

The Pennsylvania State University

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**BRINGING TO LIGHT THE QUR'AN: THE THEOPHANY OF ALLAH BY MEANS OF
LIGHTING DESIGN IN THE SÜLEYMANIYE MOSQUE**

A Thesis in

Architecture

by

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ABSTRACT

In 1558, the Ottoman architect Koca Mimar Sinan Agha (c. 1488-1588) began construction on the Süleymaniye Mosque in Constantinople (Istanbul). Commissioned by Sultan Süleyman (1494-1566), the mosque was built early in Sinan's career even though it was soon considered a masterpiece. The Süleymaniye Mosque drew significant inspiration from the nearby Hagia Sophia (532-37), a monument built a thousand years earlier for a different religion (Byzantine). Despite the differences in their theological origins, these two works of architecture in the same city share similar structural systems and lighting strategies. Although both the Süleymaniye Mosque and Hagia Sophia were designed to dramatize daylighting, the former has been more successful. Whereas Hagia Sophia is relatively dim inside, natural light alone fully illuminates the upper half of the Süleymaniye Mosque. In the lower half of the mosque, the simple yet effective mosque lamps serve as task lighting for Muslims who wish to pray. Architectural historians have studied the Süleymaniye Mosque extensively, investigating topics that range from the mosque's political role in the Ottoman Empire to the comparison of oil mosque lamps and their LED counterparts. However, the scholarship on Sinan's oeuvre continues to be predominated by "secular" readings. In fact, no literature (in English) delves into the relationship between the mosque's structural and lighting design and the religion of Islam. Sinan's autobiography, *Tezkiretü'l-Bünyân* (*Record of Construction*, 1580s), gives insight into his thought process during the conceptual design stage. Articles written by contemporary scholars analyze the impact of his design decisions on spreading the message of the Qur'an within the Süleymaniye Mosque. My thesis proposes that the light within the space was designed to do more than simply fulfill practical requirements for worship and politics. I explore the extent to which Sinan designed the Süleymaniye Mosque as a "theophanic" tool: a spiritual instrument to manifest divine presence.

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INTRODUCTION

The Süleymaniye Mosque is a must-see monument in Istanbul, Turkey. Its complex is known by tourists for its cemetery-garden (wherein are the mausoleums of Sultan Süleyman and his favorite wife Roxelana), its awe-inspiring view of the surrounding Istanbul (as a result of its location on the Third Hill), and its architectural centerpiece attributed to Koca Mimar Sinan Agha. The Süleymaniye Mosque *külliye* (complex) is a clear testament to the wealth of its commissioner, Süleyman the Magnificent. This is confirmed in accounts by Sinan himself (in his autobiography, *Tezkiretü'l-Bünyân*) and architectural historians. In 1557, to mark the grand opening of the Süleymaniye Mosque to the public, Sinan expressed his gratitude to the sultan for the opportunity to design his imperial mosque: “Take this, the key of the house of God / It is the guide to enlightened travelers. / Each of its double doors is like book / Through which surely a door will open for you.”¹ Even though Sinan himself describes the mosque as “the house of God,” most studies of this landmark have focused on the secular issues of politics, technology, aesthetics (architecture), and functionality (engineering). There is little scholarship on whether or not the sultan requested his architect to spread a religious message beyond those embedded in the Qur'an. My research considers a priority that is implicit in the Süleymaniye Mosque's purpose and its calligraphic program, which takes nearly all (if not the entirety) of its content from Islamic scripture. It investigates the possibility that the mosque advanced a spiritual agenda through an aspect of its design that has a uniquely symbolic weight: its lighting design.

In the chapters that follow, I outline four forms of evidence that support my theory regarding the Süleymaniye Mosque. The first is architectural history – a necessary starting point

¹Sâî Mustafa Çelebi, *Book of Buildings: Tezkiretü'l-Bünyân and Tezkiretü'l-Ebniye* (Istanbul: Koçbank A.Ş., 2002), 75.

for understanding the origins (both literal and figurative) of the *küllîye*. It provides context to both the historical figures directly associated with the complex (Sultan Süleyman and Sinan) and those whose work of architecture served as inspiration for the complex (Emperor Justinian I, Anthemius of Tralles, and Isidore of Miletus). Justinian “the Great” rebuilt Hagia Sophia (“Holy Wisdom”), which would come to influence the design of mosques built throughout the Ottoman Empire. The second form of evidence is lighting design. In particular, I discuss how the natural and artificial lighting strategies of the Süleymaniye Mosque and Hagia Sophia compare (and contrast). The third form disengages from the architecture at hand and explores a Qur’anic verse that relates to the concept of light: the aptly-named “Verse of Light” (*Ayat al-Nur*, Q 24:35). This chapter expounds the meaning behind the verse by way of an analysis of Sufi and contemporary interpretations. This discussion on theology leads into the final chapter, which bridges the three previous forms of evidence. By incorporating the concept of theophany into my argument, I can then fully explain in detail (based on the information provided in the previous chapters) exactly how Sinan designed the Süleymaniye Mosque to “enlighten” visitors. He produced Istanbul’s most luminous sacred space by the means of daylighting, artificial lighting, and Qur’anic calligraphy. The Süleymaniye Mosque’s magnificence was not only a tribute to worldly power; if understood through the lens of theophany, then the architecture’s purpose (and the architect’s intent) was to bridge the earthly and ethereal realms.

CHAPTER 1: ARCHITECTURAL HISTORY

Istanbul has an extensive history of significant political power change. As a Greek settlement and a Roman city, it was known as Byzantium from the seventh century BCE until 330 CE.² When Constantine the Great moved the capital of the Eastern Roman (Byzantine) Empire to Byzantium, it anticipated the prominent role that the city would play in Europe and Western Asia later on as Constantinople. During the Ottoman Empire, the city of Istanbul kept its official name of *Qustantiniyya* (“city of Constantine”). In the first quarter of the twentieth century, the Republic of Turkey took over from the Ottoman Empire. The power shift that occurred across the Golden Horn took a leap from Constantinople to Ankara. The combination of the relinquishment of the city’s title and the abolition of the Ottoman sultanate in 1924 resulted in a total break with the past.³ Once Ankara was named the capital of the Republic of Turkey in 1923, Constantinople was officially renamed Istanbul. The two known origins of Istanbul are (a) the Greek phrase *eis stin poli* (“to the city”) and (b) the Ottoman literary tradition of *İstanbul* (“full of Islam”).⁴ As Istanbul, it was the capital of the Ottoman Empire from 1453 to 1923. Ottoman rule revitalized the port of Galata as a trading hub, bringing economic success to the city.

Roman tourist Pietro della Valle was awestruck during his visit to Istanbul in 1614. He noted, “That which is noteworthy are the mosques, in particular four or five of them built by the Turkish emperors, all of them situated on the highest hilltops in such a way that they almost form a row, visible from one end of the sea to the other and equally distributed along the whole length of the city” (*see figure 1*).⁵ One of the mosques whose profile still defines the skyline is that of the

² Jonathan Bloom and Sheila Blair, *The Grove Encyclopedia of Islamic Art and Architecture*, vol. II, “Istanbul” (New York: Oxford University Press), 315.

³ Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 319.

⁴ Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 316.

⁵ Gülru Necipoğlu, *The Age of Sinan: Architectural Culture in the Ottoman Empire* (Princeton: Princeton University Press: 2005), 92.

Süleymaniye Mosque built by the Turkish emperor (sultan) Süleyman the Magnificent (1494-1566). As della Valle noted, imperial mosques are prevalent throughout the city, representing a line of descent from one sultan to another (typically a son or grandson). In the case of Sultan Süleyman, his building program sought to achieve two aims: to establish an ancestry (based on the inheritance of religiopolitical control) from King Solomon and Emperor Justinian I and to clearly demonstrate that he was chosen by Allah to receive His blessings. Thus, the Süleymaniye Mosque serves as a testament to the long-standing tradition of emphasizing imperial connections with God and, consequently, emphasizing light within sacred architecture.

Case Study: The Süleymaniye Mosque

The city of Istanbul encompasses four major areas. On the European peninsula, north and south of the Golden Horn estuary were the Latin trading quarters and Stambul, respectively. On the Asian side, there were the suburbs of Üsküdar and Kadıköy. Stambul was the walled city proper. It served as the location of what would become the largest and most significant *külliye* (a complex of buildings that each housed a specific program loosely associated with an Ottoman mosque): the Süleymaniye Mosque.⁶ Sultan Mehmed II (who sieged Constantinople in 1453) brought the city's architecture under his protection. It is during Mehmed II's reign that the site of the Süleymaniye Mosque is discernable. The mosque now stands on the ground of the Old Palace (*Eski Saray*). This palace (in the center of the city) was ordered to be built by Mehmed II.⁷ The Old Palace, which was destroyed by fire in 1541, had once been the location of the Byzantine Capitol.⁸

⁶ Bloom, *The Grove Encyclopedia*, vol. II, "Istanbul," 316.

⁷ Mehmed II's second palace, Topkapi Palace (1459-60s), was built soon after at a larger scale and at a prime location: the tip of the peninsula. The Topkapi Palace was the residence of all of the Ottoman sultans and the imperial administrative center until the nineteenth century.

⁸ Anne Stierlin and Henri Stierlin, *Turkey, from the Selçuks to the Ottomans* (Köln: Taschen, 1998), 126.

Throughout the history of Islam, the mosque was never seen as simply a place of worship. As its importance in relation to educational, commercial, and charitable activities grew, so did that of a greater complex; thus, the development of the *külliye*. The program typically included the following: a tomb (*türbe*), madrasas (*medrese*) filled with classrooms, a school of the Qur'an (*mekteb*), a school of the traditions of the Prophet Muhammad (*darülhadis*), a hostel (*tabhane*), a hospital (*bimarhane*), a kitchen (*imaret*), and bath (*hammam*). In addition, commercial establishments (stables, shops, and markets) could surround a mosque in order to provide revenues for the upkeep of the foundation. The term *külliye* derives from the Turkish word *külli* ("complete"), which appropriately describes the visual unity of the series of cells (comprising most of the independent buildings) that are capped by domes.⁹ The ashlar structure of the principal buildings in their entirety (mosque and mausolea) and the brick structure of the lesser buildings (madrasas) created a standardized material palette. The well-known Ottoman architect Koca Mimar Sinan Agha (c. 1488-1588) was a key figure in the transition from stone to brick in the 1550s. The Süleymaniye Mosque, for example, is an imperial foundation where brick is the building material exclusively for minor buildings. That same unity in material vocabulary, in conjunction with a carefully thought-through layout, created an architecture of considerable power that reinforced the *külliye* as a social center for urban development.¹⁰

The Süleymaniye Mosque is the largest (and arguably the most outstanding) of the imperial foundations built during the classical Ottoman period. After the Ottoman conquest of Constantinople in 1453, imperial *külliyes* grew in size and number due to the amount of available land in the city, which enabled the development of large open complexes. The Süleymaniye Mosque is an example of this particular development, at fifteen acres (six hectares) in size and

⁹ Bloom, *The Grove Encyclopedia*, vol. II, "Külliye," 401.

¹⁰ Bloom, *The Grove Encyclopedia*, vol. II, "Külliye," 402.

covered by over 525 cupolas. No *küllîye* at such a scale has been built since.¹¹ While the mosque covers an area of 108 by 73 meters, the addition of the *küllîye* totals an area of 350 by 280 meters – over eight hectares. These hectares encompass a site whose surface is irregular, which forced Sinan to arrange the complex buildings according to the topography.¹² The layout of this irregular diamond-shaped plot of land is oriented parallel with the mosque's longitudinal section, and perpendicular to the direction of Mecca. This is suggestive of a rectangular shape (disregarding the *hammams*) rather than axial, a shape based on the mosque's footprint that would be placed at its center.¹³ The Süleymaniye Mosque is part of a greater complex that encompasses *madrasas* and mausolea.¹⁴

There are two mausolea located in the *küllîye*: one dedicated to Süleyman and his sons and the other dedicated to Hürrem Sultan, otherwise known as Roxelana, who was the sultan's favorite wife. The sultan insisted that Sinan landscape a cemetery-garden with the two mausolea erected amongst the flowers and pathways. The garden may certainly be a reference to paradise, which would explain the headstones in parallel formation in the dirt. Since the garden is located behind the *qibla* wall, the mausolea is intentionally placed in relation to elements within the mosque. The *qibla* is the direction that Muslims face in order to send their prayers. Although Jerusalem was the first-ever *qibla*, Mecca was designated as the *qibla* in 624 and continues to be recognized as such to this day.¹⁵ Since Süleyman's mausoleum aligns with the *mihrab*, as Muslims pray towards Mecca, they also bow down to the deceased sultan. This is one piece of evidence that substantiates the claim that the Süleymaniye Mosque was both a religious and political strategic maneuver. In

¹¹ Ibid.

¹² Stierlin, *Turkey*, 126.

¹³ Stierlin, *Turkey*, 140.

¹⁴ The Museum of Turkish and Islamic Art opened in one of the madrasas in 1914. In addition to the museum, another madrasa has since become the Süleymaniye Library, which maintains one of the most extensive collections of Islamic manuscripts in the world; Bloom, *The Grove Encyclopedia*, vol. II, "Istanbul," 323.

¹⁵ Bloom, *The Grove Encyclopedia*, vol. II, "Mosque," 549.

fact, contemporary Ottoman historians interpret the mosque and the mausoleum as paradise on earth, especially since the sultan's tomb invokes the Dome of the Rock (in plan and in form).¹⁶

The site of the Old Palace and the Byzantine Capitol is the highest point in Istanbul. Süleyman undoubtedly selected that specific site for the Süleymaniye Mosque in order to maximize its visibility and exhibit his “divine” powers as leader. As sultan, Süleyman would have wanted his chief architect, Mimar Sinan to demonstrate (architectonically) his position closest to God in the human-divine hierarchy. Süleyman, in particular, envisioned his imperial mosque as both a religious and political statement. On one hand, the mosque would praise Allah in its architecture; on the other, it would show to the Muslim world the magnificence of this particular sultan. Similarly, sultans typically founded *madrasas* (colleges dedicated to the study of Islamic theology) to establish the power of the state over education.¹⁷ Even the exclusively Qur’anic epigraphic program of the Süleymaniye Mosque, which is standard practice in Islamic sacred architecture, attests to Süleyman’s official policy of religious orthodoxy. It resonates with the fatwas of Ebussuud Efendi (the author of a famous Qur’anic commentary commissioned by Süleyman) that enforced five daily communal prayers and the Friday noon prayers. Even the Arabic inscription composed by Ebussuud identifies the mosque as a place for those who dedicate themselves to congregational prayers and divine worship.¹⁸

Architect: Koca Mimar Sinan Agha

At the request of Sultan Süleyman, Sinan was challenged with the task of building a mosque complex that could express the sultan’s magnificence. The architect showed that he was more than capable of bringing (or at least attempting to bring) Süleyman’s magnificence to the

¹⁶ Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 325.

¹⁷ Bloom, *The Grove Encyclopedia*, vol. II, “Küllüye,” 401.

¹⁸ Necipoğlu, *The Age of Sinan*, 217.

fore of his design. Even prior to his appointment of chief architect, the engineer-architect Sinan had climbed the ranks of the military and consistently demonstrated his abilities to the sultan and other high-ranking officials. Although the place of Sinan's birth is uncertain, his contribution to the world of architecture is established. He is credited with designing 476 buildings (196 of which still survive to this day) across the Ottoman Empire and, as a result, has formulated the principles of classical Ottoman architecture.¹⁹ In Istanbul alone, Sinan erected 334 buildings (a majority of which are mosques).²⁰ One of the reasons for the uncertainty regarding his birthplace and birthyear is due to him having been taken from his home by military officers in order to become a *devşirme*, a Christian slave boy who was raised to serve the Ottoman Empire. Even though Sinan was forced into a system of slavery, he was granted certain opportunities.

Drawn to the art of carpentry, he was taught by a master carpenter at workshops typically located in the novices' dormitory complex or inside the palace of the *yeniçeri agha* (the chief of the Turkish infantry constituting an Ottoman sultan's guard). The location of this palace is near the now-demolished Old Palace, which would later become the site of the Süleymaniye Mosque.²¹ Throughout their training, master carpenters emphasized the importance of geometry by supposedly admonishing, "As long as a person does not understand this rare and agreeable science [geometry], he is not capable of the finest working in mother-of-pearl, nor can he be expert and skilled in the art of architecture."²² Another aspect of Sinan's academic training was "field trips" to foreign countries that allowed *devşirme* to analyze significant works of architecture. Sinan had the opportunity to accompany two sultans on their campaigns. During the reign of Selim II, Sinan

¹⁹ Bloom, *The Grove Encyclopedia*, vol. III, "Sinan," 218.

²⁰ Robert Hillenbrand, *Islamic Architecture: Form, function and meaning* (Edinburgh: Edinburgh University Press), 121.

²¹ Necipoğlu, *The Age of Sinan*, 131.

²² Necipoğlu, *The Age of Sinan*, 132.

visited Egypt and Iran. This is recorded by Sinan himself in *Tezkiret'ül-Bünyân* (*Book of Construction*, a copy of which dates from 1732 and is in the Topkapi Palace Museum). His accounts of the construction of the Süleymaniye Mosque and his own personal history (prior to his appointment of chief architect) are priceless in furthering the discussion that follows. In the context of his travels under Selim II, Sinan recounts how,

I was chosen among the novices for the probity of my character and I acquired an interest in building. I worked with the dedication of the fixed branch of a compass in the service of my master, observing both the center and the periphery. Then, like the moving branch of a compass I wished to travel in other lands. For a long time I travelled in the Sultan's service through the lands of Arabia and Persia, impressing on my mind a corner of every high *iwan* [a half-domed monumental niche] and a crumb of every ruined dervish lodge before returning to Istanbul.²³

Under Süleyman, Sinan partook in all of his major campaigns and traveled to Anatolia, Azerbaijan, the Balkans, Corfu, Eastern Europe, Iran, Iraq, Southern Italy, and Syria between the years of 1521 and 1538.²⁴ During this timeframe, Sinan advances from the position of young *devşirme* to mature *janissary*. His pride is clearly conveyed in *Tezkiret'ül-Bünyân* as he lists the various destinations that he has visited.

Then came the reign of Süleyman / The fortunes of this frail ant flourished / In his reign I performed countless services / I won the approval of statesmen / I became a janissary and suffered affliction / I fought many battles as an infantry man. In the army with my promotions, my crafts and services / And my endeavors amongst my peers / I worked hard since my childhood / I trained at the hearth of Hacı Bektaş. I joined the campaign against Rhodes and Belgrade / And again returned safely. I was promoted to the cavalry / Süleyman Han marched against Mohacs / After returning I became an infantry captain / And later captain of the *zenberek* archers. Then the Sultan marched against the Germans / He caused the enemy to flee the battlefield / From there we went to Baghdad / Fighting many battles against the Safavids.²⁵

As indicated by the *Tezkiret'ül-Bünyân*, Sinan traveled all throughout Europe and Western Asia starting from a young age. With the passing of each year, Sinan grew in the ranks and in experience. With further experience in engineering, Sinan was appointed to the post of

²³ Sâi Mustafa Çelebi, *Book of Buildings: Tezkiretü'l-Bünyan and Tezkiretü'l-Ebniye* (Istanbul: Koçbank A.Ş.), 35.

²⁴ Necipoğlu, *The Age of Sinan*, 132.

²⁵ Çelebi, *Book of Buildings*, 35-6.

zenberekcibaşı (chief of a janissary regiment). As a *zenberekcibaşı*, Sinan participated in the Baghdad campaign (1534-37), during which he helped in the construction of two mosque-cum-convent complexes.²⁶ The vizier at that time, Lütü Pasha (c. 1488-1564), ordered Sinan to assist in the Moldavian campaign (1538). In an attempt to obtain military intelligence about Safavid troops, Sinan probably spent a significant amount of time along the Rumelian border (Austria, Croatia, France, Hungary, Italy, Malta, and Spain) building warships. It was this same vizier who (as grand vizier) would offer Sinan the appointment of chief architect in 1539 saying (as recounted by Sinan in the *Tezkiret'ül-Bünyān*) “Sinan who is *subaşı* [chief of police] and *hāṣeki* [member of the sultan’s elite guard] should be appointed as architect. There is none but he worthy to do this job”.²⁷

Sinan’s design made full use of the site of the Süleymaniye Mosque complex to build his testament to Süleyman’s power. The complex would soon come to epitomize the second (of three) eras of Sinan’s career with its courtyard, cascading dome and slender minarets. Scholar’s split Sinan’s career as chief court architect (effectively Master of Works) into three different periods. The first (1538 to mid-1550s) explores the potential of the traditional Ottoman style; the second (mid-1550s to 1570) pushes the limits and grandeur of the classical Ottoman style in more complex systems of proportions and geometries; the third (1570s to Sinan’s death) goes beyond the limits of the Ottoman style in order to experiment with spatial qualities, mural treatments, and the wonders of light.²⁸ The Ottoman architect’s legacy goes beyond his lifetime. He introduced a new geometric purity, structural rationality and spatial integrity that could be integrated into the design of Ottoman mosques. For example, with the element of a single-domed baldachin, an exterior

²⁶ Necipoğlu, *The Age of Sinan*, 132.

²⁷ Çelebi, *Book of Buildings*, 38.

²⁸ Bloom, *The Grove Encyclopedia*, vol. III, “Sinan,” 219.

would be generated: a pyramidal composition of small (semi-)domes culminating in a drum-less dome and framed by sleek minarets. That same drum-less dome would also generate an interior by vertically integrating the interior space into a unified whole.²⁹

General Sources of Influence

When it came to understanding the project's context beyond its immediate environment, Sinan was aware that the Süleymaniye Mosque complex had to be monumental and leave its imprint on Istanbul. After taking the city in 1453, in the fifteenth and sixteenth centuries, Ottoman sultans ordered the construction of a series of large domed congregational mosques that (in addition to the large dome before the *mihrab*) are recognizable for two other features: completely covered spaces and an open arcaded forecourt. The best-known examples are mosques that take design inspiration from Hagia Sophia, one of the earliest being the Üç Şerefeli Mosque (1437-48) anticipates the Süleymaniye Mosque with its enormous central dome (to which smaller domes are subordinate); a courtyard featuring an ablution fountain at its center and domical arcades at its edge; and four minarets with multiple galleries (*see figure 2*).³⁰ Since each imperial mosque is a statement of power, Sinan looked to precedents as “templates” to follow and explored how he could work towards surpassing them in the Süleymaniye Mosque complex.

Scholars agree that Hagia Sophia was a model for the Süleymaniye Mosque at its time of construction. Other earlier imperial mosques had attempted to rival Hagia Sophia. Mehmed II's Friday mosque, Fatih (“Conqueror”) Mosque (1463-70), was one such attempt, which was built on the same site as the fourth-century Church of the Holy Apostle and a sixth-century church commissioned by Justinian I.³¹ With its two minarets, central dome (with a semi-dome as support),

²⁹ Bloom, *The Grove Encyclopedia*, vol. III, “Sinan,” 222.

³⁰ Necipoğlu, *The Age of Sinan*, 79.

³¹ Richard Krautheimer and Slobodan Ćurčić. *Early Christian and Byzantine Architecture* (New York: Penguin Books, 1986), 69.

and a paradisiac courtyard, it was an early attempt to prove that Muslims could in fact build a monument that paralleled Hagia Sophia. The Fatih Mosque served as a model for Sinan's design for the Süleymaniye Mosque's *küllîye*. Sinan transcended both the character of Mehmed II's mosque and its greater complex by ensuring refined proportions and a harmonious layout of domes (and half-domes) on the mosque, all the while emphasizing the grandeur of the *küllîye* with the tallest madrasas in the Ottoman Empire.³²

The Umayyad Mosque (706-15) may have served as a precedent of both architectural and semiotic value. It is located in Damascus, Syria, a city that was considered the international capital of the Muslim world after its conquest in 635-36.³³ The mosque was consequentially recognized as symbolic of the conquest of Damascus and became a powerful symbol of the triumph of Islam. Similar to the initiative behind Hagia Sophia and the Süleymaniye Mosque, the Umayyad caliph al-Walid I sought to bring attention to three cities of great import to Islam (Damascus, Jerusalem, and Medina) by the means of construction. This marked the first time in Islamic history that architecture served as an instrument of political and religious propaganda.³⁴ Another similarity between the Süleymaniye Mosque and the Umayyad Mosque is the carefully thought-through site selection. In Damascus, al-Walid I chose the site on which the mosque now stands because of its predecessors: temples to the Canaanite god of storms (Hadad) and the Roman god, Jupiter Damascenus, and the church of John the Baptist. Thus, this central location in the city had been its holiest location for fifteen centuries, under three prior faiths. As the Ottomans had done with Hagia Sophia, al-Walid I ordered that the church be demolished, but that the inner perimeter walls (completed with corner towers and an eastward-facing propylaeum) of the Roman temple be left

³² Necipoğlu, *The Age of Sinan*, 102.

³³ Bloom, *The Grove Encyclopedia*, vol. I, "Damascus," 513.

³⁴ Bloom, *The Grove Encyclopedia*, vol. I, "Damascus," 515.

untouched. The prayer hall consists of three aisles parallel to the *qibla* wall, which are cut transversely by a higher central nave that leads to the *mihrab*. Similar to the Süleymaniye Mosque and Hagia Sophia, the area in front of the *mihrab* is domed.³⁵

The Mosque-Madrasa of Sultan Hasan (1356-61) in Cairo served as an exemplar of a charitable foundation that Ottoman sultans would endow centuries later. By the late thirteenth century, Mamluk sultans endowed large charitable foundations, in which a mosque complex combined charitable and commercial functions. At the complex of Sultan Hasan, the congregational mosque sat beside four madrasas and a large mausoleum, an orphanage, a covered bazaar with shops, hospital, water tower, baths, and a kitchen. The total square footage of all of these programs was 7,900 square meters.³⁶ The mosque's decorative program emphasizes the "Verse of Light," of which its significance will be further discussed in Chapter 3. Before one even enters the space, a visitor can see the verse inscribed on the doorway: "Light upon Light; God guides to His Light whom He will". This entrance leads to several others before opening onto a courtyard inscribed with the direction for Paradise. What follows is the east *iwān*, the true *mihrab*, and a prayer hall illuminated by a wide variety of lights – the last of which opened onto the physical wall of the *mihrab* with colors of red, white and black marble.³⁷

Outside of the Islamic world, there is one precedent in particular that may have both influenced the construction of the Süleymaniye Mosque and was itself later influenced by the same mosque: St. Peter's Basilica in Rome (1506-1626). The design and construction of the Süleymaniye Mosque (1550-57) overlapped with the work on St. Peter's Basilica that took place

³⁵ Bloom, *The Grove Encyclopedia*, vol. II, "Mosque," 550.

³⁶ Bloom, *The Grove Encyclopedia*, vol. II, "Külliye," 401.

³⁷ Erica Cruikshank Dodd and Shereen Khairallah, *The Image of the Word: A Study of Quranic Verses in Islamic Architecture*, vol. I (Beirut: American University of Beirut, 1981), 70.

under Antonio da Sangallo the Younger and Michelangelo.³⁸ Many scholars have noted the coincidence between these two major projects, and Gülru Necipoğlu has suggested mutual influence. She further suggests that Sinan's design bridges those of St. Peter's Basilica by both Sangallo and Michelangelo. Beginning in 1536, Antonio da Sangallo the Younger was the architect responsible for the largest church project in the world. His responsibility included guiding his assistant Antonio Labacco in the construction of one of the chief examples of Renaissance wooden architectural models. Requested by Pope Paul III, the enormous model (at approximately 1:30 scale) took seven years to complete (1543-49). Due to its enormous size and its use as an on-site reference, the wooden model was built to the west of the "partition wall" built by Sangallo himself in 1538 to separate the demolition site of the medieval basilica and the worksite of its replacement. The model supposedly stayed on site until December 2, 1546 (four months after the death of Sangallo) – the day in which Michelangelo ordered for its removal from the site.³⁹ Sangallo's model has since been stored in one of the octagonal halls of St. Peter's Basilica.⁴⁰ Thus, despite Sinan having traveled to Southern Italy as a *hāşeki*, he most likely had not seen Sangallo's wooden model of the basilica in person. Necipoğlu presumes that Sinan would have had access to information about Sangallo's "new, incredibly light and proportioned design, composition, decoration and distribution of parts" during his time in Italy.⁴¹ If he did indeed have access to this information, he must have accessed it through drawings and prints.

³⁸ However, while the Süleymaniye Mosque took only eight years to build, St. Peter's Basilica took over one hundred; Necipoğlu, *The Age of Sinan*, 92.

³⁹ Luca Ribichini, "I Modelli. Storie Di Diverse Vicende e Realizzazioni / The Fortunes and History of Model," *Disegnare: Idee Immagini / Ideas Images*, no. 34 (2007): 61.

