy war. During the middle ages there were 8 crusades which started from 1096 until 1271. The crusades were moments where the Western society came in contact with Eastern society and learned from the buildings and techniques they saw there. (Darke, 2020)

the third part that made it possible to be architectural transmission between the Western world and Islamic architecture is the architecture that was left behind in Spain. The Umayyads conquered parts of Spain and built mosques there. These mosques were later turned into churches and used as inspiration for other styles of architecture.

Figure 4: This is a map of the first crusade. (ExploreTheMed, n.d.)

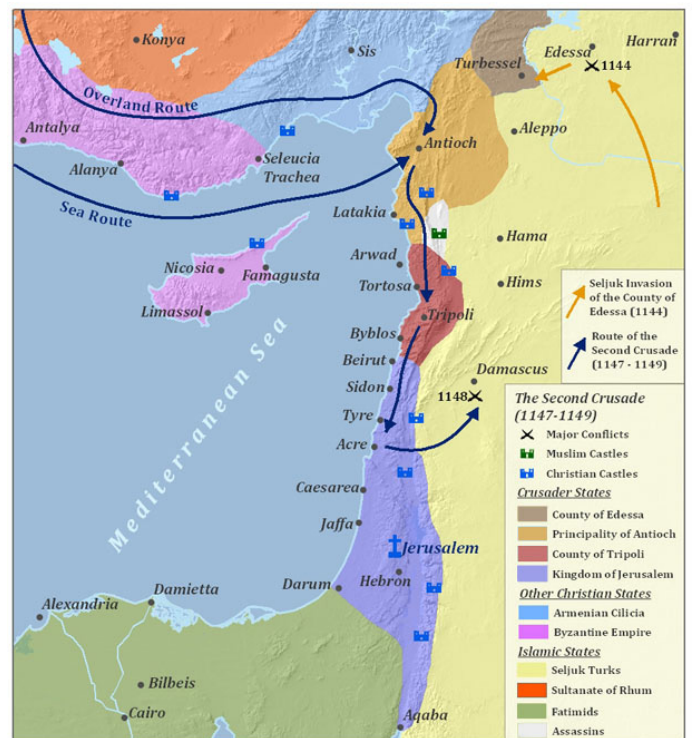


Figure 5: This is a map of the second crusade. (ExploreTheMed, n.d.)

Figure 6: This is a map of Jerusalem made during the crusades where the dome of the rock is drawn in an onion shape which is not the original shape. They also made an error and labeled it as a christian shrine the temple of solomon which made it a major inspiration in catholic architecture according to Darke (2020). (Reuwich, E. 1483)



# Chapter 2: The relation between Gothic Architecture and Islamic architecture

## 2.1 The essence of Islamic architecture

Islamic architecture is the architecture or building traditions present in the Middle East and countries in which Islam is dominant from the 7th century onwards. Buildings seen in Islamic architecture (Ching, Jarzombek and Prakash, 2011);

### Mosques

A mosque is the place of worship and the Islamic equivalent of a church. A mosque does not have to be a specific type of building. In the historical and architectural context a mosque is a specific type of building that has certain characteristics.

### Hammam

Hammams are bathhouses that were important in the Islamic world. They were built upon the existing Roman thermae. The importance of the Hammams are religious and civic. Cleanliness is extremely important in Islam. Before praying or reading/ touching the Qur'an every Muslim performs a ritual cleansing named Wuudu. The Hammams were also used as gendered meeting places for men and women.

### Madrasa

Madrasa, which means school in Arabic, were first built during the 11th century. Madrasas concentrated on teaching Islam in all the different aspects from theological to practical aspects. (Brentjes, 1997)

A madrasa has a cross like arrangement with four iwans (these are four walls with one wall open in a gate like feature. This space creates a hall). The Qibla-ivan the iwan that faces the orientation of the Ka'aba leads to the mosque. These iwans are placed around a courtyard which is an important characteristic for madrasas. Furthermore madrasas have cells for students and teachers. In figure 7 these characteristics can be seen in the floorplan of a madrasa. (Malhis, 2016)



Figure 7: Sultan Hassan's madrasa complex plan with its spatial categories. (Malhis, 2016)

Islamic Architecture borrows construction types from Roman, Byzantine and Persian building styles and merged them in their own way.

Islamic architecture is architecture that embodies the message of Islam through its multidimensionality. It facilitates Islamic goals and their sacred principles and promotes a way of life according to Islamic philosophy and principles. The role of the form is also very important, but only to fulfil functionality because the foundation of Islamic architecture is functionality. (source)

The characteristics of Islamic architecture are:

### 2.1.1 Ribbed vaults

Ribbed vaults are a structure that makes the creation of wide spaces possible. Cross ribbed vaults are a variation of ribbed vaults that were widely used by Romans as a constructive solution. The earliest surviving example is from the mosque-Cathedral of Cordoba in Al-Andalus which was built during the 10th century.



Figure 8: ribbed vault in cordoba mosque. (Corseilas, 2011)



### 2.1.2 Arches

Islamic architecture uses a wide variation of arches. Mainly the horseshoe arch, the pointed arch and the trefoil arch are embedded in the architectural style. These arches are all a variation of the original arches invented originally by the romans and Byzantines. the windows that are within these arches are made with stained glass.

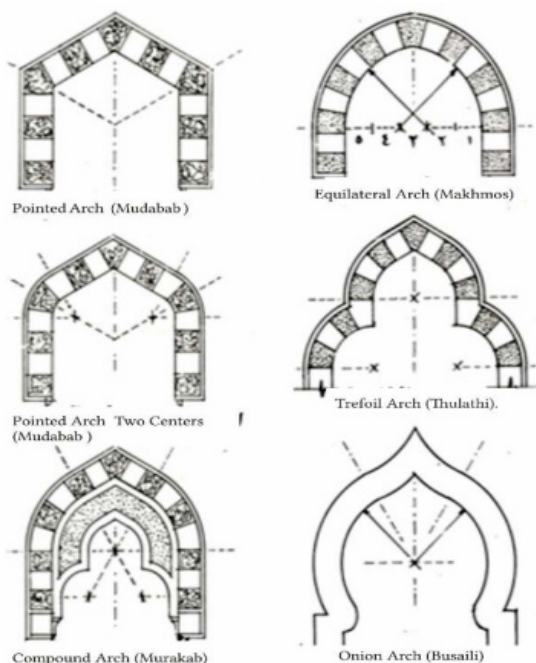


Figure 9: Different types of arches .(Almani and Nawari, 2016)

### 2.1.3 Mosaics

Mosaics although invented by the Greeks is a defining characteristic of Islamic architecture. After the Umayyad dynasty spread there was a large usage of mosaics in Islamic buildings. It was used to show mostly geometric shapes and floral shapes. This was inspired by the byzantine mosaics at the time. Later on they used it in combination with stained glass and tiles to create these iconic mosaics.

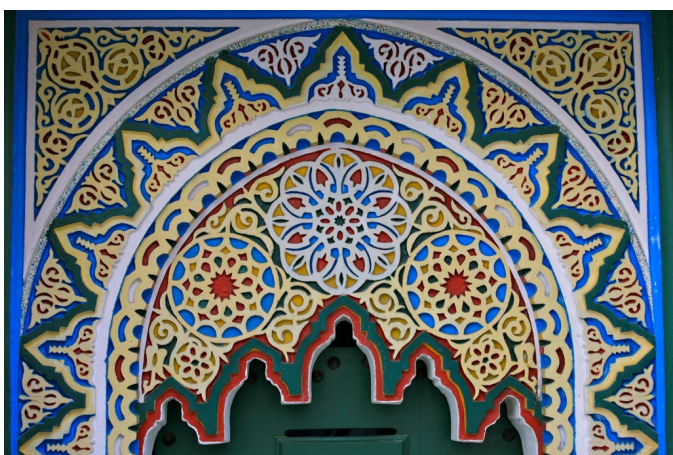


Figure 10: use of mosaics in the arch.(Proimos, 2010)

### 2.1.4 Ornaments/decoration

Calligraphy is the art of writing, this art form was popular amongst the Islamic people due to their faith. (Schimmel & Rivolta, 1992) In Islam it is not forbidden to depict animals or people but to avoid idolatry it is a common practice to not depict these images, therefore this art practice became popular in decorating buildings. Therefore most Islamic buildings depict a lot of calligraphy which are mostly verses from the Qur'an. This Calligraphy is also seen in stained glass

Another form of decoration in Islamic architecture are arabesque this is a way of decoration characterized by the use of abstract shapes shaped by flora.

The last of the most characteristic ornaments are muqarnas. These are decorations in the vaulting which resemble a honeycomb structure. These muqarnas are usually painted with bright colours.

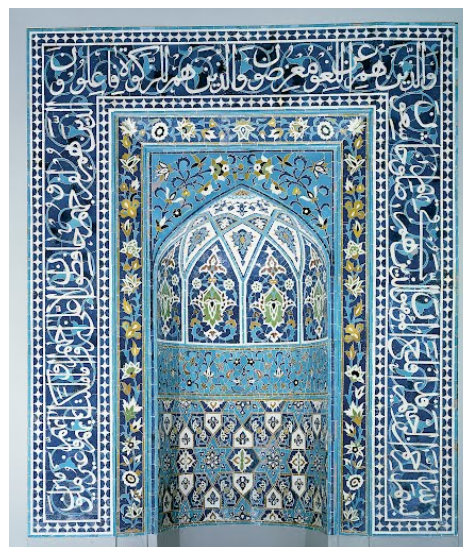


Figure 11: use of calligraphy and arabesque techniques in Islamic architecture.(Cincinnati Art Museum, n.d.)

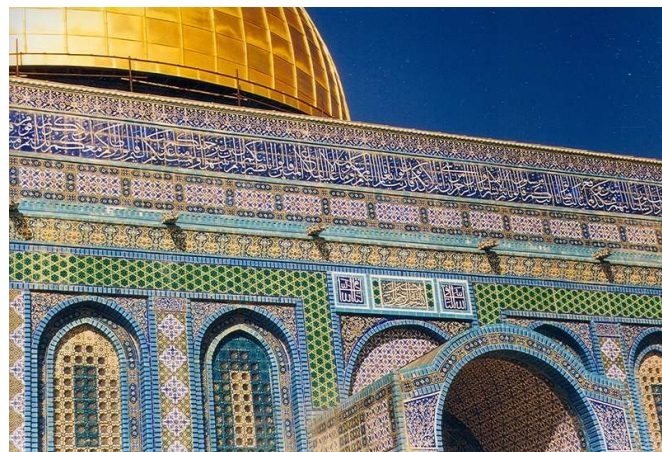


Figure 12: use of mosaics, arabesque and calligraphy in the dome of the rock.(Price, 2000)



## 2.1.5 Domes

Domes are one of the first signs that you are dealing with a Islamic building. Almost every Islamic building has a dome. There are a few type of domes that are important in Islamic architecture, especially the octagonal dome which is built in the dome of the rock is important.

