

The Spread of Islamic Architecture to the USA

The Spread of Islamic Architecture to the USA:

When, How, and by Whom?

By

Zohra Boutaraa

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This book pays tribute to the Muslim engineers, architects, and craftsmen of the Islamic Golden Age, whose artistry fascinated the world. It honors those who built the charming Andalusia and left evidence of Islamic architecture on the European continent. It was thanks to their ingenuity, creativity, and expertise that Islamic architecture, so widely admired today, spread throughout Asia, Africa, Europe, and America.

Zohra Boutaraa

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GENERAL INTRODUCTION

Architecture is one of the most significant components of a people's or a community's civilization, reflecting its culture, identity, religious beliefs, and lifestyles. What's more, a people's architectural heritage provides an insight into the history of their earlier civilizations. This is how, throughout human history, people have always struggled to build ingeniously, giving buildings an artistic stamp that reflects their own culture and identity. And so, over the millennia, mankind has discovered the eternal art of architecture, which includes different styles based on civilizations.

Among the different types of architectural styles developed is the so-called Islamic architecture, which is a centuries-old category of architecture found throughout the Islamic world, and even in non-Islamic countries, as it spread from the Middle East all over the world, precisely to Asia in the East and to the Americas in the West. It journeyed throughout the Maghreb countries in North Africa, to the Iberian Peninsula (Andalusia) in Southern Europe, and then to Central and Eastern Europe. This type of architecture includes both religious and secular structures and different building typologies.

It is known that during centuries of their rule, Muslims built thousands of monuments around the world, from China in the East to Spain in the West, and from Siberia in the North to African countries in the South. This architectural movement was initiated by the Umayyad (661-750), during the first Islamic dynasty, through the construction of the Dome of the Rock in Jerusalem, Palestine, and till the erection of the most recent famous chef-d'oeuvre, the Taj Mahal in Agra, India, realized in 1654 during one of the latest Islamic dynasties of the Mughal.

Furthermore, the Islamic architectural heritage is the physical witness of the glorious Islamic civilization. Certainly, Islamic buildings are among the most extraordinary structures in the world. Indeed, the pleasing sculptural forms, distinctive architectural elements, and amazing ornamental details that characterize this architectural style have fascinated and continue to fascinate architectural art lovers and experts around the world. The building most often associated with Islamic architecture is undoubtedly the Muslim place of worship, or "mosque". However, Islamic architecture includes both secular and religious buildings. It comprises primarily mosques, Islamic cultural centers, and Quran schools, but also castles,

palaces, tombs, and other public buildings such as fountains, public baths, domestic structures, gardens, and markets or Souks.

But, how, when, and by whom has this architecture been able to voyage to a country that is so far from its birth land? This is the reason behind the title given to this book, covering the form of the question: *Islamic architecture in the United States: How, When, and by whom?* Aiming to respond to this interrogation, this book explores the route followed by Islamic architecture from its original countries to shape buildings in the United States and from its birth to the present day. The book also aims to understand the precise mechanisms through which Islamic architecture has been integrated into modern American building designs, to identify the key players who have played a significant role in this lengthy journey, and what justifies the motivation behind contemporary architects' inspiration from Islamic architectural features.

To answer the book's question: *The Spread of Islamic Architecture to the USA: When, How, and by Whom?* A mixed research methodology, combining qualitative and quantitative approaches, is adopted. The first method investigates the historical routes by which Islamic architectural styles spread to the United States. This involves exploring the influence of Moorish architecture brought from Andalusia and other European countries by the first European settlers when they colonized the Americas. It also examines the role of African Muslim slaves and their descendants, as well as the contributions of the contemporary Muslim community in this transition. The second approach identifies the impacts of Islamic architecture on building design in the U.S, quantifying the number of mosques and Islamic centers constructed in the U.S. from the 1700s to the present day. Additionally, evidences of Islamic architectural elements shaping non-Islamic worship buildings, such as temples, synagogues, shrines, churches, and cathedrals, are presented in the last chapter.