⁴⁰ Ironically, the hall was built by Sangallo himself; Bianchini, Carlo, Alfonso Ippolito, and Luca J Senatore, "The Wooden Models of the Vatican Basilica by Antonio Da Sangallo and Michelangelo: Survey, Modelling and Interpretation" in *Digital Wood Design: Innovative Techniques of Representation in Architectural Design* (Cham: Springer, 2019), 327.

⁴¹ AA. VV., *San Pietro. Antonio da Sangallo, Antonio Labacco. Un progetto e un modello. Storia e restauro*, (Milan: 1994), 55 as cited by Ribichini, "I Modelli," 60.

Necipoğlu suggests that in order to construct a dome for the Süleymaniye Mosque on par with St. Peter's Basilica (at 120 meters in height and 42 meters in [inside] diameter), Sinan may have investigated the strategies that Sangallo had envisioned using.⁴² At the time of Sangallo's death (1546), the Süleymaniye Mosque was still under construction and Michelangelo was asked to take over for him. Necipoğlu has also suggested that Michelangelo not only looked to the Florence Cathedral (1296-1436) and the Pantheon (113-25) for domical inspiration, but he also referred to the soon-to-be completed Süleymaniye Mosque (its dome soon-to-be at 54 meters in height and 26.2 meters in diameter).⁴³ In contrast with Bramante and Sangallo's proposal for a single-shell dome atop of a circular drum with continuous colonnades for St. Peter's Basilica, Michelangelo proposed (and executed) a double-shell dome with spur-like buttresses (fronted by pairs of columns) that alternate with windows. Its double-shell dome is markedly different from the single-shell dome of the Süleymaniye Mosque and Hagia Sophia. Irrespective of this fact, certain architectural details of the two present-day landmarks of Istanbul (spur-like buttresses that alternate with windows at the base of a central dome) share greater similarities with Michelangelo's design rather than Sangallo's proposals for the basilica.⁴⁴ Thus, Necipoğlu's suggestions surmise – beyond the claim that there was a cross-cultural exchange of ideas during the Italian Renaissance – that mutual influence is evident in the 16th-century architecture of both the Italian states and the Ottoman Empire.

⁴² Necipoğlu, *The Age of Sinan*, 92.

⁴³ For further information on St. Peter's Basilica, see Christoph L. Frommel, "San Pietro," in *The Renaissance from Brunelleschi to Michelangelo : the representation of architecture* (New York: Rizzoli, 1994); *ibid.*

⁴⁴ Necipoğlu, *The Age of Sinan*, 92.

The Potential Influence of Dynastic Claim

Sultan Süleyman, in particular, held imperial tradition and semiological continuity in high regard. Through his building program he sought to underline the connections between himself – he who bears the Islamic equivalent of the name Solomon – and Justinian I, the commissioner of the architecture that was believed to be the *analogon* in the Middle Ages of Solomon’s Temple in Jerusalem: Hagia Sophia. With the figure of Solomon restored to his scriptural glory in the Qur’an (as the archetype of the imperial sovereign) and his Temple referenced considerably in the plans of Hagia Sophia, it is no surprise why Süleyman choose to parallel the Byzantine basilica in the plan of his imperial mosque complex.⁴⁵ Süleyman successfully fulfilled his destiny according to his contemporaries; a chronogram composed for his mosque by Yahya Beg announces him as “Patron of Friday prayer, Sunni Shah, Solomon of the Age!”⁴⁶

Süleyman the Magnificent, well aware of the feats of Justinian the Great, emulated his strategies for self-glorification by building another great building in Istanbul. The main source of inspiration for the Süleymaniye Mosque is undeniably Hagia Sophia, which underwent a myriad of transformations over the course of centuries. Constantine the Great (272-337) commissioned the first Hagia Sophia, completed in 360, which bore a resemblance to the Church of the Holy Sepulcher in Jerusalem.⁴⁷ The current building was erected in 537 under the rule of Justinian I. The Byzantine cathedral served as both a religious symbol of Christianity and a political symbol of the Byzantine Empire.⁴⁸ This two-fold symbolism began with the first Hagia Sophia, in which the Imperial house and other aristocratic families provided commissions and financial backing of

⁴⁵ Stierlin, *Turkey*, 131.

⁴⁶ Necipoğlu, *The Age of Sinan*, 222.

⁴⁷ Although no traces of Constantine’s sacred architecture exist any longer, the little information available details a large basilica with double aisles and galleries. Its program included an atrium, a propylaeum, a *skeuophylakium* (treasure house), and a *diaconon*; Krautheimer, *Early Christian and Byzantine Architecture*, 69.

⁴⁸ Stierlin, *Turkey*, 131.

new architecture that touted the classical concepts of order, careful workmanship, precious materials, and elegant design. Beginning in the fourth century (and ending in the sixth century), emperors' involvement (both physically and monetarily) played a major role in shaping the (sacred) architecture of Constantinople.⁴⁹ However, while Constantine encouraged construction in his namesake capital by providing moral and financial support, Justinian I took on full control of the efforts 200 years later. Considering the ambition of his building program, he was the only individual who could provide the necessary funds in order to realize his architecture.⁵⁰ As a result of his aspirations, Justinian I turned the tide in architectural history. Until the beginning of his reign, most church building had been based on the basilica building type. During his reign, Justinian I decided to break away from the West, which continued to follow the standard of the basilica, and instead commissioned centrally-planned and vaulted brick churches whose highest point is the apex of their dome.⁵¹ Thus, Justinian I initiated the development of Byzantine architecture – a new architecture that finds its roots in late, rather than classical, antiquity. It has been referred to as the “first medieval architectural system.”⁵²

The imperial heritage that Süleyman the Magnificent trusted Sinan to instill in his *küllîye* came at a price: 53,782,980 aspers (\$287,212,500 USD as per 2007).⁵³ Due to the financial incentive provided by Süleyman, the construction of the mosque took less than ten years to complete; employed 2,500 waged (not conscripted) workers of Christian and Muslim faith; and took 5,500,000 man-days of working to complete (according to the *Annals* of Topkapı).⁵⁴ The price paid by the sultan was primarily due to his selection of materials. Unlike Hagia Sophia, which

⁴⁹ Krautheimer, *Early Christian and Byzantine Architecture*, 103.

⁵⁰ Krautheimer, *Early Christian and Byzantine Architecture*, 202.

⁵¹ Krautheimer, *Early Christian and Byzantine Architecture*, 203.

⁵² Krautheimer, *Early Christian and Byzantine Architecture*, 226.

⁵³ Süleyman Yükçü, Yılmaz İçerli, and Canan Yükçü, "Construction of Süleymaniye Mosque in Istanbul and Cost Accounting (1550-1557)," *Birinci Balkan Ülkeleri Muhasebe ve Denetim Konferansı* (2007), 6.

⁵⁴ Stierlin, *Turkey*, 140.

was built in bland-looking brick (and veneered with marble, mosaic, and stone), and clad in lead, the Süleymaniye Mosque was built in pearly-white stone, and roofed with lead.⁵⁵ The walls of Hagia Sophia are built entirely from thin bricks set in thick mortar-beds (up to 2.75” high) with limestone courses placed at the springing of the vaults. The bricks – pitched on their sides instead of being placed radially – are embedded in thick beds of mortar to form extraordinarily thin and light vaults.⁵⁶ Although they appear to be resilient and homogenous, they are not the homogenous resilient masses of Roman concrete construction.⁵⁷ The resulting lightweight vaults enabled Anthemius of Tralles and Isidore of Miletus to envision and carry out bolder skeleton constructions of fewer and thinner supports and of wider vaulting spans.⁵⁸

Precedent: Hagia Sophia

Hagia Sophia served more as inspiration rather than competition during Sinan’s design of the Süleymaniye Mosque complex. The new Emperor of East Rome was pious; so much so that he believed it to be his divine duty to re-establish Christian orthodoxy and serve as a guiding light in the Church.⁵⁹ Even though Rome was still considered the spiritual center of the empire, Constantinople grew in importance as the Holy See of the patriarch. Constantinople became renowned as the New Rome and even “the daughter more ravishing than the mother.”⁶⁰ A comment made by Manuel Chrysolora in his essay “Comparison of Old and New Rome” (1411) testifies to an increase in architectural splendor in Constantinople. “New Rome” and, in particular, its prized architecture (such as Hagia Sophia) demonstrated a surge in size and inventiveness that attests to

⁵⁵Fritz Wenzel, "Investigations into the construction and repair history of the Hagia Sophia," *Construction History* vol. 25 (2010), 4.

⁵⁶ Krautheimer, *Early Christian and Byzantine Architecture*, 211.

⁵⁷ Krautheimer, *Early Christian and Byzantine Architecture*, 212.

⁵⁸ Krautheimer, *Early Christian and Byzantine Architecture*, 229.

⁵⁹ Krautheimer, *Early Christian and Byzantine Architecture*, 201.

⁶⁰ Krautheimer, *Early Christian and Byzantine Architecture*, 202.

how “the works of men competing with others can progress towards greater beauty.”⁶¹ Between 404 and 415, the propylaeum of the first Hagia Sophia underwent reconstruction due to a devastating fire. In 532, it was entirely burnt to the ground in the Nika Riot with the *skeuophylakion* as the only exception. Although the loss of the original Hagia Sophia was grave, it presented Justinian I (who came out victorious from the week-long riots) the opportunity to rebuild it as a testament to his triumph.⁶²

Similar to Sinan, the two “architects” commissioned by Justinian I were not traditional; in fact, Anthemius of Tralles and Isidore of Miletus were what their contemporaries called *mechanopoioi*: intellectuals with an in-depth knowledge of the theory of statics and kinetics and adept at mathematics.⁶³ Anthemius of Tralles was an author of a text on conical sections; an expert in projective geometry; and an inventor. Isidore of Miletus was an author of a commentary on an older treatise about vaulting. He taught stereometry and physics at universities based in Alexandria and in Constantinople.⁶⁴ Their scientific knowledge could thus be applied to the field of the built environment – and had been, successfully. Notwithstanding, experienced master builders advised them to make changes to their design in order to abide by safety coefficients. These changes include walling up the openings puncturing the main piers near the nave; adding arches to buttress the half-piers (also added to support the main piers) across the aisles and galleries; raising the main buttresses on top of the main piers to provide added weight; and increasing the number of arcades in the gallery zone to seven (from five) to diminish distances and heights.⁶⁵ The price of five years

⁶¹ Necipoğlu, *The Age of Sinan*, 138.

⁶² Krautheimer, *Early Christian and Byzantine Architecture*, 205.

⁶³ Krautheimer, *Early Christian and Byzantine Architecture*, 206.

⁶⁴ Ibid.

⁶⁵ Krautheimer, *Early Christian and Byzantine Architecture*, 212.

of construction to erect Hagia Sophia was \$180,000,000 (as per 1986). Justinian supposedly declared to the world at its consecration, “Solomon, I have vanquished thee!”⁶⁶

Even after Hagia Sophia was dedicated on December 27, 537, the building underwent significant changes to its structure. The most significant change was its dome, which collapsed in 558. The dome, which was supposedly quite low and continued the curve of the pendentives supporting it, was replaced by a steeper ribbed dome (scalloped by 40 ribs and 40 curved webs and buttressed on the outside by 40 closely-spaced short ribs that frame small windows).⁶⁷ Due to the collapse, the piers and buttresses had leaned backwards, the east and west arches had expanded and the north and south lateral arches had bent outwards. As a result of the thrust of the first dome, the deformed base had to be regularized by expanding inward the crowns of the arches and partially reconstructing the pendentives. Other changes to the second Hagia Sophia were the reconstruction of the clerestory walls below the lateral arches and the modification of the original window patterns, which either occurred between 558 and 563 or in 869, that moved back to the perpendicular gallery arcades and its respective wall. Originally, it had seven arcades and was surmounted by a single large segmental opening divided by piers. In the ninth century, four flying buttresses that projected into the atrium were added to reinforce the west façade. Irrespective of all of these changes to further strengthen the structure of Hagia Sophia, the second dome partially collapsed twice between the tenth and the fifteenth century – the western side in 989 and the eastern side in 1346.⁶⁸

Even from a distance, the ellipsoidal dome of Hagia Sophia stands out on the city skyline. As Jonathan Bloom and Sheila Blair suggest, this particular dome most likely inspired Muslim

⁶⁶ Krautheimer, *Early Christian and Byzantine Architecture*, 206.

⁶⁷ Krautheimer, *Early Christian and Byzantine Architecture*, 209.

⁶⁸ Krautheimer, *Early Christian and Byzantine Architecture*, 206.

architects to introduce this element to their sacred architecture across the Ottoman Empire, in their attempt to build imperial mosques whose dome exceeded that of Hagia Sophia in size.⁶⁹ Even though domes appeared on the earliest Islamic architecture (e.g., the Dome of the Rock), their design continued to develop and improve with time. Another feature that could be seen from a distance is minarets. The first minaret was raised on the southern stair-turret of the west façade by Mehmed II in the mid-fifteenth century. After introducing a marble *mihrab* and a *minbar* in its interior, a second minaret (of brick this time) was added to the southeastern side of Hagia Sophia. Nearly a century later, Selim II replaced the original wooden minaret and strengthened the buttresses. After the shift of imperial power from Selim II to Murad III in 1574, two additional minarets were added to the north and west corners of the mosque (*see figure 3*).⁷⁰

Case Study vs. Precedent: Architectural Elements

As a caption to Le Corbusier's watercolor drawing of the Istanbul skyline from the east-Marmara Sea (*see figure 4*), he asserts that, "The walls of Byzantium, the mosque of Sultan Ahmet, Hagia Sophia, the Grand Seraglio. Come, you town builders, note it down in your files: silhouettes!"⁷¹ In order to compete with the soaring architectural wonder of Hagia Sophia, the Süleymaniye Mosque's location on top of a hill gave it an advantage in height (and urban visibility) compared to other imperial mosques in the area. In the case of the Süleymaniye Mosque, it seems as though most of Sinan's design decisions played with one element or another of Hagia Sophia. Hagia Sophia, which is located adjacent to the site of the "New Palace" (Topkapi Palace), had been seen from its Byzantine conception as grand. Its towering height in the city at 56 meters made

⁶⁹ Bloom, *The Grove Encyclopedia*, vol. II, "Dome," 18.

⁷⁰ Bloom, *The Grove Encyclopedia*, vol. II, "Istanbul," 323.

⁷¹ Enis Kortan, *Le Corbusier: Turkish Architecture and Urbanism Through the Eyes of L.C.* (Istanbul: Boyut Kitaplari), 87.

it clearly visible from the water. The Süleymaniye Mosque's height of 54 meters may be the only element that truly “challenged” Hagia Sophia. The following is a comparative list of dimension comparisons that demonstrate how the mosque could not actually compete in size with its precedent.⁷²

	The Süleymaniye Mosque	Hagia Sophia
Area (at ground level)	108 by 73 meters	140 by 72 meters
Nave length	65 m	85 m
Diameter of dome	27 m	31 m
Open courtyard space	46 by 32 m	48 by 33 m

Transitioning from macroscopic to microscopic scales, Sinan clearly made an urban design decision in consideration of Hagia Sophia by specifying an oblong open space in the Süleymaniye Mosque complex. Sinan's decision to use a hybrid basilican plan with a central dome buttressed longitudinally by semi-domes and laterally by side-aisles basically copies its Byzantine source of inspiration. However, unlike at Hagia Sophia, he adds domes on top of the side aisles (instead of a cross-groined vault and galleries overhead) and an Ottoman four-sided portico with seven domes on the short side and nine on the long (instead of a Byzantine *atrium*, like the one that had once acted as a courtyard at Hagia Sophia).⁷³ Nevertheless, as the plans and sections show, their general layouts are very similar – they feature a large prayer hall beneath a pendentive dome, an outdoor courtyard with an ablution fountain at its center (*see figure 5*). Returning to their similar roof structure, one difference between the Süleymaniye Mosque and Hagia Sophia is that their respective domes are circular and ellipsoidal, respectively. Also, seen from without, the (semi-) domes of the mosque are predominantly hidden in its stepped profile, while those of the church

⁷² Stierlin, *Turkey*, 127.

⁷³ Stierlin, *Turkey*, 126-7.

are clearly visible from the outside. In both cases, from the inside, inspirational calligraphy abounds; however, as Q 35:41 encircles the Süleymaniye Mosque's dome, the "Verse of Light" (Q 24:35) encircles the apex of Hagia Sophia's dome.

Once visitors and worshippers enter the main interior space, one quality is clear: natural light pervades both the Süleymaniye Mosque and Hagia Sophia. A comparison of both sections demonstrates that they have a similar number of windows (*see figures 6, 7*). My analysis of the proportion of window-to-wall surface area (based on the transverse and longitudinal sections) of both the Süleymaniye Mosque and Hagia Sophia indicates that a higher proportion (approximately 15%) of the surface area of the total glazing is in the dome. Details, such as marble window grilles, derive from the Byzantine building tradition and have been used by Sinan and other Islamic architects.⁷⁴ In both the Süleymaniye Mosque and Hagia Sophia, windows (with or without grilles) are used as means to dramatize the strong rays of sun in the Levant. Hagia Sophia creates a strongly directional space in contrast to the centralized one in the Süleymaniye Mosque due to its central dome buttressed by semi-domes and lightened by a plethora of windows.⁷⁵ Furthermore, the meticulously designed exterior of the Süleymaniye Mosque reflects an easily-understood and seen-as-a-whole interior in contrast to Hagia Sophia's bland exterior that hides a hierarchical interior.⁷⁶ The lateral disposition at Hagia Sophia is convoluted, with its 12-meter high side-aisles and 10-meter high superposed galleries. The eight columns on either side of the nave creates a "curtain" effect. At the Süleymaniye Mosque, on the other hand, Sinan accentuated lateral extension, with minimal interruption of two pairs of columns on either side. The side aisles rise to a height of 30 meters. When it comes to the degree of homogeneity within the two interiors, Hagia Sophia unifies

⁷⁴ Bloom, *The Grove Encyclopedia*, vol. III, "Window," 419.

⁷⁵ Bloom, *The Grove Encyclopedia*, vol. II, "Mosque," 552.

⁷⁶ Bloom, *The Grove Encyclopedia*, vol. III, "Sinan," 219.

the space with the seemingly single, continuous surface of the *intrados* of the domes and vaults. In contrast, Sinan chose to emphasize the various components of the structure by emphasizing the groins. When it comes to the flow of one space to another, Sinan does not provide any intermediary supports between the nave and aisles. However, Anthemius of Tralles and Isidore of Miletus decided to support the squinches that extend the apse upwards (at 45° angles) with arches and columns.⁷⁷

The “Re-Christening” of Istanbul

Despite Hagia Sophia’s tumultuous history, by the sixteenth-century it had become a symbol both of Christianity and (claimed and “re-christened” for) Islam, thus further emphasizing its importance as a monument/testament. In 1453, Muslims invaded Constantinople and claimed the city as their own. The Ottoman Empire, under Sultan Mehmed II, declared Constantinople the capital and Hagia Sophia the city’s premier Friday mosque.⁷⁸ Mehmed II called for changes to be made to the building in order for it to better serve Islamic practice. One order called for enormous roundels eight meters in diameter, each with the name of one of the first four caliphs: Abu Bakr, Ali, Umar, and Uthman ibn Affan. As art historian Robert Hillenbrand points out, these medallions rest on the pendentives supporting the central dome of Hagia Sophia (*see figure 8*), which is symbolically as though the monumentality of Hagia Sophia now rests on the “unshakeable foundations” of Islam.⁷⁹ The roundels are not the only architectural elements with Qur’anic calligraphy in Hagia Sophia. At the apex of its ellipsoidal dome is an excerpt from the “Verse of Light” (*see figure 9*). It is the calligraphic work of Mustafa ‘Izzet, carried out between 1847 and

⁷⁷ Stierlin, *Turkey*, 130.

⁷⁸ Necipoğlu, *The Age of Sinan*, 80.

⁷⁹ Robert Hillenbrand, *Studies in Medieval Islamic Architecture: Volume I* (London: The Pindar Press, 2001), 523.

1849.⁸⁰ It is a clever reminder to Muslims (due to its placement) that “Allah is the Light of the heavens and the earth” – without which, the people of Istanbul (and of the Muslim world in general) would be lost. Other orders called for four minarets to visually counteract the curve of Hagia Sophia’s dome; clusters of Turkish mausolea to flank the church’s exterior; and yellow paint to conceal the figural mosaics in the interior.⁸¹ As a result, there are certain elements that no longer retain their brilliance. During the reign of Ahmed I (1590-1617), he ordered the interior and exterior to be plastered and whitewashed. Most of the figural mosaics from the sixth century were obscured – that is, until the nineteenth century. With the assistance of Ticinese Gaspare Trajano Fossati and Giuseppe Fossati, Abdülmecid (1823-61) commissioned a thorough restoration of Hagia Sophia. The Fossati brothers removed the plaster and whitewash that had obscured the figural mosaics and then re-covered in plaster for protection from further damage.⁸²

The conversion of Christian Constantinople to Muslim Istanbul transformed the city; in particular, the architecture took on a different form and a new way of representing God. Sinan, Anthemius of Tralles and Isidore of Miletus all placed importance on light, whether artificial or natural; however, they placed emphasis on different aspects of light. Istanbul became an important source of architectural inspiration throughout the entire Ottoman Empire. Hagia Sophia, remained revered – so much so that performing rituals in its prayer hall increased the value of prayers.⁸³ Its magnificence, both architecturally and technologically, challenged aspiring Ottoman architects to build a monument as grandiose as this one. According to Westerners (“those claiming to be architects among infidels and sinners”), Ottoman architects could not build anything as close in

⁸⁰ Çelebi, *Book of Buildings*, 71.

⁸⁰ Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 324.

⁸¹ Krautheimer, *Early Christian and Byzantine Architecture*, 206.

⁸² Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 324.

⁸³ Necipoğlu, *The Age of Sinan*, 84.

grandeur to Hagia Sophia and were thus discouraged from even attempting.⁸⁴ Ironically, the son of Süleyman, Selim II, further restored Hagia Sophia in the late sixteenth century. At that point in time, the mosque had begun to fall apart as neighboring secular buildings encroached on its property. Sinan, who served as the chief architect under Selim II (and is even responsible for constructing his mausoleum in the south garden of Hagia Sophia), convinced the sultan to restore Hagia Sophia to its former glory and to take it to the next level of monumentality. Despite the skepticism of the “infidels,” Selim II ordered in a 1573 imperial decree that, “Given that the repair of *masjids* [mosques] and sanctuaries is the order of God, the unique creator, when it was reported that some parts of the Great Mosque of *Ayasofya* [Hagia Sophia] located in front of my imperial palace needed to be repaired, it was personally inspected by me [...] with the chief of my royal architect [...] and the architectural experts who had gathered there.”⁸⁵ Thus, Sinan not only admired Hagia Sophia and emulated it in the Süleymaniye Mosque, but had the honor of working on it, and helping ensure its survival. According to the decree, Sinan determined the demolition of superfluous buildings on site and the addition of buttresses and water channels. One of the most significant requirements of the order was “removing the [wooden] minaret on top of the half-dome and constructing a minaret above the buttress located in front of it.”⁸⁶ Since the Süleymaniye Mosque complex comprises four multi-galleried minarets as well, Sinan simultaneously emphasized the imperial status of Hagia Sophia and made a deliberate comparison with his own imperial mosque in Istanbul.⁸⁷

⁸⁴ Çelebi, *Book of Buildings*, 92.

⁸⁵ Necipoğlu, *The Age of Sinan*, 112.

⁸⁶ Ibid.

⁸⁷ Necipoğlu, *The Age of Sinan*, 121.

The Semiotic Potential of Architecture

In Arabic, mosque is *masjid*, “place of prostration.” For a prayer to be considered valid, it does not have to be said within a Muslim house of worship, although it is encouraged at Friday noon (the most important weekly service).⁸⁸ Similar to the fact that the term *masjid* can be applied anywhere prayer is appropriate, a *masjid* does not have a prescribed architectural layout. Simply put, a mosque must enable worshippers to wash themselves before prayer; line up in rows in preparation for prayer towards Mecca; and repeat and perform series of prayers and prostration, respectively, in accordance to an *imam* (prayer leader). In the case of the Süleymaniye Mosque, the cemetery-garden flanks the northern side of the Süleymaniye Mosque while an enclosed courtyard is situated along the southern side. An essential architectural element can be found at the center of the courtyard: an ablution fountain. The ritual of washing one’s body (parts) before entering a mosque to pray is predominantly done on the eastern and western sides of the Süleymaniye Mosque. Despite there being entrances near the now commonly-used ablution fountains, the main entrance to the mosque is through the courtyard.

Once visitors and worshippers traverse the threshold, they are officially in the prayer hall. Overhead, chandeliers of mosque lamps hang approximately three meters above the ground. They are laid out according to a grid that allows for equal illumination throughout the space. During the day, the architecture above the chandelier is illuminated with natural light. Below the pendentive-held dome, windows puncture walls in order to flood the upper half of the building with light. By using pendentives instead of squinches to withstand the weight of the central dome (although both serve as zones of transition and resolution between angles and curves), Sinan was able to lighten the loads transferred to the walls and add rows of windows to illuminate (generously) the space.⁸⁹

⁸⁸ Bloom, *The Grove Encyclopedia*, vol. II, “Mosque,” 548-9.

⁸⁹ Bloom, *The Grove Encyclopedia*, vol. III, “Sinan,” 219.

Visitors see two tympana filled with rows of windows and outlined by arches that serve (via four pendentives) as the lateral support structures for the central dome. The dome's base consists of 32 windows that allow light to flood into the space from the highest architectural element, hovering at 54 meters above the paved floor.

The pervading light typically entered through screens (of stucco and marble) that accentuated wall surface and increased tension and visual ambiguity. In contrast to the upper windows, the lower ones provide an easy and direct visual communication with the exterior.⁹⁰ This light glistens the large roundels with the names of Allah, the Prophet Muhammad and his two grandsons, Hasan and Hussein (*see figure 10*). These four medallions are the largest form of calligraphy in the Süleymaniye Mosque. Gold-illuminated calligraphy adorns the walls of the mosque in either windows or cartouches. Calligrapher Ahmad Karahisari is responsible for the architectural inscriptions and Master Ibrahim was responsible for the stained-glass windows (at least of the *qibla* wall), which became an important exemplar of Ottoman colored glass.⁹¹ The design perpetually reinforces the message of the Qur'an, whether visitors walk through a doorway or worshippers pray in front of the *mihrab*.

Physical elements that help spread this message are the minaret, *minbar*, and *mihrab*. Although *muezzins* no longer call Muslims to prayer from the top of the four minarets (one at 63 meters tall with two galleries and three at 81 meters tall with three galleries), the architectural elements are still symbolic of this duty.⁹² The call at Friday noon signals the most important prayer time of the week. Muslims who enter the Süleymaniye Mosque at this hour are greeted by the *imam*, who gives his sermon on the steps of the *minbar*. The *minbar*, which insinuates an *imam*'s

⁹⁰ Bloom, *The Grove Encyclopedia*, vol. III, "Sinan," 222.

⁹¹ Bloom, *The Grove Encyclopedia*, vol. II, "Istanbul," 325.

⁹² Loudspeakers now call Muslims five times a day; Stierlin, *Turkey*, 138.

stature in relation to the Prophet Muhammad and Allah, is located to the right of the *mihrab*. As shown in the Süleymaniye Mosque, the *mihrab* is typically a concave niche. Out of all the architectural elements that the architect Sinan included within the Süleymaniye Mosque – ablution fountain, minaret, *minbar*, and *mihrab* – it is the minarets that he discusses most often in *Tezkiret'ül-Bünyân*. Aside from the significance of the minaret as the most visible architectural element of Islam, it is also imbued with religious symbolism at the Süleymaniye Mosque. In conjunction with the dome, Sinan describes the minarets as “the Prophet Muhammed, the dome of Islam, and his four friends.”⁹³ There is another element (though not exclusively tied to religion) that symbolizes these same four individuals: the piers. Sinan explicitly states that “Its four columns [are] the four caliphs. The house of Islam built on four principles / Strengthened by the four friends.”⁹⁴ These two sentences provide another example of the Süleymaniye Mosque serving as a religious statement. The piers served a physical purpose as well: to support the large central dome. Sinan’s concern for significantly sized foundations, piers and arches to withstand the weight of domes indicates his practical training as an engineer, in which he focused on an empirical rather than a theoretical approach to building.⁹⁵

The Süleymaniye Mosque: “The House of God”

Süleyman the Magnificent and Justinian the Great had similar reputations. They were both jurists, and patrons of the arts. In fact, Justinian I was considered the greatest legislator of the classical world. Süleyman earned a similar title, Süleyman the Legislator (*Kanuni*), for unifying the legislation of the entire Ottoman Empire.⁹⁶ His aspiration to build his “temple” on the pre-

⁹³ Çelebi, *Book of Buildings*, 66.

