LIGHTING AND SPATIAL STRUCTURE IN RELIGIOUS ARCHITECTURE:
a comparative study of a Byzantine church and an early Ottoman mosque in the city of Thessaloniki

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Abstract

Since the first cultures, light has had a symbolic role directly related to the sacred, religious and cosmologic beliefs. In turn, this role is apparent in the religious buildings taking a leading part in the creation of worshipping and aesthetic forms of a religion. Yet light is an influential factor not only in the spiritual relation between the believers and the religion but also in the spatial relation between the believers and the building. Spatial structures construct the religious environment while light re-constructs the religious experience.

This paper investigates and compares the relation between the spatial structure and the lighting in Early Ottoman mosques and Byzantine churches. A general study exploring the meaning and role of light in Muslim and Christian Orthodox religion is performed followed by a research on the Byzantine and Ottoman religious architecture. The city of Thessaloniki is chosen as a place where both cultures and religions have met and interacted; two examples, the Byzantine church of Holy Apostles and the Alaca Imaret mosque, are used in order to investigate the spatial structures and lighting in detail, define the relations and identify differences and similarities.

Apart from the different religion in Ottoman and Byzantine culture there are great similarities that involve building types, materials and construction techniques. In many ways some of the Byzantine characteristics are considered to have evolved through Ottoman culture while Early Ottoman religious architecture reflects the balancing of traditional Orthodox themes with the Anatolian and Muslim tradition in the city of Thessaloniki. Yet after all the coexistence and the similar architectural features and techniques, there are still differences in the overall spatial structure and lit appearance of the space that arise from the different forms, essence and rituals of each religion.

Introduction

Throughout history of religion, light's symbolic role has been related to the sacred, religious and cosmologic beliefs or even to gender [i]. The sun was viewed as the supreme celestial body, often thought of as a deity, and was vested with cosmic powers of sacred nature. The Egyptians linked the sun with a god, the god Ra, creator of the universe. The sun was thought to be Ra's eye, the source of all life and creation. Light was also given great significance in the early

Jewish beliefs that formed the basis for modern Judaism, Christianity and Islam. In the Bible light was introduced on the first day of creation. In the ancient Greek civilisation light appeared both in legend with Daedelus and Icarus and in religion with Helios and Apollo.

Consequently, light has profoundly affected the design of buildings destined to house religious activities as most ancient cultures tried to incorporate in the design of their most representative buildings their own cosmologic beliefs. In ancient Egypt the orientation, the sanctuary and processional paths were designed according to the movement of the sunlight. The temples of ancient Greece were orientated towards the east to relate directly to the first light of the day. The Romans, the first to consciously design interior space, used light in their temples to enhance and articulate space. From the medieval monasteries to the Gothic temple, light was employed as the medium through which the representation of heaven was given a temporal earthly reading (Krautheimer, 1986).

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In each culture, the religious buildings reflect the fundamental ideas about the cosmos, the nature of gods and the way the creation is viewed. Light has been used not only to provide the necessary visual condition for the religious acts to be performed but also to evoke mystical and spiritual feelings and strengthen the belief. As a result, the main differences in the lighting of religious buildings arise from the different spiritual content, beliefs and rituals of each religion.

Christian Orthodox Religion

In the orthodox dogma, light has been treated as the materialised representation of the divine. It is directly related to the presence of the Holy Spirit, while Jesus Christ is thought to be self-luminous and constitutes the “real light” and the eternal truth of the world. The internal uplift of the believers can be achieved only by their “enlightenment”. In the Byzantine psalms and hymns the relation between God and light is present while the sun and the light are not God but the closest symbols to the deity (Prokopiou 1981, p.65).

Orthodox religion created forms according to the need for meditation and concentration of the believers. This fact was the determinant factor since the first orthodox religious buildings and therefore a symbolic character was given to the structural materials, forms and light. In the Byzantine churches the role of light has been important in the emphasis of the building’s religious character. Light is used to represent a positive power. Triantafyllides (1964, p.5) argues that “the believers entering the church will look towards the light and will feel the presence of God towards its direction”. According to Humphrey and Vitebsky (1997), the basic cross design of the church obtained an elaborate symbolism. The movement from west to east represents a movement from the less sacred to the highly sanctified space, from the less bright to the heavenly bright.

Light levels in churches are mostly related to the creation of an environment where the worshipper can fulfil his religious needs and feel the essence of the religion, rather than to regular visual comfort objectives. According to Unver and Enarun (1999) the following table presents proposed light quantity and quality for churches in general.