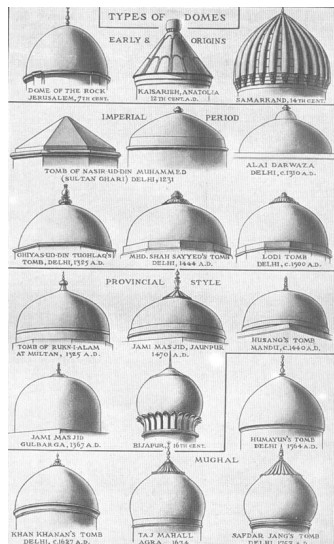


Figure 13: Dome typology. (Fletcher, 1996)



Figure 14: Dome usage in Dome of the rock. (Todd, 2018)

## 2.1.6 Minarets

The minaret is used for the azan which is the call to prayer which is chanted by the muezzin. The minaret is probably an extension of the towers that were present in past Roman buildings which were reused for this purpose. Crosswell argues that they were inspired by churches that had sort like towers in Syria

Minarets are towers that are taller than the building. They have a rectangular form sometimes they do have a other form but that is dependent on the region. Usually there are around 4 minarets according to the size of the mosque it can be more or less. The minarets are mainly located next to the big gate that is present.

the form as stated earlier is dependent on the region it is in. This is due to the reusing origin of the minaret. Towers used to have the function of a lighthouse that could function as a way to find a city or path. The first towers in Persia were mostly circular and were later reformed into minarets that are used for the azan. The Seljuks a Turkish-Persian empire that ruled regions in the

Middle-East. This empire was architecturally influenced by the Byzantine style and introduced the minarets in a rectangular form instead of a round form like the Persian-Iranian minarets. In every region the shape of minarets were shaped by the historical architecture that was present in that area. Later on the ornamentation of Islamic architecture was also added to these minarets. (Makvandi et al., 2015)

A number of historical minaret types presented according to shape and height

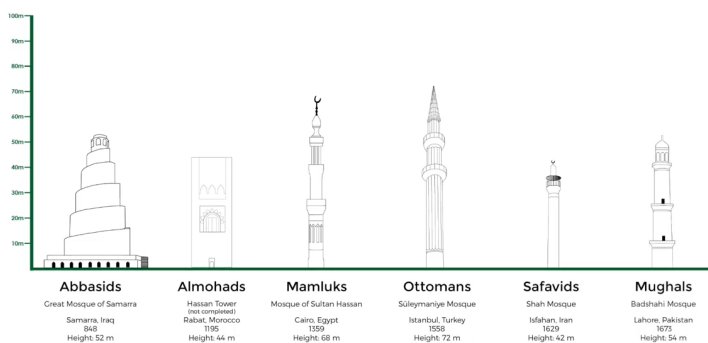


Figure 15: Minaret types through the years. (CSBE Films, 2017)

## 2.1.7 Courtyards with riwaq

Courtyards are characteristics for most Islamic buildings in the past, this is primarily due to the inspiration of Roman and Byzantine buildings having the same concept of creating a congregational space and the hot climate in the area made it possible and necessary. These open courtyards are almost always met with the use of riwaqs which is Arabic for arcade. These riwaqs serve as a transition space between outside and inside. The riwaqs functioned as shelter from mainly sun and functioned as a shaded cooling place.



Figure 16: Courtyards with riwaq at the Cairo Citadel. (Charlesdrakew, 2007)



## 2.2 The essence of Gothic architecture

According to Spanswick (2015), a graduate from the university of Washington in art history with a special focus on classical architecture, Gothic architecture is a style that started around the 12th century and lasted until the 16th century. It was the following style of the Romanesque style. The name Gothic is derived from the Goths a tribe who resided mainly in the northern part of Europe between the fall of the roman empire and the rising of the holy roman empire. As in the renaissance the Gothic style was seen as a vulgar style it was named after the goths. The goths were an old Germanic group that were the enemies of the Roma empire. They were pillaging and destroying their way through Europe. It started primarily in France and in the United kingdom.

Von Simmons(1952) an experienced art historicist that studied the medieval arts says Gothic has three main aspects: function, significance and design.

Gothic was the solution of statical problems(function), it was a way of expressing aesthetic principles(design) and it was a way to express an idea through ornamentation(significance). Gothic was the opposite of Romanesque and byzantine architecture as the structural elements are a technical mean to achieve an artistic goal. This means that technical structure is hidden behind fresco's and other artforms. While Gothic incorporates the technical structure to its art form.

Gothic architecture values geometry and ornamentation heavily in its design. Geometry and ornamentation are highly valued in its essence as Gothic wants to show the spiritual beauty in nature.

The people in the middle ages started to think that light is the divine power and that a church should embody that. So Gothic architecture had to show a lot of light and try to embrace the light.

Gothic architecture allowed for churches to be more slim and less massive in the interior. By using vaulting elements and pointed arch Gothic buildings could be more slim

and open in comparison to Romanesque buildings. As the churches became more lighter the importance of decoration and ornamentation became bigger which lead to a more inviting and warmer building. This new found architectural design led to more innovation in vaulting and ornamentation which led to it being a definitive characteristic in Gothic architecture.

Because of the lighter columns and the big height they could reach the windows in the church became bigger and allowed for more light into the church. In later Gothic buildings almost every surface is decorated.

This light is part of the beauty in nature that Gothic architecture wants to highlight. Which is why it is something that keeps coming back in most characteristic elements.

Van Simmons argues that Gothic originated from France as if it was created by a small group of men that share similar ideas. As if Gothic emerged by itself without influence of multiple styles and as if it is the opposite of Romanesque and byzantine architecture.

The characteristics of Gothic architecture can be seen in the picture below. The most important characteristics will be discussed further. In figure 16 a few characteristics are shown like the flying buttresses, the arcs and the gallery.

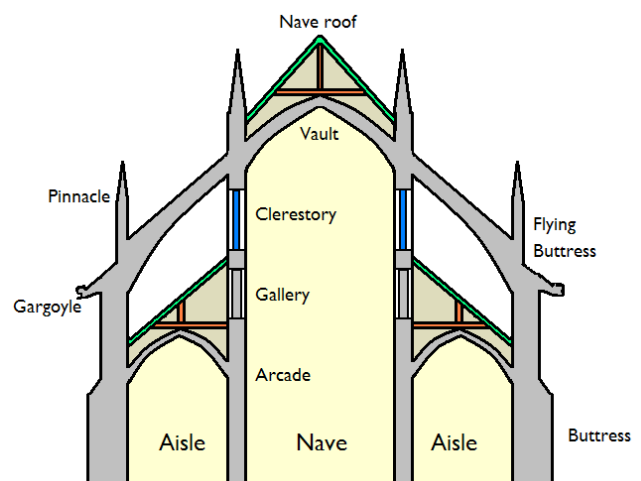


Figure 17: Sketch of all the characteristics of a Gothic church. (TTaylor,2007)

### 2.2.1 Arches

The pointed arch is the most used arch in Gothic architecture. It is an arch which is connected at the tip and curving in a sharp angle. These arches allowed for bigger windows and doors. The trefoil arch was also popular in Gothic Architecture. These arches were much thinner than the usual arches which added to the light form of the structure and allowed more light to come into the building. These arches added unto the desire to get light into the churches. Trefoil arches were also a common Gothic characteristic. Trefoil arches are arches that are in the shape of a trefoil which had a symbolic meaning in Christianity as it stood for the trinity which is prevalent in Christianity.

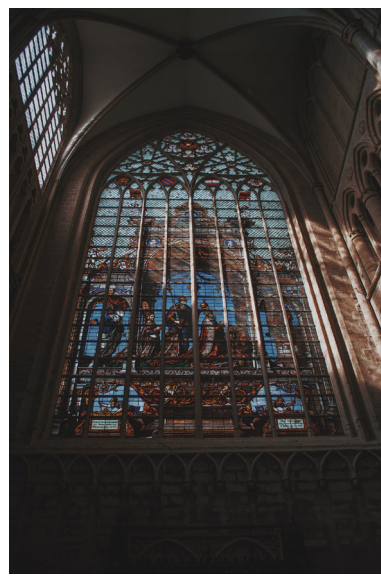


Figure 19: Example of the big windows with stained glass. (Abu bakr,2019)

### 2.2.3 Vaulted ceilings

The rib vault was a new way of vaulting which allowed the columns to be thinner than in the Romanesque style. This also reduced the amount of columns needed which in turn opened up the floorplan.

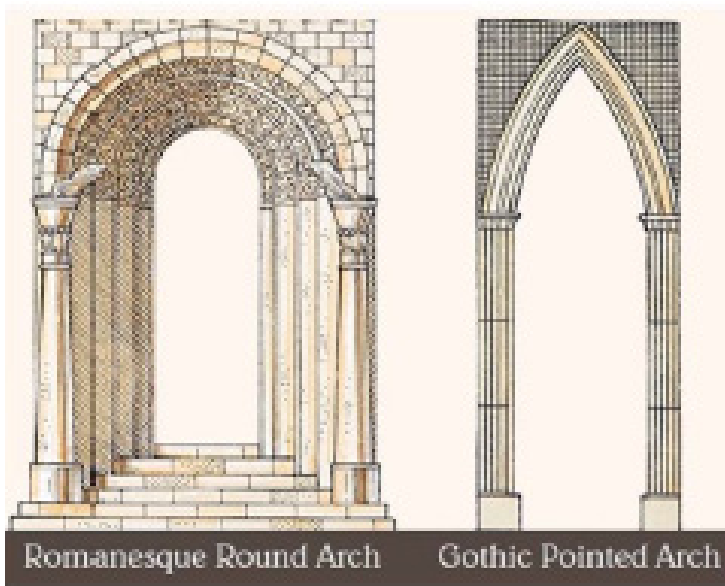


Figure 18: difference between romanesque round arch and the Gothic pointed arch. (Poor,2020)



Figure 20: Ribbed vault ceilings as can be seen here. (Y.,2019)

### 2.2.2 Big windows with stained glass

Due to the use of the pointed arch there was more room and force to facilitate big windows. These big windows were made with the usage of stained glass. these windows normally portrayed stories from the bible.

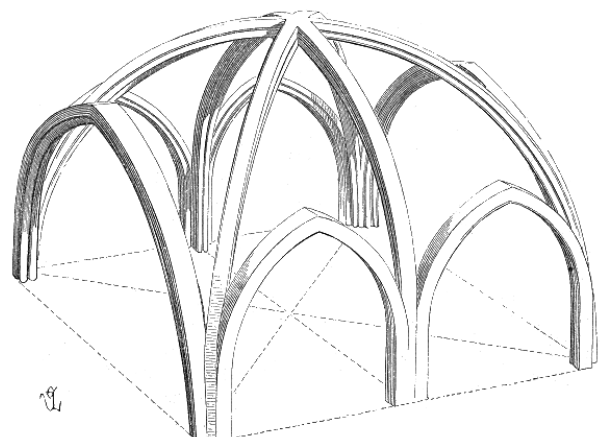


Figure 21: Ribbed vault ceilings in a technical drawing drawn by Viollet-le-Duc. (Wikimedia, 2005)





Figure 22: Arcade of Doge's palace highlighted in red. highlighted by author (Descouens, 2012)

### 2.2.4 Arcade

An arcade is the repetition of arches which lead to a sheltered space between the arches and a second wall (which can be either open or closed). These would normally lead to a courtyard in Gothic churches or to a aisle. These arcades would normally also have a gallery above it which are a row of windows that allowed a lot of light to fall into the church.