⁹⁴ Çelebi, *Book of Buildings*, 63.

⁹⁵ Bloom, *The Grove Encyclopedia*, vol. III, “Sinan,” 221.

⁹⁶ Stierlin, *Turkey*, 116.

eminent tradition of Istanbul's Byzantine past, led his architect to make certain design decisions with clear intentions. One example is Sinan's use of classical columns to support the tympana of the central hall. The columns of Hagia Sophia are of Aswan granite, the imperial stone *par excellence*. According to historian Gilbert Dagron, the origin of its eight "Roman" columns was supposedly the Temple of Aurelian. The mythologized Romano-Byzantine columns were the source of inspiration for utilizing *spolia* from temples as the four columns that support the central square of the Süleymaniye Mosque. One was known as the Column of Virginity and originally stood near the Church of the Holy Apostles; another had allegedly supported a statue of the emperor at one of the Imperial Palaces; and the last two purportedly came from Alexandrette (Iskenderun).⁹⁷ Sinan discusses this subject in depth in *Tezkiret'ül-Bünyān*. The columns

were like lofty cypresses in the garden of faith, representing the four chosen companions, were brought from different lands. One of these was that known as Kiztaşı, made from a single piece of stone, as tall as a minaret; [...] Another column was brought from Alexandria by cargo ship. One column was transported from Baalbek to the seashore and brought by cargo ship. Another column was found at Topkapı Palace.⁹⁸

The tympana (in conjunction with half-domes) buttressed the central dome of the Süleymaniye Mosque, which clearly alludes to the central dome of Hagia Sophia. The conscious decisions about the columns and the tympana were made by Sinan to establish a direct connection between Süleyman the Magnificent and Justinian the Great.⁹⁹

According to the content of the *Tezkiret'ül-Bünyān*, the Süleymaniye Mosque does not simply fulfill its duty to house the followers of Allah; it arguably serves as the "house of God." This characterization is made by Sinan himself. He expresses gratitude to Süleyman right before the grand opening of the mosque to the people in 1557 by telling him, "Take this, the key of the *house of God* [*italics added for emphasis*] / It is the guide to enlightened travelers. Each of its

⁹⁷ Stierlin, *Turkey*, 134.

⁹⁸ Çelebi, *Book of Buildings*, 58.

⁹⁹ Stierlin, *Turkey*, 17.

double doors is like a book / Through which surely a door will open for you”.¹⁰⁰ Although there is no evidence that the book that Sinan is referring to is the Qur’an, there are other instances in the *Tezkiret’ül-Bünyân* in which elements of the Qur’an are strategically placed within the Süleymaniye Mosque. For example, the angel Gabriel is mentioned in a description of the windows located on the *qibla* wall. Sinan describes “The unsurpassed and incomparable decorated windows *are like the wings of Gabriel* [italics added for emphasis], becoming a beautiful rose garden in springtime whenever the sun’s rays illuminate them.”¹⁰¹ Another is Sinan’s statement that, “When the beautiful dome of the holy mosque was completed, and the construction of the other parts done, lodestone of calligraphers Hasan Karahisarî wrote in *müsenî* script in the dome resembling the heavens the verse, ‘God holds the heavens and the earth, lest they remove,’ and on each door like that of heaven he wrote many beautiful and inspiring inscriptions” (*see figure 11*).¹⁰² Even though *Tezkiret’ül-Bünyân* attests to individuals, such as Sinan himself, interpreting the architect’s buildings from a theological point of view, the scholarship on Sinan’s oeuvre continues to be predominated by “secular” readings. However, this sort of readings aids in better understanding a technical aspect of mosques (the Süleymaniye Mosque, in particular) that is typically not mentioned in Islamic scholarship: lighting design.

¹⁰⁰ Çelebi, *Book of Buildings*, 75.

¹⁰¹ Çelebi, *Book of Buildings*, 66.

¹⁰² Çelebi, *Book of Buildings*, 71.

Catalogue of Figures

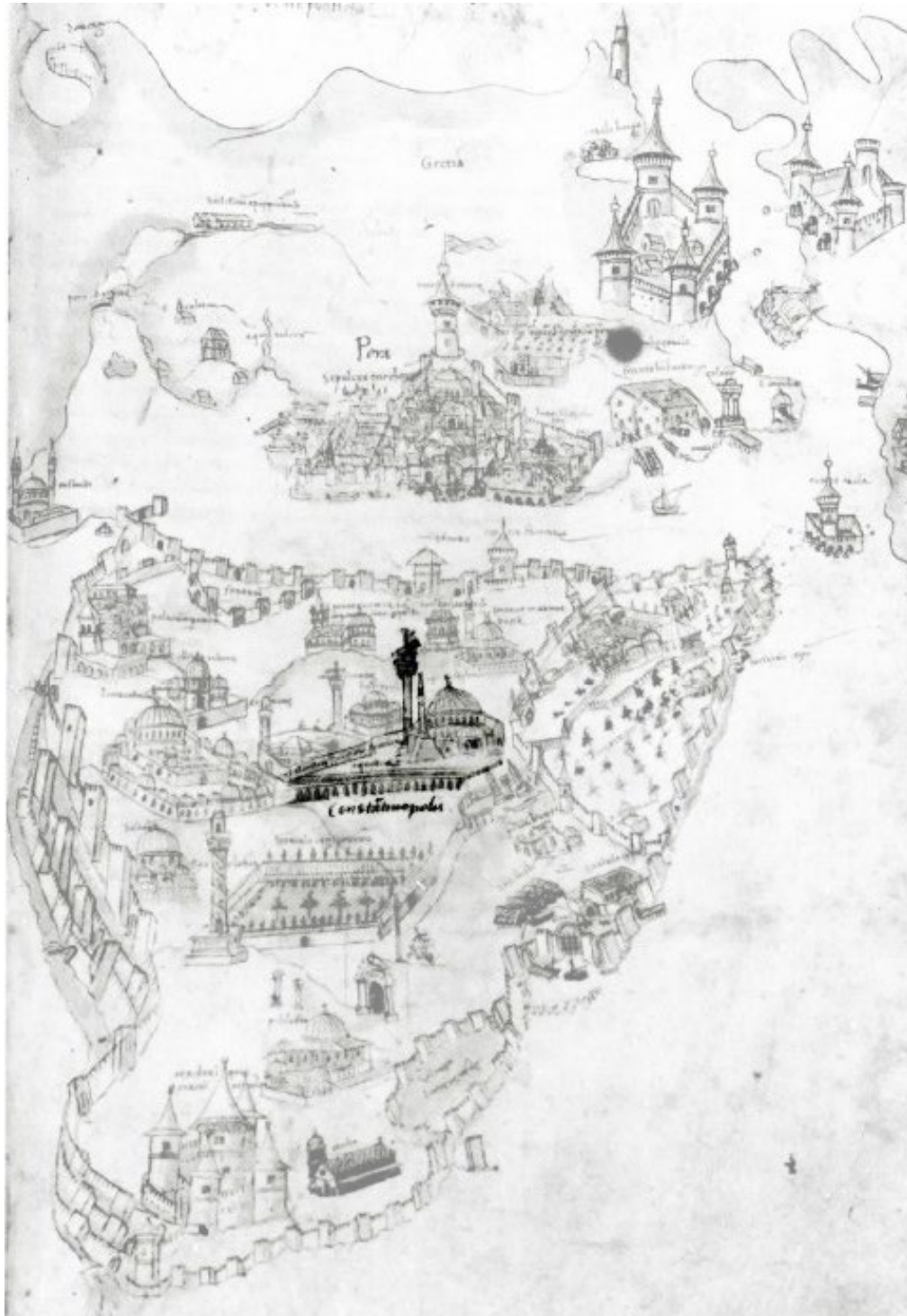


Fig. 1: Map of Constantinople (with Hagia Sophia at the forefront) drawn in ink by Cristoforo Buondelmonti (c. 1481).



Fig. 2. The courtyard at the Üç Şerefeli Mosque featuring an ablution fountain at its center and domical arcades at its edge.

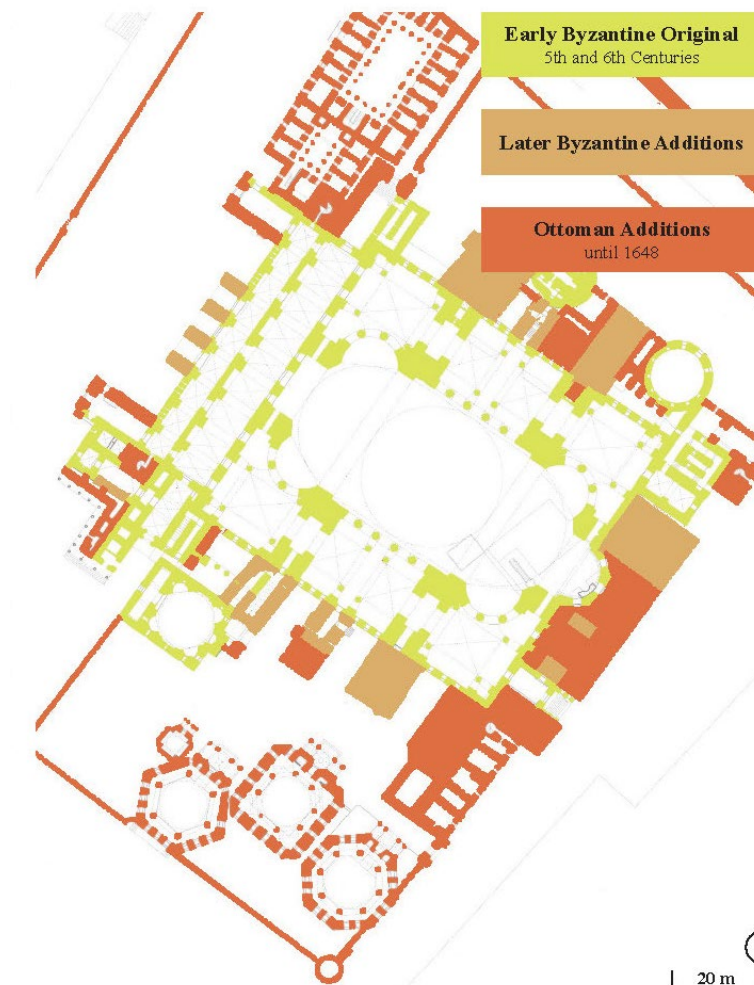


Fig. 3: Architectural history of Hagia Sophia.



Fig. 4: Silhouette of Istanbul seen from east-Marmara Sea. L to R: The Sultan Ahmet Mosque, Hagia Sophia, Topkapi Palace.

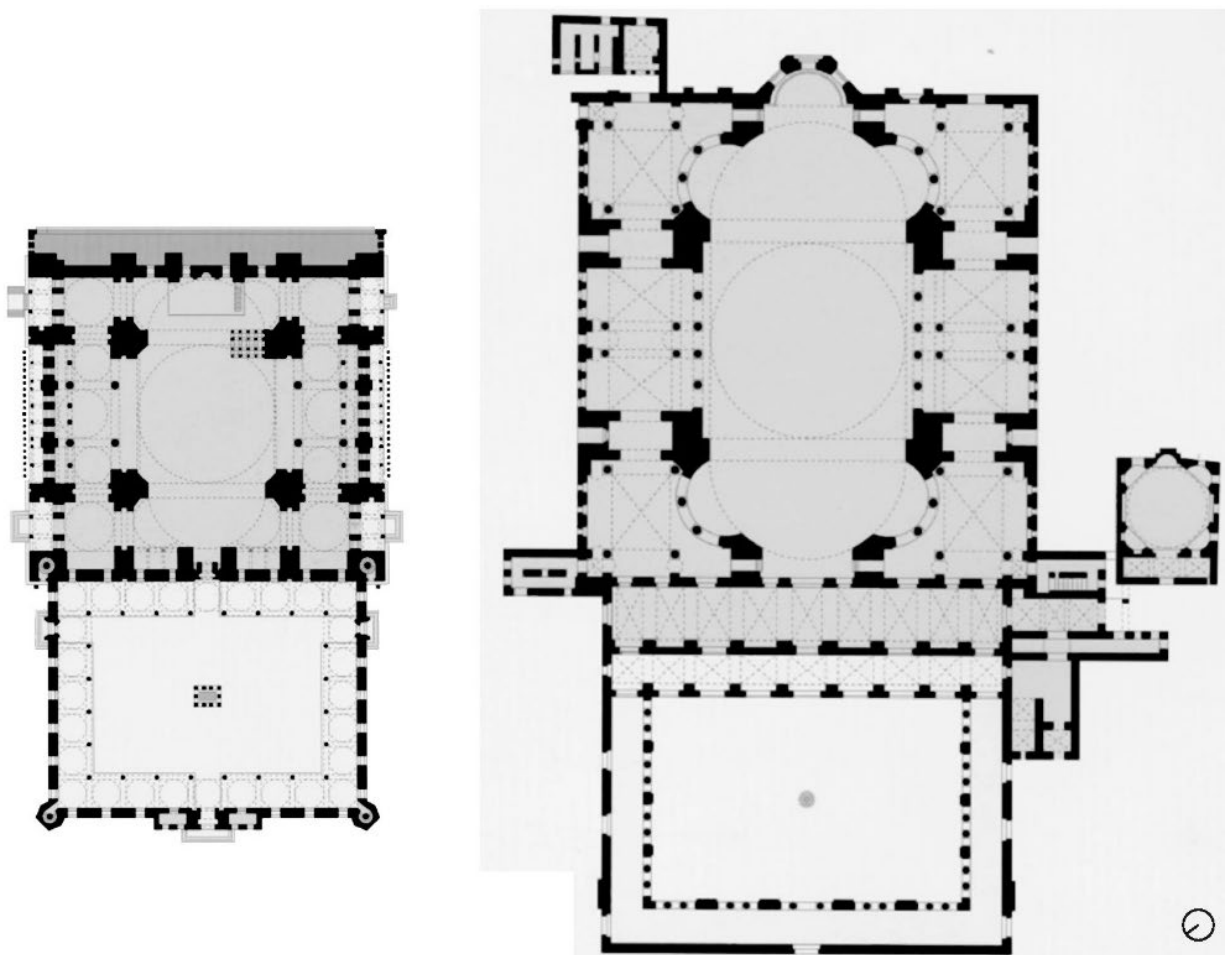


Fig. 5: Floor plans of the Süleymaniye Mosque (L) and Hagia Sophia (R).

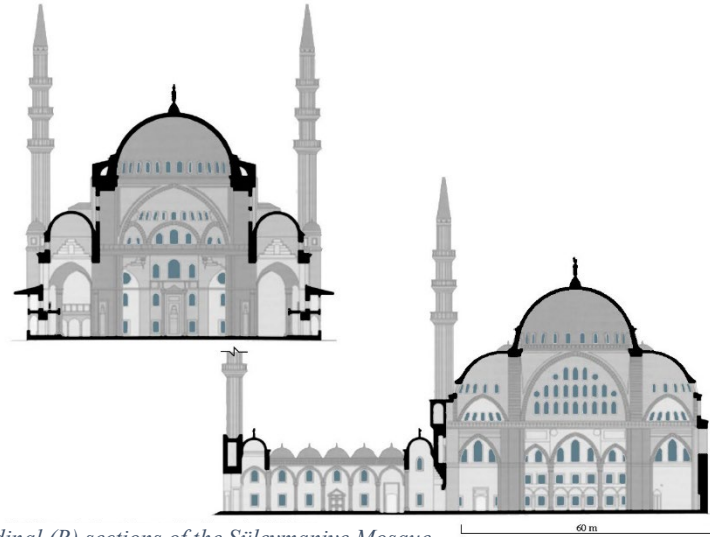


Fig. 6: Transverse (L) and longitudinal (R) sections of the Süleymaniye Mosque.

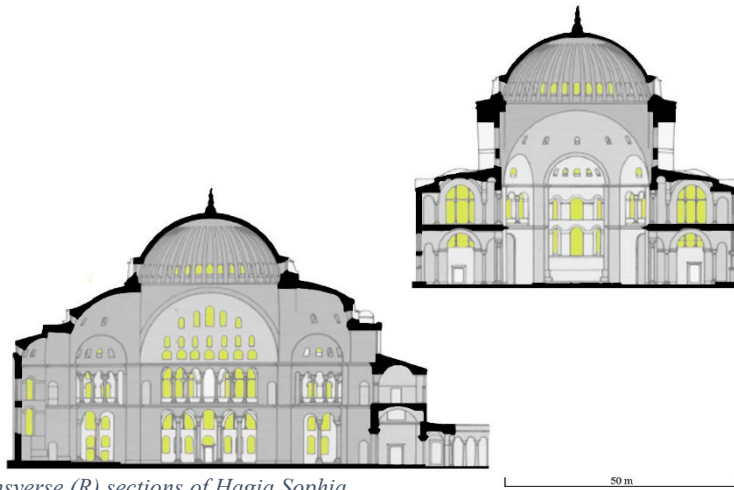


Fig. 7: Longitudinal (L) and transverse (R) sections of Hagia Sophia.



Fig. 8: The names of Prophet Muhammad's grandson, Hussein (L), and son-in-law, Caliph Ali (R), at Hagia Sophia.



Fig. 9: An excerpt from the “Verse of Light” written on the apex of Hagia Sophia’s ellipsoidal dome.

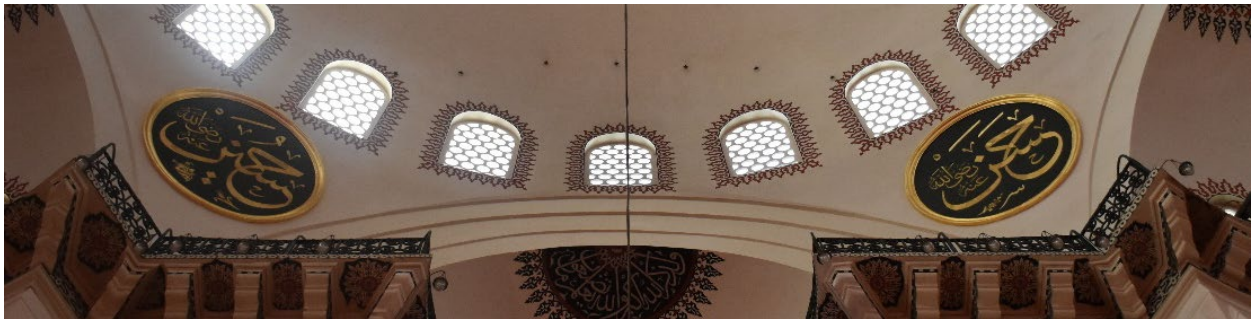


Fig. 10: The names of Prophet Muhammad’s grandsons, Hussein (L) and Hasan (R), at the Süleymaniye Mosque.



Fig. 11: “God holds the heavens and the earth, lest they remove” written on the apex of the Süleymaniye Mosque’s dome.

CHAPTER 2: LIGHTING DESIGN

Light plays an important role in Islam. Muslims abide by five daily prayer times (Fajr, Dhuhr, ‘Asr, Maghrib, ‘Isha), which are scheduled according to the rising and setting of the sun. As a result, prayer times are not at the same time of day throughout the calendar year. Typically, there is some sort of time-telling device (sundial or clepsydrae in pre-modern periods, wall or grandfather clock in modern periods) within mosques.¹⁰³ However, the most natural way of telling time is according to the amount of sunlight that enters a prayer hall. Natural light floods the prayer hall of the Süleymaniye Mosque as a result of Sinan’s design decision to puncture the base of its central dome. Anthemius of Tralles and Isidore of Miletus also made this particular move at Hagia Sophia. A centuries-old description of Hagia Sophia that continues to resonate with contemporary scholars (and visitors) is attributed to Procopius, Justinian I’s court historian. He describes its central dome as not appearing “to rest upon a solid foundation, but to cover the place beneath as though it were *suspended from heaven* by the fabled golden chain [italics added for emphasis].”¹⁰⁴ Its “Dome of Heaven” is an appropriate epithet not only for its height above the ground, but for the continuous ring of windows at the base of the dome.

Interestingly, the same strategy resulted in two different environments: a mosque that is “rational” with delimited interior elements and a church that is intuitive with vague interior limits, according to contemporary architectural historians.¹⁰⁵ However, as Procopius notes, “Light seems to flood the interior from the outside, yet it seems generated inside as well.”¹⁰⁶ A second design

¹⁰³ Jonathan Bloom and Sheila Blair, *The Grove Encyclopedia of Islamic Art and Architecture*, vol. II, “Mosque” (New York: Oxford University Press), 549.

¹⁰⁴ Fergus M. Bordewich, “A Monumental Struggle to Preserve Hagia Sophia” (*Smithsonian.com*, December 2008).

¹⁰⁵ Bloom, *The Grove Encyclopedia*, vol. II, “Istanbul,” 325; for further information, see Gülru Necipoğlu, *The Age of Sinan: Architectural Culture in the Ottoman Empire* (Princeton: Princeton University Press: 2005), 215.

¹⁰⁶ Richard Krautheimer and Slobodan Ćurčić. *Early Christian and Byzantine Architecture* (New York: Penguin Books, 1986), 216.

decision (made by both sets of architects) to further enhance the luminous quality of the interior space of the Süleymaniye Mosque and Hagia Sophia was to incorporate artificial lighting. Since the latest (earliest) of the five Muslim prayer times, ‘Isha and Fajr, are performed after sunset and before sunrise, respectively, artificial lighting is an essential (yet underrepresented) topic to discuss in architectural scholarship. The evolution of lighting techniques, in particular, is thus an underlying theme of this chapter. It serves to fulfill the purpose of comparing and contrasting the lighting strategies of the Süleymaniye Mosque and Hagia Sophia according to three categories: natural light, artificial light, and quality of light.

Natural Light

In 1524, Ottoman court historian T.S.K. Lokman described how “All four sides [of the Süleymaniye Mosque] are opened up with pleasure-increasing windows on multiple layers, from which Space and Time is exposed.”¹⁰⁷ Lokman alludes to a visual continuity between the interior and the exterior that has been perceived by scholars since the sixteenth century and, thus, also alludes to the potential of windows to create one of two effects in an interior space: continuity or fragmentation. Procopius makes clear that the latter is the atmosphere present in Hagia Sophia by acknowledging its contradictions.

The building [...] forms part of the city, but at the same time it stands very much by itself. It is exceedingly long, yet extraordinarily wide. It is bulky, yet harmonious. [...] Vistas change and yet the spatial shapes follow each other in a clear sequence.¹⁰⁸

Centuries later, despite the recurring rhythms that can help visitors partly understand the interior space, it is difficult to grasp the interior of Hagia Sophia as a whole. As Richard Krautheimer observed, the relationship between the ancillary and main spaces is difficult to distinguish because, as one stares at the curved arcades in the conchs and into the outer bays, one’s perception is shifted

¹⁰⁷ Necipoğlu, *The Age of Sinan*, 215.

¹⁰⁸ Krautheimer, *Early Christian and Byzantine Architecture*, 216.

by the overlap of arcades and windows in the outer walls.¹⁰⁹ As a result, the fragmentation of views and of a space which is nevertheless whole marks the design of Hagia Sophia and its architectural components.¹¹⁰ Thus, the natural lighting strategies of Anthemius of Tralles and Isidore of Miletus creates a sharp contrast of dark shadows and bright spots that further reinforces the splintering off of individual spaces by architectural elements.

The natural light that fills Hagia Sophia does imbue the interior space with a sense of harmony, especially in its former roles as a church and a mosque. The aforementioned contrast in light and darkness could be interpreted as a play of light – one that is strategic and meaningful. However, even on cloudy days during which the sun’s rays do not reach Hagia Sophia, a sense of harmony is still achieved via the simple rhythm of (either three, five or seven) colonnades and window openings (*see figure 12*). The particular rhythm of three is noticeable at various locations: in the three arches on the ground floor supporting the seven in the gallery zone; in the three openings that lead visitors to the nave from the west gallery; and in the double row of windows (each with three windows) that pierce the wall of the apse. In regards to the repetitions of five and seven, the five arcaded bays on either side of the nave are surmounted by seven arcaded bays in the gallery zone. These bays are further “surmounted” by seven windows, which are located below a single window with five intercolumniations in the clerestory zone. In the opposite direction (the east and west conches), five windows line the rim of the conch vault and eastern and western half-domes. In addition to the aesthetic value that the window layout adds to the interior space, it also neatly splits the interior into three areas of varying luminosity. The side aisles comprise the darkest zone in Hagia Sophia due to being low to the ground and naturally illuminated by only side windows. The galleries above the side aisles have the added benefit of the light emanating from

¹⁰⁹ Krautheimer, *Early Christian and Byzantine Architecture*, 214.

¹¹⁰ Krautheimer, *Early Christian and Byzantine Architecture*, 216.

the clerestory windows. The brightest zone is the nave – specifically, right below the “Dome of Heaven.”

The fragmented interior space of Hagia Sophia and the unified prayer hall of the Süleymaniye Mosque is a macrocosmic effect of natural light streaming in through windows. On a microcosmic scale, the windows themselves differ in nature. Panels surmounting the upper gallery windows (on three sides of the prayer hall) invoke the 99 Names of Allah, a number of which are even repeated in the stained-glass windows of the *qibla* wall. Specifically, above the *mihrab* is a window that has written the profession of faith (*shahada*), the Names of Allah, the Prophet Muhammad, and the four Sunni caliphs. Inscribed in cartouches along the window’s border is the “Verse of Light.” Proclaiming the faith of Süleyman the Magnificent was clearly an essential part of the design intent of his imperial mosque; thus, Sinan achieved this aim by the means of stained-glass windows. Likewise, the faith of Justinian the Great continues to resonate profoundly with Hagia Sophia despite centuries of imposed changes. Although the current glass panes of Hagia Sophia’s windows are clear, the original versions were presumably of deep blue, greenish, dark purplish brown, off-white, yellow, and light purplish tones.¹¹¹ Due to the dark tones of the material palette, the “mood” of Hagia Sophia was thus subdued. However, the stained-glass color palette was one of the design decisions made by Anthemius of Tralles and Isidore of Miletus in the sixth century that indicates an awareness of the importance of muted light within a space, especially one that is sacred (Christian).

The 247 windows that pierce the walls of the Süleymaniye Mosque are divided into multiple tiers (*see figure 13*). Irrespective of the different “moods” created in the Süleymaniye Mosque and Hagia Sophia, the proportion of window surface area to that of the central dome of

¹¹¹ Krautheimer, *Early Christian and Byzantine Architecture*, 216.

each indicate similar lighting design strategies. The difference in percentage of window-to-dome surface area between the two buildings is negligible (0.5%) (*see figures 14, 15*). Furthermore, their transverse and longitudinal sections demonstrate an identical tactic of placing a row of windows along the base of the central dome in order for sunlight to enter the prayer hall from the highest architectural element (with the exception of the minarets). There are over 90 windows along the base of the dome, many of which were supposedly much larger in the original dome before its collapse.¹¹² According to Yasser Arab and Ahmad Sanusi Hassan, the higher illuminance levels of a single-pendentive domed mosque served as motivation for Ottoman architects to choose this architectural style over others (pyramid roof).¹¹³ An analysis of the longitudinal and transverse sections of the Süleymaniye Mosque and Hagia Sophia makes apparent differences in interior square footage and window-to-wall surface area percentages. Even though the central dome of the Süleymaniye Mosque is significantly smaller than that of Hagia Sophia (297.6 m² versus 371.2 m²), the prayer hall directly beneath the dome of the Süleymaniye Mosque is significantly larger than that of Hagia Sophia (2,299,954.6 m² versus 1,458,527.5 m²). The second is evident in a sectional comparison between the Süleymaniye Mosque and Hagia Sophia. The difference in window-to-wall surface area in relation to their transverse and longitudinal wall sections is 27.9% and 16.5%, respectively. This difference provides mathematical substantiation to the comments made by both Procopius in the sixth century and Krautheimer in the twentieth century. The Süleymaniye Mosque has a greater percentage of window-to-wall surface area in both the transverse and longitudinal sections (36.5% and 26.4%, respectively). These two numbers indicate that the transverse section of the mosque has a higher proportion of window-to-wall surface area.

¹¹² Mark Major and Anthony Tischhauser, *Made of Light: The Art of Light and Architecture* (Basel: Birkhäuser, 2005), 20.

¹¹³ Yasser Arab and Ahmad Sanusi Hassan, "Daylight Performance of Single Pendentive Dome Mosque Design During Winter Solstice" (*American Journal of Environmental Sciences* vol. 9, 2013), 111.

At Hagia Sophia, the longitudinal section has a slightly higher proportion than its transverse section (9.9% and 8.6%, respectively). This comparison of window-to-wall surface area underlines one of the most significant conclusions reached in terms of the engineering behind the Süleymaniye Mosque and Hagia Sophia: the former appears much lighter, both in weight and in appearance, than the latter due to its natural lighting.