The main liturgy hours are also linked with the sunrise and sunset hour. At those hours, light shafts penetrate the interior and provide the intended visual appearance of the space. At those hours, the sun is low in the sky and the modifications of the light patterns in the interior occur in a quicker way due to the low angle. Due to the constant orientation of the Byzantine churches, Triantafyllides (1964, p.5) considers those affects “important and of general application”.

Action-Place	Quantity		Quality		
	Illuminance lm/m^2	Position	Illuminance Distribution	Colour of Light	Direction, Shadows
Desk	100-200	Horizontal	General	Warm-white	Diffuse, Shadowless
Altar	300	Vertical/Horizontal	Local	Warm-white	Diffuse, Shadowless
Pulpit	300	Vertical/Horizontal	Local	Warm-white	Diffuse, Shadowless

Table 1:

Quality and quantity of illumination in churches

In the Byzantine religious architecture, there seemed to be certain rules in the use of daylight. The sunlight penetration in the interior and the solemn impression on the worshippers seems to have arranged the plan of the buildings. The movement of daylight during the liturgy defined the main axis of the building's plan. The second vertical axis of guided light defined the position of the image representing the deity (Potamianos 2000, p.162). It should be further noted that in the domed Byzantine churches light is engaged in order to motivate people proceed from the entrance of the temple to the Agio Bima. According to Kalligas (1946), the whole aesthetic impression of the Byzantine church was based on that movement from the entrance through the narthex to the centre of the church. The transition takes place from the bright exterior to the well-lit first zone interior. From there, there is a reduction in the lighting levels until the light from the dome appears and leads people to the bright space underneath it. This transition is also enhanced by the subtle lit side zones that seem present but yet not capital [ii].

The careful designed transitions of the interior of the domed Byzantine church result in the perception of a much higher than measured illumination. A characteristic example is the difference in light levels in the interior of the basilica and the domed Byzantine church. Comparing the light levels in a basilica type and a domed Byzantine church (Triantafyllides 1964), the levels at the centre of the basilica are higher than under the dome of the Byzantine church. Yet there is the misleading impression that the lighting levels are higher under the dome than at the centre of basilica.

Apart from the domes, the main illuminating sources were the windows arranged on the sidewalls. Windows are arranged in zones and are generally small while those arranged at eye level are often covered with screening materials or perforated elements, this way minimising the relationship between interior and exterior. Stained glasses are often used in the windows to colour the daylight and strengthen the mystical atmosphere.

According to Potamianos (2000), three seem to be the major phenomena on the interior of Byzantine churches. The first phenomenon constitute of rays of light that fall onto the altar in the morning, lighting the presents the moment they are dedicated to God. The large cathedrals and their east openings of the sanctuary are orientated in a way that rays fall on the altar at several times over a year and especially in the morning of the equinox. Churches, which are dedicated to a saint or are supposed to function once or twice a year, are orientated in a way to receive rays in the middle of the morning of those special celebrating days. The second phenomenon is the lighting on the top of the interior of the central dome that appears shining through the image of the Christ, which is the most common theme of the painting of the dome. In contrast with the previous phenomenon that is temporary, this phenomenon lasts throughout the day as windows all around the dome highlight its top.

The third phenomenon is the rays of light coming through the dome's windows with the constantly changing patterns that light the interior of the church. This phenomenon resembles a sundial where its regular shade is replaced by a spot of light. In its track, the light highlights paintings and mosaics of the interior. Major paintings are set in a way to be lit throughout the year, while other less important are lit less often.

Church of Holy Apostles

The church of Holy Apostles [FIG 1] is the katholikon of an older monastery situated in the city of Thessaloniki and serving the religious needs of its immediate neighbourhood. The church was built around 1312-1315 and was converted into a mosque shortly after the ottoman capture of the city. During the 20th century restorative works gave the monument its contemporary form.

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Figure 1:

The church of Holy Apostles

From an architectural point of view, it belongs to the late Byzantine architecture. The characteristics of the building closely resemble the churches built in Constantinople and it is considered as a product of Constantinopolitan workmen, especially as far as it concerns the decoration of the interior with elegant mosaic and fresco cycles. Although it was converted into a mosque during the years of Turkish administration, the church of Holy Apostles remained a landmark in the city of Thessaloniki. The church is located in a crowded residential neighbourhood in the western part of the city, set within a small plateia. The surroundings are composed by box-like 20th century blocks of flats that contrast with the finely articulated masses and contours of the Byzantine church.