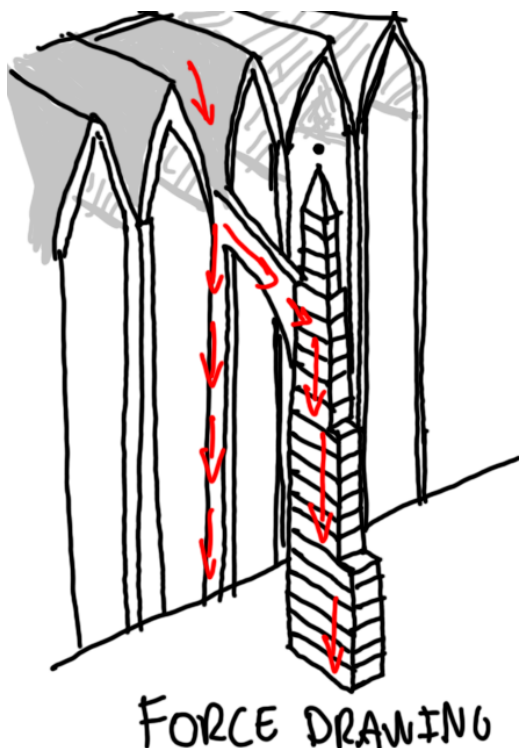


Figure 23: loadbearing buttress drawing. (Lemnawar, 2022)

### 2.2.5 Buttress

The buttress and the flying buttress functioned as a structure that supports the load on a wall. Buttresses are better in offloading the sideways forces from a wall. The flying buttress made it possible for the higher ceilings compared to Romanesque buildings.

### 2.2.6 Ornate decorations

Gothic architecture used a high variety of ornaments in their buildings. These ornaments were around arches, columns and on windows. It was mostly depictions of flora and also animals and people. The stained glass also had these decorations in their design.

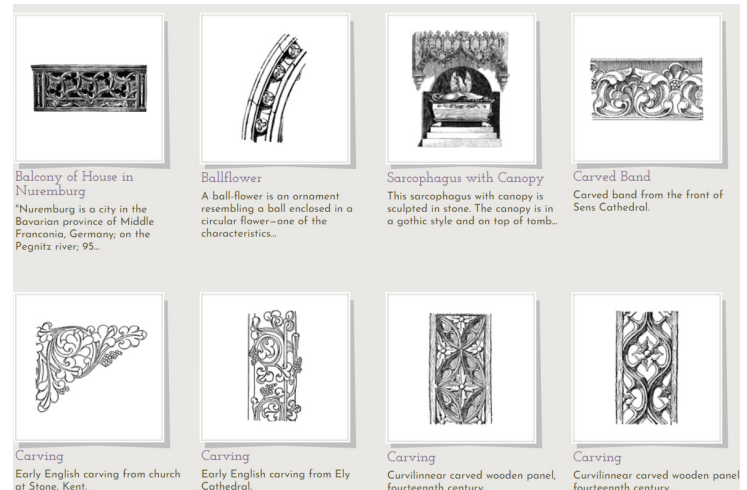


Figure 24: Example of Gothic decoration. (Florida Center for Instructional Technology., n.d.)

After this analysis it becomes clear that Islamic architecture and Gothic architecture have specific characteristics. Some of these characteristics show some similarities but also some differences this could indicate a certain influence. The similar characteristics are:

#### **- Rib vaults**

Both the styles have a big usage of rib vaults. The vaults in both the styles create a way to have less columns and a more open floorplan. In both styles this can be seen as a characteristic.

#### **- Ornamentation**

In Islamic architecture ornamentation is seen in the form of Flora and Calligraphy. In Gothic architecture ornamentation is seen in the arches, stained glass and on the walls. The difference in Gothic architecture and Islamic architecture is that Gothic architecture also depicts people and stories from the bible.

#### **- Arcades**

The arcades that are seen in Gothic architecture are also prevalent in Islamic architecture although in Islamic architecture arcades are mostly used in the courtyards. While in gothic architecture they are used in courtyards but also inside the churches.

#### **- Galleries**

In both the styles galleries are extremely important due to the importance of light. Light is seen as something spiritual and something that should be present in religious buildings according to the styles.

#### **- Stained glass**

Stained glass is an ornamentation that is seen in both styles although the form they appear in differ. Gothic architecture depicts people and stories from the bible in their stained glass while Islamic architecture as stated earlier forbid the depiction of saints/people. The stained glass used in Islamic architecture is mostly decorated with floral patterns.

#### **- Arches**

In Islamic architecture there is a vast array of arches these arches seem to be prevalent in Gothic architecture as well. The pointed arch is used due to its light construction and that it allows the usage of big windows that let in light. The trefoil arch is an ornamented arch which is covered in floral patterns that celebrates the godly through the usage of nature.

The analysis of Von Simmons research about Gothic architecture concludes that Von Simmons image of Gothic is reflecting a black and white thinking that is prevalent in history. He sees architectural styles as separate styles instead of connected. He states that Gothic is the opposition of Romanesque architecture while it could also be seen as an variation or eclectic of the style. The analysis of Islamic, Gothic and the other influencing architecture styles shows a constant influence that can be seen in both Gothic and Islamic architecture.



# Chapter 3: Transmission from the east to the west

There are various sources that discuss how these two architecture styles have influenced each other. Various arguments by using case studies but also arguments made by using literary sources. In this chapter these various influences/transmissions will be discussed.

## 3.1 Trading connections

According to Rahman (2015) the pointed arch is one of the most influential element in Gothic architecture. The pointed arch made the flying buttress and the larger ceilings possible which formed the foundation of Gothic architecture.

Scholars over the years all had different opinions about the origin of the pointed arch. Fletcher(1948) argued that the pointed arch came from the Babylonians, White (1971) claimed that it originates from India and was later transmitted to Persia. and Hillenbrand(1994) dismissed all these ideas and argued that it was most definitely an invention of the Muslims tracing it back to the Al-Aqsa Mosque built in 780.

Rahman(2015) speaks about the transmission and says Mesopotamian and Syrian Muslim motifs were transmitted via Egypt and Persia to the 12th century Gothic Europe. This happened due to two trading routes from Egypt, Tunisia and/or Andalusia.

Rahman(2015) argues that due to Qayrawān(caravan) which are a group of travelers that went on a trade expedition architectural knowledge was transferred from the Middle-East to North-Africa and Europe.

This transfer of knowledge is seen in the two earliest examples of Gothic architecture. The Montecasio Abbey(1071) and the Church of Cluny(1088-1095).

The Montecasio Abbey is an abbey that was built near Cassino, Italy around 570 on

top of old Roman ruins. The abbey is rebuild multiple times through the years. Abot Desiderius(1058-1086) was in charge of the rebuild of the abbey. The rebuilding of the Abbey involved a specific combination of pointed arches and straight-arris groin vault. The usage of this specific combination is a powerful argument to prove the impact of Islamic architecture on Gothic architecture. As stated earlier the Abbey was rebuild in the 11th century while this combination of pointed arches and straight-arris groin vault is used around 990 ,which is about 80 years earlier than the abbey, in the Great Mosque of Mhadiyya, North Africa. Due to the trading connections Italy had with North Africa it could be prove for the transfer of knowledge as this combination was never used in Christian architecture until this point. (Conant, 1972)

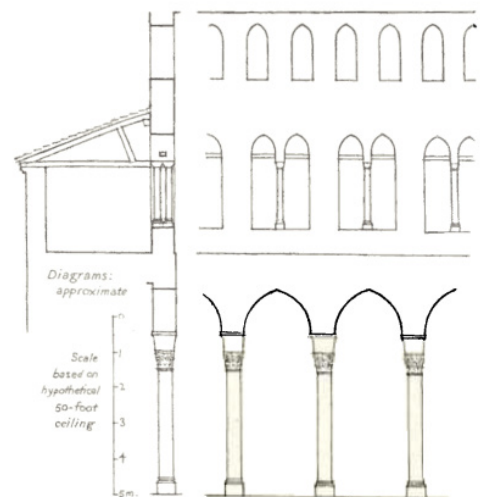


Figure 25: sketch restoration of the church. (Conant, 1972)

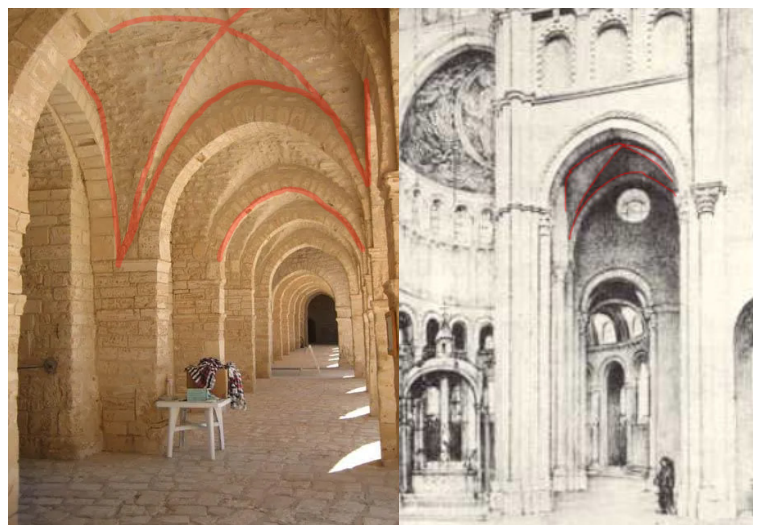


Figure 26: Straight-arris groin vault from north-africa(El-shahed, 2006) left and in st cluny church right(Conant, 1972)

For the rebuild of the abbey, craftsmen were trained by craftsmen from Amalfi and the Byzantine empire. They learned the art of mosaics and also imported materials from the east. This was another way of transferring knowledge between the Middle East and Europe.

The importance of these instances of transferring knowledge is not only the impact on this abbey but also the impact of the rest of Europe. The abbey in Cluny had a close relationship with the abbey in Cassino. Cluny used the abbey in Cassino as a frame of reference to rebuild their own abbey. Through this Islamic elements were used in their building. The abbey of Montecassino and the abbey of Cluny were both one of the most influential churches at the time and served as a inspiration for other churches. This was a secondary transmission of knowledge in architectural style.

### 3.2 Pilgrimage and Crusades

Diane Darke an author and scholar in the subject of Islamic Art and Architecture did research about the influence of Islamic architecture and Western architecture. In her book *stealing from the Saracens*(2020) she describes a detailed history and connection between Europe and the Middle-East.

She states that holy conquest and pilgrimage was a significant contributor to the transfer of knowledge between Europe and the Middle East. The pilgrimage and crusades made it possible for the European society to come in contact with the Eastern society. This means that they see buildings, materials and techniques they normally do not see.

At the time there were a lot of temples and mosques that were reused as a church. Pilgrims and crusaders used these churches as an inspiration to build in the west. Abbot Daniel also known as Daniel the Traveller is a pilgrim from Russia. In his journals he writes multiple times about the churches he sees and adores them. According to Wilkinson et al (1999) ,who translated and organized pilgrimage journals, he is told that the churches are built by Muslims but still is in denial of it being the truth this shows that

even though people knew that the building in origin is Islamic it is still seen as Christian.

Darke argues that all round templar churches are modelled on the Dome of the Rock which was called Templum Domini by the pilgrims and crusaders. All those templar churches share the same features as the Dome of the Rock. Normally churches at that time had a regular nave but these templar churches had a circular nave modelled like the Dome of the Rock with an arcade of pointed arches that are topped by interlocking round arches. in the figure below you can see the similarity of London's round Temple Church design and the Dome of the Rock. the red square shows the arcade of pointed arches in a circular form.