Regardless of this general introduction, and a conclusion that closes and highlights the main discoveries of the theme addressed in this book, this latter is structured in five chapters. The first chapter gives an overview of Islamic architecture, its definition, and philosophical concepts. It also details its principal features. While before arriving at the stage of its arrival to Europe, and then to the United States, the second chapter exposes the main Islamic architectural styles according to the dynasties to which they belong. These dynasties are treated starting from the Umayyad in Syria (661-750), then in Andalusia comprising Spain and Portugal (756-1492), passing through the Abbasids and Fatimid dynasties (750-1258), to the Seljuk dynasty (1037-1194), then the Mamluk (1206-1570), and the Mughal (1526-1720), and ending with the Ottoman (1075-1919) dynasty.

The third chapter traces the path of Muslims from their homeland in the Arabian Peninsula to the Asian, African, and then European continents, since it was through these continents that Muslims could spread their architectural ideas worldwide. This chapter also provides a summary of the role of Muslims in shaping European civilization during their centuries-long presence in the Iberian Peninsula (Andalusia). It examines how Muslim advancements in science have influenced the views of European thinkers, providing examples of key figures inspired by Muslim scholars and Islamic concepts. The chapter then delves into the realm of Islamic architecture, showcasing instances of architectural works influenced by Islamic styles in European countries like Britain, Germany, Italy, Russia, Spain, and France.

The fourth chapter delineates the trajectory of Islamic architecture as it transitioned from the European continent to the United States. It elucidates the contributions of European settlers or colonizers in the United States, including Jewish emigrants, who introduced into the “New World” the architectural styles prevalent in their nations of origin. The significance of other pivotal figures in this architectural evolution, such as the first enslaved Black Muslims and the contemporary Muslim community, as well as prominent American public figures advocating for the incorporation of Islamic architecture within the United States, is accentuated. The chapter gives a clear response to the book’s question: How, when, and who spread Islamic architecture throughout the United States?

The fifth and final chapter presents a series of cases of edifices within the United States that have been influenced by aspects of Islamic architectural design and constructed in accordance with its artistic principles. This chapter elucidates the principal effects of Islamic architecture on architectural design within the United States, while also delineating several illustrative examples of such structures. It emphasizes the significant prevalence of this architectural style in both Islamic and non-Islamic (Christian and Jewish) buildings, whether religious or secular, throughout the United States, by addressing a second critical inquiry pertinent to the overarching theme of this scholarly work, which is: What are the primary influences of Islamic architecture on architectural design in the United States?

CHAPTER ONE

ISLAMIC ARCHITECTURE: AN OVERVIEW

Introduction

People have always devoted themselves to constructing ingeniously; giving buildings an artistic stamp that reflects their own culture and identity. And so, over the millennia, humanity has discovered the eternal art of architecture, covering diverse styles based on the different civilizations.

Among the different developed types of architectural styles, the so-called Islamic architecture. This architecture is a centuries-old architectural type constituting a part of Islamic civilization. It started with the first Islamic dynasty, the *Umayyad*, and then continued its evolution through the conquest territories that became the Islamic world. It has continued to grow and develop, drawing inspiration from its predecessors but also creating new forms.

Currently, Islamic architecture is widespread in the Islamic countries, and extends to non-Islamic regions. It continues charming and enchanting foreign visitors, students, and experts in the architecture art found throughout the Islamic world, and even in non-Islamic nations. The magnificence of this art that continues to fascinate both enthusiasts and experts in the art of architecture is a type of architecture that encompasses different building typologies, principally mosques and Qur'an schools, but also palaces, baths, or hygienic buildings "*Hammats*", tombs, and Markets or *Souks*.

This first book's chapter explores the philosophical concepts and principles supporting Islamic architectural design. It provides definitions and detailed descriptions of the main architectural features and elements that distinguish Islamic architecture from other styles. It also serves as a foundational exploration of Islamic architecture, offering readers a comprehensive understanding of its essence, characteristics, and distinguishing features.

The chapter begins by elucidating the concept and definition of Islamic architecture, delving into its historical development, cultural significance, and regional variations. It then examines the principal features and elements that define Islamic architecture, highlighting their unique contributions and symbolic meanings. These features encompass a wide array of architectural components.

Due to the technical nature of the subject matter, a methodical approach is employed, aiming to enhance the reader's understanding. Each discussed point is supplemented with illustrative figures and examples, ensuring a clear and detailed exposition of the topics. This approach not only clarifies complex ideas but also demonstrates the practical application of theoretical concepts within the field of architecture.