The church is orientated with its main axis east west, as Christian churches, to capture the first light of the day at the sanctuary area [FIG 2]. Further research by Potamianos (2000) argues that the axis is orientated towards the east but with a slight turn in order to capture the morning light at the day of the celebration of the church, e.g. the day of the celebration of the saint to whom the church was dedicated. The church of Holy Apostles was originally dedicated to the Holy Mary and is orientated towards the day of the celebration of the Assumption (15th of August), 112º degrees North, in a way that the left pilaster of the central window is in line with the altar on the 15th of August 1313.

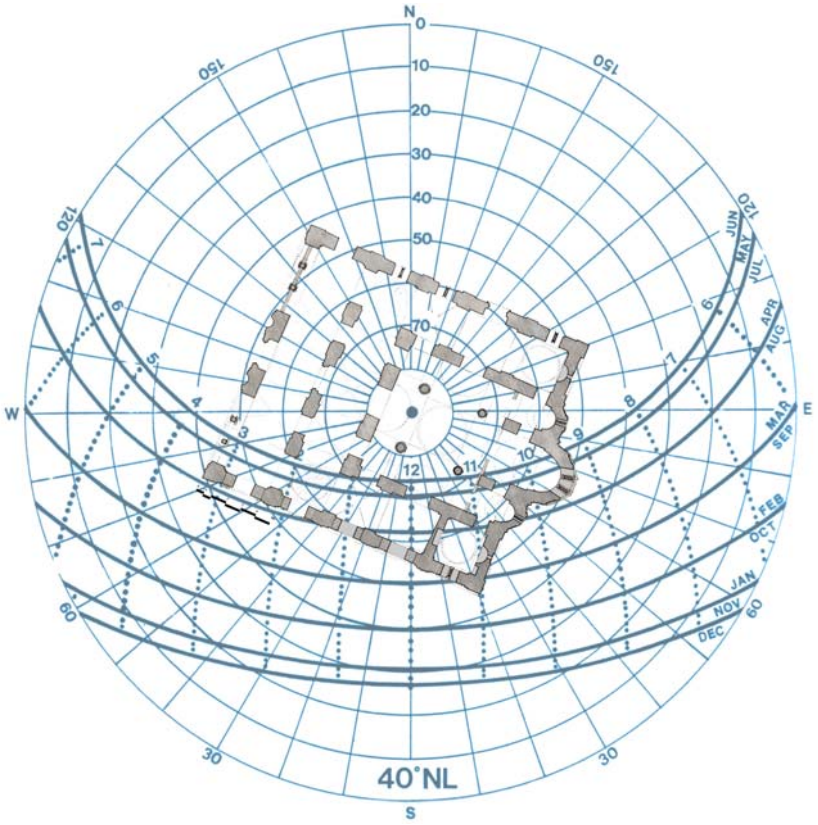

Figure 2:

The sunpath diagram overlaid on the plan of the church

The church is of the complex five-domed cross-in square type. In plan it is almost square (17.6-18*19.3m) and it is constituted by the naos, a triconch sanctuary in the east, an esonarthex, an exonarthex to the west, lateral ambulatory wings and terminal lateral chapels. The central naos defines a tall cruciform-like volume illuminated by broad tympanum windows and crowned by a tall central dome that dominates the whole composition. Four domes diminutive versions of the central one cover the corners of the building. These five, in total, domes dominate the external appearance of the building and reflect the predominantly vertical proportions of the interior. All domes are of a regional variety the “thessalonikian type”, with elongated recessed windows piercing each drum of the domes.

Doors, windows and arches are formed on projecting and recessed planes are executed in an alternation of brick and stone. Small windows are arranged on the sidewalls often covered with perforated screens. The decoration of the interior is a combination of mosaics (on the upper part of the walls) and wall paintings (on the lower part) that result in low reflectance walls. Enclosed and private in its interior, the church is richly ornamented. A broad variety of stone, dressed lime stock blocks and fieldstone mixed with brick have been used to form the external appearance of the building.

Illuminance levels are relatively low except from the altar region during sunrise and the area around the sidewall openings, while illuminance distribution is not uniform. Yet the lighting levels of the interior follow the architecture of the space. The architectural arrangement in zones goes with the illuminance distribution, which is arranged in similar zones. Daylight levels are generally low because the windows are placed on the sidewalls and the dome lighting is not enough to increase the illuminance levels.

The visual relationship between the interior and the exterior is minimized by the arrangement of small openings and windows on higher that eye levels. In the central areas of the interior, daylight is

diffuse and relatively shadowless, yet off the centre of the church, sunlight penetration rejuvenates the space, creates interesting patterns and constitutes the liaison with the outside world.