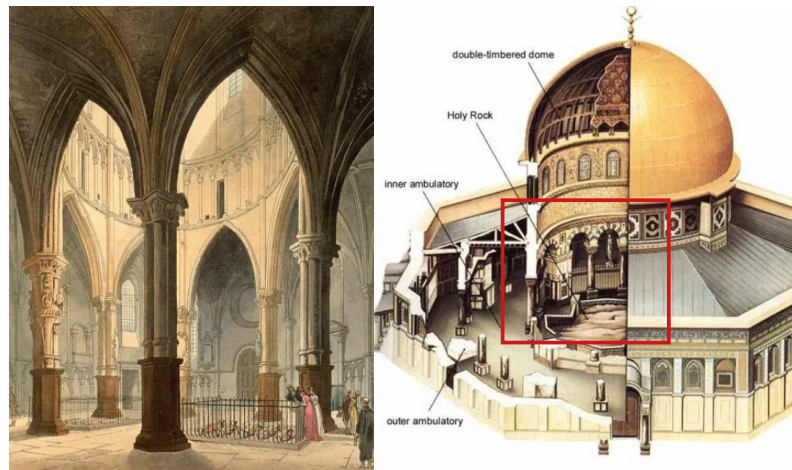


Figure 27: Left Templar church in London.(Darke, 2020) right the dome of the rock (Figure 27 Right, 2014)

Darke refers to other scholars who wondered if translated works shared a role in the transfer of knowledge. Because the Islamic society during the Middle Ages were further scientifically in comparison to Europe a lot of Arabic scripture was translated and used by people who chased knowledge. In this literature building techniques and buildings were also present which could have played a role in this transfer of knowledge.

Crusaders took things from the Middle East with them to Europe which also added to the transferring of knowledge and architectural style. In Venice outside of the St.



Mark's Basilica there are to pillars that are known as the Pillars of Acre which were taken from Constantinople as loot. These artifacts could act as inspiration on the existing architecture.



Figure 28: Pillars of Acre in front of St. Mark's Basilica. (Green, 2000)

### 3.3 Conquest

Howard (1991) an art historian that studied the impact of Islam/Arab influence on the architecture and culture of Venice added a fourth option of transferring knowledge namely through colonies. After the 4th crusade Venice conquered a part of Byzantium and occupied three-eighths of Constantinople. For almost 50 years this part of Constantinople stayed in the hands of Venice which made it an important part of the trading exchange between the "west" and the east. These colonies were also responsible for the transfer of knowledge.

In the 11th century significant parts of Spain and some parts of Italy were also under Islamic rule. The remains of this rule functioned as an influence on the European society. This can also be seen in the Cloister of Notre Dame du Puy Cathedral where the usage of the horseshoe in shape and colour directly resemble the same arch in the earlier built Mosque of Cordoba. (Darke, 2020)

Throughout history it becomes clear that there are different ways knowledge from the east can transfer to the west. The ways for knowledge during the Middle Ages could be:



Figure 29: The horseshoe arch in the cloister of Notre Dame du Puy Cathedral built in the 12th century below this picture is the interior of the Cordoba Mezquita a cathedral in Spain which is built originally by Abd ar-Rahman I as a mosque which shows the Islamic elements that the cloister above has used/is inspired by. right (Grandmont, 2003) left (Gordon, 2007)

#### - Trade route/Merchants

There were numerous trade routes between the Middle East, North-Africa and Europe. Due to these travels people from Europe got in contact with Middle Eastern architecture, materials and techniques.

#### - Crusades

Due to the crusades being a war it was normal for them to take loot from the Middle East. This loot functioned as study material in Europe which could function as inspiration. Secondly the Crusaders came in contact with Islamic architecture and society which made it a way to transfer knowledge.

#### - Translated literature

Due to the knowledge the Islamic society had, translated literature was available for scholars to learn.

#### - Pilgrimages

Pilgrimages made people from Europe see and use Islamic architecture as inspiration with the understanding that those buildings are a product of Christian architecture.

#### - Conquest

Existing conquests made the transfer of architectural knowledge possible. The remnants of Islamic conquest in Europe made it possible for Europe to have Islamic buildings that could be used as inspiration.



# Chapter 4:

## Form studies in iconic buildings

In this chapter an analysis is done on existing Islamic and Gothic buildings. Their main design will be discussed briefly, and their characteristics will be discussed as thorough as possible. At the end of this chapter the similarities or differences in the characteristics will be discussed.

### 4.1 Umayyad mosque

The Umayyad Mosque in Damascus is a monumental work of Islamic architecture. The building is designed as 3 long spaces that are parallel to each other. In front of those 3 halls there is a huge open courtyard. The mosque is designed as a big rectangle of 97 meters by 156 meters with 3 big main gates that connect the east, west and the north. The Umayyad Mosque is one of the earliest known Islamic building that is seen as one of the biggest Islamic monument.

There are different characteristic elements that are in this building. The Umayyad Mosque has a courtyard that is surrounded by riwaqs(arcades) that are built in a pointed arch. In the centre of the courtyard a fountain is present to perform wudu(ritual washing).

In this building the 3 Arabic art forms are apparent: Calligraphy, mosaics and arabesques.

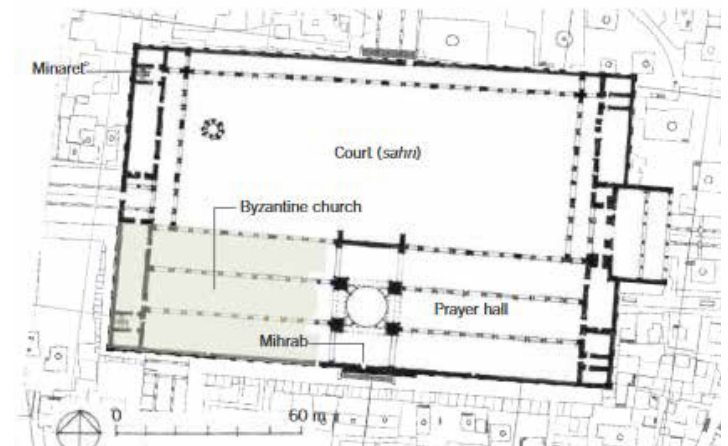


Figure 30 : floorplan of Umayyad Mosque (Jarzombek, Prakash and Ching, 2011)



Figure 31 : aerial of Umayyad Mosque(Gagnon, 2010)



In the courtyard the stylistic elements that are prevalent are rivaqs which are built in an equilateral arch which is highlighted in the image below in yellow. The equilateral arches can also be seen in the fountain at the centre which is highlighted in red. Above the arcade a gallery that stretches across the whole arcade is present which is highlighted in blue. There are domes pre-

sent which are highlighted in green. The rivaqs are covered with mosaic decoration these are highlighted in orange. In figure ... the other side is visible. All the elements that were previously mentioned are seen here as well. The addition is a second structure which is covered in arabesque ornamentations highlighted in orange.

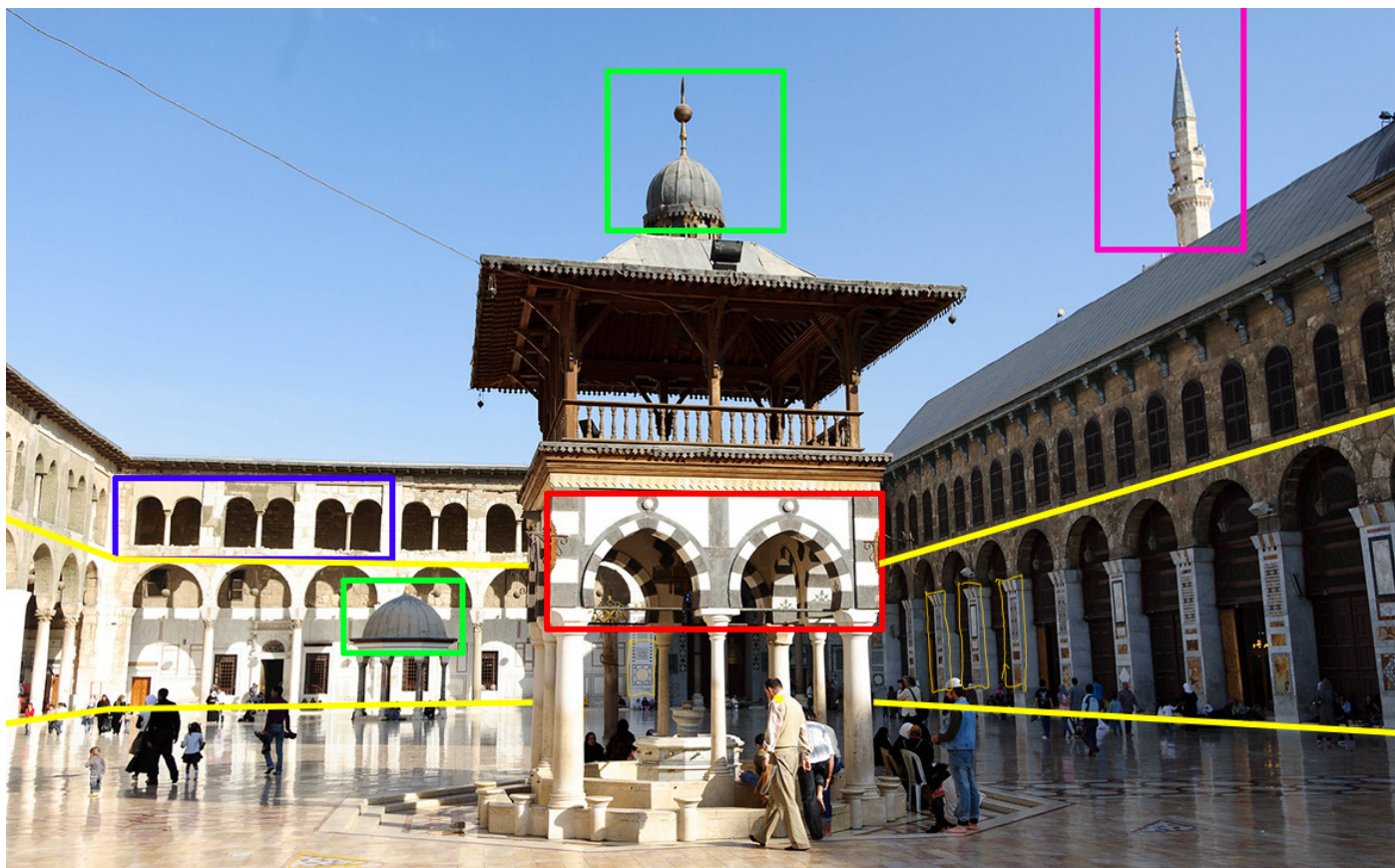
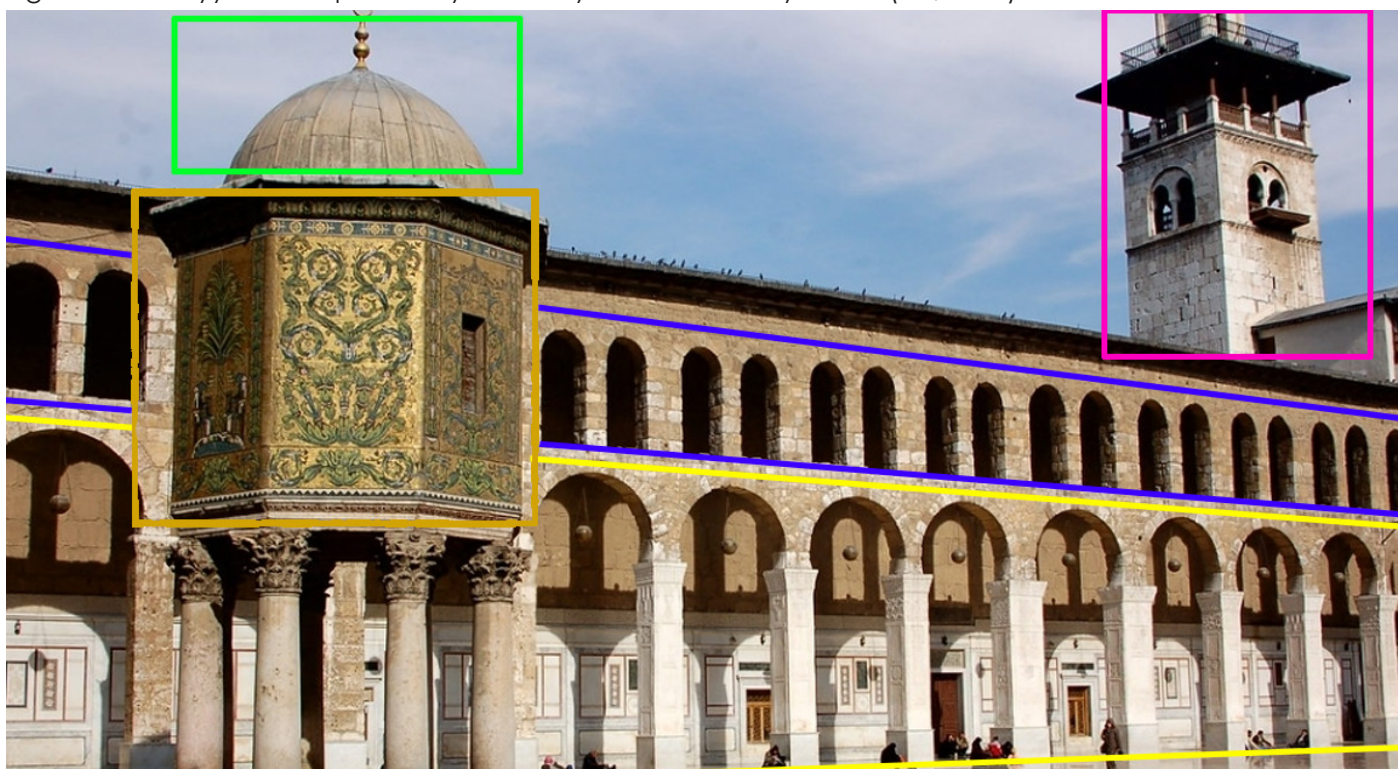