What is Islamic Architecture?

Scholars frequently characterize Islamic architecture as a form of architectural expression intricately associated with the Islamic faith and its followers. Consequently, numerous comparable definitions exist, all of which delineate Islamic architecture in this manner, asserting that Islam and Islamic architecture emerged concurrently, implying that Islamic architectural forms predated the inception of Islam.

Safic reported the words of *Ibn Abdun*¹, an Andalusian writer and poet, quoted by Stefano Bianca in his book *Urban Form in the Arab World*:

As far as architecture is concerned, it is the haven where man's spirit, soul, and body find refuge and shelter.

This implies that architecture can be likened to a vessel that provides refuge and shelter for individuals. Also, *Ibn Qutayba*², a Muslim scholar of the 9th century, compared the house to a shirt, saying: "just as the shirt should fit its owner, the house too should suit its dwellers" (104). In other words, both have to suit each other.

Islamic architecture is believed to have been influenced by Islamic principles, as it is rooted in the religious teachings of Islam. Its primary purpose is to facilitate the observance of religious rituals by Muslims, including worship, which encompasses various aspects of their lives (Ali et al. 71). However, Palmer provides a clear definition of Islamic architecture, stating that it encompasses any structure that is influenced by the religious beliefs of Islam. This includes both religious and non-religious buildings, all of which embody the design principles of Islamic culture (145). Other definitions of Islamic architecture are given by other authors:

Adel and Kamal (qtd. in Iftikhar et al.) conclude that Islamic architecture is the translated representation of Islam into reality at the request of Muslims, signifying culture and civilization (73). Similarly, Omer defines Islamic architecture as follows:

Islamic architecture is an architecture that embodies the message of Islam. It both facilitates the Muslims' realization of the Islamic purpose and its divine principles on earth, and promotes a lifestyle generated by such a philosophy and principles. At the core of Islamic architecture lies function with all of its dimensions: corporeal, cerebral, and spiritual (103).

Nasser (quoted in Iftikhar et al.) argues that traditional Islamic architecture was created by incorporating several fundamental elements typical of a specific geographic area, such as the climate, human requests, accessible building materials, construction techniques, social and economic circumstances, and local architectural backgrounds remaining from the previous era of Islam (73). Sidawi claims that Islamic architecture serves not only as a global tradition's aesthetic sense, but also as a vehicle for conveying political ideology, social and economic structure, and religious values (Sidawi qtd in Ali et al. 73).

Likewise, a detailed definition is given on the Website: the collector by the historian Dusan Nikolic, who defines Islamic architecture as follows:

Islamic architecture refers to the architectural styles and techniques employed in various regions since the 7th century, where Islam held significant religious or cultural influence. While commonly associated with religious structures, Islamic architecture encompasses a wide range of buildings, including fortresses, palaces, tombs, schools, as well as smaller structures like fountains, public baths, and residential buildings. Characterized by its towering minarets, horseshoe and pointed arches, *muqarnas* vaulting, and intricate decorative elements, Islamic architecture has made significant contributions to the field of architecture throughout history. Notable examples such as the Dome of the Rock, Taj Mahal, and Alhambra exemplify the enduring legacy of this architectural tradition, which continues to thrive in contemporary times (Dusan).

Thus, according to the cited historian, the phrase "*Islamic architecture*" describes construction methods used in a number of locations where Islam had a major cultural influence since the 7th century. It does not encompass only religious buildings, but also palaces, tombs, schools, public baths, fountains, and residential constructions. He claims that architectural history has benefited greatly from the unique and distinctive contributions made by this art, which include tall minarets, horseshoe and pointed arches, *Muqarnas* vaults, and elaborate ornamentation. Famous structures

like the Alhambra, the Taj Mahal, and the Dome of the Rock demonstrate the lasting influence of this architectural legacy, which is still strong today (the collector, Website).

Another definition given by Kristin Hohenadel on the Spruce Website pointed out that:

Islamic architecture is a centuries-old style *of* architecture that is rooted in the principles of Islam. The remarkable architectural shapes and frequently brilliant decorative elements that define Islamic architecture encompass some of the most magnificent constructions on earth (The Spruce Website).