Artificial Light

Both the Süleymaniye Mosque and Hagia Sophia have been praised for their well-lit interior over the course of centuries. However, most scholars have focused predominantly on their natural lighting system. It is only in recent decades that scholars such as Lale Erdem Atılğan and Mustafa Yurtseven, have begun to explore the effect of artificial lighting systems and, in particular, of the transition from oil-filled to electric lamps in Turkish mosques.¹¹⁴ In the sixteenth century (at the time that the Süleymaniye Mosque was under construction) or even in the seventh century (at the time of the Qur'an's genesis), lamps were supplied by oil and lit sacred spaces upward, which explains their shape. The typical form of a mosque lamp is a sphere – topped off with a funnel – resting on a conical base (*see figure 16*). Glass loops (attached to its sides) allow the lamp to be suspended from the ceiling of a mosque.¹¹⁵ The conical enclosure surrounding the wick encouraged the light from the fire to travel up and out in order to light the ceiling (and in the case of Ottoman mosques, the dome). Its glass component acts as a lens which - when filled with water up to a thin layer of oil - magnifies the flame as seen from below.¹¹⁶ Once the oil was consumed, the wick would have automatically been extinguished in the water. By adjusting the amount of oil

¹¹⁴ The negative effects include poor energy consumption and unmet illuminance requirements; “A case study of lighting Turkish historic mosques using LEDs: Semsî Ahmet Pasha Mosque” (*Lighting Research & Technology* vol. 50, 2018), 894-5.

¹¹⁵ Bloom, *The Grove Encyclopedia*, 113.

¹¹⁶ Nicholas Stone, *Symbol of Divine Light: The Lamp in Islamic Culture and Other Traditions* (Bloomington: World Wisdom, 2018), 39.

filled, one could have presumably controlled the length of time the lamp would have burned. The water in the lamp would have also enhanced the optical performance by acting as a lens. As such, it would have magnified the flame when seen from below through the water.¹¹⁷ The substitution of electric light bulbs for the original oil lamps has left quite an impact on the atmosphere of the Süleymaniye Mosque (and Hagia Sophia). The effect of the flickering flame and its magnification by water is no longer experienced by visitors.

Although the natural light that pervades the Süleymaniye Mosque's prayer hall has not changed (substantially) since 1557, its current artificial lighting system did not exist at the time of its inauguration. Today, most Ottoman mosques continue to use polycandela; however, the glass lamps now contain electric light bulbs instead of the original oil lamps.¹¹⁸ Upon entering the Süleymaniye Mosque, it is evident that the dozens of polycandela (chandeliers) that hover overhead are laid out according to a thought-through pattern (*see figure 17*). The polycandelon was a type of light fixture that became widespread (and remained popular) in Ottoman architecture. It consists of structures that support a large number of small glass lamps. Due to the large domed spaces that typically characterize Ottoman architecture, there are few wall surfaces or columns to reflect any light cast in an upward direction towards the high ceilings. The metal frameworks of the polycandela are suspended from the domed ceilings and hang a few meters above the floor. The polycandela fill the prayer hall and side aisles of the Süleymaniye Mosque with soft and subtle light (2,522 candelas per individual lamp). Since tourists are not allowed to step into the prayer hall, the only two luminaires visible from a distance are the polycandela and "lamp posts" (*see*

¹¹⁷ Stone, *Symbol of Divine Light*, 114-5.

¹¹⁸ Godfrey Goodwin, *A History of Ottoman Architecture* (London: Thames & Hudson, 1987), 232-3 as cited by Stone, *Symbol of Divine Light*, 81.

figures 18, 19). Out of the dozens of polycandela that illuminate the Süleymaniye Mosque, the largest one (consisting of three concentric rings of lamps) is located below the apex of the dome.¹¹⁹

Just as the present lighting conditions at the Süleymaniye Mosque have changed, those of Hagia Sophia do not reflect the lighting scheme envisioned during the reign of Justinian I (*see figure 20*). At one point in time, lamps had been strung along the rim of its dome, polycandela hung from its cornices, and candlesticks stood in its arcades. As a result, the schematic design sought to achieve a natural gradation in light. Today, the polycandela of Hagia Sophia predominantly hang in two locations: in the intercolumniations and from the (semi-) domes above the prayer hall. The polycandela that hang low in Hagia Sophia (*see figure 21*) use electricity as well (2,350 candelas per individual lamp). This is a significant change considering that its respective lamp posts are clearly more suited for its predecessor light source, the oil lamp (*see figure 22*). The issue that artificial lighting technology presents is in achieving the same effect of the oil lamps that originally filled prayer halls. The electric light bulbs that are now part of the polycandela are not omni-directional; instead of directing light upward (as their oil-filled counterparts had once done), they direct light downward (*see figures 23, 24*). The benefit of downward light is that Muslims who seek to read their Qur'an in a mosque receive a greater amount of direct, useable light than they would with upward light. If to be conscious of light, darkness must be present, then it is arguably better to not illuminate architectural spaces in a uniform manner. Light - described as a symbol of the Divine in the Qur'an - may not have to be of a certain light level to enable Muslims to read the Qur'an at every point within the mosque. Although reading the Qur'an is an activity that takes place within a mosque, only a low number of

¹¹⁹ According to the volunteers who answer visitor questions, this particular polycandela is a representation of the solar system – the sun at its center (“keystone”) and the planets and stars rippling out in the physical form of lamps on outer rings.

mosque users would typically want to do this at any one time. The entire space within a mosque is generally occupied only when the users congregate for the performance of the canonical prayers and is usually filled to capacity only for the Friday and 'Eid prayers. Thus, it is arguably sufficient to have only certain areas of higher light levels for Muslims who wish to sit and read.¹²⁰

The design brief for present-day mosque projects often calls for lighting levels sufficient enough to be able to read the Qur'an at any point within the prayer hall. Additionally, glare is often avoided by achieving a uniform distribution throughout the space.¹²¹ According to a simulation conducted by architectural historian Nicholas Stone of a spherical glass lamp (with a wick floating on oil and water), the distribution of sixteenth-century artificial lighting would have been non-uniform. Light would have been radiated in an upward direction uninterrupted. Below the "horizon" would have been a dark zone created by total internal reflection from the oil and water. Beneath this zone the water would have acted as a lens, concentrating the light below and magnifying the flame when seen from certain angles.¹²² Irrespective of its former rate of uniformity, current lighting conditions in Hagia Sophia are appropriate considering circumstantial changes. For example, its lamp posts were originally to mark the area dedicated to the Byzantine emperor and the royal family during religious ceremonies. This political function of the lamp post is contrary to the strictly theological function of the lamp post in the Süleymaniye Mosque, which is not dedicated to a ruler, but in which the presence of Allah is further reinforced. These lamp posts – which flank either side of the mihrab (most likely as an architectural tool to draw attention towards the qibla wall) – is inscribed with the name of Allah.

¹²⁰ Stone, *Symbol of Divine Light*, 118.

¹²¹ Stone, *Symbol of Divine Light*, 117.

¹²² Stone, *Symbol of Divine Light*, 115.

Quality of Light

The conditions created by the natural and artificial lighting design of the Süleymaniye Mosque and Hagia Sophia beg the questions of how the conditions shift throughout the day and what is the consequential effect on their respective interior space. In order to address the first uncertainty, I took photographs in each prayer hall (at the top of the hour) and then converted them into false color images to determine the zone that provides the most amount of natural light. Unlike a true-color image (photograph), a false-color image features a range of colors taken from the visible or non-visible parts of the electromagnetic spectrum (displaying colors that the human eye cannot perceive). In terms of the Süleymaniye Mosque, there is a consistent minimum level of light throughout the prayer hall (*see figures 25-33*). It is only near the windows and the mosque lamps that the amount of candelas significantly increases. Transitioning from one hour to another (chronologically), it is easy to identify the location of the sun. At noon on Thursday, July 18 the sun appeared to be facing Muslims who come to the Süleymaniye Mosque to pray towards the *qibla* wall. This may also be the case for Hagia Sophia, in which the false color image with the warmest colors (facing me straight on) was taken on Saturday, July 20 at noon (*see figures 34-40*). The set of images taken in Hagia Sophia could not compensate for the lack of light reaching me from its left side. Scaffolding and canvas obscured nearly all light that would normally pervade the prayer hall from that direction.

It becomes clearer with each consecutive photograph that the sun is traveling from left to right due to the canvased scaffolding that changes color (in the false color image) from indigo to teal. Even though the *qibla* wall of the Süleymaniye Mosque and the apse of Hagia Sophia are oriented in the same direction, the reflective properties of the surrounding architecture create two completely different environments. The contrary impressions are in large part due to the

materiality of each space, which subsequently called for electric lamps in the dark-walled Hagia Sophia that produce four times more candelas per square meter than those in the white prayer hall of the Süleymaniye Mosque (*see figures 41, 42*).¹²³ The electric lamps that hang from the polycandela seem to fall under three categories of artificial lighting: ambient, decorative, and task. The polycandela are the source of the general illumination within both prayer halls (ambient lighting) that permits generic tasks to be completed.¹²⁴ However, as grandiose luminaires, they also attract attention (decorative lighting). Since the polycandela held oil lamps in the sixteenth century, they were also considered to be kinetic lighting. As the tiny flame on each wick flickered, the slight movement would have created shadows in the prayer hall. Today, the oil lamps have been replaced with electric ones and, thus, have lost their kinetic properties. These contemporary mosque lamps are more efficient at lighting the floor rather than the dome above. As a result, these lamps could be considered task lighting due to illuminating the Qur'ans of Muslims and the guidebooks of tourists who choose to read in the Süleymaniye Mosque and in Hagia Sophia.

In conjunction with the five types of lighting, contemporary lighting designers commonly refer to the lighting cues coined by Professor John Flynn. Flynn proposes “reinforcing lighting modes” that enable designers to make subjective impressions.¹²⁵ Although it is impossible to say for certain that Mimar Sinan or Anthemius of Tralles and Isidore of Miletus sought to make a certain impression in the Süleymaniye Mosque or Hagia Sophia, Flynn’s description of each

¹²³ I determined an approximate average luminance level in both the Süleymaniye Mosque and Hagia Sophia by using a Konica Minolta luminance meter. By multiplying the output of an electric lamp in each respective space by the number of lamps per polycandelon and the number of polycandela, I reached the conclusion that Hagia Sophia “produces” an average of 2,359.3 cd/m² and the Süleymaniye Mosque “produces” an average of 514.1 cd/m². This stark contrast in luminance levels compensates for the reverse condition in natural lighting.

¹²⁴ “Ambient Lighting,” Illuminating Engineering Society, Illuminating Engineering Society, July 5, 2018, <https://www.ies.org/definitions/ambient-lighting/>.

¹²⁵ John E. Flynn, Clyde Hendrick, Terry Spencer, and Osyp Martyniuk, “A guide to methodology procedures for measuring subjective impressions in lighting,” *Journal of the Illuminating Engineering Society* 8, no. 2 (1979): 95-110.

lighting mode can at least lend a hand in understanding the impression given today considering current conditions in each edifice. Due to the uniform lighting in both prayer halls, it is arguable that the Süleymaniye Mosque and Hagia Sophia give the impression onto visitors of visual clarity and/or spaciousness. The reinforcing lighting mode for visual clarity is bright and uniform lighting with some emphasis on the periphery. Even though there is no wall lighting in either building, the wall material (marble and mosaic, respectively) is highly reflective. The mosaic in Hagia Sophia is composed of small ceramic cubes covered in two layers: one of color (or gold leaf) and another of glass. With an amalgamation of these cubes, the reflection and refraction of light is done both individually and collectively. As a result, Hagia Sophia appears brighter than it is – almost seeming to produce “inner light” – due to the shimmering effect of the mosaics that occurs when visitors move within the space.¹²⁶

The mode for spaciousness is similar in terms of emphasizing uniform and peripheral lighting. Unlike the impression of visual clarity, that of spaciousness does not view brightness as a critical reinforcing factor. Both the Süleymaniye Mosque and Hagia Sophia are spacious (as their orthographic drawings show); however, visual clarity is less of a shared attribute. The differences in both lighting modes and types demonstrate how, irrespective of similarities in their lighting techniques, the two architectural wonders are wondrous in different ways. The interaction of natural light and architecture imbues the Süleymaniye Mosque with a sense of clarity and Hagia Sophia with a sense of enigma. What Hagia Sophia lacks in luminous clarity, it makes up for in artificial lighting. The polycandela in both interior spaces have withstood the test of both time and technological advancement in holding hundreds of lamps above the head of visitors. Even though the transition between oil-filled and electric lamps has changed to some degree the experience of

¹²⁶ Major, *Made of Light*, 19.

visitors (as indicated by the loss of kinetic lighting), architectural elements of import continue to draw attention, staying true to Sinan, Anthemius of Tralles, and Isidore of Miletus' lighting strategies. The lighting modes (and types) that they employed continue to reinforce the overarching “themes” of the two monumental buildings. Decisions made by the architects regarding the mood within the Süleymaniye Mosque and Hagia Sophia begs the question of what inspired them in choosing certain subjective impressions for visitors. As the *Tezkiret'ül-Bünyān* attests to, the tenets of the Qur'an served as an important source of inspiration. Thus, the answer to the aforementioned question rests on what specifically the Qur'an (and the hadith [spoken wisdom attributed to the Prophet Muhammad]) advocate for and how Sinan and the architects of Hagia Sophia used architecture and engineering to give a physical form to certain religious beliefs.

Catalogue of Figures



Fig. 12: Longitudinal (L) and transverse (R) sections of Hagia Sophia.

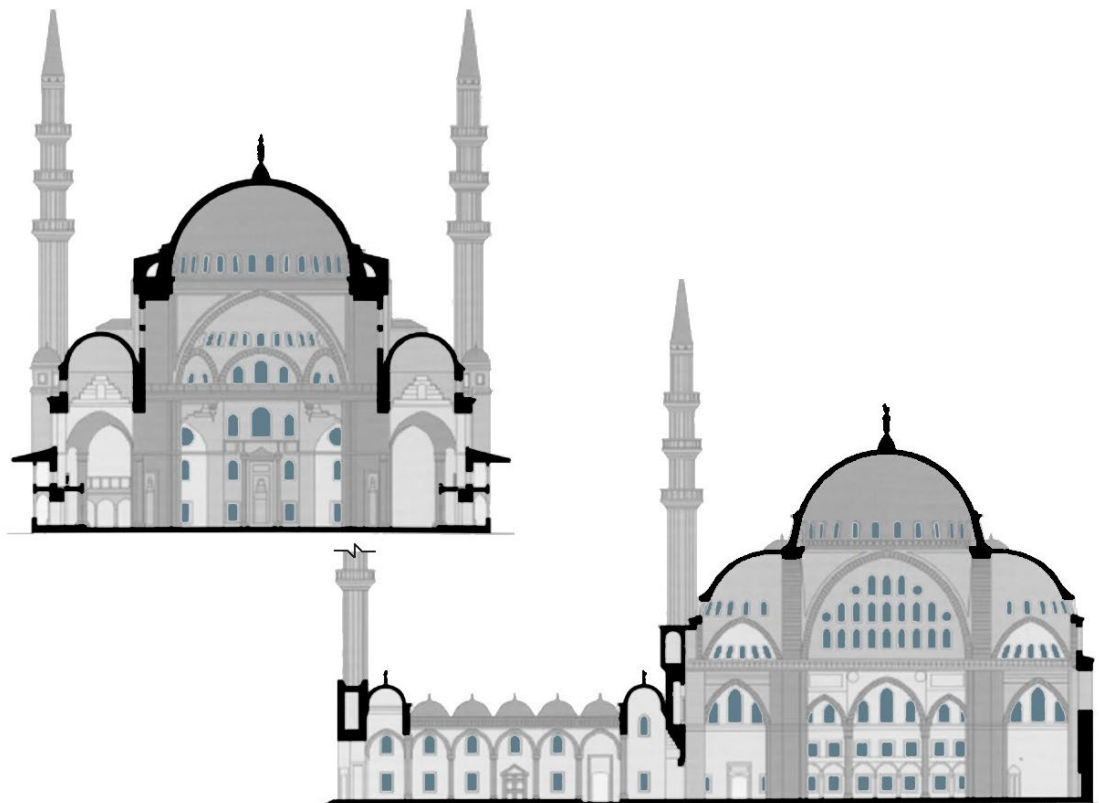


Fig. 13: Transverse (L) and longitudinal (R) sections of the Süleymaniye Mosque.

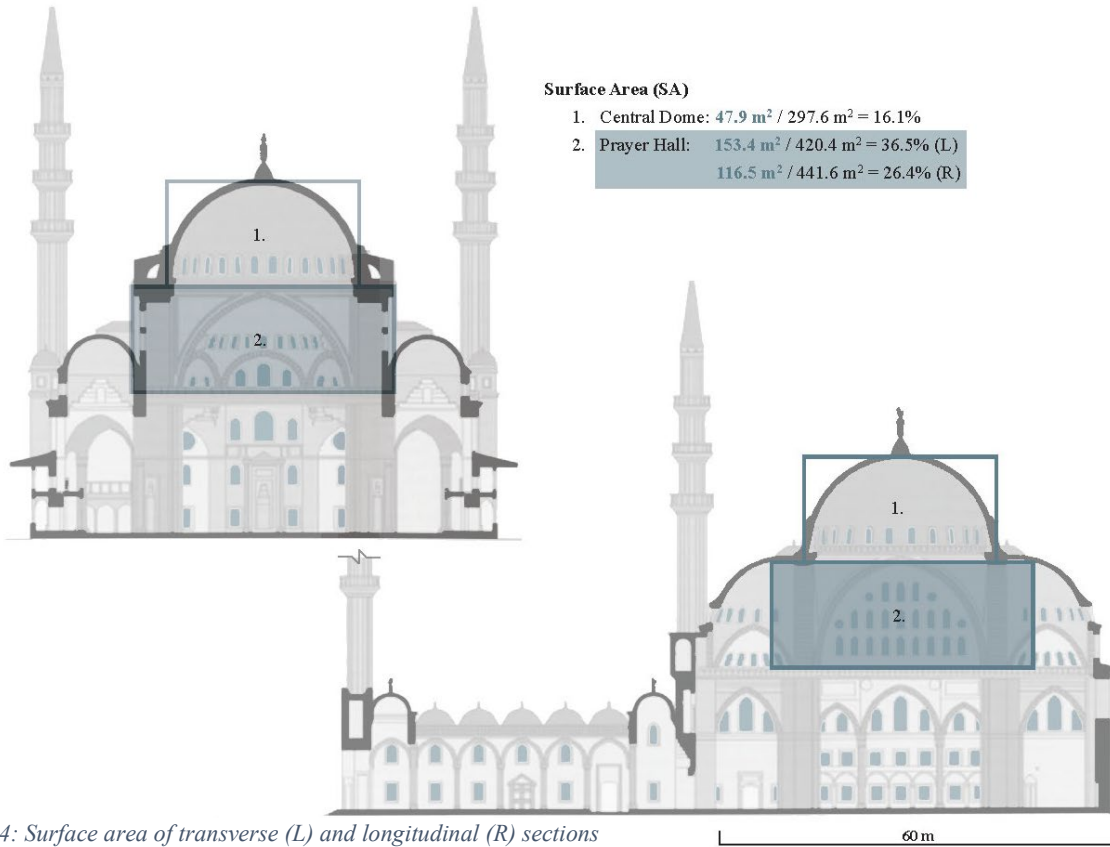


Fig. 14: Surface area of transverse (L) and longitudinal (R) sections of the Süleymaniye Mosque.

Surface Area (SA)

1. Central Dome: $59.4 \text{ m}^2 / 381.2 \text{ m}^2 = 15.6\%$
2. Prayer Hall: $116 \text{ m}^2 / 1175.0 \text{ m}^2 = 9.9\% \text{ (L)}$
 $106.3 \text{ m}^2 / 1241.3 \text{ m}^2 = 8.6\% \text{ (R)}$

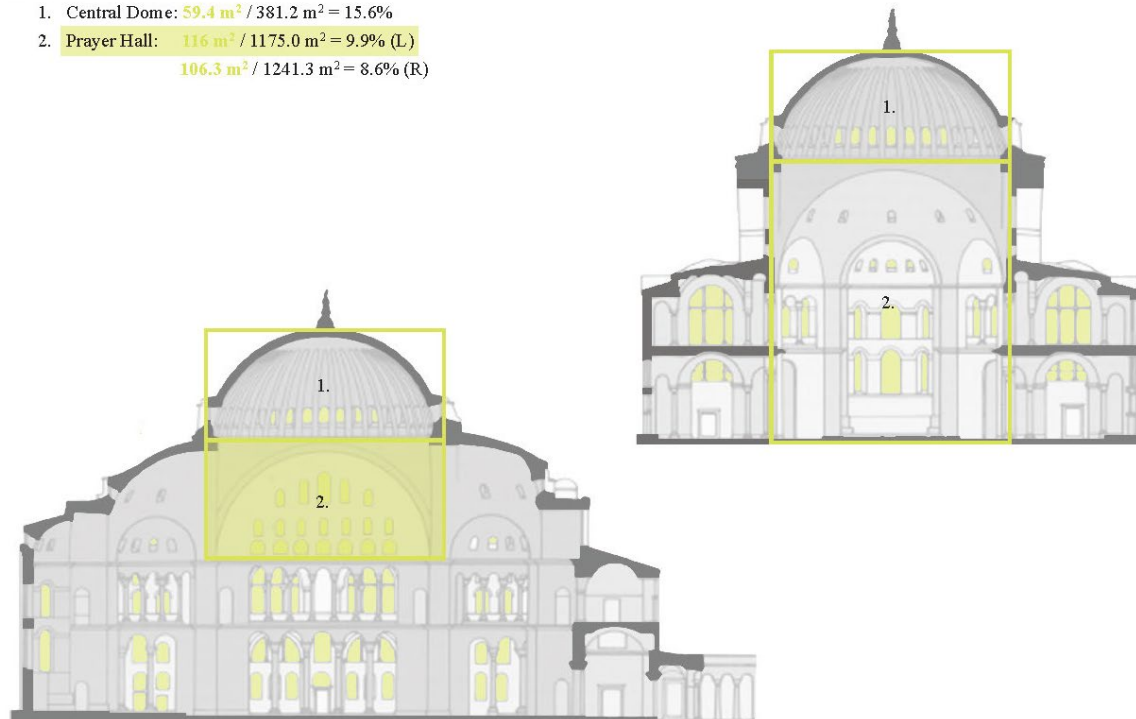


Fig. 15: Surface area of longitudinal (L) and transverse (R) sections of Hagia Sophia.



Fig. 16: Mosque lamp with an excerpt from the Verse of Light (c. 1557) from the Süleymaniye Mosque.

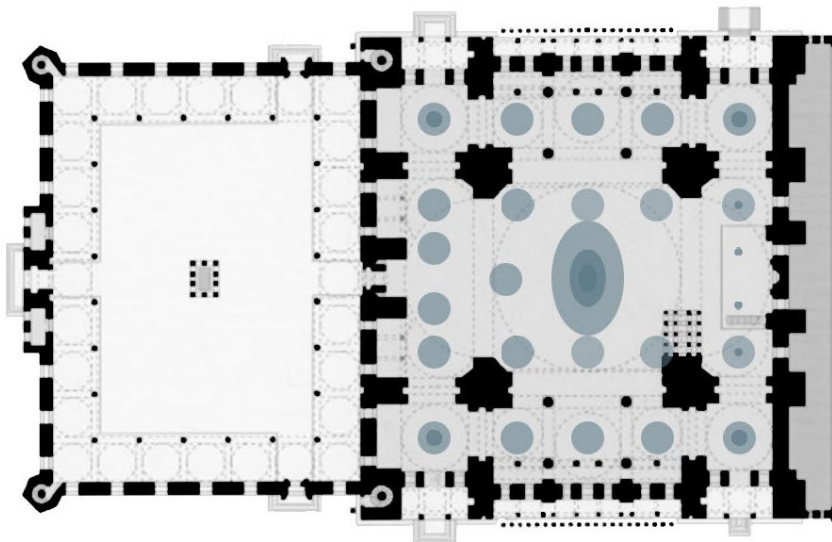


Fig. 17: Floor plan of the Süleymaniye Mosque.





Fig. 18: Individual light fixtures hanging from a polycandelon in the Süleymaniye Mosque.

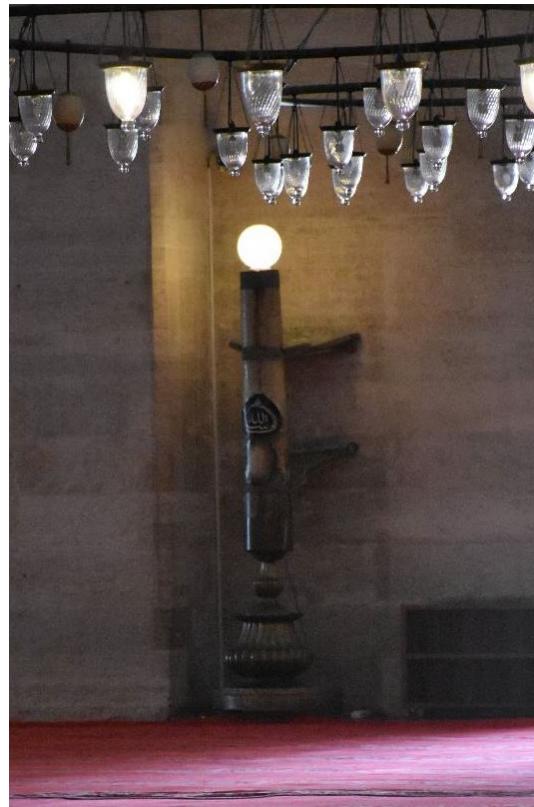


Fig. 19: A "lamp post" along the qibla wall of the Süleymaniye Mosque.

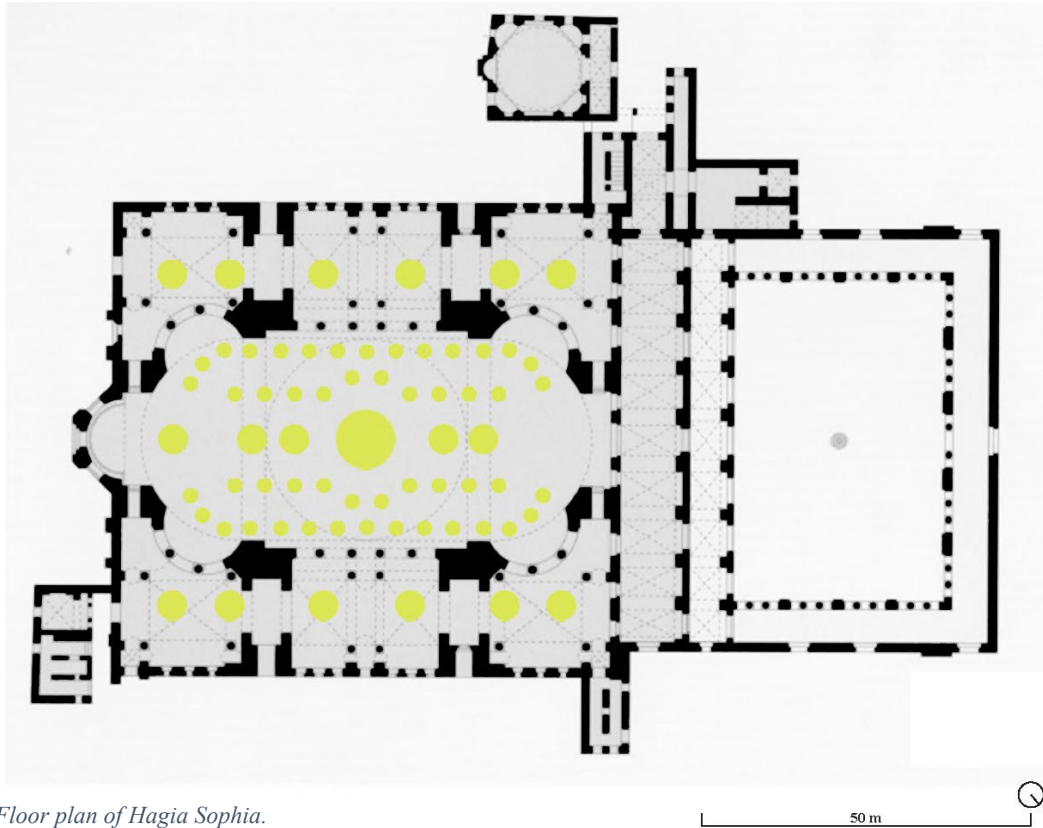


Fig. 20: Floor plan of Hagia Sophia.



Fig. 21: Individual light fixtures hanging from a polycandelon in Hagia Sophia.



Fig. 22: A “lamp post” in the gallery of Hagia Sophia.