Figure 32: Umayyad mosque courtyard analysis 1 annotated by author( May, 2010)

Figure 33: Umayyad mosque courtyard analysis 2 annotated by author( D., 2006)





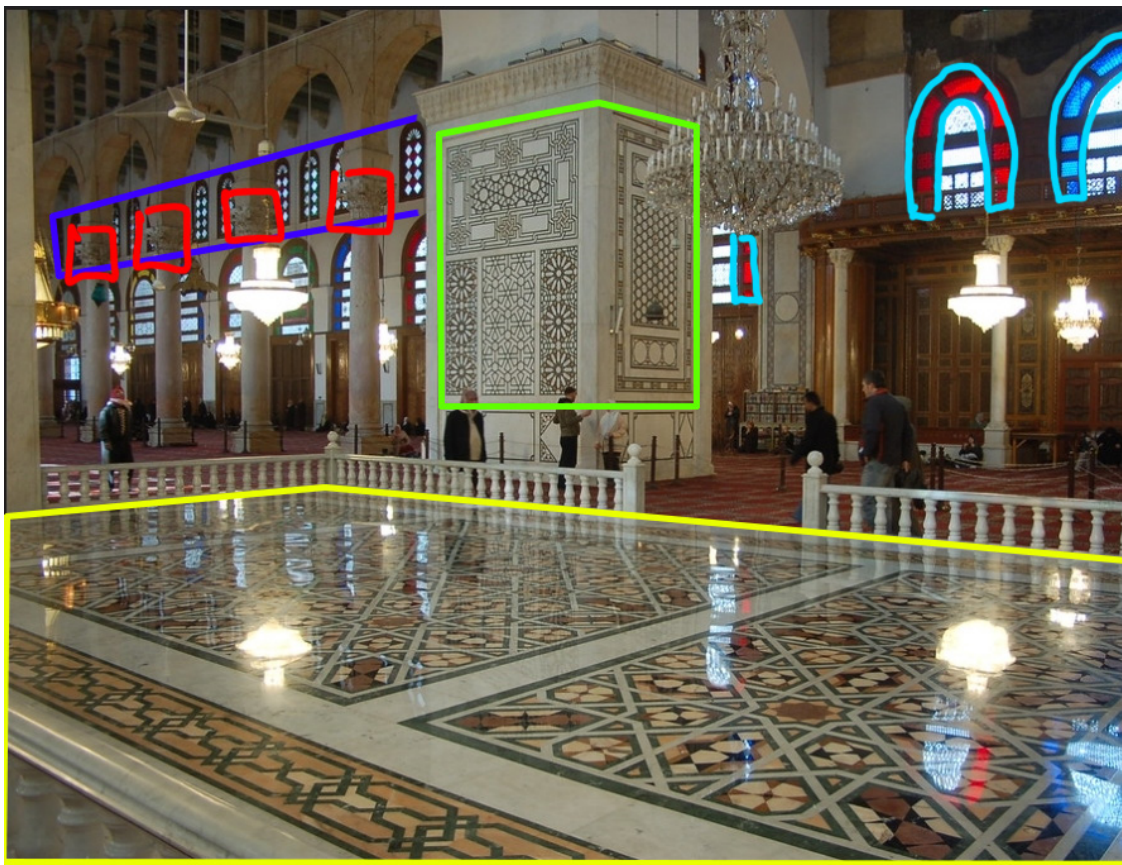


Figure 34: Umayyad mosque interior analysis 1 annotated by author( D., 2006)

specific elements the next analysis will focus on the interior. In the interior a lot of characteristics are notable. Firstly the focus for Islamic architecture to let in light is obvious as the whole wall is covered with big windows there is even a gallery above the big windows to let in more light these elements are highlighted in blue. It becomes clear that decoration is extremely important in Islamic architecture when the Umayyad mosque is analysed. There are mosaics on the wall (highlighted in green) and on the floor (highlighted in yellow) all the mosaics use a combination of geometric shapes and bright colours. there are arches going through the mosque these make it possible to have big rows with free floorspace. This is also accompanied with arcades on both side. These arches are decorated with arabesque decoration. The windows are all decorated with stained glass in an array of colours blue, red, green and yellow. These stained glass are not decorated and are kept basic. In figure .. the stained glass is vastly different than the ones that were shown previously, these stained glass are heavily decorated with geometric shapes and bright colours, arabesque decoration and even calligraphy. The stained glass creates a divine-like glow with the right light fall.



Figure 35: Example of stained glass and calligraphy. (Reibai, 2008)

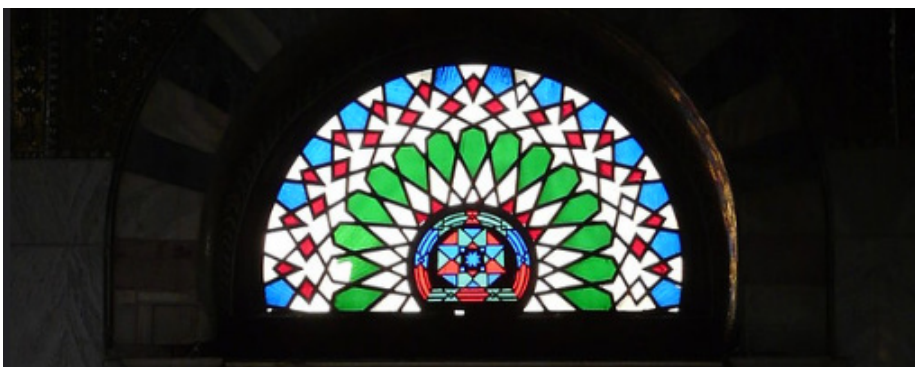


Figure 36: Example of stained glass. (Kapur, 2010)



Figure 37: Example of Gothic decoration. (Florida Center for Instructional Technology., n.d.)



## 4.2 Abbey Church of Saint Denis

The Abbey Church of Saint Denis is a church that is considered as a highly influential early Gothic building. The Abbey Church of Saint Denis is rebuilt multiple times first it was first a Roman cemetery and later changed into a church. (Darke, 2020)

There are different characteristic elements that are in this building. In the facade the ornamentation and the rose window is the most defining detail. There are 3 enormous main gates that have equilateral arches around them. Which are heavily decorated with plant like motives.

Figure 38: floorplan Abbey Church. (n.d.)

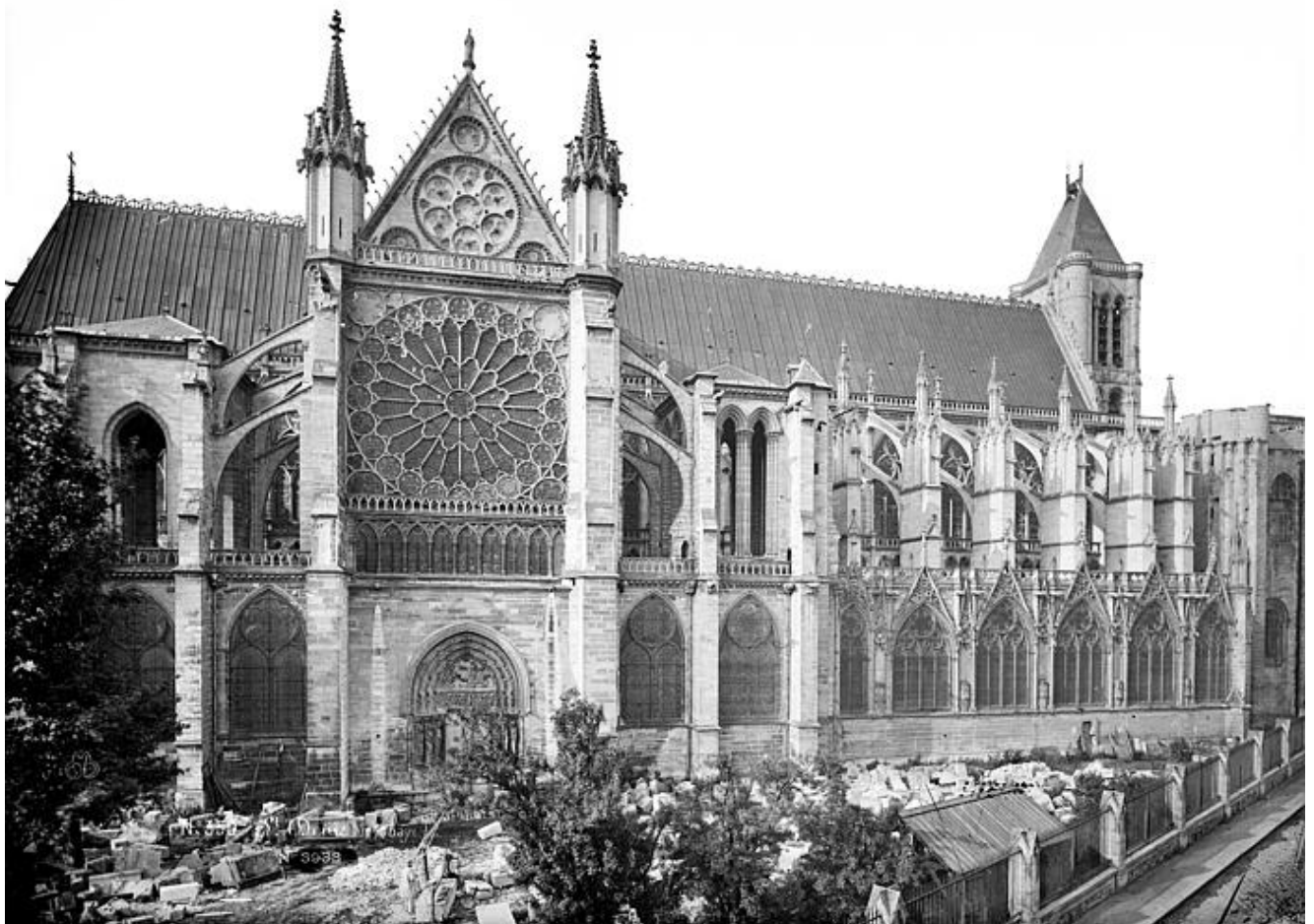
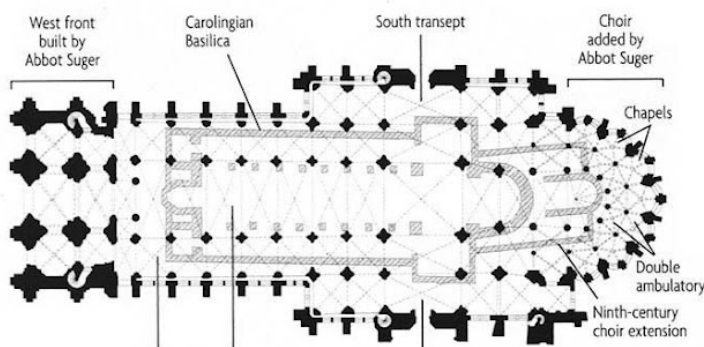