In fact, all the cited definitions are precise, given the fact that the construction practices of Muslims have consistently been guided by their Islamic beliefs. As Saoud (2013) elucidates, there are no imposed rules governing the construction process, but rather a multitude of instructions that have a direct impact on how Muslims have approached and organized their living spaces. These instructions encompass values such as privacy, neighborly rights, and hospitality towards guests, hygiene, and several other considerations (2).

Concept of Islamic Architecture

Islamic architecture, which stretches from the seventh century to the present day, is one of the most marvelous and famous forms of architecture the world has known since antiquity. It originated with the advent of Islam in the Arabian Peninsula, and then spread till the sixteenth century through the Islamic conquests (*El Fotouhat*) to the Asian, African, and European continents. Yet, the American continent was the last to experience the marvels of this architecture, as it was only during the last four centuries that it spread to this continent. To define the concept of architecture, it is necessary to dig deeper into its roots and review the values and theories that influenced and shaped it. To this end, it is essential to outline the philosophy behind this architecture.

In a conference organized in 2003 by the University of Chicago approaching the Middle East history and theory, Selim and Abdelmonem elucidated the fact that Islamic philosophy believes in the total submission and equality of human beings before their Creator. This architecture has been influenced by this philosophy and has reflected it in the style of buildings according to the following principles (5):

- The emphasis is on the simplicity of the buildings, with no external vernacular motifs or complex details. There are no major differences in Muslim lifestyles and architectural styles, which is why the exterior facades of Islamic buildings are generally similar throughout the ages;
- The main goal of the building is to allow its residents to accomplish their ritual and spiritual obligations;
- The building should enable the occupants to achieve their social commitments without infringing on their life privacy;
- The building's planning and construction must take into account both the users' functional necessities as well as their cultural, environmental, and religious values;
- The building should ensure the privacy of the family and separate the movement of guests from the family's private zone;
- The building is an object of integration with its environment, which explains the different building forms depending on the environment in which they were built; and
- The focus on the interior of the building rather than the exterior.

Characteristics of Islamic Architecture

Islamic architecture is generally characterized by the architectural elements included in the building design, such as the use of domes and vaulting in the roof. Horseshoe arches and round arches for the upper part of doors and windows represent a usual practice in Islamic architecture. The construction of minarets in mosques, and garden landscaping that are significant elements, especially in the construction of worship edifices and palaces, are also of great importance in this architecture. Other architectural elements are characteristic of Islamic architecture, like the courtyard or *Sehan* in Arabic, found in both religious and secular structures. Balconies or *Mashrabiya* make a valuable contribution to residential buildings in Islamic architecture through the introduction of natural light into the interior of the building. Arabesques and handsomely decorated calligraphy used on the interior walls, and the practice of *Muqarnas*³, which is typically utilized on domes, vaults, niches, squinches, and pendentives, are specific and unique techniques used in Islamic architecture. In addition to these elements, the absence of any human or animal representations, unlike other architectural styles, except those found in Andalusia and other rare cases, is a major characteristic of Islamic architecture.

Domes

According to the dictionary of Islamic architecture, the definition of a dome is:

A dome is a circular vaulted construction used as a means of roofing. First used in much of the Middle East and North Africa whence it spread to other parts of the Islamic world, because of its distinctive form, the dome has, like the minaret, become a symbol of Islamic architecture (Petersen, 68).

In Islamic architectural design, the main characteristic of a dome is its hemispherical shape, maintained by an octagonal transition zone, which is supported by four pillars. The ornamental ribs and *Muqarnas* found in these domes are primarily decorative elements that have no mechanical role and do not contribute to the structural integrity. Double domed construction became a common practice from the fifteenth century onwards, creating additional space between the inner and outer layers. This innovation allowed for the creation of taller monuments (Chtatou). It is important to notice the existence of several types of domes in Islamic architecture: radial, lattice, and geodesic domes (Hameed 21).

The first domes in the Middle East were made of mud brick stacked in layers that tilted slightly inward and were connected to circular structures. The corbelled dome is another ancient dome-building technique that is still used in northern Syria and Harran, Turkey. It is created by placing mud bricks horizontally in circular layers with decreasing circumference. The dome was adopted into Roman architecture after the Roman conquest of the Middle East, and it was the primary roofing material for monumental structures during the Byzantine era (Petersen, 68).