Lighting conditions in the interior of the church, in combination with the building form, the wall paintings and decoration create an atmosphere that fits the orthodox rituals. In many areas, light has a revealing role, while in others, the lack of light and the darkness evoke mystical feelings and expectation of disclosure. As the liturgy proceeds, the combination of sound, light and architecture evoke mystical feelings and devoutness.

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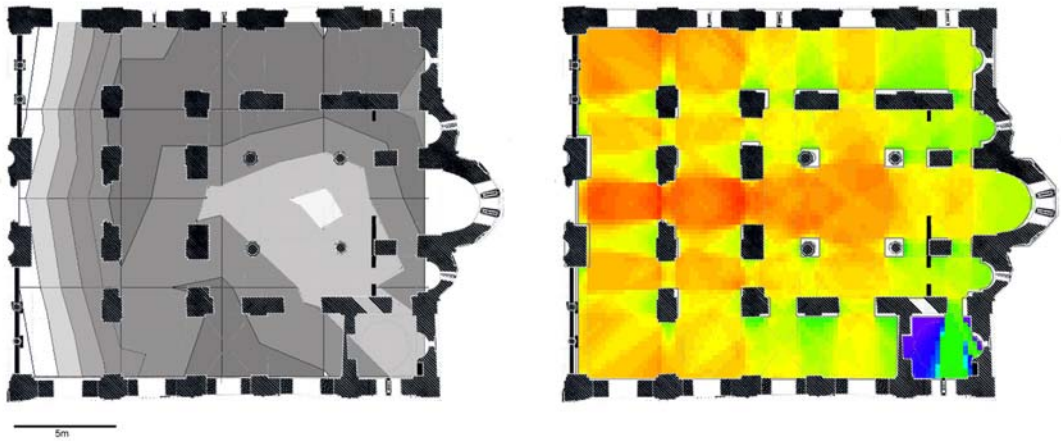
In terms of spatial analysis, the interior of the church is rather complex with a clear distinction between the different parts. The focus is on the main axis formed between the entrance and the sanctuary to the east. The visual integration analysis using Turner's Depthmap software [FIG 3] shows that although the most visually integrated area is the central part of the esonarthex, the area under the main dome is well integrated too. When comparing lighting levels to the spatial measures, the central area of the esonarthex is one of the least well lit areas of the building in contrast with the area under the dome which is one of the best lit. As a result, visitors standing in the most visually privileged area, have direct view of the high illuminance area under the central dome, serving the processional movement from the outside to the inside of the church.

Figure 3:

Lighting levels & Visual integration in the interior of the Holy Apostles church



When moving along the main axis of the church, the first transition from the exterior to the exonarthex occurs with a decrease in the light levels, providing a gentle transition from the exterior to the interior of the church. From there, moving towards the interior, there is another decrease followed by a rapid increase when moving towards the central dome, where the lighting levels are at the highest point. It can be argued that after entering the church, through the transition space of the narthex, the subject is adapted to the less lit interior of the church and then again sets off seeking the light as the an orientation factor. The effects of these transitions were also noticed when observing visitors. The common behaviour noticed was the movement on the main axis of the church from the narthex towards the central naos and the movement of the gaze upwards as the subject was reaching the centre of the church, underneath the central dome.

Islamic Religion

In the Islamic scripture, light is perhaps the most fundamental metaphor (Humphrey & Vitebsky 1997, p.132). In the "Sura of Light" of the Koran there is a key description of the symbolic significance of light. "God is the Light of the heavens and of the earth… It is Light upon Light…" (Portoghesi 1997) Islam is the light of Allah who

illuminates the world; it is divine knowledge. In Muslim traditions, the sun is the all-seeing and all-knowing eye of the Allah (Weightman 1996).

As Islam does not separate the body from the spirit or the reason from the faith, the space of the mosque expresses this unity through its own spirituality. Light as the symbol of the unity, "enlighting" bringing together and connecting people with sacred. As Garaudy (1985) argues, light in the interior of the mosques is the god who is always invisible and everywhere present, in all dimensions of reality, matter or spirit, reason or faith. In many examples of Ottoman architecture daylight flowing down from the main dome is used to emphasize the dome and to gather the people under it. Light of Allah pours down from the dome at the gathered worshippers; it is also encoded in the abstract designs in Islamic architecture were according to Humphrey & Vitebsky (1997) figures representing sources of spiritual light- stars, lamps and rays are entwined together with verses from the Koran and located at doors, windows and prayer- alcoves.