Figure 39: st denis facade (Mieusement, 1893)



In the interior of the church it is full of decorations. The most important elements that are seen in the building are the galleries highlighted in blue. These galleries use a quatrefoil arch in the window and stained glass. Underneath the gallery there is a row of equilateral arches that form an arcade highlighted in green. In the ceiling the ribbed vault is seen and part

of the decoration of the church. The stained glass is decorated with figures and plants. The window-frame of the stained glass have a pointed arch and finish in a round circle at the top. The lightfall that is important in Gothic architecture is luminating the stained glass in a



Figure 40: stained glass in st denis. (Myrabella, 2012)

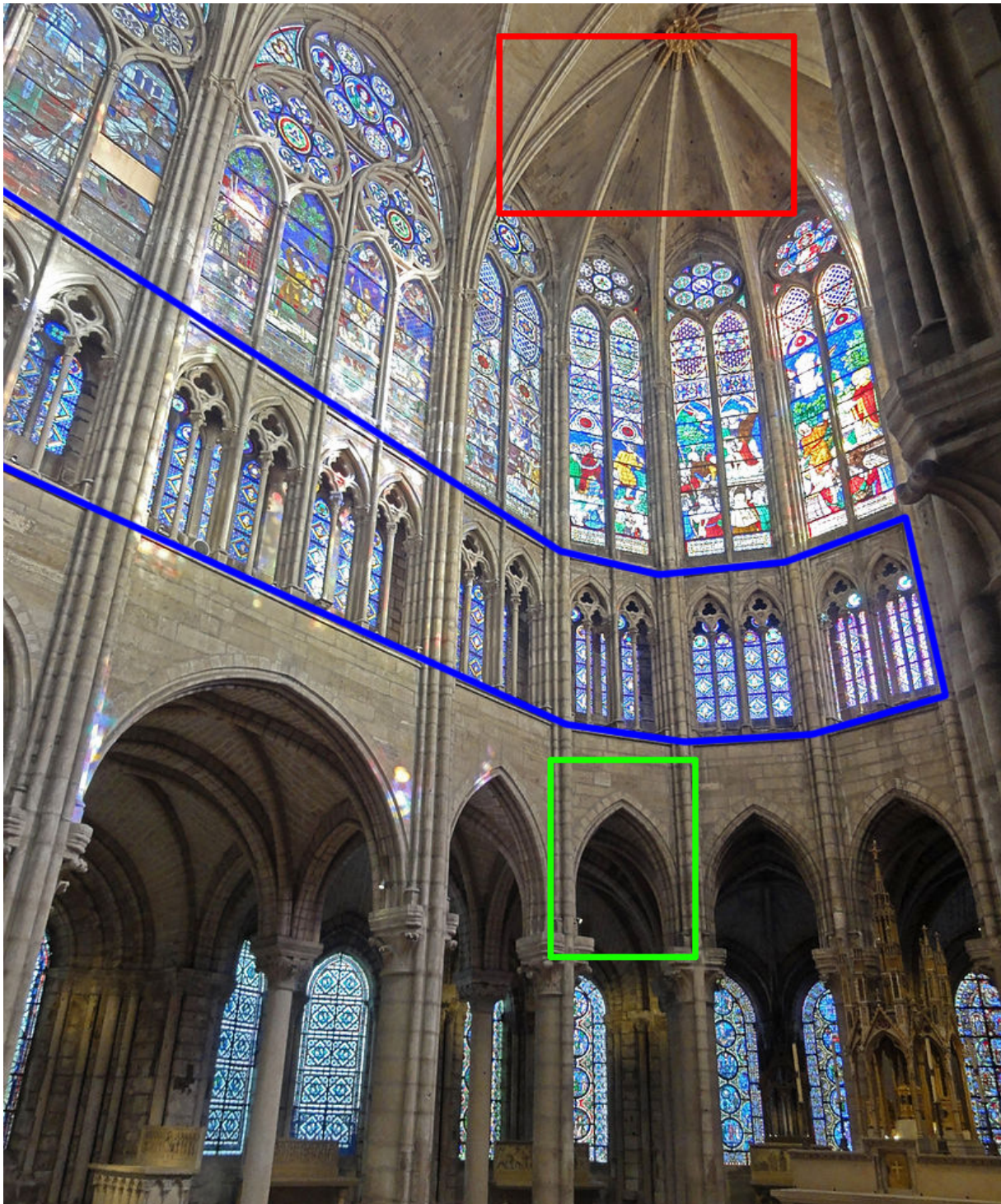


Figure 41: analysis interior annotated by author. (Poschadel, 2014)



### 4.3 Dome of the Rock

During the 7th century caliph Abd al-Malik brought with him stonemasons and craftsmen to create the Dome of the Rock or otherwise called the Al Aqsa Mosque. This is one of the oldest Islamic building that still survived like the Umayyad Mosque.

The dome encloses a enormous holy stone in its centre. This Dome is accessible from the north, west, east and south. The dome has a diameter of 20 meters. And rests on a double system of pillars and arches. The inner Pilar system is round and the outer Pilar system is octagonal.

The characteristics that are seen in this building are: **Domes, Arcades, Mosaic, Calligraphy, Arabesque**

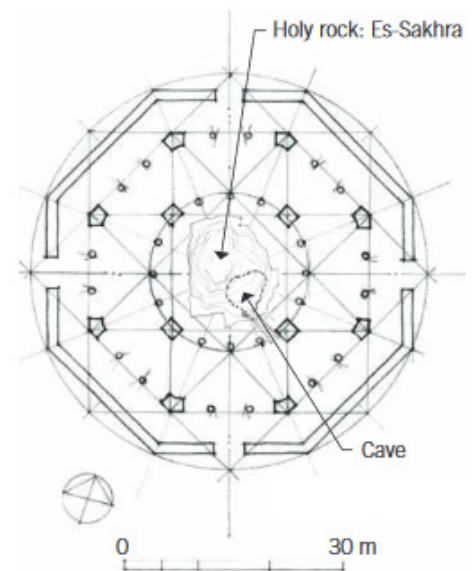


Figure 42: circular and octagonal floorplan of the Dome of the Rock (Jarzombek, Prakash, and Ching, 2011)



Figure 43: The dome of the rock mosque one of the most important buildings in Islamic architecture. This building is the essence of Islamic architecture which shows all the main points in the style. (Shiva, 2013)



The Dome of the rock is a perfect example of decorative Islamic architecture there is a wide usage of **mosaics, calligraphy and pointed arch** on the facade of the building. Every surface of the **dome** is covered in **arabesque** decoration. underneath the dome there is a gallery with round arched windows highlighted with blue. The round arched inside column is decorated with black and white highlighted with red. There is even calligraphy that is highlighted with green. The usage of bright colours is iconic for this building.



Figure 44: decorated facade (Victorgrigas,2011)

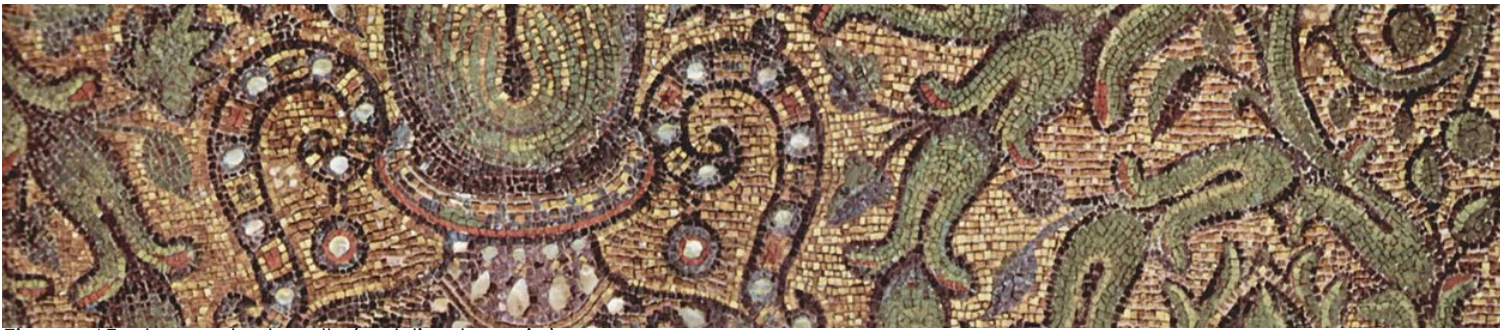


Figure 45: decorated walls (public domain)