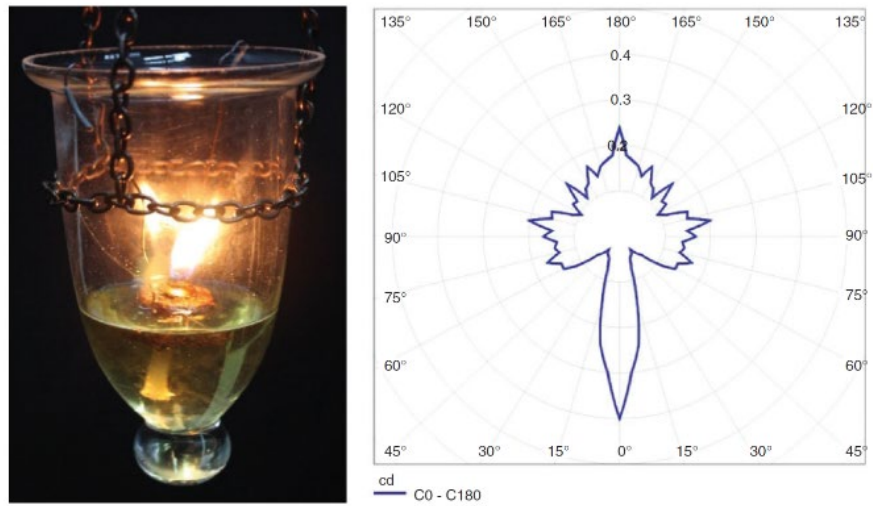


Fig. 23: Traditional oil-filled lamp and its luminous intensity distribution.

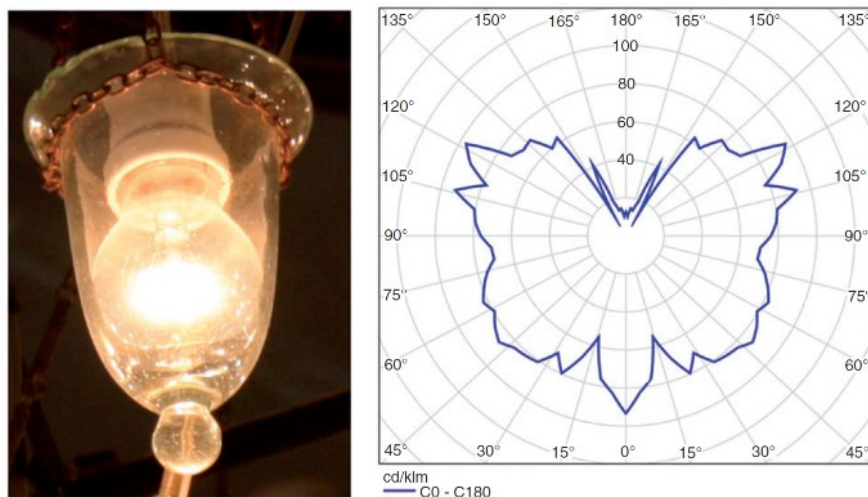


Fig. 24: Contemporary electric lamp and its luminous intensity distribution.



Fig. 25: False color photograph taken inside the Süleymaniye Mosque on July 19 at 10.00.



Fig. 26: False color photograph taken inside the Süleymaniye Mosque on July 19 at 11.00.

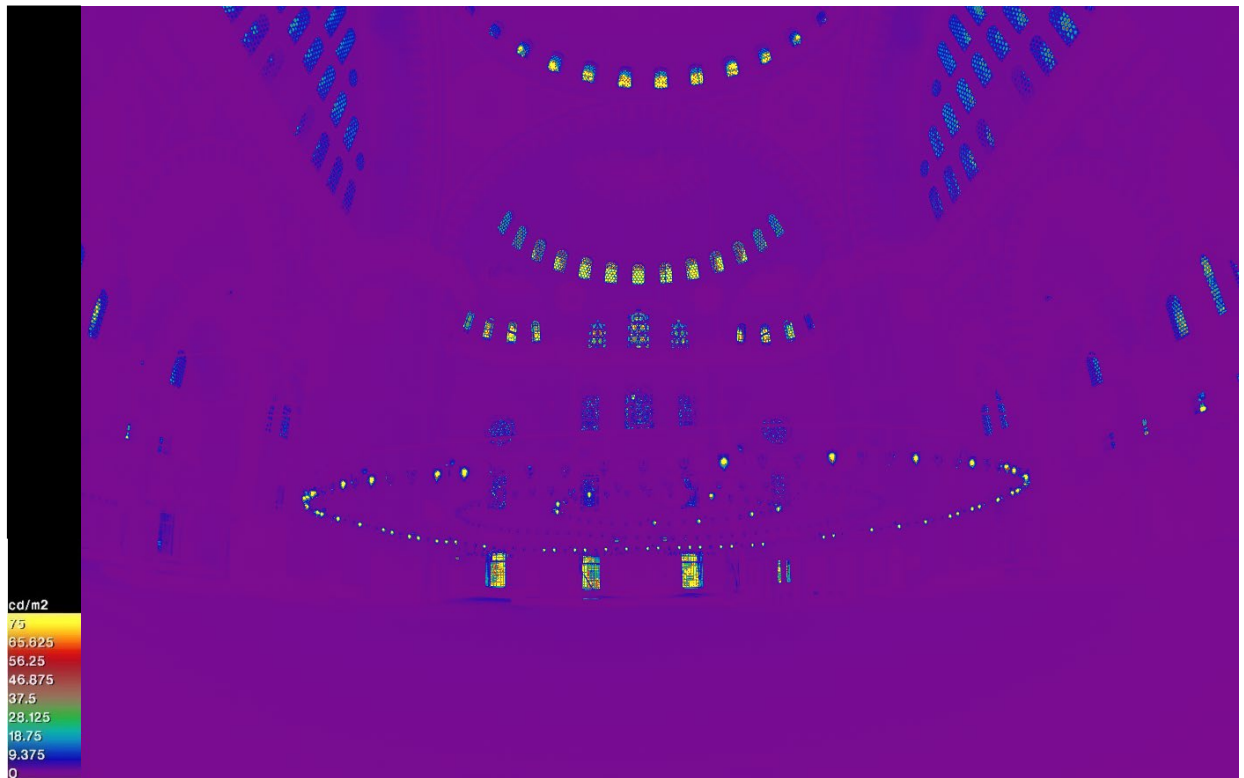


Fig. 27: False color photograph taken inside the Süleymaniye Mosque on July 18 at 12.00.

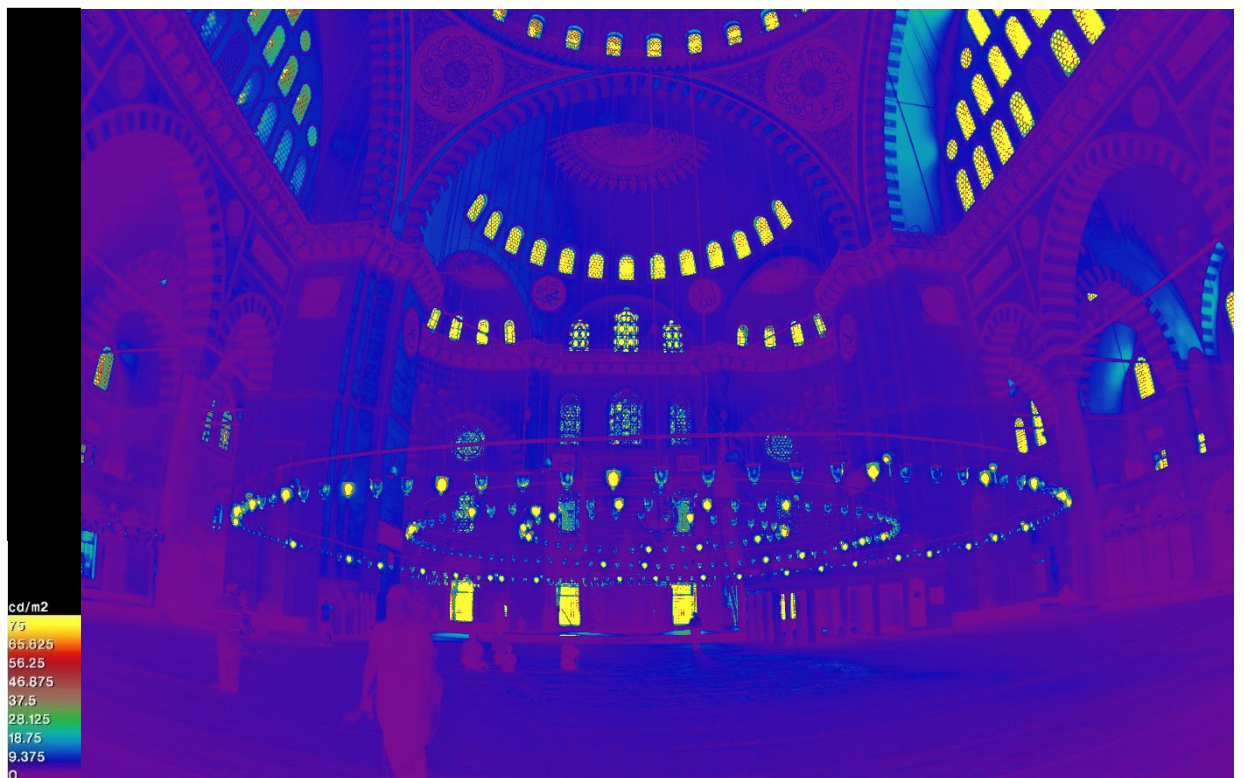


Fig. 28: False color photograph taken inside the Süleymaniye Mosque on July 22 at 14.15.



Fig. 29: False color photograph taken inside the Süleymaniye Mosque on July 18 at 15.00.



Fig. 30: False color photograph taken inside the Süleymaniye Mosque on July 19 at 15.00.



Fig. 31: False color photograph taken inside the Süleymaniye Mosque on July 18 at 16.00.



Fig. 32: False color photograph taken inside the Süleymaniye Mosque on July 19 at 16.00.

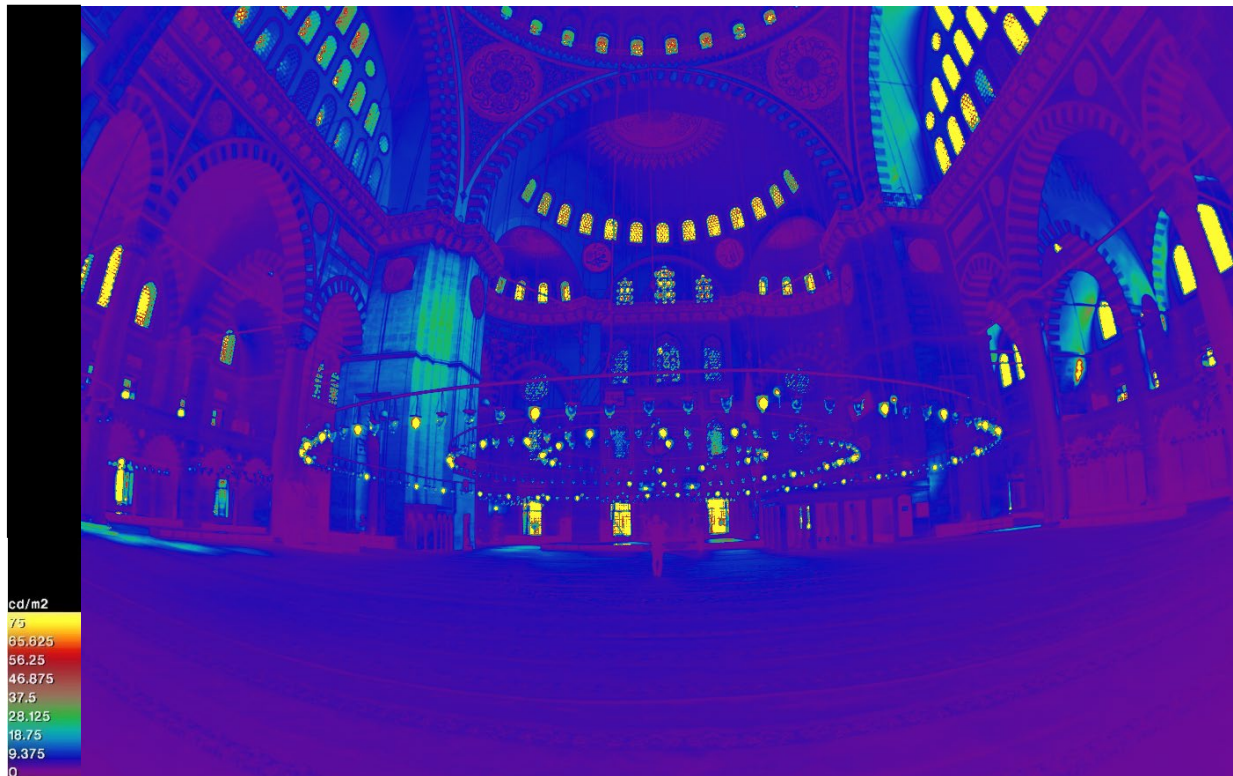


Fig. 33: False color photograph taken inside the Süleymaniye Mosque on July 19 at 17.00.

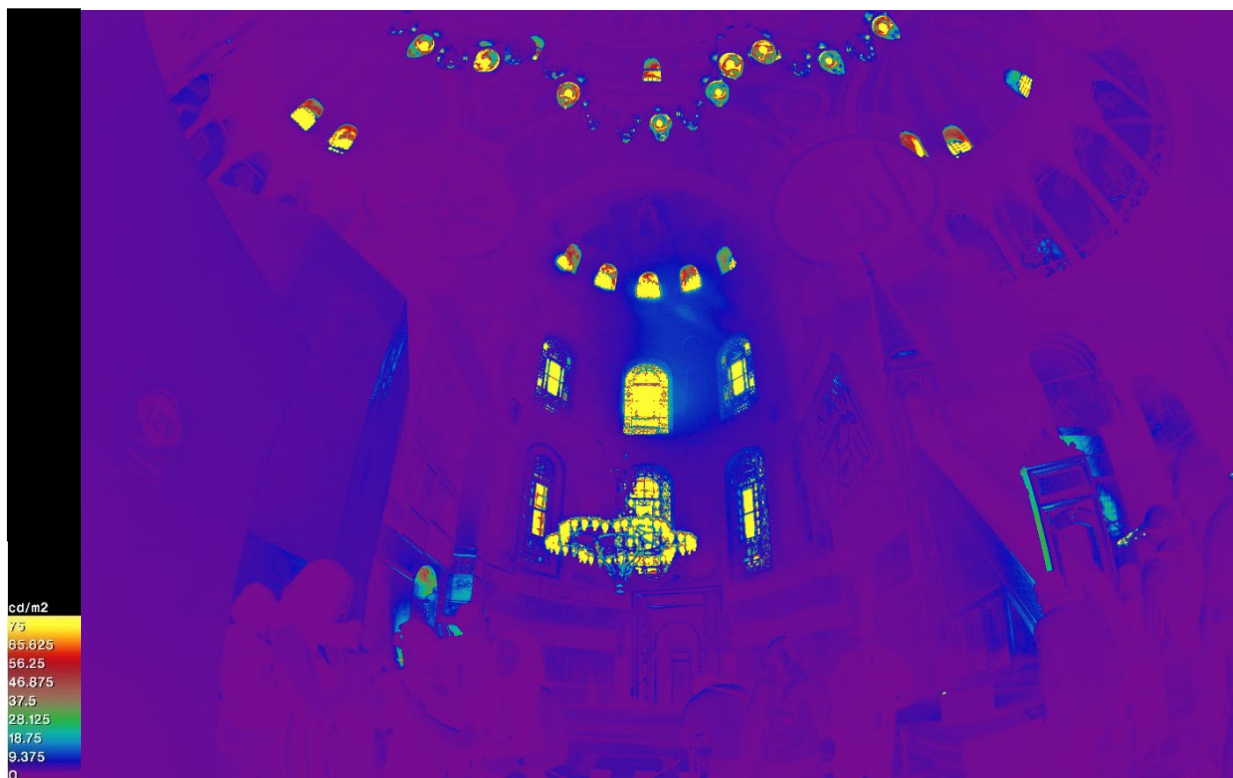


Fig. 34: False color photograph taken inside Hagia Sophia on July 20 at 10.00.

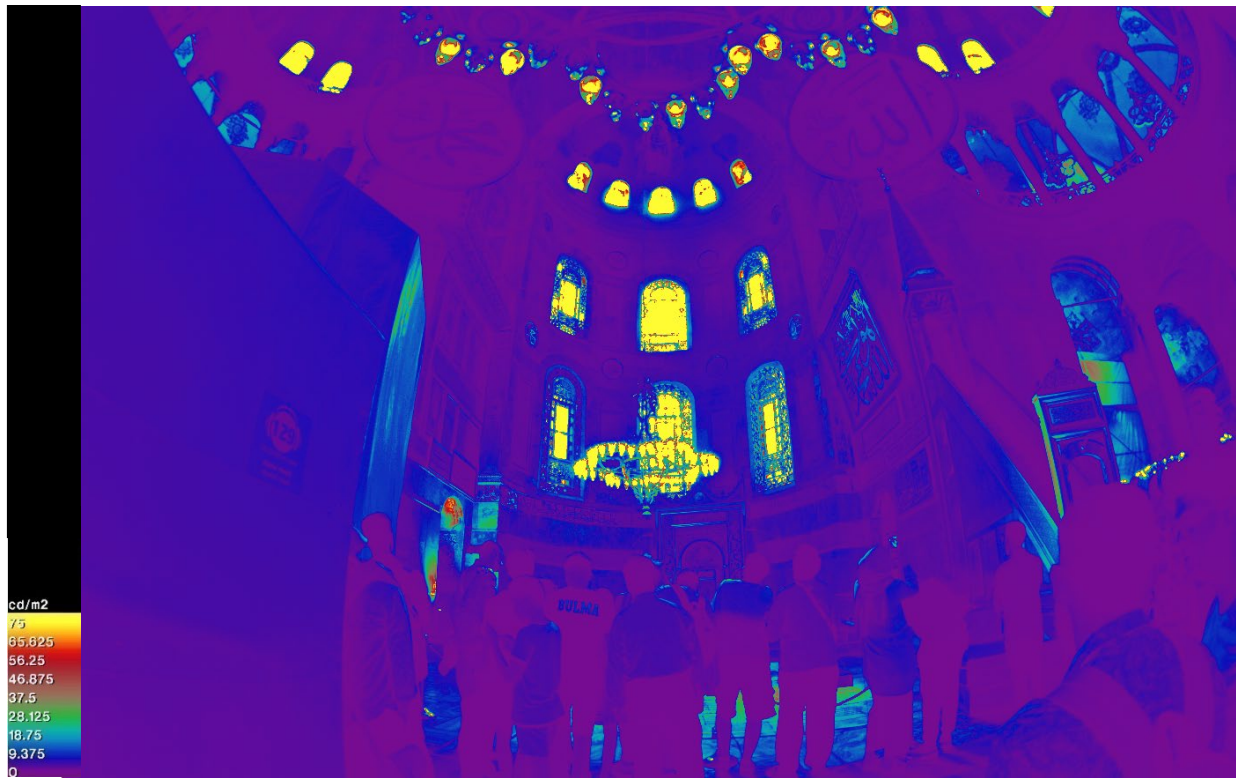


Fig. 35: False color photograph taken inside Hagia Sophia on July 20 at 11.00.

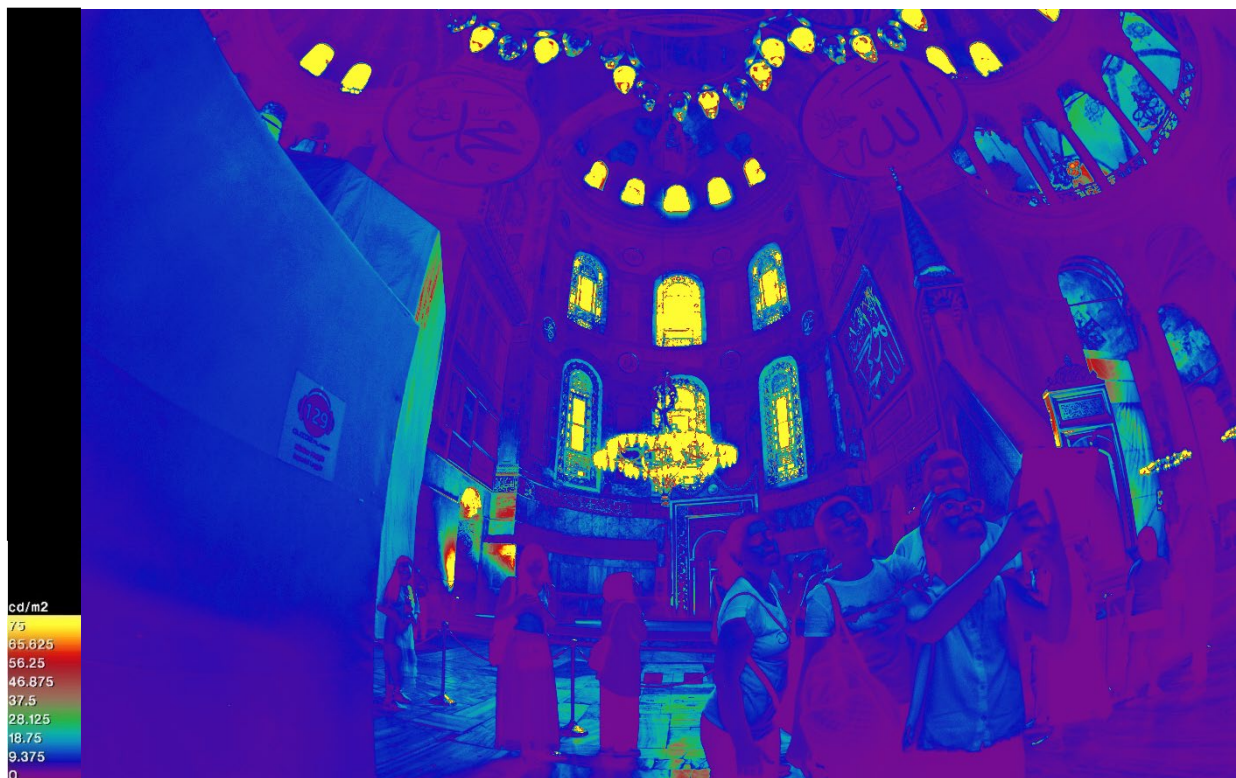


Fig. 36: False color photograph taken inside Hagia Sophia on July 20 at 12.00.



Fig. 37: False color photograph taken inside Hagia Sophia on July 20 at 13.00.



Fig. 38: False color photograph taken inside Hagia Sophia on July 20 at 14.00.

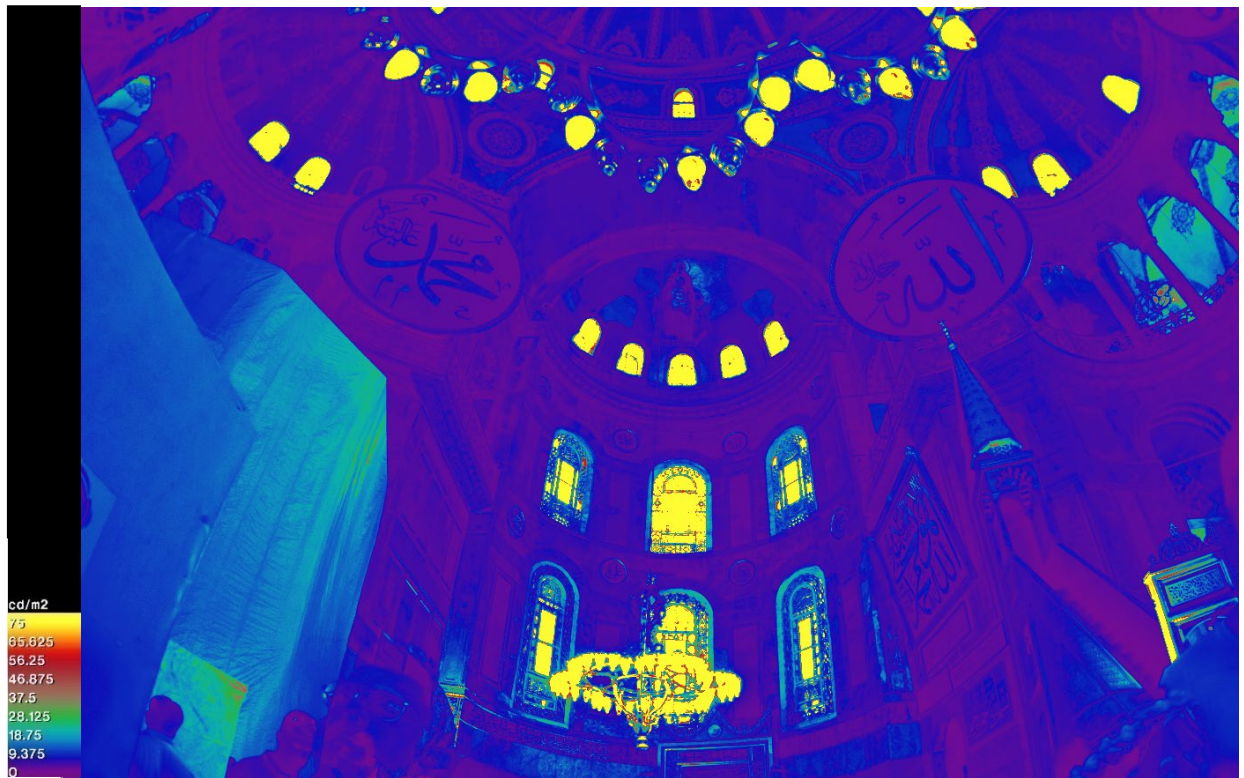


Fig. 39: False color photograph taken inside Hagia Sophia on July 20 at 15.00.



Fig. 40: False color photograph taken inside Hagia Sophia on July 20 at 16.00.

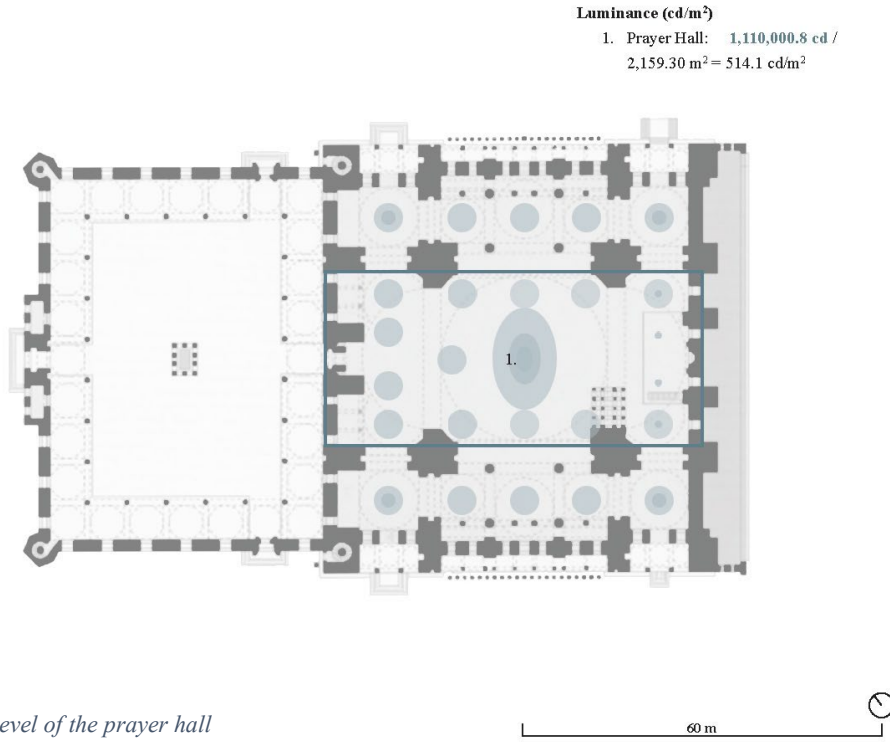


Fig. 41: Average luminance level of the prayer hall of the Süleymaniye Mosque.