In Islamic architecture, the dome is a feature not only of religious buildings, such as mosques, but also of other types of building, such as public baths (*Hammamat*), and palaces or *Kosour* in Arabic. One of the most important Islamic monuments is the Dome of the Rock in *Jerusalem* in Palestine (See Figure I-1) that was built in 685 during the Umayyad Islamic dynasty under the reign of El caliph *Abd al-Malik Bno Marwan*⁴, and which is considered the earliest fully documented monument of Islamic architecture. The dome is placed on a circular arcade and rises about 30 meters over the platform. The building can be entered via four doors placed on the cardinal points. The exterior of the building was initially decorated with grandiose mosaics, and then renovated with engraved marble plaques and tinted tiles in 1545–46 (Mahbub 13).

Semi-domes are also architectural features of Islamic architecture that have been employed since the Umayyad period. These architectural components are typically correlated with additional structural elements such as mihrabs⁵ and bath exedrae, which are semicircular extensions frequently positioned in relation to the palaestra or the peripheral walls, as indicated by the glossary from ancient baths, a website dedicated to the examination of ancient baths. Recently, semi-domes from the Mafjar mosque, also designated as Khirbat al-Mafjar in Palestine, and the Hallabat mosque, which forms an integral part of the extensive Qasr al-Hallabat complex located in Wadi al-Dhlayl, Jordan, have been discovered. However, the earliest examples of this architectural feature that have been preserved are likely these two semi-dome fragments, which are undoubtedly attributed to the Umayyad period. The uniqueness of the sample from Hallabat mosque is reinforced by its external appearance, as is the first mihrab and the only Umayyad one built externally with a polygonal plan (Arce, 215).



Fig. I-1: The Dome of the Rock in Jerusalem, Palestine
(Image Source: en.wikipedia.org, photo by Andrew Shiva)

Several dome types exist in Islamic architecture, depending on the interior or exterior shape of the dome, and also on the architectural style of the concerned Islamic period. For instance, Ottoman double domes of the 16th Century were made out of stone and were flatter than church domes.

It should be noted that the use of double domes dates back to the 11th-century Seljuk period. They were the first to use this architectural technique (Nabi, p.200).

In addition to the Umayyad and Abbasid domes, another Islamic architecture dynasty, which is considered one of the most famous dynasties of Islamic architecture, used these structural elements. In fact, creating a unique style of monumental structures based on the Byzantine domes, the Ottoman architecture was one of the Islamic architectural dynasties during which domes were frequently used. The architect *Sinan*⁶, who was responsible for the construction of major structures in Turkey, designed and built some of the most ornate domed structures, such as the Selimiye complex (Turkey) from 1569 to 1575, which is one of the finest examples of Ottoman architecture (See Figure I-2). The principal dome of the mosque, which is the centerpiece of this complex, is 31 meters in diameter and is surrounded by smaller semi-domes (Mahbub 30). Further fine points concerning the Ottoman Islamic architectural style will be discussed in the second chapter of this book.



Fig. I-2: The Selimiye complex in Edirne- Turkey
(Image Source: en.wikipedia.org, Photo by rob Stoeltje)

Arches

The dictionary of Islamic architecture defines an arch as: a method of vaulting area between two walls, columns, or piers. Islamic architecture is characterized by arches, which are employed in all types of buildings from houses to mosques (Peterson 24).

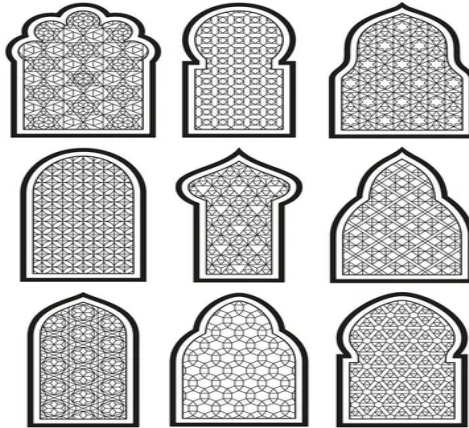


Fig. I-3: Types of Arches in Islamic Architecture
(Image Source: www.depositphotos.com Website)

Petersen exposes chronologically the different types of arches existing in Islamic architecture. He claims that the earliest form of arches employed in Islamic architecture was the semi-circular round arches, drawing inspiration from the architectural traditions of the Romans and Byzantines. Pointed arches, in contrast, are crafted by establishing each side of the arch from a distinct center point, resulting in a sharper point with an increased distance between the two points. However, fairly soon after the Islamic conquests, a new type of pointed arch began to develop. The pointed arch was subsequently adopted and widely used by Muslim architects, becoming the characteristic arch of Islamic architecture. It spread from Islamic lands, probably through Sicily, then under Islamic rule, and from there to *Amalfi* in Italy, before the end of the eleventh century.