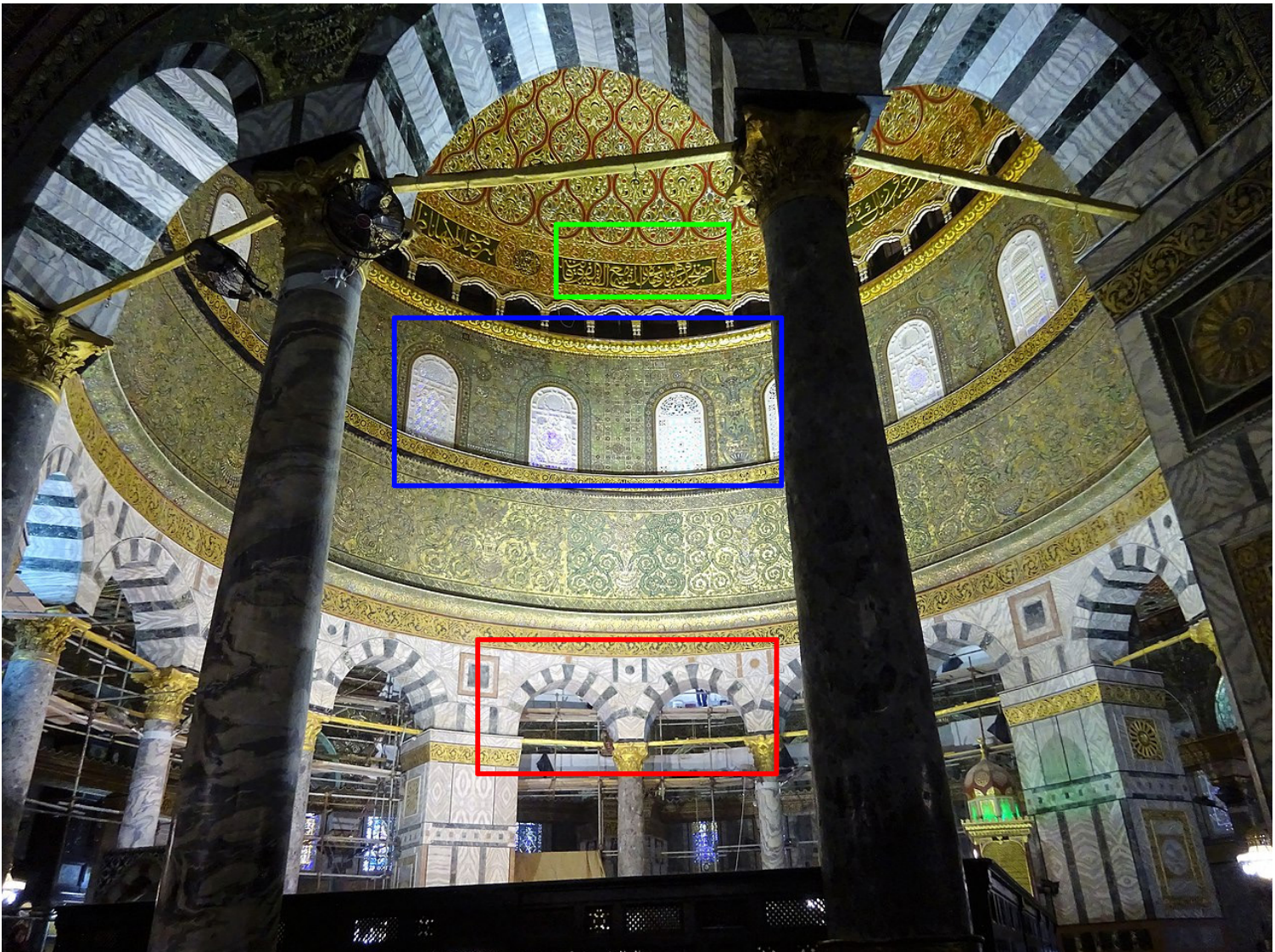


Figure 46: decorated walls (virtutepetens, 2018)



In both the Islamic buildings and the Gothic building it becomes clear that both styles have their own separate identity. But some characteristics that are part of this identity share similarities. In all the buildings the most seen and most defining characteristics are the arches. They come in different form and sizes but the pointed arch and the equilateral arch are seen in all the case studies.

The second characteristic is ornamentation. Ornamentation is done through stone carving, stained glass, mosaics and arches.

The usage of light and the effect light has in all the buildings is an characteristic that is important in both styles.

All these similarities in the styles with the historical knowledge show that an influence is possible between Islamic and Gothic architecture.

## Chapter 5: Discussion

style started. This is of course absurd as it is impossible to determine which time exactly a style started or is created.

This thesis tried to determine in what way so called eastern architecture influenced Gothic architecture. Due to orientalism most sources have to be taken with a grain of salt. To perform this research and to get good qualitative and truthful results these historical facts should be analysed and mapped out. To research this subject properly there should first be research about what type of architecture there is in the Middle East. For now it was only possible to research the influence of Islamic architecture due to the orientalist nature of most sources. After the different types of architecture are known it is easier to map out which influenced which and in what way.

Due to the young nature of this subject and the recent developments on this front it is important to be critical of the literature in the west. For example Cresswell worked for most part of his life on Islamic architecture and its history. His approaches were to analyse monuments in chronological order with a classification system that is not structured and objective. These kind of researches (which there are many of) influence the results significantly.

Sources that are useful or primary especially for the Middle Eastern side was hard to find in English. It could be better to search for these sources in Arabic as there might be some well-preserved literature from the Middle East. Due to the inability of the researcher to read Arabic it was hard to get both side of the stories in a detailed manner.

The static perception of styles is dangerous for this research as there is a certain hierarchy that get created by our own mind while in real life there is no hierarchy. Banister Fletcher is somebody who had this static way of thinking were every architectural style branched out in its own while this is not the case. This is a theme that is recurring in western literature. The origins of Islamic architecture are vague and hard to determine but for gothic architecture it is clear exactly what building and what time the

## Conclusion

Islamic architecture as the academic world knows it is formed by three major things: history, environment and prejudice.

The history of the Middle East played a major part in the origin of Islamic architecture. The previous buildings built by the Romans, Byzantines, Persians etc. were detrimental for the basis of Islamic architecture. These were the building bricks for Islamic architecture.

Then the environment decided how these bricks would be shaped or formed. The materials and the technical abilities that were going to be used were decided by the environment (climate and society).

The depiction of Islamic architecture even the name of it stems from orientalism a prejudiced thinking about the east opposed to the west. Decades of research with this thinking shaped Islamic architecture until now. Islamic architecture is the architecture of the Middle East according to the sources. The better terminology would be that Islamic architecture is the architecture to describe religious buildings that are built for the practicing of the faith Islam.

Architectural influence is the influence of a past or current architectural style on another architectural style. This influence is usually happening in the reusage of characteristics from the past or current style in the other. Architectural influence could also be the further exploration of characteristics of the past or current architectural style. Throughout this research it becomes clear that each architecture style lends something from another due to constant connection between styles.

Islamic architecture knows different kind of building typologies in its style but they all fulfil the same goal which is to facilitate the practicing of Islam in a way that enriches your life with beauty.

Gothic architecture is an architecture style

that is a complex style with many different variations. Its main goal is to celebrate the divine through nature, this celebration is done by constructing a building. Gothic architecture was influenced by Romanesque architecture as they used Romanesque vaulting and building characteristics which find their roots again in Roman and Byzantine architecture.

Although both styles have their specific characteristics maybe too much to name them all, they still share a certain amount of similarities. These similar characteristics is seen in 1 their main goal both want to facilitate the practicing of their respective faith. Both do it by the glorification and the usage of nature in their building. These similarities are seen in arches, arcades, ornamentation, glass techniques and the importance of light.

There are 5 ways the transference of Islamic architecture to Gothic architecture is facilitated through:

- Crusades
- Pilgrimage
- Trading routes
- Conquest
- Translated literature

The characteristics that are in every iconic Gothic and Islamic building are mainly the Pointed arch, Equilateral arch, ornamentation, Arcades, Galleries and Big windows.

It can be concluded that Gothic architecture and Islamic architecture share a lot of similarities and in their history came close to each other in different ways. The exact source and moment one architectural style influenced the other is impossible to determine although a lot of scholars try to do it, but the arguments that the one influenced the other is persuasive and holds a certain truth.

## **Short Bio**

**The author of this paper was born in Nijmegen. He holds a bachelor degree in Built environment from TU Delft. He is currently following the Masters degree in Architecture on the TU Delft.**

**Anwar Lemnawar  
anwarl@live.nl**



## Primary Sources

Charlesdrakew. (2007). figure 16 [Foto]. [https://commons.wikimedia.org/wiki/File:M.Ali\\_Mosque6.JPG](https://commons.wikimedia.org/wiki/File:M.Ali_Mosque6.JPG)  
Cincinnati Art Museum. (n.d.). Figure 10: use of calligraphy and arabesque techniques in Islamic architecture. [Foto].

IMPRESSIVE TILES A TEXTURAL MOSAIC ART AND LANGUAGE ARTS GRADES: 9–12. <https://www.cincinnatiartmuseum.org/media/217249/secondary-lesson-impressive-tiles.pdf>

Clouet, T. (2015). figure 37 [Foto]. [https://nl.wikipedia.org/wiki/Kathedraal\\_van\\_Saint-Denis#/media/Bestand:Saint-Denis\\_-\\_Fa%C3%A7ade.jpg](https://nl.wikipedia.org/wiki/Kathedraal_van_Saint-Denis#/media/Bestand:Saint-Denis_-_Fa%C3%A7ade.jpg)

D. (2006a). Figure 33 [Foto]. [https://www.flickr.com/photos/twiga\\_swala/2254513311/in/photolist-4rdY-ga-kTyY8-eTwS9o-D6zTJ-4rc1Tr-2dLJ11Y-kTL18-2dtSekR-2gaC7mt-99BKau-99BHQd-99yFo4-99BMbY-99ywSe-99yF9i-99BNtf-99yBhR-9MFUoe-3Lzg9Y-86uGe2-4rdwBn-zELth-GCk2Ny-Fbw5bb-7sGWrY-4ri-iw-kTyy7-23oZ8iB-5aDrbi-qz13kP-23oZ7kV-99yE6x-99yEkP-99yG14-99BPg1-kVcBk-642Hw3-7sCY5g-99yCpp-99BKx9-DzA3BL-7sCYia-7sCYav-aGMfi2-kWrSnH-8vGrfV-8asDJt-8avUnL-8vKpid-99BGQU](https://www.flickr.com/photos/twiga_swala/2254513311/in/photolist-4rdY-ga-kTyY8-eTwS9o-D6zTJ-4rc1Tr-2dLJ11Y-kTL18-2dtSekR-2gaC7mt-99BKau-99BHQd-99yFo4-99BMbY-99ywSe-99yF9i-99BNtf-99yBhR-9MFUoe-3Lzg9Y-86uGe2-4rdwBn-zELth-GCk2Ny-Fbw5bb-7sGWrY-4ri-iw-kTyy7-23oZ8iB-5aDrbi-qz13kP-23oZ7kV-99yE6x-99yEkP-99yG14-99BPg1-kVcBk-642Hw3-7sCY5g-99yCpp-99BKx9-DzA3BL-7sCYia-7sCYav-aGMfi2-kWrSnH-8vGrfV-8asDJt-8avUnL-8vKpid-99BGQU)