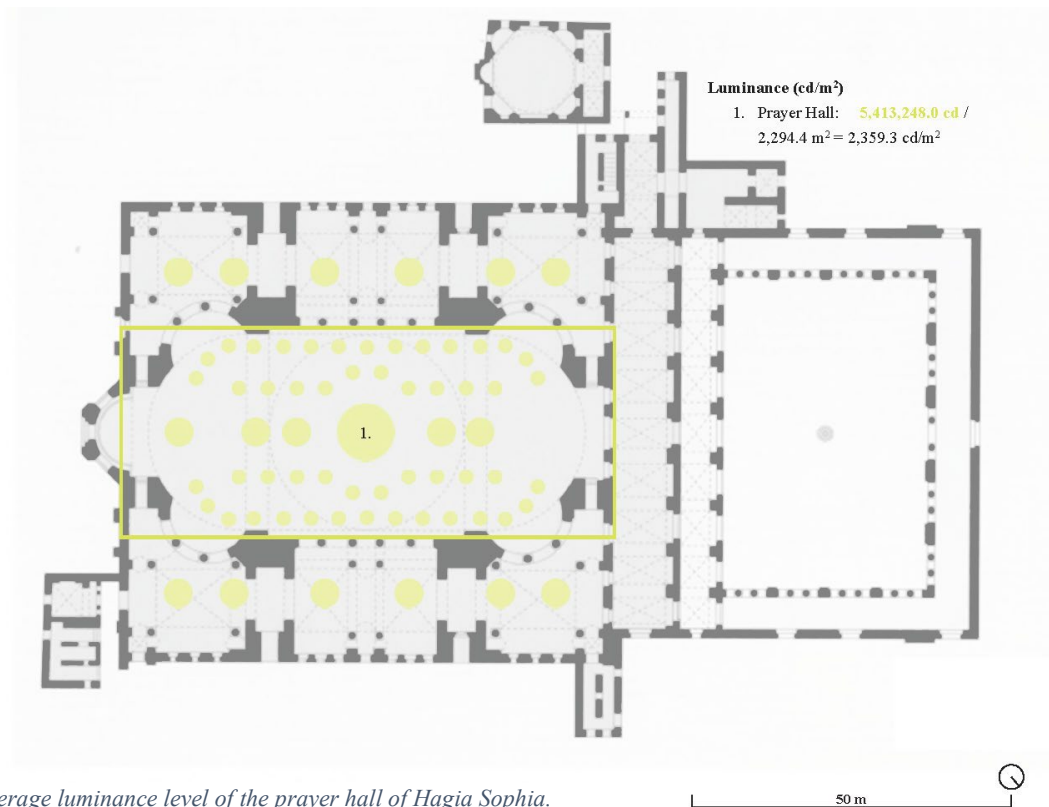


Fig. 42: Average luminance level of the prayer hall of Hagia Sophia.

CHAPTER 3: THEOLOGY

According to the Qur'an, Allah is identified by 99 names (the Beautiful Names, the *asma'-al-husna*). These are considered to be "[...] the best names, so invoke Him by them."¹²⁷ One of these names is *al-Nur*, which means "Light." The Arabic word *nur* appears 43 times throughout the Qur'an. However, it is only in the "Verse of Light" that God is explicitly equated with light:¹²⁸

Allah is the Light of the heavens and the earth. The example of His light is like a niche within which is a lamp, the lamp is within glass, the glass as if it were a pearly [white] star lit from [the oil of] a blessed olive tree, neither of the east nor of the west, whose oil would almost glow even if untouched by fire. Light upon light. Allah guides to His light whom He wills. And Allah presents examples for the people, and Allah is Knowing of all things.¹²⁹

The Verse of Light inspired the title of its *surah* (chapter), the *Surat an-Nur* (Chapter of Light). The Qur'an is organized into 114 *surahs*, each of which focuses on a different subject matter. The twenty-fourth chapter is the *Surat an-Nur*. Arguably, mosques, such as the Süleymaniye Mosque, inscribed with Qur'anic calligraphy may be considered the "best" locations to meet God if the Qur'an is the closest representation of God on earth. This may be especially true if the Verse of Light is among the inscriptions. The special relationship between the spiritual and visual aspects of light (in terms of architectural history and engineering) has been studied at length by Nicholas Stone, and much of what follows in this chapter is drawn from his extensive work on this subject. As he repeatedly points out, the Verse of Light is more than simply a well-known Qur'anic verse; it is one closely associated with mosques and their architectural elements. The transfiguration of the Verse of Light proceeds from literal (in the form of calligraphy), practical (in the form of architecture), to figurative (as "light").

¹²⁷ Qur'an 7:180 (Sahih International; all subsequent citations are from this edition).

¹²⁸ Nicholas Stone, *Symbol of Divine Light: The Lamp in Islamic Culture and Other Traditions* (Bloomington: World Wisdom, 2018), 10.

¹²⁹ Qur'an 24:35.

The Verse of Light: Literal and Figurative Interpretations

The Verse of Light establishes some sort of a relationship between God and architecture by the means of light. This vagueness is due to the numerous interpretations across centuries. For example, although Sufi commentaries tend to describe the Verse of Light as an allegory about man rather than a description of manmade objects, a number of mosques have taken the Verse of Light literally by incorporating elements from the verse into architectural design in explicit ways. The mosque lamp is a prime example of the Verse of Light being realized by the means of a physical object. The lamp, which is a consistent element in mosques, may have been intended to serve two purposes according to commentaries. The first is practical – to light the interior spaces of a mosque. The second is metaphorical – to light the heart of Muslims in order to show them the way towards Allah. The Qur'an refers to light in both a literal and figurative sense. In the context of "from the darkness to the light" (a phrase that is frequently found in the Qur'an), light indicates a transition from a state of ignorance to one of spiritual illumination. Thus, Divine Light is equated with the guidance offered by the Qur'an – "Allah guides to His light whom He wills."¹³⁰ It is by means of the Qur'an that "Allah presents examples for the people" to follow. Thus, in the process of translating the Verse of Light, important architectonic elements are given even more significance by being placed "side-by-side" with Allah.

The Prophet Muhammad serves as "His light" in the Qur'an, leading Muslims towards metaphorical illumination.¹³¹ Additionally, if the Prophet Muhammad is "like a niche within which a lamp, [...] whose oil would almost glow even if untouched by fire," then the lamp is akin to a light bulb that flashes on in the mind of Muslims when reading the Qur'an. Even today, a light

¹³⁰ Stone, *Symbol of Divine Light*, 12.

¹³¹ Marcia K. Hermansen, "The Prophet Muhammed in Sufi Interpretations of the Light Verse (Aya Nur 24:35)" (*Islamic Quarterly* vol. 42, 1998), 224.

bulb remains a visual metaphor that indicates an epiphany, which is further reinforced by Martin Lings.¹³²

There can be no question, in Islam, of representing the epiphany by any anthropomorphic image. But the prayer-niche is nonetheless "illuminated by the divine Sun" through its association with the Qur'an's Verse of Light. [...] Especially relevant to our context of inward depth are the different degrees of brightness which increases in proportion to its interiorization, first the niche, then the glass, then the oil, then the flame itself - the inwarder the brighter.¹³³

Regarding the first layer of depth mentioned by Lings, the word *mishkah* occurs only once in the Qur'an, and it is in the Verse of Light. It is typically translated as "niche" (as Lings demonstrates), which is warranted since it was a word commonly used during the time of the Prophet Muhammad to describe a small recess in a wall from which a lamp could reflect light at a greater height. A number of Western scholars believe that the term is of Ethiopic origin and means "window." However, another definition of the word is a perforated lamp body that enclosed a suspended lamp. This meaning may have derived from its concave form.¹³⁴ This interpretation of the word *mishkah* would have housed a separate glass container to hold the oil and the wick.¹³⁵ Mahmud Bina-Motlagh takes the reading of a perforated lamp body one step further and proposes that it represents the means by which mankind can reach (or manifest) God.

The word *mishkah* has two different meanings: one is the metallic body of a lamp perforated with holes and the other is translated as "prayer niche." The former translation of *mishkah* is preferable, because in a lamp the *misbah* and *mishkah* are two parts of a single entity [...] *Al-misbah fi zujajah* [the lamp is in a glass]. There are therefore three different constituent elements: the outer body, or *mishkah*, within it is the *zujajah*, which actually means glass, and then within it is the *misbah*, the part that gives the light. The normal (mystical) interpretation is that this signifies the three degrees of Being: gross manifestation, subtle manifestation, and supra-formal manifestation, which

¹³² Lings is a principal thinker of the Traditionalist School (Perennialism), in which its students believe in the existence of a set of universal truths that creates the base of knowledge for all world religions. Other Perennialists mentioned in this thesis include Titus Burckhardt, Ananda Coomaraswamy, René Guénon, Jean-Louis Michon, Seyyed Hossein Nasr, and Frithjof Schuon.

¹³³ Martin Lings, *Symbol & Archetype: A Study of the Meaning of Existence* (Louisville, KY: Fons Vitae, 2006), 131-2 as cited by Stone, *Symbol of Divine Light*, 25.

¹³⁴ Stone, *Symbol of Divine Light*, 29.

¹³⁵ Stone, *Symbol of Divine Light*, 114.

correspond within the human to the body, the soul, and the spirit. The spirit gives the light, the soul transmits it, and the body, through its “apertures,” propagates the light.¹³⁶

According to the verse, “the lamp is within glass, the glass as if it were a pearly [white] star.” The physical attribute of the glass resonates with the reality of its highly reflective surface, which appears as brilliant and glittering. There are different interpretations of the Arabic word that is the adjective of “star” in the Verse of Light. It can be “shining” or “radiant”; however, it can also be “pearly” according to some authorities. If the written word is pronounced as *durrryyun*, then “pearly” (*durr*, as if the star were made out of pearls) would result. If it is pronounced as *dirri’un* or *durri’un*, then it could also mean “reflection” (*dir*).¹³⁷ According to Finbarr Barry Flood, Keppel Archibald Cameron Creswell suggested that the motif of a pearl suspended from a chain was “probably imitating a lamp hanging in a doorway.”¹³⁸ Thus, scholars have established that there is a subtle yet strong relationship between the pearl motif and the lamp imagery.

According to the Qur'an, the Blessed Olive Tree could be in one of two locations. The first is at Mount Sinai (where olives supposedly have been cultivated by the monks in the monastery of St. Catherine): “And [We brought forth] a tree issuing from Mount Sinai which produces oil and food for those who eat.”¹³⁹ The second is at the Mount of Olives in Jerusalem. Irrespective of the actual location of the olive tree, according to the Verse of Light, the Blessed Olive Tree is “neither of the east nor of the west”. Thus, it holds a central position in the cosmic order. Symbolically, it is identical with the world axis.¹⁴⁰ This is the position advanced by René Guénon:

In the *surat al-nur*, a “blessed tree” is mentioned, that is, a tree charged with spiritual influences, that is “neither of the East nor of the West,” which clearly defines *its position as central or axial* [italics added for emphasis]; and this is an olive tree of which the oil feeds the light of a lamp; this light symbolizes the light of Allah, which is really Allah himself, for, as it is said at the beginning

¹³⁶ Mahmud Bina-Motlagh, Professor Emeritus of Mathematics and Philosophy of Science, Isfahan University of Technology, Iran as cited by Stone, *Symbol of Divine Light*, 60-1.

¹³⁷ Stone, *Symbol of Divine Light*, 39.

¹³⁸ Finbarr Barry Flood, *The Great Mosque of Damascus: Studies on the Makings of an Umayyad Visual Culture* (Boston: Brill, 2000), 15ff as cited by Stone, *Symbol of Divine Light*, 123.

¹³⁹ Qur'an 23:20.

¹⁴⁰ Stone, *Symbol of Divine Light*, 45.

of the same verse, "Allah is the Light of the heavens and of the earth." It is obvious that if the tree is here an olive, it is because of the illuminating power of the oil which is drawn from it, and therefore because of *the luminous and igneous nature inherent in it* [italics added for emphasis].¹⁴¹

Guénon points out two interesting aspects of the “blessed tree”: that it holds a central position and that it has an “igneous nature” due to its oil. The position of the tree lends to it being an expression of *religio perennis*: a primordial truth that all sacred religions share.¹⁴² For example, In Zechariah 4 (in the Bible), the seven-branched Menorah lampstand stands beside two olive trees – one to its left and one to its right. The significance of the presence of the olive tree suggests a parallel between this chapter and the Verse of Light. In the Bible, "the two anointed ones" seem to be Joshua (the high priest) and Zerubbabel (the governor of Israel). If so, there is a possible bi-polarization in priestly and kingly authority, respectively. In the Qur'an, there is only one Blessed Olive Tree (that feeds the lamp), which emphasizes an essential underlying unity, over and above the dualistic aspect accentuated in Zechariah 4 (and later, Revelation 11).¹⁴³ Frithjof Schuon argues for a parallel between the possible bi-polarization and “igneous nature” of the olive tree:

The combination of the two principles “fire” and “water” is none other than “wine,” which is both “liquid fire” and “igneous water” [...] Like wine, *oil is an igneous liquid* [italics added for emphasis], which “would almost glow forth (of itself) though no fire touched it,” according to the famous Verse of Light (*ayat an-Nur*). [...] [L]ike wine, oil is igneous by its very nature, but at the same time it does not correspond exactly to wine except when combined with the flame that it feeds, whereas wine has no need of any complement to manifest its nature.¹⁴⁴

The Verse of Light: Esoteric (versus Exoteric) Interpretations

The parallels between Christian and Islamic traditions (the “blessed tree”; wine versus oil) have led religious studies scholars to further investigate the Verse of Light. Gerhard Böwering broadens the common interpretation of the sole olive tree featured in the Verse of Light from one

¹⁴¹ René Guénon, *Fundamental Symbols: The Universal Language of Sacred Science* (Cambridge, UK: Quinta Essentia, 1995), 220-23 as cited by Stone, *Symbol of Divine Light*, 47.

¹⁴² Stone, *Symbol of Divine Light*, 44.

¹⁴³ Stone, *Symbol of Divine Light*, 43-4.

¹⁴⁴ Frithjof Schuon, *Logic and Transcendence: A New Translation with Selected Letters* (Bloomington, IN: World Wisdom, 2009), 176-7 as cited by Stone, *Symbol of Divine Light*, 44.

person to collective “peoples.” To him, those who pray to the east represent Christians, while those who pray to the west are Jewish.¹⁴⁵ Thus, it is the people of Islam whom “Allah guides to His light.” Although Charles Simon Clermont-Ganneau argues that the lamp described in the Verse of Light was inspired by actual lamps that the Prophet Muhammad may have seen, others believe that the revelation of the Verse of Light was not influenced by the use of oil lamps introduced into Islamic places of worship during the Prophet's lifetime. A number of verses in the Qur'an were revealed in direct response to actual events during the lifetime of the Prophet Muhammad; thus, the circumstances in relation to which a revelation came to the Prophet (*asbab al-nuzul*) were one of the factors taken into account by traditional commentators.¹⁴⁶ One such event was the interaction between Tamim al-Dari, a merchant of oil and lamps, and the Prophet Muhammad. al-Dari supposedly introduced both the practice of using oil lamps in the mosques of Mecca and Medina as well as using olive oil to fuel them. In fact, after his conversion to Islam, he was granted a fiefdom over the region of Hebron (in his native Palestine), which is renowned for its olive oil.¹⁴⁷

The Prophet Muhammad is said to have informed Tamim al-Dari in the mosque of Medina, “Whoever lights a lamp in the mosque, the angels and the bearers of the Throne will not cease to pray for forgiveness for him so long as the light of that lamp is shining in the mosque.”¹⁴⁸ His consequential words seem to have been taken to heart by Muslims and taken into account by commentaries across centuries. As a side note, the lamp described in the Verse of Light realistically represented the most intense light source that could have been achieved in the time of the Prophet. Olive oil burnt more brightly than the sesame oil used in lamps and the palm fronds burnt as torches

¹⁴⁵ Gerhard Böwering, “The Light Verse: Qur’ānic Text and Sūfī Interpretation,” *Oriens* vol. 36 (2001), 131.

¹⁴⁶ Stone, *Symbol of Divine Light*, 74.

¹⁴⁷ Charles Simon Clermont-Ganneau, “*La lampe et l’olivier dans le Coran*,” in *Revue de l’Histoire des Religions* 81 (1920), 249ff as cited by Stone, *Symbol of Divine Light*, 43.

¹⁴⁸ *Al-Fataawa al-Kubra*, 588-93 as cited by Stone, *Symbol of Divine Light*, 75.

at that time. In fact, the Arabic word for lamp, *siraj*, derives from the word for sesame oil, which was the oil predominantly used in lamps prior to the advent of Islam.¹⁴⁹ Furthermore, the interaction between glass and water would have resulted in a makeshift optical lens that magnified the flame and transmitted the light to the eye of the beholder in the clearest way possible. Thus, if enclosed in a niche, the light would have been concentrated and focused (especially the component cast upwards) onto the immediate surroundings. The overall effect would have been of a bright light shining in the comparative darkness of an otherwise dimly lit interior.¹⁵⁰

Although it would be intuitive to imagine a well-lit mosque complete with a niche and oil-filled mosque lamps, Sufi commentators in particular have pushed their readers to interpret the physical objects mentioned in the Verse of Light in semiotic terms. Beginning with etymology, the Arabic words for fire (*nar*) and light (*nur*) derive from the same verbal root.¹⁵¹ In Islam, “it is taught that at the end of time light will become separated from heat, and heat will be hell whereas *light will be Paradise* [italics added for emphasis]; the light of heaven is cool and the heat of hell dark.”¹⁵² Interestingly, only in the Verse of Light does *al-Nur* denote the divine. In other Qur'anic verses that contain the word *nur*, “light” is either of, from, or sent by a divinity.¹⁵³ Schuon distinguishes heat and light as representations of the human and divine states, respectively.

As for the “Light” (*Nur*), which we see simultaneously attributed – like the character of “creature” – to Divine, and therefore unmanifested, realities, and to cosmic, and therefore manifested, realities (or more precisely to realities belonging to formless Manifestation), it must be appreciated that the cosmos comprises of fundamental degrees: firstly, “earth” (*tin*), secondly “fire” (*nar*) and thirdly “light” (*nur*); the human body, like the whole sensory order (*'alam al-mulk*), is made of “earth,” beings of the “subtle state” (*'alam al-malakut*) – that is to say “spirits” (*jinn*) – are made of “fire,” and the Angels and the whole formless order (*'alam al-jabbarut*) are made of “light.” [...] to say that the Heavens are “created” or “Light” can therefore signify only one thing, namely that they are alone in being directly “conformable” to the Divine “Light,” and that consequently in being

¹⁴⁹ Clermont-Ganneau, “*La lampe et l’olivier*,” 216 as cited by Stone, *Symbol of Divine Light*, 42.

¹⁵⁰ Stone, *Symbol of Divine Light*, 117.

¹⁵¹ Stone, *Symbol of Divine Light*, 21.

¹⁵² Frithjof Schuon, *Understanding Islam: A New Translation with Selected Letters* (Bloomington, IN: World Wisdom, 2011), 48 as cited by Stone, *Symbol of Divine Light*, 21.

¹⁵³ Stone, *Symbol of Divine Light*, 3.

identified with this “Light” in the sense of an “essential identity.” God is necessarily the Archetype of all light: “Allah is the Light of the Heavens and of the earth” (Qur'an, Surat an-Nur, XXIV, 35).¹⁵⁴

Schuon’s interpretation of how light fits into Islamic cosmology serves as a foundation for better understanding humankind and the rest of God’s creations. According to his hierarchy, God is the highest power, “the Archetype of all light,” from which all else trickles down.

Allegorical verses in the Qur'an tend to be written in a language that gives the impression of being intuitive to understand (i.e., interpreting Qur’anic verses in terms of the outer or macroscopic place [the world]). However, transcending one’s first impression of Qur’anic verses leads to a deeper revelation. It is on the inner plane (the human soul) where Qur'anic verses (such as the Verse of Light) are attributed substantial significance in the context of Islamic spirituality and mysticism.¹⁵⁵ Generally speaking, every symbol's outer form also expresses an inner reality. The mosque lamp in the Verse of Light is one case in which an object’s symbolism may predominate over its functional purpose.¹⁵⁶ One of the earliest commentaries on the Verse of Light is that of Abū Ja’far Muḥammad ibn Jarīr al-Ṭabarī (839-923), in which he contrasts the outer, literal meanings and the inner, symbolic meanings inherent in the verse. For example, the niche is understood to literally mean a windowless recess in the wall of a house and to figuratively mean the breast of the believer holding the lamp of faith.¹⁵⁷ Among the various points of debate between commentators lies that over whether the key phrase "Allah is the Light of the heavens and the earth" should be accepted in its literal sense. Most classical non-Sufi commentators believed that

¹⁵⁴ Frithjof Schuon, *Dimensions of Islam* (London: George Allen & Unwin, 1970), 108-9 as cited by Stone, *Symbol of Divine Light*, 11-2.

¹⁵⁵ Stone, *Symbol of Divine Light*, 49.

¹⁵⁶ Stone, *Symbol of Divine Light*, 149.

¹⁵⁷ Gerhard Böwering, “The Light Verse: Qur’ānic Text and Sūfī Interpretation,” *Oriens* 36 (2001), 113-144 as cited by Stone, *Symbol of Divine Light*, 50.

it has to be interpreted; after all, if Allah is incomparable, how could he be equated with Light, which is created?

Q: Can Allah Be Equated with Light?

Despite the rhetorical nature of the aforementioned question, Islamic texts beyond the Qur'an reinforce the claim that Allah is in fact Light. The hadith, for example, presents the Veils Tradition, in which God reveals himself via a hierarchy of light ("veilings"). It states, "Allah hath Seventy Thousand Veils of Light and Darkness: were He to withdraw their curtain, then would the splendors of His Aspect surely consume everyone who apprehended Him with his sight."¹⁵⁸

William C. Chittick admits that,

[That light is a veil] is already paradoxical, because light is that which allows us to see. But light can also be bright enough to blind us, and this is manifestly so in the case of God. [...] When the Prophet was asked if he had seen God when he journeyed to Him in his ascent (*mi'raj*), he replied, "He is a light. How could I see Him?" Thus, in the earliest texts, along with the idea that a veil is something that prevents the vision of God, we also have the idea that the most basic of veils is the superabundance of God's light.¹⁵⁹

Chittick is one of numerous philosophers who attempted to interpret the Veils tradition. Schuon interprets the "veilings" in terms of Absolute and Relative. In his opinion, reality is the result of certain veils being exposed to mankind.

The Light shines for itself, then it radiates to communicate itself, and by radiating, it produces the Veil and the veils; by radiating and spreading out it creates separation, veils, gradations. The intrinsic tendency to radiation is the first Veil, that which later defines itself as creative Being, and then manifests itself as cosmos. Esoterism or gnosis, being the science of Light, is thereby the science of veilings and unveilings, and necessarily so since on the one hand discursive thought and the language that expresses it constitute a veil, while on the other hand the purpose of this veil is the Light.¹⁶⁰

¹⁵⁸ William Henry Temple Gairdner, trans., *Al-Ghazali's Mishkat al-Anwar* ("The Niche for Lights") (London: Royal Asiatic Society, 1924), 88 as cited by Stone, *Symbol of Divine Light*, 14.

¹⁵⁹ William C. Chittick, *Sufism: A Beginner's Guide* (Oxford: Oneworld Publications, 2007), 181 as cited by Stone, *Symbol of Divine Light*, 14.

¹⁶⁰ Frithjof Schuon, *Esoterism as Principle and as Way* (London: Perennial Books, 1990), 47-64 as cited by Stone, *Symbol of Divine Light*, 15.

The Veils Tradition is one of three hadith traditions that supports the important notion in Islamic cosmology of the Light of Muhammad (i.e., the whole cosmos emanates from the *nur muhammadi*). In the second hadith tradition, the Prophet states, "the first thing God created was my light"; in the third he states, "I am [made] of God's light and all created beings [are made] of my light". In the Qur'an, the Prophet Muhammad is explicitly referred to as a source of light: "And one who invites to Allah, by His permission, and *an illuminating lamp* [italics added for emphasis]."¹⁶¹ To return the conversation back to the Verse of Light, Annemarie Schimmel recounts how Muhammad was interpreted by early Qur'anic scholars to be the "niche" mentioned in the Verse of Light. In conjunction with the metaphor of an illuminating lamp, "As such, he is charged with leading people from the darkness of infidelity and error towards the light."¹⁶² Schimmel may have taken evidence from a hadith that states, "I heard the Messenger of Allah say: 'Allah created His creation in darkness, then on the same day He sent His Light upon them. Whoever was touched by His Light on that day will be guided and whoever was missed will be led astray.'"¹⁶³ It is even reported that the Prophet would recite the following *du'a*:

O Allah, place light in my heart, light in my tongue, light in my hearing, light in my sight, light behind me, light in front of me, light on my right, light on my left, light above me and light below me; place light in my sinew, in my flesh, in my blood, in my hair and in my skin; place light in my soul and make light abundant for me; make me light and grant me light.¹⁶⁴

Irrespective of whether a particular commentary on the Verse of Light is of Sufi, non-Sufi or contemporary origins, all scholars seem to agree that God is Light; His light illuminates Muslims; and His light is the source of all of His creations. In other words, God figuratively and literally illuminates all. Mu'tazila commentators described Allah as the illuminator (*munawwir*) of

¹⁶¹ Qur'an 33:46.

¹⁶² Annemarie Schimmel, *Deciphering the Signs of God: A Phenomenological Approach to Islam* (Albany, NY: State University of New York Press, 1994) 12-3 as cited by Stone, *Symbol of Divine Light*, 12.

¹⁶³ Recorded by Imam Ahmad from 'Abdullah bin 'Amr as cited by Stone, *Symbol of Divine Light*, 10.

¹⁶⁴ Stone, *Symbol of Divine Light*, 13.

the heavens and the earth. The two phrases within the Verse of Light, “Allah is the Light of the heavens and the earth” and “Allah guides to His light whom He wills,” are most commonly interpreted as “God is Light” and “God is the possessor of light,” respectively.¹⁶⁵ Regardless of their unique interpretations, the two-fold meaning behind the verse – Allah is Light and the possessor of light – was not (and continues to not) be contradictory by all commentators.¹⁶⁶ If one were to interpret the niche mentioned in the Verse of Light to a cave, then one could find supporting evidence in other sacred scriptures. The first reference is to a cave close to Mecca, in which the Prophet Muhammad received his first revelation of the Qur’an. The second is to the cave at the summit of Mount Sinai (Horeb), in which Moses waited to receive the Ten Commandments.¹⁶⁷ An interpretation of the cave is the womb of Mother Earth. As such, it is symbolic of birth and regeneration.¹⁶⁸ This is common across all religions, according to Titus Burckhardt. Burckhardt believed that, “In all sacred architecture the niche is a form of the ‘Holy of Holies,’ the place of the epiphany of God, whether that epiphany be represented by an image in the niche or by an abstract symbol, or not suggested by any sign other than the purely architectural form.”¹⁶⁹

Burckhardt also argued that light has an intimate connection with both the Prophet Muhammad and Our Lady Mary. She is commonly referred to by the Arabic name *Umm al-Nur* (the Mother of Light). In another instance, the *mihrab* may be identified as the “eastern place” – the source of light or illumination – to which Mary withdrew. This is confirmed in Q 9:16: “And mention, [O Muhammad], in the Book [the story of] Mary, when she withdrew from her family to

¹⁶⁵ Stone, *Symbol of Divine Light*, 3.

¹⁶⁶ Stone, *Symbol of Divine Light*, 50.

¹⁶⁷ Stone, *Symbol of Divine Light*, 23.

¹⁶⁸ Ibid.

¹⁶⁹ Titus Burckhardt, *Sacred Art in East and West* (Louisville, KY: Fons Vitae, 2001), 104-5 as cited by Stone, *Symbol of Divine Light*, 25.

a place toward the east [italics added for emphasis].”¹⁷⁰ In contrast to commentaries that focused primarily on the exoteric meanings of the Qur’an, Sufi commentaries were more concerned with the esoteric meaning. They sought to understand the language as symbolic and metaphorical, particularly in relation to man’s inner dimension and the transformation of the soul on the path of spiritual realization.¹⁷¹ One Sufi scholar, Ibn Abbas (c. 619-87), considers the olive tree, which (according to the Verse of Light) is “neither of the east nor of the west,” to be “the [believer’s] heart, its root firmly grounded in true faith and its branches the limbs of the body, educated to perform works of obedience.”¹⁷² Muqātil (d. 767), on the other hand, interprets the olive tree as a representation of Abraham who prayed neither to the east nor to the west but instead towards Mecca.

The olive tree is one of the five objects that Abu Hamid Muhammad al-Ghazali (c. 1058-1111) interprets in the *Mishkat al-Anwar*, likely the most famous commentary on the Verse of Light. Along with the Niche, the Lamp, the Glass, and the Oil, he establishes their relationship with the five faculties of the human soul: the Niche to the sensory spirit; the Lamp to the imaginative spirit; the Glass to the intelligential spirit; the Tree to the discursive spirit; and the Oil to the transcendental prophetic spirit. These “lights of the human spirit are graded rank on rank” and their existence substantiates the phrase “Light upon light.”¹⁷³ Al-Ghazali conceives of light in various grades in *Mishkat al-Anwar*. He perceives a hierarchical relationship between different manifestations of Light (e.g., physical Light versus the Eye, which makes things visible). Reflecting upon what is most worthy of the term Light, he believes that Intelligence is the “worthiest” since it transcends the seven defects related to the physical eye. However, later on he

¹⁷⁰ Stone, *Symbol of Divine Light*, 29.

¹⁷¹ Stone, *Symbol of Divine Light*, 50.

¹⁷² Böwering, “The Light Verse,” 134.