A second type of arch is the round arch, which is formed from a continuous curve that has its center at a point directly below the apex and level with the springing of the arch on either side. Another arch form

developed during the early Islamic period is the horseshoe arch, which was developed in Syria in pre-Islamic times and has been recorded as early as the fourth century CE. However, the area where these arches developed their characteristic form was in Spain and North Africa, where they can be seen in the Great Mosque of Cordoba. Regarding the utility of arches in Islamic architecture, it is observed that they are most used to span a series of columns or piers in arcades to form a gallery open on one side (24).

Minarets

The location designated for the call to prayer, known as *Ma'adhana*, is commonly associated with the minaret (Petersen 167). A minaret is a tower-like structure that is typically integrated into or situated near mosques. Several shapes of minaret exist in Islamic architecture depending on the mosque location and Islamic architecture dynasty (See Figure I-4). For instance, Ottoman minarets have a special design consisting in the following patterns: they were tall, pencil-shaped, and the tip being lead covered with an elongated conical cap, as can be seen in *Sultan Ahmed*⁷ Mosque in Istanbul, Turkey (Nabi, p.199). A minaret consists of four main components: a base, a shaft, a cap, and a head. These architectural elements collectively form a tall spire, which is often crowned with a conical or onion-shaped structure (Hameed 15).

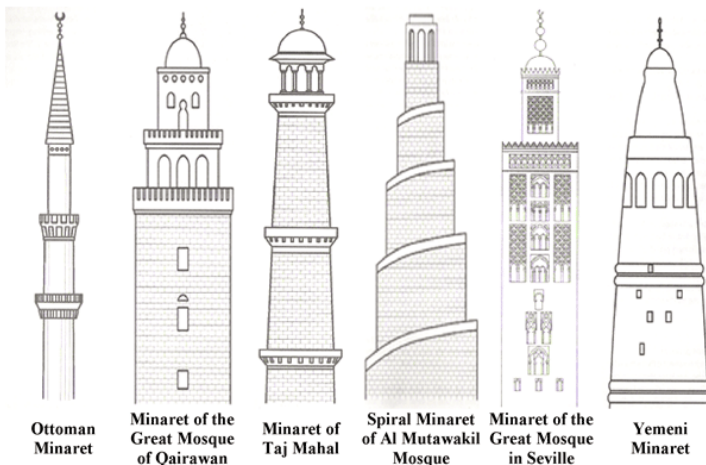


Fig. I-4: Minarets Types versus Mosques Location
(Image Source: islamicarchitecture.org Website)

Mahbub points out that during the Prophet's lifetime, the mosque did not have a minaret, and the call to prayer was made from the roof of a house. Later, as the Muslim community grew, the minaret was used for this purpose, as a visual guide to identify the mosque from a distance and to guide travelers during nighttime by suspending a source of light from its top (15). Note that the first minaret in Islamic architecture is that of the Great mosque of *Damascus* in Syria, also known as the *Umayyad* Mosque, built between 705 and 715 CE. In the recent era, the highest minaret in the world is that of the Grand Mosque of Algiers (Algeria), reaching a height of 265 meters (See Figure I-5). This mosque is ranked as the third largest mosque in the world following the *El Haram El Makki* in Mekka, *El Mokarama*, and *El Masjid Enabawi* in El Medina El Monawara mosques in Saudi Arabia.



Fig. I-5: Minaret of the Great Mosque of Algiers (Algeria)
(Image Source: Author's collection)

Gardens

Islamic architectural design has frequently incorporated gardens as a significant element, especially in the construction of palaces. Petersen states that the specific purpose of a number of the initial Islamic gardens is

not consistently understood, with speculation that a few might have served primarily as vegetable gardens (96).