Light levels in mosques, as in churches, are mostly related to the creation of an environment where the worshipper can fulfil his religious needs, rather than to regular visual comfort objectives. The main acts performed for religious purposes are the rituals namaz [iii] and mevlûd [iv]. During the namaz, people follow the movements of Imam [v] and therefore illumination should be adequate for the Imam to be seen. Praying can take place at every point inside the mosque; therefore the illumination on the floor surface should be uniformly distributed. The reference plane is the floor as the believers sit and pray on it. Another action performed is reading the Holy Koran. This is also performed on the floor by putting the Koran on a low reading desk (rahle). In the mosques there are no representations, pictures or statues. Light is therefore used to accentuate the building, provide general illumination and assist in the performance of the worship. According to Unver & Enarun (1999), the following table presents the proposed qualitative and quantitative illumination for the mosque interior.

Table 2:

Quality and quantity of illumination in mosques

Action-Place	Quantity		Quality		
	Illuminance lm/m^2	Position	Illuminance Distribution	Colour of Light	Direction, Shadows
Reading-Rahle	300	Horizontal	Local-General	Warm-white	Diffuse, Shadowless
Namaz-Mihrab [vi]	300	Vertical	Local-General	Warm-white	Diffuse, Shadowless
Namaz-Prying	100	Horizontal	General	Warm-white	Diffuse, Shadowless

In the building of mosques there is a profound relationship between the orientation and the concept of centre. The mihrab area, opposite the main entrance of the mosque, is orientated towards Mecca, a single geographical centre as the site of a historical event. This allowed worshippers to pray towards the symbol-place and resulted to an almost constant southeast orientation of the mosques in the regions of the Ottoman Empire.

The basic sources of illumination in the interior of the mosques are windows placed on walls and domes. From the 16th century and onwards most of the ottoman mosques had used elaborately the openings on the domed structure, enhancing the visual appearance of the space and adding to the general lighting levels of the interior. Light coming through the main dome provides general illumination and

gives reason to the believers to gather under the dome. The dome or half-dome covering the mihrab area, orientated towards Mecca opposite the main entrance, both emphasises the mihrab and illuminates locally the Imam's place at it.

Windows are arranged on different levels, from the base of the dome to ground level. Series of openings at eye level contribute to the unison of the interior with the outside world while the next zones of openings are higher and removed from the immediate visual field of the observer. The sidewall windows contribute to the general lighting and create both a diffuse lighting especially in the big mosques and an illuminated area for Koran reading near the walls, while windows at the altar region, at the wall opposite the main entrance provide accentuation at the altar and local illumination. Windows are in general relatively small to avoid changing the static balance of the cover and the structural systems, due to the load bearing function of the walls that did not permit big openings.

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In the mosque interior incoming light filters through stucco screens and coloured glass, which function as diffusion screens and luminous filters. Perforated materials (such as plaster and iron) cover and protect the windows on the outside while on the inside stained glass is frequently used. These are mainly used on the windows of higher zones, resulting in a colouring of the daylight.

The whole arrangement of the mosque emphasises not on mass or surface but on space. According to Kuran (1968), the aim was to create the largest single uninterrupted space disturbed by as few vertical structural elements inside the main prayer hall as possible. One of the major attributes of the space is its clear delimitation while the common characteristic of the early Ottoman mosques is not the form of the interior (as a Byzantine or Latin cross) but the non-directional containment of the inner space by four walls. This was realised with building form, yet it would not have been possible without light. Thick walls and large openings result in a mostly diffuse and relatively shadowless daylight in the interior. Once inside the prayer hall there is no path and the devotee is encouraged to linger and contemplate this open, undivided space

Alaca Imaret Mosque

The Alaca Imaret or Ishak Paşa Camii [FIG 4] was built shortly after the beginning of the Turkish administration in the city of Thessaloniki. An inscription over the entrance informs us that it was built in 1484. It belongs to the early ottoman architectural style. The Alaca Imaret, as most mosques of this time that were built in a newly conquered by the Ottomans city, incorporated multiple functions that fulfilled the needs of the new social order and soon became a centre of the ottoman social life. Today the mosque is under the authority of the Municipality of Thessaloniki and the Greek Ministry of Culture and functions as a gallery [FIG 5].

The Alaca Imaret mosque is located in a crowded residential neighbourhood in the north part of the centre of the city of Thessaloniki. Set within a small plateia and surrounded by box-like high-rise 20th century blocks of flats that have completely changed the original setting of the monument, the mosque is orientated towards Mecca with the mihrab wall facing southeast and its main axis, from the entrance to the mihrab is orientated from northwest to southeast [FIG 6].