D. (2006b). Figure 34 [Foto]. [https://flickr.com/photos/twiga\\_swala/2255298026/in/photolist-4rhZwJ-86uGe2-99yE6x-99yEkP-2i7KRRQ-NZowhJ-Fbw5bb-2i7KRrM-2bbCjEV-24jV6XH-Ra5WTF-2aUAHqo-24jWXH2-2dxHuZR-5ix6m-2dwJxZT-8aJtYC-2mXpDrA-4neqSN-2aWZAJM-Jx1Ubn-fG4HT-7dT2xV-2eS-FqW9-2i9oNik-2i9oMES-2hD3rhU-5U3n7K-2eSDRg5-SMo6eb-9L6kuK-2i7nHQX-2jiXXbd-9Bbzn2-2i5N-FMS-aGMfi2-2i7NkNv-2i5MC76-2jiXXqm-2i8PHNq-2i8L6eL-2i7nJ5V-7dT2G8-2i9oN1m-7haQuR-2i5N-G1h-2i2q8xh-2jjQuCN-2i8ejNX-k4vodJ](https://flickr.com/photos/twiga_swala/2255298026/in/photolist-4rhZwJ-86uGe2-99yE6x-99yEkP-2i7KRRQ-NZowhJ-Fbw5bb-2i7KRrM-2bbCjEV-24jV6XH-Ra5WTF-2aUAHqo-24jWXH2-2dxHuZR-5ix6m-2dwJxZT-8aJtYC-2mXpDrA-4neqSN-2aWZAJM-Jx1Ubn-fG4HT-7dT2xV-2eS-FqW9-2i9oNik-2i9oMES-2hD3rhU-5U3n7K-2eSDRg5-SMo6eb-9L6kuK-2i7nHQX-2jiXXbd-9Bbzn2-2i5N-FMS-aGMfi2-2i7NkNv-2i5MC76-2jiXXqm-2i8PHNq-2i8L6eL-2i7nJ5V-7dT2G8-2i9oN1m-7haQuR-2i5N-G1h-2i2q8xh-2jjQuCN-2i8ejNX-k4vodJ)

Descouens, D. (2012). Figure 22 [Foto]. [https://commons.wikimedia.org/wiki/File:\(Venice\)\\_Doge%27s\\_Palace\\_facing\\_the\\_sea.jpg](https://commons.wikimedia.org/wiki/File:(Venice)_Doge%27s_Palace_facing_the_sea.jpg)

Elshahed, M. (2006). figure 26 left [Foto]. [https://www.archnet.org/sites/3767?media\\_content\\_id=75199](https://www.archnet.org/sites/3767?media_content_id=75199)

Figure 19. (2019). [Foto]. <https://www.pexels.com/nl-nl/foto/bruin-ingelijst-glazen-raam-2537383/>

Figure 29 right. (2007). [Foto]. [https://commons.wikimedia.org/wiki/File:Mosque\\_of\\_Cordoba.jpg](https://commons.wikimedia.org/wiki/File:Mosque_of_Cordoba.jpg)

figure 45. (n.d.). [Foto]. [https://en.wikipedia.org/wiki/Dome\\_of\\_the\\_Rock#/media/File:Arabischer\\_Maler\\_um\\_690\\_001.jpg](https://en.wikipedia.org/wiki/Dome_of_the_Rock#/media/File:Arabischer_Maler_um_690_001.jpg)

Gagnon, B. (2010). Figure 31 [Foto]. [https://en.wikipedia.org/wiki/File:Umayyad\\_Mosque,\\_Damascus.jpg](https://en.wikipedia.org/wiki/File:Umayyad_Mosque,_Damascus.jpg)

Green, P. J. S. T. B. (2000). Figure 28 [Foto]. [https://commons.wikimedia.org/wiki/File:Pillars\\_from\\_St\\_Polyeuktos\\_Constantinople\\_outside\\_south\\_wall\\_of\\_San\\_Marco\\_in\\_Piazzetta\\_Venice\\_known\\_as\\_Pillars\\_of\\_Acre.jpg](https://commons.wikimedia.org/wiki/File:Pillars_from_St_Polyeuktos_Constantinople_outside_south_wall_of_San_Marco_in_Piazzetta_Venice_known_as_Pillars_of_Acre.jpg)

Kapur, V. S. (2010). Figure 36 [Foto]. <https://www.flickr.com/photos/varunshiv/5347762171/in/photolist-99BKau-99BHQd-99yFo4-99BMbY-99ywSe-99yF9i-99BNtf-99yBhR-99yE6x-99yEkP-99yG14-99BPg1-99yCpp-99BKx9-99BGQU-99yEBv-99yzHg-99BEXG-99C1W3-99yDPr-99yvMg-99ywrD-99BSV5-99yCYD-99BLjq-99yvcD-99C2Hd-99yTAT-99BQQS-99yHxX-99yHRH-99BLV5-99yz36-99BjxU-99BPUN-99yzZi-99yADF-99C63h-99yUQK-99yGFa-99BD9d-99BDLW-99yT5p-99BRGL-99C2u3-99BS1o-99BG6m>

May, T. (2010). Figure 32 [Foto]. [https://www.flickr.com/photos/samizdat\\_thom/5241932773/](https://www.flickr.com/photos/samizdat_thom/5241932773/)

Mieusement, S. M. (1893). Figure 39 [Foto]. [https://commons.wikimedia.org/wiki/File:Basilique\\_Saint-Denis\\_-\\_Fa%C3%A7ade\\_nord\\_-\\_Saint-Denis\\_-\\_M%C3%A9diath%C3%A8que\\_de\\_l'architecture\\_et\\_du\\_patrimoine\\_-\\_APMH00003933.jpg](https://commons.wikimedia.org/wiki/File:Basilique_Saint-Denis_-_Fa%C3%A7ade_nord_-_Saint-Denis_-_M%C3%A9diath%C3%A8que_de_l'architecture_et_du_patrimoine_-_APMH00003933.jpg)

Myrabella. (2012). Figure 40 [Foto]. [https://en.wikipedia.org/wiki/Basilica\\_of\\_Saint-Denis#/media/File:Basilique\\_Saint-Denis\\_chapelle\\_de\\_la\\_Vierge.jpg](https://en.wikipedia.org/wiki/Basilica_of_Saint-Denis#/media/File:Basilique_Saint-Denis_chapelle_de_la_Vierge.jpg)

Poschadel, P. (2014). Figure 41 [Foto]. [https://en.wikipedia.org/wiki/Basilica\\_of\\_Saint-Denis#/media/File:-Saint-Denis\\_\(93\),\\_basilique\\_Saint-Denis,\\_abside\\_3.jpg](https://en.wikipedia.org/wiki/Basilica_of_Saint-Denis#/media/File:-Saint-Denis_(93),_basilique_Saint-Denis,_abside_3.jpg)

Reibai. (2008). Figure 35 [Foto]. <https://www.flickr.com/photos/reibai/2599905903/in/photolist-4XPtw5-4XKdBg-4XKcrR-4XKdHZ-8vKsRd-4XKdWp-4XPt8W-4XPtd9-oyUPSz-8A3mto-4XPtGW-oyUqmX-5Phr-Bi-ofE2op>

Shiva, A. (2013). figure 43 [Foto]. Wikipedia. [https://commons.wikimedia.org/wiki/File:Jerusalem-2013-Temple\\_Mount-Dome\\_of\\_the\\_Rock\\_%26\\_Chain\\_02.jpg](https://commons.wikimedia.org/wiki/File:Jerusalem-2013-Temple_Mount-Dome_of_the_Rock_%26_Chain_02.jpg)

Todd, G. (2018). Figure 14 [Foto]. <https://www.flickr.com/photos/101561334@N08/42291167815/>

Victorgrigas. (2011). figure 44 [Foto]. [https://en.wikipedia.org/wiki/Dome\\_of\\_the\\_Rock#/media/File:Dome\\_of\\_the\\_Rock\\_Jerusalem\\_Victor\\_2011\\_-1-5.jpg](https://en.wikipedia.org/wiki/Dome_of_the_Rock#/media/File:Dome_of_the_Rock_Jerusalem_Victor_2011_-1-5.jpg)

Y., A. (2019). Figure 20 [Foto]. <https://www.pexels.com/nl-nl/foto/mensen-in-een-oude-kerk-2661924/>

## Secondary sources

Almaimani, A., & Nawari, N. (2016). BIM-Driven Library for Islamic Arch. <https://itc.scix.net/pdfs/w78-2016-paper-016.pdf>

Bloom, J. M. (1993). On the Transmission of Designs in Early Islamic Architecture. *Muqarnas*, 10, 21. <https://doi.org/10.2307/1523168>

Crimson, M. (1996). *Empire Building: Orientalism and Victorian Architecture* (1st ed.) [E-book]. Routledge.

CSBE Films. (2017). Figure 15 [Diagram]. [https://www.youtube.com/watch?v=G5-bXChr79g&ab\\_channel=CSBEFilms](https://www.youtube.com/watch?v=G5-bXChr79g&ab_channel=CSBEFilms)

Darke, D. (2020). *Stealing from the Saracens*. Hurst.

Draper, P. (2005). Islam and the West: The Early Use of the Pointed Arch Revisited. *Architectural History*, 48, 1–20. <https://doi.org/10.1017/s0066622x00003701>

Early Examples of the Pointed Arch and Vault in Romanesque Architecture. (1972). *Viator*, 2, 203–210. <https://doi.org/10.1484/j.viator.2.301690>

Fletcher, B. (1948). *A History of Architecture . . .* [E-book].

Goldschmidt, A., Jr, & Davidson, L. (2010). *A Concise History of the Middle East*. Van Haren Publishing.

Hillenbrand, R. (1994). *Islamic Architecture* (Casebound ed) [E-book]. Amsterdam University Press.

Islamic Civilization. (2012, January 24). Middle East Institute. <https://www.mei.edu/publications/islamic-civilization#:~:text=It%20has%20an%20oral%20tradition,culture%20through%20poetry%20and%20narrative.>

Makvandi, M., Hasani, N., Lary, S. M., Khodabakhshi, Z., & Makvandi, S. (2015). Research on the evolution of minaret from early Islam to Seljuk period looking at background of minaret in Iran. *Science Journal (CSJ)*, Vol. 36(No: 3 Special Issue). [https://www.researchgate.net/publication/320076251\\_Research\\_on\\_the\\_evoluti-](https://www.researchgate.net/publication/320076251_Research_on_the_evoluti-)



on\_of\_minaret\_from\_early\_Islam\_to\_Seljuk\_period\_looking\_at\_background\_of\_minaret\_in\_Iran/referen-  
ces

Malhis, S. (2016). Narratives in Mamluk architecture: Spatial and perceptual analyses of the madrassas and their mausoleums. *Frontiers of Architectural Research*, 5(1), 74–90. <https://doi.org/10.1016/j.foar.2015.11.002>

Raby, J. (1991). Reviewing the Reviewers. *Muqarnas*, 8, 4. <https://doi.org/10.2307/1523147>

Rahman, M. M. (2015). Islamic Architecture and Arch. *International Journal of Built Environment and Sustainability*, 2(1). <https://doi.org/10.11113/ijbes.v2.n1.52>

Said, E. W. (2022). *Orientalisme* (2nd ed.) [E-book]. Athenaeum.

Scanlon, G. T., Ettinghausen, R., & Grabar, O. (1990). The Art and Architecture of Islam 650–1250. *Journal of the American Research Center in Egypt*, 27, 235. <https://doi.org/10.2307/40000117>

Schimmel, A., & Rivolta, B. (1992). Islamic Calligraphy. *The Metropolitan Museum of Art Bulletin*, 50(1), 1. <https://doi.org/10.2307/3263914>

von Simson, O. G. (1952). The Gothic Cathedral: Design and Meaning. *Journal of the Society of Architectural Historians*, 11(3), 6–16. <https://doi.org/10.2307/987608>

Wilkinson, J., & Hill, J. (2017). *Jerusalem Pilgrimage, 1099–1185* [E-book]. Taylor & Francis.