



**ORNAMENT IN ARCHITECTURE IN THE RELATIONSHIP TO SYMBOL
& REPRESENTATION: MUQARNAS AS A GRADUAL TRANSITION
ELEMENT**

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(M. Sc. Thesis)

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ABSTRACT

Rethinking the relationship of the ornament with other arts through its relationship with the “body” can provide to reconceptualize of its problematic position with a holistic view. In this manner, this thesis focuses on this problem through the concept of Cassirer’s “symbol” and representation following Kant’s transcendental scheme based on “free” and “adherent” beauty. From this point of view, John Ruskin discusses that the perfect whole/single body can only be achieved through free beauty attitude. On the other hand, the efforts of Gottfried Semper and Henry Louis Sullivan to fuse ornament and “body” by animating ornament with artistic sculptural forms shows the possibility of achievement of symbol/single body in “adherent beauty” while providing the rethinking of the strong connection of figural arts and architecture. This thesis aims to reveal Cassirer’s perfect whole/symbol in solid geometry as an adherent beauty, answering to Renaissance art historian and architect Leon Battista Alberti’s search for a harmonious geometrical whole based on the metaphor of the human “body” concept which ties figural arts and architecture. The study focuses on the development of the sculptural ornament muqarnas, which is the gradual transition and basic element of Islam, in the degree of fusion in relation to other transition elements to the dome, as pendentive, Turkish triangle, and squinch in the historical process of mosque architecture. When we examine this process, the mosques of Architect Sinan reveal a breaking point. So, the three great mosques of Sinan were selected. Muqarnas squinch that appeared after the union of squinches and shouldered arch after the Seljuks increased the fusion until the Ottomans contrary to the single use of elements in the pre-Seljuks period. In the period of Sinan, in the high-level use of technology with the abandonment of the previous use of muqarnas, it emerges as an element formed by hybridization of transition elements to dome in a perfect fusion to form a single body/symbol together with other elements such as arches, semi domes, exedras, and pendants. Thus, Sinan provided the realization of Alberti’s perfect whole along with the perfect reinterpretation and abstraction of muqarnas in the gradual and parametric transition between the two realms through bodily movement with perfect use of technology and has succeeded in reaching the perfect symbol of Cassirer in adherent beauty. Ornament revealed its necessity with its holistic role which provides this fusion.

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SEMBOL & TEMSİL İLİŞKİSİNDE MİMARLIKTAKİ SÜSLEME: BİR KADEMELİ GEÇİŞ ELEMANI OLARAK MUKARNAS

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ÖZET

Süslemenin diğer sanatlarla ilişkisini, “beden” ile olan ilişkisi üzerinden yeniden ele almak, sorunlu konunun bütüncül bir bakış ile yeniden kavramsallaştırılmasına olanak sağlayabilir. Çalışma, bu ilişkiyi Kant'ın "özgür" ve "bağlı" güzelliğe dayalı aşkın şemasını izleyen Cassirer'in "sembol" ve temsil kavramı üzerinden ele alır. Bu bağlamda John Ruskin, mükemmel bütünün ancak özgür güzellik tutumuyla elde edilebileceğini tartışır. Diğer yandan, Gottfried Semper ve Henry Louis Sullivan'ın süslemeyi sanatsal heykelsi formlarla canlandırarak süsleme ve "beden"i kaynaştırma çabaları, figür sanatlarının ve mimarının güçlü bağlantısının yeniden düşünülmesini sağlarken "bağlı güzellik"te sembol/tek bedene ulaşmanın mümkün olabileceğini gösterir. Bu tez, Rönesans sanat tarihçisi ve mimar Leon Battista Alberti'nin figürel sanatları ve mimarlığı birbirine bağlayan insan “bedeni” metaforunu temel alan ahenkli bir geometrik bütün arayışına karşılık Cassirer'in mükemmel bütünü/sembolünü “bağlı güzellikte”ki katı geometride ortaya çıkarmayı amaçlamaktadır. Bu anlamda çalışma, İslam'ın kademeli geçiş ve temel elemanı olan heykelsi süsleme “mukarnası” örneklem olarak kullanarak cami mimarisinde pandantif, türk üçgeni ve tromp olmak üzere kubbeye geçiş elemanları ile ilişkisinde kaynaşma derecesindeki gelişimi incelemiştir. Bu süreci incelediğimizde Mimar Sinan camileri kırılma noktası ortaya koymaktadır. Bu anlamda Sinan'ın üç büyük camisi ele alınmıştır. Selçuk öncesi dönemde elemanların yalın kullanımının aksine, Selçuklulardan sonra tromp ve omuzlu kemerin birleşmesinden sonra ortaya çıkan mukarnaslı tromp, Osmanlılara kadar olan süreçte kaynaşmada artışı sağlamıştır. Sinan döneminde ise teknolojinin üst düzey kullanımında mukarnas, önceki kullanımının terk edilmesi ile kubbeye geçiş elemanlarının sentezi ile ortaya çıkan bir eleman olarak, kemer, yarım kubbe, eksedra ve pandantif gibi diğer geçiş elemanları ile beraber tek beden olma çabasında mükemmel bir kaynaşma içerisinde yer alır. Sonuç olarak, Sinan, iki âlem arasındaki kademeli ve parametrik geçişte mukarnasları yeniden yorumlama ve soyutlama konusundaki mükemmel sanatsal yorumu ile teknolojiyi mükemmel kullanımında bedensel hareketle Alberti'nin bütünü yakalamış ve bağlı güzellikte Cassirer'in mükemmel sembolüne ulaşmayı başarmıştır. Süsleme, bu kaynaşmayı sağlayan bütüncül rolüyle gerekliliğini ortaya koymuştur.