¹⁷³ Stone, *Symbol of Divine Light*, 51.

realizes that since it is the Qur'an that enables the intelligence to see actually (not potentially), it deserves to be called Light.¹⁷⁴ Al-Ghazali also explains that Allah is in Himself the Light of heaven and earth, since, just as everything is manifest to man's sight by means of phenomenal, visible light, everything is manifest to man's Insight by means of Allah.¹⁷⁵

A: Allah Illuminates the Heavens and the Earth

Whether or not Muslims have a Qur'an in hand, mosques (such as the Süleymaniye Mosque) tend to be decorated heavily with Qur'anic inscriptions. Thus, the written word and architectural design work together in mutually reinforcing messages. In pre-Islamic art, an arch (or a niche) was understood to be a symbolic doorway to the next world. Thus, a lamp would light the way for the soul on its path of return to God. In both Christianity and Judaism, one would see a lamp often placed within a niche or above an altar. The Verse of Light predominantly established this form of religious iconography in Islamic art and architecture.¹⁷⁶ As a result, mosque architects typically made one of two design decisions: to either inscribe the Verse of Light directly onto the walls (in the form of calligraphy) or to hang an actual lamp in a niche. Stone believes (similar to Bina-Motlagh) that the primary function of a mosque lamp is to be symbolic in nature. One case in point is the extensive use of the lamp as a decorative motif in Islamic cultural expression, whether in architecture or in art. Irrespective of its form, the mosque lamp is a recurrent symbol, deployed to remind Muslims of the Verse of Light.¹⁷⁷

Shaykh Mahmud Shabistari (1288-1340) wrote the *Gulshan-i Raz* (Rose Garden of Secrets) in 1317. Edward Henry Whinfield offers further explanation on "The one Light shines with many

¹⁷⁴ Stone, *Symbol of Divine Light*, 50-1.

¹⁷⁵ Stone, *Symbol of Divine Light*, 51.

¹⁷⁶ Erica C. Dodd, "Light I: The Lamp in the Niche," in Helene E. Roberts, ed., *Encyclopedia of Comparative Iconography: Themes Depicted in Works of Art*, vol. 1 (Chicago: Fitzroy Dearborn, 1998), 499-504 as cited by Stone, *Symbol of Divine Light*, 30.

¹⁷⁷ Stone, *Symbol of Divine Light*, viii.

rays through the lattices of various personalities” in related notes. The one Light (the Spirit) is refracted on a plane of manifestation into a multiplicity of individual lights (spirits). This is the principle of individualization. This principle is not a process of fragmentation of one light at its source. On the contrary, each differentiated ray projects an image of the totality of the Spirit (of “Necessary Being”).¹⁷⁸ In the *Gulshan-i Raz*, *mushabak-ha-ye mishkat* is translated by Whinfield as “the lattices of the niches of the lamp.” However, in the Persian context, *mishkat* makes more sense if it is understood as the perforated body of the lamp. The Persian word *mushabak-ha* should thus be translated as “perforations.” If this were the translation, then the image is of light emanating from the flame of the Spirit at the center of the lamp and shining out from it through a multiplicity of minute perforations.¹⁷⁹ Similar to the original text of Shabistari, Safi ‘Ali Shah (1835/6-98/9) compares the holes in the *mishkah* through which light passes (referring to a perforated lamp body, rather than a niche in a wall) with the five physical senses in his commentary on the Verse of Light.¹⁸⁰ He equates the Lamp with the Spirit, the Glass with the Heart, the Tree with the Soul, and the *mishkah* with the Body in his commentary.¹⁸¹

Even though the Arabic term *qandil* typically refers to a single hanging lamp, the Arabic term *misbah* is used to describe the lamp in the Verse of Light. The term (whether singular or plural) occurs only three times in the Qur'an: in the *Surat an-Nur* 24:35, the *Surat Fussilat* 41:12, and the *Surat al-Mulk* 67:5. In the two latter *surahs*, *masabih* is used as a metaphor to designate the sun, moon, and other light-emitting heavenly bodies – “And We adorned the nearest heaven with lamps and as protection” and “And We have certainly beautified the nearest heaven with stars and have made [from] them what is thrown at the devils and have prepared for them the punishment

¹⁷⁸ Stone, *Symbol of Divine Light*, 54.

¹⁷⁹ Ibid.

¹⁸⁰ Stone, *Symbol of Divine Light*, 55.

¹⁸¹ Ibid.

of the Blaze,” respectively.¹⁸² The terms *misbah* and *siraj* are among the “sacred names” of the Prophet Muhammad. They are commonly used in litanies and prayers. The latter name is a word used four times in the Qur’an as “lamp.” While three of the four references refer to the sun, the lone reference refers to the Prophet in the *Surat al-Ahzab* 33:46: “And one who invites to Allah, by His permission, and *an illuminating lamp* [italics added for emphasis].”¹⁸³ The concept of paralleling the status of an individual (specifically, their soul) with a lamp is even stated in a hadith:

The Messenger of Allah said: “Hearts are of four kinds: the heart that is clear like a shining lamp; the heart that is covered and tied up; the heart that is upside-down; and the heart that is clad in armor. As for the clear heart, it is the heart of the believer in which is a lamp filled with light.”¹⁸⁴

As indicated by the hadith, light is equated with knowledge and a lamp is equated with the dissemination of this knowledge (light) according to various Islamic sacred texts. The term *misbah* is used in this sense in the title of the hadith collection, *mishkat al-masabih* (A Niche for Lamps).¹⁸⁵

The Verse of Light in Terms of “Houses of Worship”

Sufi interpretations of the Verse of Light generally concur that the meaning behind the Verse of Light is much more spiritual than physical. Despite the mention of an oil lamp within glass, many Sufis suggest that it does not actually refer to a lamp in a physical mosque. In fact, at the time when the Qur’an was written, physical mosques did not exist. The English word “mosque” derives from the Arabic word *masjid*, which means a place of prostration. As a result, there was no explicit call for a built environment – just a place in which Muslims could pray. The thirty-sixth verse (that which follows the Verse of Light) continues with “[Such niches are] in mosques which Allah has ordered to be raised and that His name be mentioned therein; exalting Him within

¹⁸² Stone, *Symbol of Divine Light*, 30-1.

¹⁸³ Stone, *Symbol of Divine Light*, 31.

¹⁸⁴ Recorded by Imam Ahmad from Abu Sa’id Al-Khudri as cited by Stone, *Symbol of Divine Light*, 31.

¹⁸⁵ Stone, *Symbol of Divine Light*, 31.

them in the morning and the evening.”¹⁸⁶ In other translations – such as that referenced by Erika Dodd and Shereen Khairallah – the Arabic term that had been translated as “mosque” in the Sahih International edition, *buyūt*, is translated otherwise as “house of worship” or “temple.”¹⁸⁷ Thus, *buyūt* might be much broader than what Muslims reading the Sahih International version could have imagined. This observation indicates the potential difference in past and present interpretations of the Qur’an and how the course of time has altered them. Despite inconsistencies among religious studies scholars on how the Verse of Light is materialized, the overarching theme in Sufi scholarship is consistent: God is Light.

The Verse of Light contains some of the most visually evocative content for semiotic interpretation of the Qur’an. An indication of this is the Arabic word “*manthal*” used at the start of the verse. This term indicates that what is to follow is a symbol of Allah’s Light. The verse concludes with a similar word (“*amthal*”) in the phrase, “And Allah presents *examples* [italics added for emphasis] for the people, and Allah is Knowing of all things.”¹⁸⁸ A concept commonly associated with semiotics is that a sole entity could encompass a multitude of interpretations. For example, “Light of the heavens and the earth” could be interpreted as either (a) the Divine is equated with Light of a transcendent nature or (b) His light also radiates on an earthly plane.¹⁸⁹ Seyyed Hossein Nasr, ponders this connection between the heavenly and the earthly plane and concludes that,

“God is the Light of the Heavens and the Earth,” the Qur’an asserts and a prophetic saying adds a cosmogonic and cosmological dimension to this verse by adding, “The first being created by God was light.” [...] [I]n fact the primal man in every man yearns for light which is ultimately a symbol

¹⁸⁶ Qur’an 24:36.

¹⁸⁷ Erica Cruikshank Dodd and Shereen Khairallah, *The Image of the Word: A Study of Quranic Verses in Islamic Architecture*, vol. I (Beirut: American University of Beirut, 1981), 69.

¹⁸⁸ Stone, *Symbol of Divine Light*, 7.

¹⁸⁹ Stone, *Symbol of Divine Light*, 3.

of Divine Presence, the Light which shines upon the whole cosmos from the central *axis mundi* that is neither of the East nor of the West.¹⁹⁰

Irrespective of which interpretation an observant architect may choose to follow, the practical and figurative forms of the Verse of Light (as architecture and lighting design, respectively) have become a means of using light in contemporary mosque design to imbue sacred space with Divine Presence.

The Transfiguration of the Verse of Light

Guy Le Strange quotes early accounts by Ibn al-Faqih and Ibn ‘Abd Rabbih (dating from 903 to 913) that describe the Haram in Jerusalem and its lighting. They mention that “the Noble Sanctuary [...] is lighted every night by one thousand six hundred lamps” and that “the total number of the lamps that light the *Sakhrah* [Dome of the Rock] is 464, which hang by hooks and chains of copper.”¹⁹¹ Persian traveler Nāsir Khusraw Qubādiyānī Balkhi (1004-88) can attest to the heavy use of brass and silver lamps in Jerusalem, as well as in Hebron and Bethlehem. In the Dome of the Rock, he recalls “a silver lamp suspended by a silver chain from the center of the Dome, and many other lamps of the same material, each with its weight inscribed on it.”¹⁹² The extensive use of mosque lamps over the centuries evokes the aniconic tradition of Islam. A commentary that had influenced the style of Persian mosque lamps to such a degree that, “[T]here are few, if any, productions of Persian art more beautiful than the mosque lamps; and here we can be sure that every Muslim must have known the interpretation given in the Qur’an [in the Verse of Light],”¹⁹³

¹⁹⁰ Seyyed Hossein Nasr, *Islamic Art and Spirituality* (Ipswich: Golgonooza Press, 1987), 50-1 as cited by Stone, *Symbol of Divine Light*, 10.

¹⁹¹ Guy Le Strange, *Palestine Under the Moslems: A Description of Syria and the Holy Land from A.D. 650 to 1500* (London: Alexander P. Watt, 1890), 160-3 as cited by Stone, *Symbol of Divine Light*, 75.

¹⁹² Wheeler M. Thackston, trans. and ed., *Nāser-e Khusraw’s Book of Travels (Safarnāma)* (Albany, NY: Bibliotheca Persica, 1986), 55-8 as cited by Stone, *Symbol of Divine Light*, 75.

¹⁹³ Roger Lipsey, ed., *Coomaraswamy: Selected Papers I, Traditional Art and Symbolism* (Princeton, NJ: Princeton University Press, 1977), 263 as cited by Stone, *Symbol of Divine Light*, 52.

is that of Dara Shikuh (1615-59). In his text *Majma'-ul-Bahrain (The Mingling of the Two Oceans)*, he offers his own interpretation of the Verse of Light.

[W]hat this *faqir* has understood, [from the Verse of Light], is that *Mishkat* (or, niche) applies to the world of bodily existence, *Misbah* (or, the lamp) to the Light of the Essence and *Shisha* (or, glass) to the (human) soul which is like a shining star and that, on account of this lamp (*misbah*), the *Shisha* (or, glass) also appears like a lamp (or *Misbah*). And: “That lamp is lit,” applies to the “Sacred tree” (*Shajar-I-Mubarak*) refers to the Self of the truth, Holy and Exalted is He, who is free from the limitations of the East and of the West. By *Zait* (olive-oil) is meant “the Great [Spirit]” (*Ruhi-A'zam*), which is neither of Eternity past nor of Eternity to come, in that the *Zait* is luminous and resplendent by itself, for the reason that it possesses great elegance and purity, and does not require to be lighted. [...] This light of *Zait* (olive-oil) is “light upon light” (*nur-un-'ala nur*), which signifies that, on account of its extreme purity and brightness, it is light full of light; and no one can behold Him with this light, unless He guides (and directs) him with the Light of His unity.¹⁹⁴

Although Shikuh frequently uses the term *Zait*, the olive itself is mentioned only seven times in the Qur'an. In most Qur'anic passages, the emphasis is placed on the abundance of Allah's provision – “[...] And [We produce] gardens of grapevines and olives and pomegranates, similar yet varied. Look at [each of] its fruit when it yields and [at] its ripening. Indeed in that are signs for a people who believe” and “Have you not considered how Allah presents an example, [making] a good word like a good tree, whose root is firmly fixed and its branches [high] in the sky? It produces its fruit all the time, by permission of its Lord. And Allah presents examples for the people that perhaps they will be reminded.”¹⁹⁵ Olives (and, in particular, their oil) encourage three primary uses. The first is for nourishment; the second is for anointing; and the third is for lamps.¹⁹⁶ In one particular hadith, the Prophet Muhammad says, “Eat olive oil and anoint yourselves with it, for it comes from a blessed tree.”¹⁹⁷ According to Clermont-Ganneau, even the successors (caliphs) of the Prophet followed suit in taking full advantage of the benefits that they could reap from olive oil:

¹⁹⁴ Dārā Shikūh, *Majma'-ul-Bahrain: Or The Mingling of the Two Oceans*, ed. and trans. Muhammad Mahfuz-ul-Haq (Calcutta: Asiatic Society, 1926), 48-50 as cited by Stone, *Symbol of Divine Light*, 53.

¹⁹⁵ Qur'an 6:99 and 14:24-5.

¹⁹⁶ Tirmidhī 4535-6 as cited by Stone, *Symbol of Divine Light*, 40.

¹⁹⁷ Hadith transmitted by al-Tirmidhī, Ibn Mājah and Dārimī. (Al-Tirmidhī Hadith 4221, Narrated by Abu Usayd al-Anṣārī) as cited by Stone, *Symbol of Divine Light*, 40.

On the authority of Abu Bakr ibn al Harith, it is reported that, during the Khalifate of ‘Abd al Malik, the *Sakhrah* was entirely lighted with [oil of] the Midian Ban [the Tamarisk, or Myrobalan] tree, and oil of Jasmin, of a lead color. [And this, says Abu Bakr was of so sweet perfume, that] the chamberlains were wont to say to him: “o Abu Bakr, pass us the lamps that we may put oil on ourselves therefrom, and perfume our clothes”; and so he used to do, to gratify them.¹⁹⁸

The oil-filled lamp is an example of lighting design bearing a theological undertone. As this chapter underlines several times, the motif of a lamp within a niche is a potent symbol that carries the meaning behind the Verse of Light. However, the lamp becomes greater than itself if interpreted in terms of architecture (aesthetics), engineering (functionalism), and theology (semiotics). It is not merely an attractive architectural element or the most efficient means of illuminating mosques in the evening. The light that emanates from the mosque lamp (whether electric or oil-filled) appears to leave the earthly realm and enter the ethereal realm. It subconsciously impresses upon visitors a feeling of divine presence that does not typically exist with such strength outside of sacred architecture. Thus, the mood that Mimar Sinan, Anthemius of Tralles and Isidore of Miletus had sought to achieve is the result of the team effort of architecture, engineering, and theology to manifest something that any one of the elements cannot bring about on its own: the presence of God.

¹⁹⁸ Le Strange, *Palestine Under the Moslems*, 147 as cited by Stone, *Symbol of Divine Light*, 43.

CHAPTER 4: THEOPHANY

Theophany – the physical manifestation of God – derives from the Ancient Greek term, *theophaneia* (“appearance of God”).¹⁹⁹ One of the earliest texts to use this term to discuss divine appearance is the Early Christian treatise *Peri theophaneias* (c. 324-37). The term theophany became more widespread among modern religious studies scholars after Mircea Eliade used it (and *hierophany*, “the act of manifestation of the sacred”) to interpret the incarnation of the Divine Logos first described by Eusebius of Caesarea (260/65-339/40) in *Peri theophaneias*.²⁰⁰ The vast majority of religious studies scholarship that discusses theophany (including Eliade’s work) was written in the second half of the twentieth and twenty-first century. The term is used to characterize subject matter ranging from the Old Testament historical events or prophetic visions (e.g., the burning bush) to the New Testament, where theophanies take place during rituals (nocturnal baptism and diurnal Eucharistic liturgy). Eliade’s interpretation in particular subsequently informed related scholarship on the phenomenology of sacred space, as indicated by Adrian J. Ivakhiv.²⁰¹ Although a few historians of art and architecture use it, it has not been widely adopted among historians of sacred architecture. Despite this, it is a useful term for this thesis. Over the course of centuries, Abrahamic religions have used architectural elements as tools to manifest God in sacred spaces – a purpose that is most fully conveyed through the concept of theophany.

One of the most common means of manifesting God is through artificial and natural lighting, which harkens back to the first words pronounced by God in the Bible: “Let there be light.”²⁰² Throughout Late Antiquity, Early Medieval Byzantium, and the Middle Ages in Europe

¹⁹⁹ The Editors of Encyclopædia Britannica, “Theophany” (Encyclopædia Britannica. Encyclopædia Britannica, January 23, 2015), <https://www.britannica.com/topic/theophany>.

²⁰⁰ *Patterns in Comparative Religions* (New York: Sheed & Ward, 1958).

²⁰¹ *Claiming Sacred Ground: Pilgrims and Politics at Glastonbury and Sedona* (Bloomington: Indiana University Press, 2001), 253.

²⁰² Genesis 1:3 (New International Version).

and the Near East, lighting design has consistently been used as an approach to manifest divine presence in sacred spaces. However, the application of theophany to sacred art and architecture is often in either a Christian or Jewish context. Even though all Abrahamic religions have consistently viewed light as an incarnation of divinity, theophany does not appear to be a concept commonly associated with Islamic theology or invoked in studies of Ottoman architecture. Nevertheless, I argue that theophany is as applicable to Islam as it is to Christianity and Judaism, as other scholars have asserted.²⁰³ However, unlike the vast majority of Islamic scholars who focus solely on the Qur'an as theophanic, this concept can help explain Islamic architecture and the implicit spiritual purpose that its lighting design may serve. At the Süleymaniye Mosque in particular, the inherently religiopolitical relationship (and parallels) between it and Hagia Sophia; the constant reminder of the Word of God in the form of Qur'anic inscriptions; and the plethora of light sources that evoke "Divine Light" serve as three means by which Mimar Sinan imbued the imperial mosque with theophanic qualities.

Theophany is not a mere representation or symbol of God; rather, it is a literal manifestation of God. As such, that which is theophanic is imbued with greater significance than that which is merely associated with the Divine. This is in part the reason behind the Eucharistic liturgy being one of the most important rituals in Christianity. A ritual with such theophanic potential is not readily recognized in Islam. Thus, theophany is not a common subject discussed in Islamic religious studies scholarship. Light (in its broadest sense) is the chosen form that God takes in order to appear in front of His religious followers. His manifestation as light is especially appropriate considering that one of Allah's 99 Names is *al-Nur* (English: the Light). Thus, it follows that for believers, whenever light is present (especially in a sacred space), God is present

²⁰³ For example, Seyyed Hossein Nasr states that "The central theophany of Islam, the Qur'an, is the source *par excellence* of all Islamic spirituality"; *Islamic spirituality: foundations*, vol. 19 (Routledge, 2013), xv.

as well. This may have been reason enough for Sultan Süleyman to request the manifestation of Divine Presence through architectural means. Despite the standardized view that imperial mosques were simply a manifestation of secular power, they also served as sources of religious power. Thus, the “illumination” that takes place within the Süleymaniye Mosque goes beyond the human realm (of tangible light) and enters that of the divine (of spiritual light). Whether we consider the sacred space itself or the Muslims within it to be “illuminated,” it is a combination of daylighting, artificial lighting, and calligraphy that “enlightens.” The Süleymaniye Mosque in particular demonstrates the potential of architecture to communicate more than simply its earthly magnificence (equal in grandeur to that of its client, Sultan Süleyman). If viewed through the lens of theophany, then the architecture of the Süleymaniye Mosque appears intended to bridge two realms: the earthly and the ethereal.

The Religiopolitical Intention of Clients and Architects

As a means of implicitly proclaiming their own glory by proclaiming that of God, Süleyman the Magnificent and Justinian the Great commissioned the Süleymaniye Mosque and Hagia Sophia as houses of worship. The Süleymaniye Mosque was to be a testament of Süleyman’s own magnificence as sultan. On one hand, his dedication of an enormous sum of money towards the mosque complex gave the impression of a steadfast and deep devotion to God. On the other hand, his choice of a prestigious location, expensive construction materials, and uncanny similarities with Hagia Sophia suggest that he also wanted to be remembered as an all-powerful ruler like Justinian the Great. After the Nika riots of 532, Justinian I used the re-building program of Hagia Sophia as a serendipitous circumstance to commemorate himself. Both the Süleymaniye Mosque and Hagia Sophia share an architectural element that attests to their grandeur: the “Dome of Heaven” (which is potentially due to the fact that “in the ancient Near East it already had a clear

and specific meaning... the canopy of Heaven”).²⁰⁴ Although these domes differ in scale and in material, their effect is nearly identical: to impress upon awed visitors the idea that heaven is right above them.

The Dome of Heaven is the location under which the most important rituals of both the Süleymaniye Mosque and Hagia Sophia are held. It is a reminder that the design decisions of Sinan, Anthemius of Tralles and Isidore of Miletus were made with religious beliefs in mind. In the Muslim ritual of prayer (performed five times a day) in praise of Allah, the act of surrendering is of utmost importance. This can be explained simply by the definition of Islam: “surrender [to God].”²⁰⁵ If the mosque is considered to be the house of Islam (as described by Sinan in *Tezkiret’ül-Bünyân*), then it is supposedly where a Muslim is closest to God. Although Muslims can pray in any location, prayers performed in a mosque are most respected by the religious community. Perhaps Q 24:36 purposefully serves as encouragement to Muslims to come to mosques – especially since “Allah guides to His light whom He wills” – as it asserts that His religious followers are “exalting Him within them in the morning and the evenings.”²⁰⁶ Whether or not the architects themselves were personally pious, their decisions had the tenets of the Qur’an and of the Bible in mind. Soon after the consecration of Hagia Sophia, Justinian I would lead mass with the patriarch under the eastern rim of its central dome. Clearly, the Byzantine cathedral and the Süleymaniye Mosque were considered more than simply works of art in which rituals were performed – they were strategic physical testaments to the power of supreme leaders; their

²⁰⁴ Richard Krautheimer and Slobodan Ćurčić. *Early Christian and Byzantine Architecture* (New York: Penguin Books, 1986), 229.

²⁰⁵ Jonathan Bloom and Sheila Blair, *The Grove Encyclopedia of Islamic Art and Architecture*, vol. II, “Islam” (New York: Oxford University Press), 301.

²⁰⁶ Qur’an 24:36 (Sahih International).

dedication (whether genuine or not) to God; and the resulting combined effort to demonstrate their power by “inviting” God’s presence into their commissioned buildings.

Wall Decoration as A Theophanic Tool of Architecture

One of the most significant means by which God’s presence is conveyed in the Süleymaniye Mosque and Hagia Sophia is wall decoration. This is not simply ornamentation of the interior surfaces of each building. In addition to their explicit aesthetic qualities, their respective decoration has an implicit theophanic ability. The interior of the Süleymaniye Mosque contains calligraphy that fills a plethora of roundels, cartouches and even windows. The inscriptions are taken directly from the Qur’an and, as a result, spread the message of God. The Verse of Light is one such example in the space. Above the *mihrab* is a stained-glass window (attributed to the master craftsman Sarhos Ibrahim) that contains the verse in glass rather than gold paint (*see figure 43*).²⁰⁷ In the Süleymaniye Mosque, the Word of God is either illuminated with natural daylight (in the case of windows) or in shimmering gold paint (in the case of hand-written calligraphy). Since the Süleymaniye Mosque is built in white marble, the colorful glass and the gold inscriptions gently contrast with the monochromatic structure of the building. This leads visitors’ eyes to the words of God that hover above their head, which may subconsciously lead them to contemplate the significance of the messages contained in the Qur’an.

Although Hagia Sophia appears to be encrusted in gold, there are fewer written words. Instead, the gold is the color of the mosaics. This distinction between the Süleymaniye Mosque and Hagia Sophia serves as a reminder that the latter had been built as a Byzantine cathedral. In particular, its mosaics are a testament to Christian beliefs. With depictions ranging from a seraphim

²⁰⁷ Nicholas Stone, *Symbol of Divine Light: The Lamp in Islamic Culture and Other Traditions* (Bloomington: World Wisdom, 2018), 63.

angel on a pendentive to Emperor Leo IV the Thrace (749-80) on the Imperial Gate, Sinan would not have seen the figural images that had been covered over with plaster since the fall of Constantinople. In Hagia Sophia's original design, as commissioned by Justinian I, one of the most significant decorative elements that brings about God's presence, specifically in the "form" of light, is the mosaic Jesus Christ over the imperial door of the narthex of Hagia Sophia (*see figure 44*). The representation of Jesus holds an open book in which one can decipher the words from John 8:12, "I am the Light of the world." This is only one architectural example of Jesus Christ being depicted as *Photodotis*, the "Giver of Light."²⁰⁸

Unlike Christianity, Islam prohibits sacred images, meaning "figural images" representing humans and animals as frequently seen in Christian houses of worship.²⁰⁹ Even though only images of God are prohibited in the Qur'an, specific injunctions against the making of such images are found in the hadith. This aniconic belief system means the presence of God must be conveyed more abstractly in mosques. If the Qur'an is interpreted as the faithful reproduction of the original scripture in heaven (communicated at different times to the Prophet Muhammad, who would then convey it to Muslims), then the written or recited Qur'an is identical to the uncreated and eternal Word of God.

[...] Since God did not reveal Himself nor His Image to the Prophet, He had nevertheless revealed the faithful "picture" of His Word. The representation of this Word, the Holy Qur'an, offered a meaningful substitute for the traditional human figure that represented divinity in both pagan and Christian religions and would necessarily have a divine association for all true believers.²¹⁰

As *Photodotis* looking onto visitors, the mosaic Jesus Christ spreads the message that God is Light and that (through him) he is present therein. Thus, the wall decoration in the Süleymaniye Mosque

²⁰⁸ Stone, *Symbol of Divine Light*, 19.

²⁰⁹ Erica Cruikshank Dodd and Shereen Khairallah, *The Image of the Word: A Study of Quranic Verses in Islamic Architecture*, vol. I (Beirut: American University of Beirut, 1981), 7.

²¹⁰ Dodd, *The Image of the Word*, 17.

and Hagia Sophia does not merely beautify the interior space. They underline the fact that God is present in each of these spaces – and it is due to architecture (in the general sense) that he is “seen.”

Light as A Theophanic Tool of Aniconism

The standard of aniconism is established in the Qur’an and expanded upon in the hadith, in which the rule also applies to the Prophet Muhammad. If the outlook that the Qur’an “offered a meaningful substitute for the traditional human figure” according to Erica Dodd and Shereen Khairallah is further explored, then it is possible that scriptural calligraphy in mosques could “have a divine association for all true believers.” In fact, Dodd and Khairallah compare the imagery of saints in Western European cathedrals facilitating the entry of human souls to heaven (as intermediators between them and Jesus Christ) to the verse often selected to adorn Muslim tombs, which

[...] makes it clear that for Islam there is no intercessor between God and Man on the Last Day. There is no one between the newly waking souls and God Himself, Who is Utterly Universal, Completely Competent and therefore needs no helpers. *He is not represented on the door of the mosque, but under the Dome of Heaven, and He is understood through the Image of His Word* [italics added for emphasis].²¹¹

Thus, Muslims view God via his word: the Qur’an. This is the reason why calligraphic inscriptions taken from the Qur’an is a common feature within mosques. The Süleymaniye Mosque is not included among the mosques that Dodd and Khairallah discuss. Nevertheless, like most mosques, it is filled with Qur’anic calligraphy. Despite the dome having undergone substantial changes (from monochromatic gold mosaic to a superimposed mosaic purple cross in 563), its symbolism has remained unwavering as a conceptual mediation of the divine.²¹² This role has been further reinforced with the nineteenth-century inscription of the Verse of Light at its apex. Since calligraphers write down their own version of scripture, light presents another means by which

²¹¹ Dodd, *The Image of the Word*, 65.

²¹² Krautheimer, *Early Christian and Byzantine Architecture*, 216.

God is conveyed in a space without such a high degree of mediation. The heightening of divine presence through Qur'anic inscriptions in the Süleymaniye Mosque explains in part why Sinan regarded highly the art of calligraphy as an architect.