In fact, Islamic gardens are meticulously designed to replicate the serenity and beauty of the heavens, serving as a peaceful sanctuary and gentle reminder of paradise. Creating an Islamic garden involves a thoughtful selection of elements that reflect the values and aesthetics of Islamic culture. Islamic gardens are known for their tranquility, beauty, and symbolism, incorporating elements such as water, vegetation, symmetry, and geometric patterns.

In addition, water is a fundamental element in Islamic garden design, symbolizing purity, life, and paradise. Incorporating a central water feature such as a fountain, pond, or stream not only serves as a focal point, but also creates soothing sounds. Water features can be used strategically to divide the garden into sections, symbolizing the four rivers of paradise. Water features can also be embellished with intricate tile designs or calligraphy, showcasing the artistic mastery of Islamic craftsmanship (Abid).

In the Islamic world, all palaces, guesthouses, and residential buildings are required to have gardens, either at the entrance or within the building itself. The latter is the more common case. There are numerous examples of these gardens embellishing buildings designed according to Islamic architectural style throughout the countries of the current Islamic world, as well as in countries that were part of this world in past centuries. Examples can be found in Spain and Portugal, which were part of Andalusia between the seventh and fifteenth centuries.

The incorporation of gardens played a crucial role in the architectural design of Madinat El Zahra in Islamic Spain, serving as an integral element. It was in Granada, however, that gardens truly flourished and reached their zenith. In Iran, the art of garden design flourished in the fourteenth century and later during the Timurid Empire⁷. Empire, gardens became a primary focus in the construction of royal residences. The Mughals⁸ of India took their interest in gardens from the Timurids and developed the idea of a commemorative garden surrounding a tomb. From the 16th century, garden cities became fashionable throughout the Islamic world, with cities such as Isfahan in Iran and Meknes in Morocco. Further east in Java and Indonesia, gardens were important in the pre-Islamic Hindu tradition and were maintained and developed by the Muslim sultans who ruled the area. (Petersen 96). Figure I-6 shows an example of Islamic gardens in Granada (Spain) designed during the mid-fourteenth century.

The palaces, mosques, and family residences of the Maghreb⁹ countries feature lush gardens that enhance the buildings' charm and freshness. The

Algerian town of Tlemcen, the former capital of the *Zianids*¹⁰, is a prime example, with gardens adorning every house, palace, and mosque. Kasr El Michouar, built in 1145, is an example of a royal palace with this type of garden (See Figure I-7).



Fig. I-6: Example of Islamic garden in Granada, Spain
(Image Source: www.thegoodgarden.com Web Site)



Fig. I-7: The interior garden of Kasr El Michouar, Tlemcen (Algeria)
(Image Source: author's collection)

Courtyard (*Sehan*)

The courtyard, or *Sehan* in Arabic, is found in both religious and secular structures. It is an open-air space, surrounded on all sides by halls and rooms, and often by an arcade. In a mosque, it is used for ablutions and represents a space where the faithful can rest or meet. In homes and secular buildings, it is used for aesthetic purposes, replacing the garden by decorating it with plants, a water source such as a fountain, and natural light. It is also a fresher space that provides drafts and breezes during the summer heat (Hameed 27).



Fig. 1-8: The Courtyard of Dar Aziza Palace in Algiers, Algeria
(Image Source: Author's collection)

According to Almamoori (2015), courtyards are designed to meet an environmental need, since they still exist in hot, arid regions, in order to keep the building cool inside and achieve thermal comfort. The fundamental

reason for this element in Islamic architecture is therefore related to the climatic function (4).

A good example of still existing buildings encompassing a courtyard is Dar Aziza, a 16th-century Moorish two-story palace located in Algiers (Algeria). Like all the buildings of “The White Algiers”, the facade of Dar Aziza is whitewashed and painted white. The palace is renowned for its impressive tiling and central courtyard (Figure I-8). During the Ottoman presence in Algeria (1516-1830) it served as a residence for the Beys (rulers) of Constantine and later became the archbishop’s palace during French colonial rule (1830-1962). The palace now houses the National Agency for Archaeology and Protection of Historical Sites and Monuments, as well as the Office for the Management and Exploitation of Cultural Assets in Algeria. Dar Aziza, undoubtedly the most iconic surviving building of its time in Algiers, was part of a large government complex known as the Janina Palace, which existed before the arrival of the Ottomans in 1516.