The methods of wall construction and the decorative detailing follow the local Byzantine practices while plan and vaulting form are aligned with the architecture of the Seljuqs. In terms of scale and general conception the mosque is not far from the multi-domed middle and

late Byzantine churches. Yet in its plan, the clear square and rectangular units and the distinctive prayer hall are far from the blending space of the Byzantine church interior.

Figure 4:

The Alaca Imaret mosque

Figure 5:

The interior of the Alaca Imaret mosque

Alaca Imaret falls into the category of early Ottoman mosques of the "inverted T" type or rather "Zaviye-mosques", which has lateral adjacent structures in addition to the central praying area, serving various purposes such as eating or teaching. This type of mosque is the most original small scale encountered in the Ottoman Empire. Its multifunctional structure with the inverted T plan features a central rectangular prayer hall, measuring approximately 17x8m, and several adjacent domed cubes. These two cubes constitute the main rectangular central praying area. The domes, of 11m span each, cover the large rectangular main prayer area while the mihrab is in the middle of the south-facing wall directly opposite the main entrance. On either side of the prayer area of the mosque are two smaller rooms covered with round domes, lower and smaller than the major ones.

Light is used as a medium of presenting the space but not as a medium of altering or essentially forming the appearance of the space. Illuminance levels are generally low, except around the mihrab area where the number of the windows is greater. Illuminance is not uniform yet there is a symmetrical arrangement of the distribution

around the mihrab area. Thick walls result in a diffusion of daylight through the relatively small sized openings and daylight is mostly diffuse and relatively shadowless. However during sunlight penetration hours there is a play of light patterns on the empty walls. Yet it should be noted that due to alterations in the building and the surrounding urban fabric the original lighting levels in the interior would have been much higher. The two domes appear relatively dull and there seems to be a significant difference in the appearance of similar structures with openings. Lighting conditions in the interior of the mosque, in combination with the building form create an overall impression of a bright, open, unified space. Light is enhancing this quality through its diffusion in the interior. However light shafts and bright intervals add visual interest and create a feeling of uplift.

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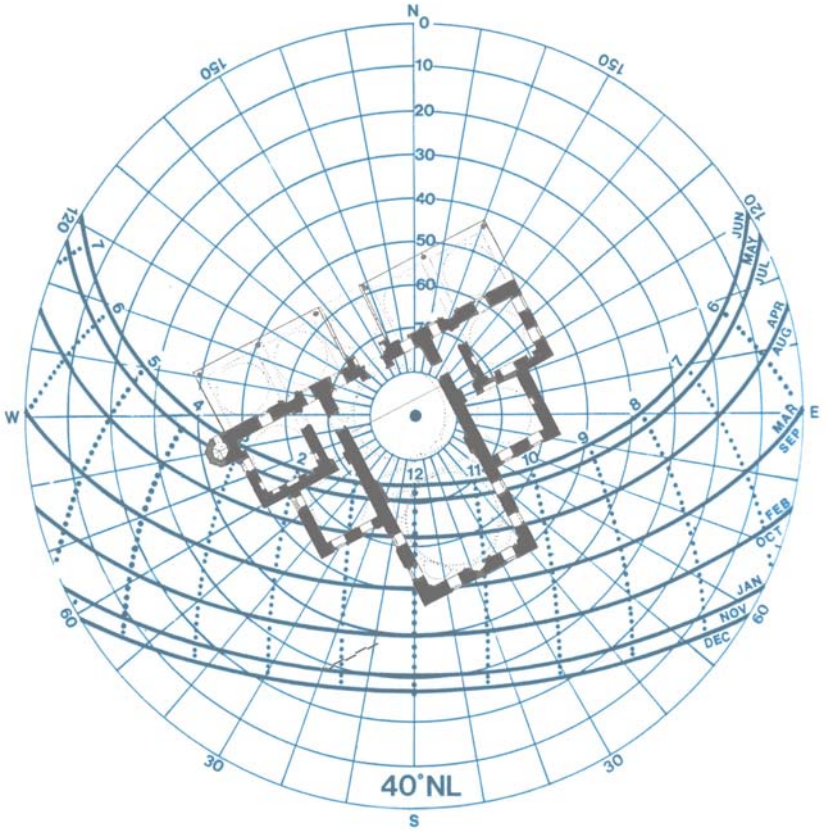
Figure 6:

The sunpath diagram overlaid on the plan of the mosque

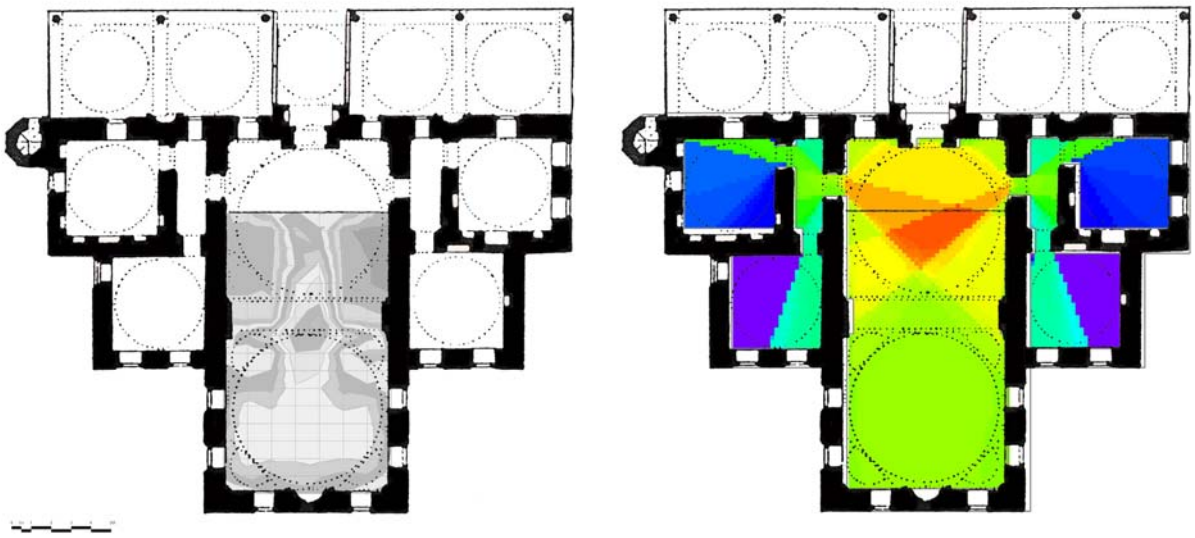


The arrangement of the interior of the prayer hall consists of no paths or obvious pathways. In terms of spatial measures, analysed with Turner's Depthmap software, high levels of visual integration occur in the main praying area, closer to the entrance [FIG 7]. From there the visitor can assess the space and move towards the desired destination. When comparing lighting conditions to the spatial arrangement of the mosque, the highest visually integrated areas are the lowest in illuminance levels. Although there is not a highly perceptible difference in the illuminance levels, still the visitor is located in a spatially privileged space and potentially attracted to explore higher illuminance areas like the area closer to the mihrab. This movement is part of the several transitions that take place during the visit. Moving from the bright Mediterranean exterior to the entrance, the domed portico provides a shelter as well as an inviting transition to the interior of the mosque. Although the interior is open plan, there is a clear arrangement in two parts. The first part is the area next to the entrance, which at the same time is the entrance to the adjacent rooms that are attached to the main prayer hall. This arrangement is also accentuated by light, as light levels are lower near the entrance and increase as one proceeds in the main prayer

hall reaching the mihrab area. Although the interior of the mosque is not dark enough to cause any discomfort when entering, the process of passing through parts of different illuminance levels provides a soft transition from the bright exterior to the interior of the mosque. These transitions also formed part of the observed behaviour of the visitors as common behaviour noticed was the visitor's movement towards the mihrab area and the gaze upwards, in order to conceive the spaciousness of the interior and investigate the domed structure.

Figure 7:

Lighting levels & Visual integration in the interior of the Alaca mosque



Discussion

In both religions light is related directly or indirectly with the divine. Light in Muslim architecture is used in a symbolic way to enhance the feeling of unison, oneness and unification of the worshippers, increasing the collective sense of the space. In a symbolic too but different way, light in the orthodox religion is used to attract the worshippers and to guide them all the way towards the revelation. It creates a mystical, transcendental atmosphere inspiring worshippers to look for the light, look for the truth of the apocalypse.

The lit appearance of the interior is a determinant factor on the perception of the space. According to Davies (1982), there are two kinds of architectures that use light: the one draws forms with darkness upon light. The other draws forms with light on darkness. In the mosque, the form of the interior is revealed through light on darkness, while in the church, the space is revealed through darkness on light, as shade is a vital element.