Sacred Architecture: “Heaven” on Earth

Whether or not Muslims experience light as theophany, scholars across the centuries attest to light being the most direct representation of Divine Unity (Arabic: *tawḥīd*). As the most important concept in Islam, the first part of the *shahada* declares the belief in the oneness of God. One philosophical theory that remains particularly relevant is that of the “Nine Celestial Hierarchies.” Oana-Maria Nicuță has proposed that stained glass does not merely serve aesthetic purposes; rather it is theophanic by literally illustrating the scriptures and materializing the diaphanous. Nicuță defines the diaphanous as “a medium of low density, which allows light to come through.”²¹³ Nicuță employs Pseudo-Dionysius the Areopagite’s *On the Celestial Hierarchies* as a concrete example of the diaphanous as a medium for the manifestation of celestial hierarchies. Even though the argument that Pseudo-Dionysius the Areopagite puts forth is set in a Christian context, Nicuță’s implicit application of theophany to stained-glass windows suggests that it also may be relevant to Islam. For example, the stained-glass windows along the *qibla* wall of the Süleymaniye Mosque could materialize the diaphanous, which (in an Islamic context) would be [the Word of] God (the Qur’an).

It is within the celestial hierarchies that supposedly angels serve as the means of revelation, which Pseudo-Dionysius interprets as light from God. This light that emanates throughout space establishes a hierarchy based on “the sense of light, as pouring away from the initial spring, [which]

²¹³Oana Maria Nicuță, “Visual Litteracy [*sic*] and the Crux of the Visible: Is Stained Glass a Manifestation of the Diaphanous?” (*Anastasis: Research in Medieval Culture and Art* vol. 5, 2018), 112.

offers the possibility of regaining the relation to the original, divine light.”²¹⁴ Pseudo-Dionysius the Areopagite is a source for a second scholar, Vladimir Ivanovici. He investigates two Christian rituals (baptism and Eucharistic liturgy) held in sacred architecture during Late Antiquity to support his claim that brightness was the most important factor in the design of the space.²¹⁵ As Nicuță points out, Pseudo-Dionysius envisioned celestial hierarchies as levels of being that exhibit certain features of God in material (i.e., visible) form. Ivanovici elaborates further on this idea by emphasizing the supporting role of lighting design in rituals to convey theophany.

The amount of natural and artificial light within churches reveals a hierarchy of interior space that abides by Pseudo-Dionysius’ philosophy. In sixth-century Byzantium, mass at Hagia Sophia was split into two: a private ceremony that took place inside of the chancel and a public one that took place in the nave. Even though the Divine Liturgy was a standard service in the Eastern Orthodox Church, the Eucharistic liturgy performed in Hagia Sophia was unique since both the emperor and the patriarch took part in manifesting the presence of Jesus Christ. In Hagia Sophia, both the emperor and the clergy met below the eastern rim of the Dome of Heaven to perform their respective roles. This location is significant in reinforcing the relationship between the “two halves of God” – the patriarch and the emperor, who reflected the religious and secular aspects (of power and justice) of the Godhead.²¹⁶ According to the nine celestial hierarchies, the patriarch (hierarchy) is closest to the angels and thus has the honor and responsibility (with the assistance of the clergy) to evoke the image of the invisible world that centers around the divinity. The emperor, on the other hand, had his assigned place in the celestial hierarchy as mirrored on

²¹⁴ Nicuță, “Visual Litteracy [*sic*] and the Crux of the Visible,” 115.

²¹⁵ *Manipulating Theophany: Light and Ritual in North Adriatic Architecture (ca. 400-ca. 800)* (Berlin: Walter de Gruyter GmbH & Co KG, 2016).

²¹⁶ Krautheimer, *Early Christian and Byzantine Architecture*, 218.

earth, considered equal to (if not greater than) the apostles.²¹⁷ Since light levels range from the aisles being the darkest and the nave being the lightest, it is of no surprise that the common people would be in the aisles – able to see the light and the colors emanating from the nave, but unable to interact with it. This is a physical representation of the celestial hierarchy, wherein the light of the Divinity emanated from the center of heaven (the dome) and spread to the angels, patriarch, clergy, and then to the emperor (Justinian I).²¹⁸

Ivanovici lists a number of revelatory functions that light exhibits in Eucharistic liturgy. In general, light simultaneously gave the sacred architecture an aura and reaffirmed the sanctity of the bishop through a selective process of positioning apertures and choosing materials and colors that would interact with both natural and artificial lighting. The elaborate artificial lighting system of Hagia Sophia included huge circular rings – supporting hundreds of glass oil lamps – suspended from the dome. Although none of the original lighting system survives, Maria Luigia Fobelli points out certain details taken from Paul the Silentiary's *ekphrasis* (descriptive poem) written in 563: the bronze chains suspended above the worshippers' heads and polycandela in circular, cruciform, and polygonal shapes.²¹⁹ Consequently, Justinian I's Hagia Sophia undoubtedly served as the technical source of inspiration for Ottoman imperial mosques (such as Süleyman's imperial mosque), which were built with tall wide-spanning domes. As seen in the Süleymaniye Mosque, larger polycandelon-type devices (without a monumental ornamental treatment) were used, consisting of giant metal frameworks that supported a myriad of glass receptacles suspended from its domes (a short distance above human height). Irrespective of their size, their slender metal profiles and their respective supporting chains form a filigree web that appears unobtrusive

²¹⁷ Ibid.

²¹⁸ Krautheimer, *Early Christian and Byzantine Architecture*, 219.

²¹⁹ The polycandela were apparently still in use until 1847, as shown by chromo-lithography from that period; Stone, *Symbol of Divine Light*, 73-4.

underneath.²²⁰ The polycandela of both the Süleymaniye Mosque and Hagia Sophia demonstrate how architecture and their architectural elements (including the individual components of a luminaire) can aid in the expression of God by shaping His light.

Mosque Lamps: “Hanging Ornaments”

I noticed during my site visits that not all of the luminaires that hang from the polycandela of the Süleymaniye Mosque and Hagia Sophia are turned on. In fact, it appeared that nearly half of the luminaires in the Süleymaniye Mosque were turned off. Since the main activities taking place in the mosque do not require a substantial amount of light, the limited luminance levels provide enough light for reading the Qur’an, praying as an observant, or admiring as an observer. There appears to be a consensus among scholars that even if mosque lamps do not always serve a functional purpose by providing “tangible” light within mosques, they perpetually serve a symbolic one as “hanging ornaments.” This is due to the fact that the Verse of Light is one of the few instances wherein a direct reference to a quasi-architectural element as a symbol is made in the Qur’an. As a result, Islamic architecture has taken advantage of this rare opportunity for visual expression.²²¹ According to Jean-Louis Michon,

The “Verse of Light” is one [verse] whose symbolic imagery has never ceased to feed the imagination of Muslim artists. The verse alone, over and above any reference to historic “loans,” explains why the niche, in the form of the mihrab, has been adopted to indicate the direction of Mecca and mark the locus of the mosque.²²²

In accordance with the intended meaning behind the Verse of Light, Michon adds that a lamp is typically hung in front of the *mihrab* to reinforce its symbolism. In some cases, the lamp is depicted naturalistically with details (e.g., suspension chains) that imitate the form of actual lamps. In other

²²⁰ Stone, *Symbol of Divine Light*, 101.

²²¹ Stone, *Symbol of Divine Light*, 121.

²²² Jean-Louis Michon, *Introduction to Traditional Islam: Illustrated* (Bloomington, IN: World Wisdom, 2008), 72 as cited by Stone, *Symbol of Divine Light*, 63.

cases, the lamp is represented in a more stylized fashion.²²³ If the motif of the lamp within a niche is viewed with the hanging ornament in isolation, it may hardly even be recognizable as a lamp. The ornament may take on the form of an arabesque motif, which was often the case on Ottoman *mihrahs*. However, if the motif is viewed in its entirety (with the surrounding arch), then it is recognizable as a symbolic representation of the lamp within the niche and a reminder of the Verse of Light.²²⁴

The *mihrab*, according to Vincenzo Strika, could symbolically represent a gate to paradise.²²⁵ If one were to take a step back (literally), one could interpret certain mosque facades as *qiblas* and their doorway(s) as a *mihrab*. Doorways and *mihrahs* seem to be generally recognized in Islamic architecture as the canvas for spiritually significant calligraphic messages.²²⁶ This has already been noted at the Süleymaniye Mosque; however, the tomb of Süleyman located right behind the *mihrab* further reinforces his religiopolitical intention and the celestial hierarchy. Additionally, visuals can further accentuate the *mihrab*'s message. For example, the standard decoration of a lamp suspended from the crown of the *mihrab*'s arch was often seen in tandem with the calligraphic inscriptions of Q 24:35-6. The combination of the *mihrab*, lamp, and inscriptions united physical and spiritual illumination. In fact, this would still stand as a metaphor of spiritual illumination without the Qur'anic inscriptions, due to the ability of religious iconography to communicate via visual rather than verbal cues.²²⁷

In terms of verbal cues, most Qur'anic quotes are located arbitrarily within mosques.²²⁸ The Verse of Light seems to be an exception; however, since it is typically found along the *qibla*

²²³ Stone, *Symbol of Divine Light*, 147.

²²⁴ Ibid.

²²⁵ Hillenbrand, *Studies in Medieval Islamic Architecture*, 324-5.

²²⁶ Hillenbrand, *Studies in Medieval Islamic Architecture*, 325.

²²⁷ Hillenbrand, *Studies in Medieval Islamic Architecture*, 324.

²²⁸ According to *The Image of the Word*.

wall. This is the case in the Süleymaniye Mosque, as well as in many Egyptian mosques. One of the imperial mosque's precedents, the Mosque-Madrasa of Sultan Hasan (1356-63), is an apt example. The Verse of Light is written right above the *mihrab* (see figures 45, 46) – reinforcing the belief that Allah is the Light of the heavens and the earth as Muslims pray towards Mecca.²²⁹ Even though excerpts from the Qur'an (in the form of inscriptions) are typically too high above the ground in mosques for visitors to decipher them, most Muslims can recognize certain words that then trigger the memory of a *surah*.²³⁰ Thus, to copy the Qur'an was seen as an act of merit performed by Muslims who sought to become high-status calligraphers or by sultans who sought to reaffirm their "special connection" with Allah.²³¹

The Divine Role of Light Within Man-Made Mosques

Islamic beliefs have associated God with light since their very beginnings. Even though modern lamps differ from the mosque lamps used during the time of the Prophet Muhammad, they still serve as a reminder of Islamic tenets related to light. According to Charles Simon Clermont-Ganneau, the lamp described in the Verse of Light is a type that the Prophet Muhammad had seen with his own eyes or had described to him by someone who had.²³² The latter situation seems to make the most sense considering that the type of lamp described (a glass container filled with oil and a floating wick) would not have been found in Mecca or Medina. At that time, mosques were illuminated at night by burning palm fronds as torches. As larger and more complex lighting devices became the preferred means of illumination (in order to provide higher levels of lighting in mosques), the mosque lamps developed away from the *qandil* type described in the Verse of

²²⁹ Dodd, *The Image of the Word*, 51.

²³⁰ Hillenbrand, *Studies in Medieval Islamic Architecture*, 257.

²³¹ Hillenbrand, *Studies in Medieval Islamic Architecture*, 267.

²³² Stone, *Symbol of Divine Light*, 74.

Light. Nevertheless, that same form remained in use – less as a functional lighting device and more as a physical “literary device” (metaphor). One particular hadith makes the explicit connection between the light of God and an actual lamp for the first time. In it, the Prophet Muhammad praises Tamim al-Dari for bringing lamps to provide illumination in the mosque. His words “you have illuminated Islam, may Allah enlighten your path” insinuates that mosque lamps do not only fulfil a practical requirement; they recall how on the macrocosmic plane the Divine Intellect illuminates every level of the transcendent and manifested orders, while on the microcosmic plane it illuminates the heart as God leads man on the path of enlightenment. Thus, the mosque lamp demonstrates how a symbol has the potential to communicate higher truths.²³³

The importance of mosque lamps in Islam is clear due to their constant appearance in miniature paintings and illuminated manuscripts. Al-Hariri's *Maqamat* (1240) is an example of a miniature painting that shows the tendency for graphic representation to be stylistic in character.²³⁴ It is precisely for this reason that these paintings are of interest: they show how the mosque lamp was conceptualized in its essential form. Most are represented with a round elliptical body, a flaring, funnel-shaped neck and base, and suspension chains. This form is also seen in the representations of mosque lamps in architectural decorations. There are only a couple of surviving examples of early lamps that can provide information regarding the material from which they were made and their form. The lattermost description is rarely provided by historical accounts. Although historical manuscripts in which lamps are represented could potentially compensate for this lack of knowledge, they rarely depict lamps in realistic detail. The earliest (and most note-worthy) example of a historical manuscript in which lamps are represented is an early eighth-century illuminated parchment Qur'an. It was most likely produced in the Umayyad court of Damascus

²³³ Stone, *Symbol of Divine Light*, 149-50.

²³⁴ Stone, *Symbol of Divine Light*, 110-11.

and discovered in 1972 during restoration works in the Great Mosque in Sana'a, Yemen.²³⁵ Its illuminated frontispiece has one of the earliest surviving depictions of mosque lamps. The images in the manuscript (known as the "Great Umayyad Qur'an") appear to represent multi-storied, arcaded facades (*see figure 47*). However, Hans-Caspar Graf von Bothmer argues that it is in fact a plan view of the architecture, onto which the arcades are projected.²³⁶ Thus, the arched form at the top of the first pictorial representation of a mosque represents the plan of the *mihrab* niche, in which the lamp is emphasized. This manuscript provides valuable insight into the form of the earliest mosque lamps since it originated from the first Islamic century and is thus historically close to the revelation of the Verse of Light.

If Light Is God, Then Architecture Is His Lamp

In the chapter "The Alchemy of Light," Titus Burckhardt explains that Muslim artists and architects seek to manipulate light in accordance with its representational role as Divine Unity on earth. This Islamic belief has motivated creative individuals to use colors (in the stained-glass windows of the Süleymaniye Mosque) to reveal the inherent nature of light.

In the spiritual order, alchemy is none other than the art of transmuting bodily consciousness into spirit: "body must be made spirit," says the alchemists, "for spirit to become body." By analogy, one can say of Muslim architecture that it transforms stone into light, which in its turn is transformed into crystals.²³⁷

That being said, architecture is an "illustration" and the Qur'an is the "Text." The text on Islamic art and architecture serves to illuminate the world of God's handiwork, the world of "real" images.²³⁸ Another way of interpreting this reality is that since architectural forms are creations of

²³⁵ Stone, *Symbol of Divine Light*, 109.

²³⁶ Hans-Caspar Graf von Bothmer, "Architekturbilder im Koran: Eine Prachthandschrift der Umayyadenzeit aus dem Yemen," in *Pantheon* 45 (1987), 4-20 as cited by Stone, *Symbol of Divine Light*, 109.

²³⁷ Titus Burckhardt, *Art of Islam, Language and Meaning*, Commemorative Edition (Bloomington: World Wisdom, 2009), 84.

²³⁸ Dodd, *The Image of the Word*, 73.

God, it is the Qur'an that reveals them to the world.²³⁹ From the Islamic perspective, architecture does not exist as an enclosure within the world, but as a part of the world. Each work of architecture is decorated in a specific manner that reveals its use and the use is described in its decoration, which typically comprises of Qur'anic verses. Thus, there is a discrete relationship between text and image – the former supplies an explanation and purpose to the latter. The “text” and the “image” are one in reality – one creation of God.²⁴⁰

From the messages spread by the Qur'an to the intentional design decisions made by architects, mosques are not only buildings designated for prayer. They are houses of worship, wherein visitors are welcomed in and asked to meet the host: God. Although He may not appear as most hosts do (i.e., in human form), His presence is known in other ways – His word as recounted by His messenger and then spread by Muslim calligraphers and His aura as felt in the warm sunlight or in the warm white light emanating by the polycandela.²⁴¹ Whether the Verse of Light is interpreted literally or figuratively, the Süleymaniye Mosque attests to its importance to its authors (both client and architect). The imperial mosque contains both the written word and the essence of the word. Whether this essence is interpreted as tangible (visual) or intangible (spiritual) illumination, at least one conclusion can be reached: the Süleymaniye Mosque was designed to be a theophanic instrument. The agency of both Sultan Süleyman and Mimar Sinan enabled the imperial mosque to successfully use this special skill. This skill enabled the Süleymaniye Mosque to be greater than an architectural masterpiece. It successfully spread the message that Süleyman was a wealthy individual in both the material and spiritual sense (as a “chosen one” of God's

²³⁹ Dodd, *The Image of the Word*, 88-9.

²⁴⁰ Dodd, *The Image of the Word*, 89.

²⁴¹ Both the Süleymaniye Mosque and Hagia Sophia are oriented in such a way that their *qibla* wall (apse) is aligned with the sun at high noon. In the case of the former, the stained-glass window that contains the Verse of Light will be flooded with light at the most important prayer time of the day.

blessings). In order to do so, Sinan strategically used architectural elements as rhetoric. Even though the Süleymaniye Mosque's "Dome of Heaven" took inspiration from a Byzantine cathedral, Sinan took advantage of whatever architectural means he had to imbue the interior with earthly light in order to bring about ethereal Light. The client's request for a religious monument that would attest to his political success and the architect's ability to satisfy his request with a monumental building that recalls the celestial hierarchy (consequentially placing the sultan on a similar level to God), granted the Süleymaniye Mosque the ability to bridge the gap between the earthly and the ethereal realms.

Catalogue of Figures

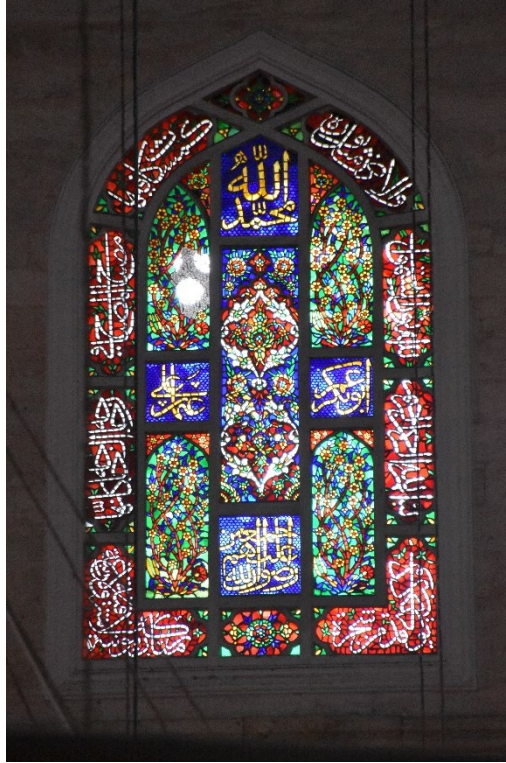


Fig. 43. Stained-glass window with an excerpt from the Verse of Light above the mihrab of the Süleymaniye Mosque.

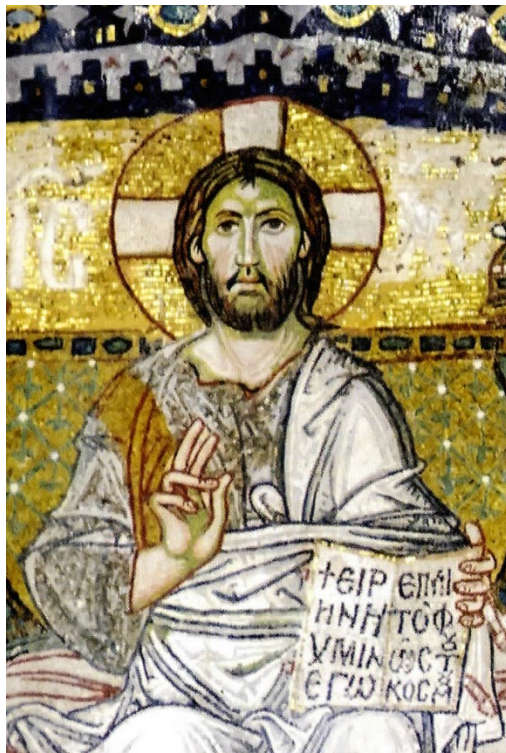


Fig. 44. Mosaic of Jesus Christ as Photodotis above the Imperial Gate of Hagia Sophia.

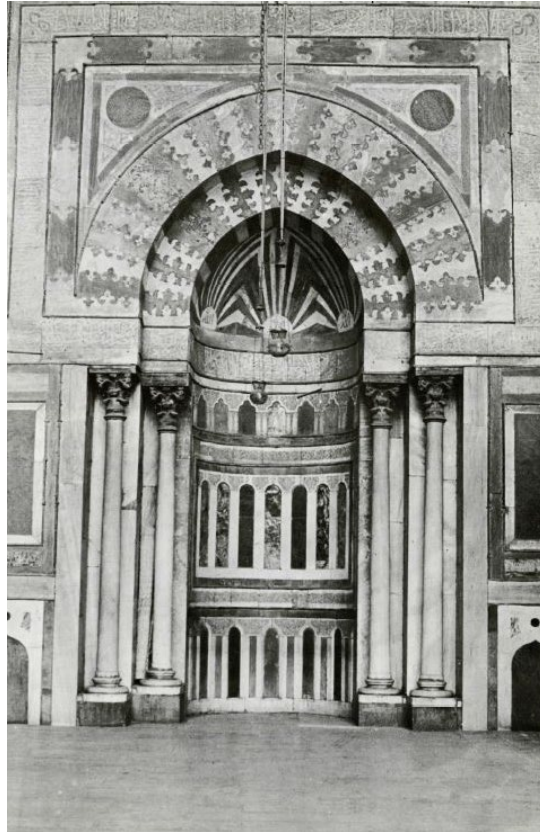


Fig. 45. Mihrab at the Madrasa Sultan Hasan.



Fig. 46. Mihrab detail at the Madrasa Sultan Hasan.



Fig. 47. Frontispiece of the eighth-century "Great Umayyad Qur'an" found at the Great Mosque.

BIBLIOGRAPHY

- “Ambient Lighting.” *Illuminating Engineering Society*. Illuminating Engineering Society, July 5, 2018. <https://www.ies.org/definitions/ambient-lighting/>.
- Arab, Yasser and Ahmad Sanusi Hassan. “Daylight Performance of Single Pendentive Mosque Design During Winter Solstice.” *American Journal of Environmental Sciences* vol. 9 (2013): 25-32.
- Arel, H.Ş. and M. Öner. “Use of Daylight in Mosques: Meaning and Practice in Three Different Cases.” *International Journal of Heritage Architecture* vol. 1 (2017): 421-29.
- Atilgan, Lale Erdem and Mustafa Berker Yurtseven. “Thermal Design of an LED System: A Special Lantern for Turkish Historical Mosques.” *Light & Engineering* vol. 25 (2017): 30-41.
- Atilgan, Lale Erdem and D. Enarun. “A case study of lighting Turkish historic mosques using LEDs: Semsi Ahmet Pasha Mosque.” *Lighting Research & Technology* vol. 50 (2018): 894-910.
- Belakehal, Azeddine, Kheira Tabet Aoul, and Abdallah Farhi. “Daylight as a Design Strategy in the Ottoman Mosques of Tunisia and Algeria.” *International Journal of Architectural Heritage* vol. 10 (2016): 688-703.
- Bianchini, Carlo, Alfonso Ippolito, and Luca J Senatore. “The Wooden Models of the Vatican Basilica by Antonio Da Sangallo and Michelangelo: Survey, Modelling and Interpretation.” In *Digital Wood Design: Innovative Techniques of Representation in Architectural Design*, 321–42. Cham: Springer, 2019.
- Bloom, Jonathan and Sheila Blair. *The Grove Encyclopedia of Islamic Art and Architecture*, 3 vol. New York, NY: Oxford University Press, 2009.

- Bordewich, Fergus M. "A Monumental Struggle to Preserve Hagia Sophia." *Smithsonian.com*, December 2008. <https://www.smithsonianmag.com/travel/a-monumental-struggle-to-preserve-hagia-sophia-92038218/>.
- Böwering, Gerhard. "The Light Verse: Qur'ānic Text and Sūfī Interpretation." *Oriens* vol. 36 (2001): 113-44.
- Çelebi, Sâi Mustafa. *Book of Buildings: Tezkiretü'l-Bünyan and Tezkiretü'l-Ebniye*. Istanbul: Koçbank A.Ş, 2002.
- Dodd, Erica Cruikshank and Shereen Khairallah. *The Image of the Word: A Study of Quranic Verses in Islamic Architecture*, vol. I. Beirut: American University of Beirut, 1981.
- Eliade, Mircea. *Patterns in Comparative Religions*. New York: Sheed & Ward, 1958.
- Flynn, John E., Clyde Hendrick, Terry Spencer, and Osyp Martyniuk. "A guide to methodology procedures for measuring subjective impressions in lighting." *Journal of the Illuminating Engineering Society* vol. 8, no. 2 (1979): 95-110.
- Frommel, Christoph L. "San Pietro." In *The Renaissance from Brunelleschi to Michelangelo : the representation of architecture*. New York: Rizzoli (1994).
- Kuban, Doğan. "The Style of Sinan's Domed Structures." *Muqarnas* vol. 4 (1987): 72-97.
- Hakim, Negar. "Mosque Architecture Past and Present." In *Sacred Buildings: A Design Manual*. Basel/Berlin/Boston: Walter de Gruyter GmbH, 2008.
- Hassan, Ahmad S. and Spahic Omer, *From Anatolia to Bosnia: Perspective on Pendentive Dome Mosque Architecture*. Pulau Pinang: Penerbit Universiti Sains Malaysia, 2012.
- Hermansen, Marcia K. "The Prophet Muhammed in Sufi Interpretations of the Light Verse (Aya Nur 24:35)," *Islamic Quarterly* vol. 42 (1998): 144-55.

- Hillenbrand, Robert. *Studies in Medieval Islamic Architecture: Volume I*. London: The Pindar Press, 2001.
- Hillenbrand, Robert. *Islamic Architecture: Form, function and meaning*. Edinburgh: Edinburgh University Press, 1994.
- Ivakhiv, Adrian J. *Claiming Sacred Ground: Pilgrims and Politics at Glastonbury and Sedona*. Bloomington: Indiana University Press, 2001.
- Ivanovici, Vladimir. *Manipulating Theophany: Light and Ritual in North Adriatic Architecture (ca. 400-ca. 800)*. Berlin: Walter de Gruyter GmbH & Co KG, 2016.
- Kortan, Enis. *Le Corbusier: Turkish Architecture and Urbanism Through the Eyes of L.C.* Istanbul: Boyut Kitaplari, 2005.
- Krautheimer, Richard and Slobodan Ćurčić. *Early Christian and Byzantine Architecture*. New York: Penguin Books, 1986.
- Kreuz, Eva-Maria. "Light in Sacred Buildings." In *Sacred Buildings: A Design Manual*. Basel/Berlin/Boston: Walter de Gruyter GmbH, 2008.
- Major, Mark and Anthony Tischhauser. *Made of Light: The Art of Light and Architecture*. Basel: Birkhäuser, 2005.
- Mohamed, Mostapha Thabit. "The Metaphor of Nature in the Holy Qur'an: A Critical Metaphor Analysis." *Language in India* vol. 12 (2012): 628-53.
- Nasr, Seyyed Hossein. *Islamic spirituality: foundations*, vol. 19. London: Routledge, 2013.
- Necipoğlu, Gülru. *The Age of Sinan: Architectural Culture in the Ottoman Empire*. Princeton: Princeton University Press, 2005.

- Nicuță, Oana Maria. "Visual Litteracy [*sic*] and the Crux of the Visible: Is Stained Glass a Manifestation of the Diaphanous?" *Anastasis: Research in Medieval Culture and Art* vol. 5 (2018): 110-29.
- Osseman, Dick. *Wikimedia Commons*. Wikimedia Foundation, December 8, 2008. https://upload.wikimedia.org/wikipedia/commons/0/0c/Edirne_Uc_Serefeli_6026.jpg.
- Ribichini, Luca. "I Modelli. Storie Di Diverse Vicende e Realizzazioni / The Fortunes and History of Model." *Disegnare: Idee Immagini / Ideas Images*, no. 34 (2007): 50–61.
- Stierlin, Anne and Henri Stierlin. *Turkey, from the Selçuks to the Ottomans*. Köln: Taschen (1998).
- Stone, Nicholas, *Symbol of Divine Light: The Lamp in Islamic Culture and Other Traditions*. Bloomington: World Wisdom (2018).
- The Editors of Encyclopædia Britannica. "Theophany." *Encyclopædia Britannica*. Encyclopædia Britannica, January 23, 2015, <https://www.britannica.com/topic/theophany>.
- Yükçü, Süleyman, Yılmaz İçerli, and Canan Yükçü. "Construction of Süleymaniye Mosque in Istanbul and Cost Accounting (1550-1557)." *Birinci Balkan Ülkeleri Muhasebe ve Denetim Konferansı* (2007).
- Wenzel, Fritz. "Investigations into the construction and repair history of the Hagia Sophia." *Construction History* vol. 25 (2010): 1-20.