Vaulting

Vaults are structural elements in a building, usually made of stone or brick, consisting of an arrangement of arches that form a ceiling or roof. However, in Islamic architecture, vaulting follows two distinct architectural styles: the first is Umayyad architecture, which was developed by the Umayyad during the first Islamic dynasty (661-750 AD) in the West. It follows Syrian traditions of the sixth and seventh centuries, showing a mixture of ancient Roman and Persian architectural traditions. Eastern Islamic architecture, on the other hand, primarily reflects the *Sasanian*¹¹ architectural style (Islamic Architecture).

Note that Peterson claims that the Sasanians’ influence on Islamic architecture can be seen in Palestine during the *Umayyad* period, where the mosaics of the Dome of the Rock are decorated with Sassanian symbols of royalty (252).

On the other hand and as a result of the research project titled Mudejarismo and Moorish Revival in Europe (2014-2018), funded by the Swiss National Science Foundation and based at the University of Zurich, Giese et al. (2016) conclude that the famous track of the great mosque in Cordoba was the starting point for the typology of similar storage facilities adapted from Andalusia in Western Europe to Samarkand in southeastern Uzbekistan in central Asia. It is evident that the aesthetic effect of the shore star arrangement must have been one of the reasons for the widespread use of this se of this vault type seen not only in Al-Andalus

and the Maghreb, but also in Christian territories, as has been demonstrated by Antonio Momplet Mínguez and María de los Angeles Utrero Agudo, who have studied Christian examples up to the thirteenth century (1309).



Fig. I-9: Blue Tile Vault in Imam Mosque, Tehran, Iran
(Image Source: www.tehrantimes.com Website)

According to the same project outcomes, Islamic craftsmen from Andalusia were working in two monastery complexes in which similar rib vaults can be found. In both cases, the centralized chapels are domed with an elaborate rib star, which shows an advanced level of development by using an increasing number of crossing ribs, a trend which can already be observed in the dome of the Great Mosque of Tlemcen in Algeria built by Almoravid¹² and the in the Casa del Patio de Banderas of the Alcázar of Seville (present Spain) built by Almohad¹³. Thus, this gives evidence of the transcultural exchange within medieval Spain and materialized in Mudéjar¹⁴ architecture (1312).

Muqarnas

Peterson (2002) defines the *Muqarnas* as follows:

A *Muqarnas* is a system of projecting niches used for zones of transition and for architectural decoration (206).

The *Muqarnas* is a practice of ornamental art in Islamic architecture, consisting of geometric forms used at transition points in spaces with different surface features, from the rectangular basis of the building to the vaulted ceiling. The commencement of the use of *Muqarnas* in both religious and non-religious buildings dates back to the first period of Islamic architecture. However, it developed later into a distinctive element that characterizes this architectural style during the era extending between the 11th and 16th centuries.

In Islamic architecture, *Muqarnas* is typically utilized on domes, vaults, niches, squinches, and pendentives (under domes). The aim is to offer a common manner of transition to overcome the distinction between vertical, curved, and horizontal domes and to produce a smooth transition from the building's rectangular form to the vaulted ceiling. There are three types of *Muqarnas*, namely suspended, superimposed, and corbeling *Muqarnas* (Naz, 2024, p. 3).

The first known examples of *Muqarnas* belong to the late ninth or early 10 century and were discovered at Nishapur, in eastern Iran. These are pieces of stucco niches with painted and carved ornamentation that were originally part of residential structures. Early-period painted stucco *Muqarnas* fragments are linked to a bath house at Fustat, Egypt, that may have been built during the Abbasid or Fatimid periods. *Muqarnas*'s wide diffusion in the early ninth and tenth centuries suggests that its roots are most likely in Baghdad, near the center of the Islamic world (Peterson, 206).

The use of *Muqarnas* remains a practice in modern Islamic architecture as a decorative element, both in the exterior and interior of buildings. A technique currently used to incorporate *Muqarnas* into architectural designs involves using computer-aided design software and numerically controlled machines to create intricate patterns (Naz, 2024, p. 7).