The mosque has an open plan arrangement serving the collective sense of the Muslim way of praying. One of its main characteristics is the unified space and the spaciousness of the interior. No attempt is made to eliminate volume and the aforementioned attributes are enhanced by the diffusion and the general lighting of the interior, creating a sensation of light spaciousness. On the other hand, the church is a composition of spaces aiming to create an atmosphere of privacy and meditation. Volume is eliminated and everything becomes part of the whole. Different zones have different lighting and this characteristic enhances both the division and the composition. However, the interior of the church is not clearly delimitated but rather a blending space, enhanced by the diffusion of light in the interior, while guiding to the crest of the composition, the bright areas under the domes.

Due to its open plan arrangement, the mosque is a multidirectional space. The characteristic is not the form of the interior as in the church but the non-directional containment of the inner space by four walls. Still the visual integration core is has low levels of lighting and falls at the periphery of the main central area, as in the church where the visually most integrated location is the esonarthex. On both buildings, the highest illuminance areas are the ones related to the main rituals as light forms the transition from the exterior to the dark and to the bright again at the mihrab or the main naos. Yet this guiding quality of light is more apparent in the church with visual axes and directionality leading from one part to another and then finally at the crest, in front of the altar under the dome.

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The mosque is orientated towards the Mecca, a single geographical centre. In the case of the city of Thessaloniki, the mosque is orientated southeast. As the mihrab region faces southeast and gets sunlight almost throughout the day, especially as openings are also arranged on the adjacent west and east walls. In the church, there is a constant orientation towards the east, with an occasionally slight divergence [vii]. The altar faces east and therefore gets sunlight only in the morning, the first light of the day. Lighting levels in the mosque interior are generally higher than in the church and more stable throughout the different hours of the day. The distribution is relatively uniform and there is a good diffusion of light in the interior. On the other hand, in the church, the light levels are lower and less stable during the day, except from the domes, which are constantly illuminated by peripheral openings, trapping the sunlight at anytime.

There are similarities that arise from the common building techniques and environmental conditions but also from the similar approach to light, its meaning and its symbolism. Many Byzantine churches, during the Ottoman period in Greece, were transformed into mosques. During this change, many of the openings of the buildings were altered leading to a transformation in the interior illumination. This fact proves Triantafyllides's (1964) argument that there is also a "conscious difference in the quantity and quality of daylight in these two religions". In the Early Ottoman mosques, there seems to be no obvious linking of daylight design with liturgy. Light from symbolic to functional is an important factor yet remains within the limits of an attribute of the space. On the other hand, in the Byzantine church interior, light seems to have a more integral role in the process of liturgy and worship. As in Potamianos (2000) the impressions that lie upon light for their visualisation are not a random effect but a well arranged handling trying to transmit a sense of divine.

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i. According to Humphrey & Vitebsky (1997), light in Berber houses of North Africa is associated with the typical activities of each sex. The simple rectangular house of the Kabylie Berbers represents several complex and interlocking ideas of the sacred. Areas of light are male and associated with creative parts of the house while areas of darkness are female.

ii. As described by Garaudy (1985), in the Hagia Sophia, the entire processional way from the narthex to the apse, seemed guided and channelled by the modulations and tracks of light. The "cataract of light" from the central dome suggested an upward movement and an upward appeal. while the shading off of the shadows and the semi darkness of the aisles gave a sense of the presence of mystery

iii. Namaz: worshipping God of Muslims by repeating kiyam (standing, hands crossed of the breast), rükû (hands on the knees, the body parallel to the floor), sucut (putting nose, forehead, hands, knees and feet on the floor) and kuut (sitting on the knees on the floor) called body positions in an orderly way while praying, five times during a day, namely in the morning (the sun rise), midday (the sun is at his zenith), midafternoon (the midtime between midday and the evening), in the evening (the sunset) and in the night (two hours after the sunset). Namaz will be performed after ezan (call to prayer) has ended. (Unver & Enarun 1999)

iv. Mevlûd: the religious ceremony during which the mesnevi (mystical poem) telling about the prophet Mohammed's birth and life will be chanted. One or more persons do the chanting. The believers listen and everybody sits on his knees on the carpet (Unver & Enarun 1999)

v. Imam: the religious leader leading the namaz at the mihrab (altar niche) in a position turned towards Mecca.

vi. In Islamic tradition, mihrab is the most important element in any mosque, the niche that indicates the direction of Mecca (qiblah). It functions as the focal point in the prayer ritual and is lavishly decorated and hung around with lights (Humphrey & Vitebsky 1997, p.96)

vii. As mentioned earlier in the text, orthodox churches were orientated in a way to capture in the altar region the morning light on the day of the celebration of the saint that the church was named after.