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Anahtar Kelimeler : Sembol, temsil, özgür ve bağlı güzellik, süsleme, mukarnas, kademeli geçiş, Mimar Sinan

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CONTENTS

	Page
ABSTRACT.....	iv
ÖZET	v
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	xiv
1. INTRODUCTION.....	1
2. MUQARNAS AS A GRADUAL TRANSITION ELEMENT IN THE HISTORICAL PROCESS.....	17
2.1. Transition elements to dome in pre-Seljuk mosques	19
2.2. Seljuks period (1037-1308)	25
2.3. Ottomans period (1299-1453).....	35
2.4. Section Evaluation.....	40
3. THE DEVELOPMENT OF MUQARNAS IN RELATION TO SYMBOL IN ARCHITECT SINAN’S PERIOD.....	43
3.1. Şehzade Mosque (1543).....	43
3.2. Süleymaniye Mosque (1551).....	48
3.3. Selimiye Mosque (1569).....	52
3.4. Section Evaluation	56
4. DISCUSSION AND CONCLUSION.....	59
REFERENCES	65
APPENDICIES	81
APPENDIX-1.	82

Page

CIRRICULUM VITAE..... 92



LIST OF TABLES

Table	Page
Table 1.1. The distinction between symbol and representation	4
Table 1.2. From representation to symbol/single body in adherent beauty and intersection with holistic attitude in free beauty approach.....	14
Table 2.1. The Development of Muqarnas as Gradual Transition Element.....	41
Table 3.1. Development in the use of muqarnas in three mosques of Sinan's to achieve a single body/symbol in adherent beauty.....	58



LIST OF FIGURES

Figure	Page
Figure 1.1. Differences in the classifications of the arts.....	3
Figure 1.2. a) Pure abstract expressions of Gothic b) Holistic expressions of Gothic as a symbol.....	7
Figure 1.3. a) Structural integration of ornament at Union Trust Building b) column detail of Guaranty Building by Henry Louis Sullivan.....	9
Figure 1.4. a) Semper's knot as a structural approach b) The holistic approach expression of ornament and structure, Dresden Opera House.....	11
Figure 1.5. Thesis flow-chart.....	16
Figure 2.1. a) pendant b) Turkish triangle c) squinch d) muqarnas.....	18
Figure 2.2. The mosques before Seljuks in the boundary of The Great Seljuk Empire and Anatolian Seljuks.....	20
Figure 2.3. Masjid an Nabavi a) 3D model b) c) transition to dome with the simple use of transition elements.....	21
Figure 2.4. Quba Mosque a) general view of dome b) c) simple use of pendants and squinch.....	21
Figure 2.5. Great Mosque of Damascus a) 3D model b) semi-circular squinch detail...	22
Figure 2.6. Al Azhar Mosque (970-972) a) 3D model b) squinch detail.....	23
Figure 2.7. Kairouan Mosque a) detail of transition to mihrab dome b) axonometry by the author.....	23
Figure 2.8. Nain Friday Mosque (940) a) Northern iwan shell vault squinches b) axonometry by author.....	24
Figure 2.9. The domination of Seljuk Empire in Islamic lands.....	25
Figure 2.10. Degaron Mosque a) axonometry b) c) drawing d) brick muqarnas e) drawing.....	26
Figure 2.11. Talhatan Baba Mosque a) general view b) simple brick squinches.....	27
Figure 2.12. Sujas Mosque a) The squinch as a single arch b) axonometry by author...	28

Figure	Page
Figure 2.13. The Friday Mosque of Isfahan (Masjid-Jomeh of Isfahan) a) The detail of shouldered arch and squinch system in the north dome b) drawings by author c) axonometry by author	29
Figure 2.14. Transition detail of dome in a) The Friday Mosque of Barsiyan (1104-5) b) The Friday Mosque of Ardistan (1158), c) The Friday Mosque of Zevareh (1135).....	30
Figure 2.15. Golpaygan Mosque a) detail of muqarnas b) drawing of muqarnas by author c) axonometry by author	31
Figure 2.16. Sultan Baybars Al-Jashankir Masjid of Mameluks (1309-40) a) general view of the dome b) muqarnas squinch c) drawing by author	32
Figure 2.17. Silvan Grand Mosque (1157) a) general view of dome b) muqarnas squinches c) muqarnas squinches with motifs d) pure muqarnas squinches e) drawing by author	33
Figure 2.18. Niğde Alaaddin Mosque (1223) a) general view of dome b) muqarnas on the dome transition c) drawing by author	34
Figure 2.19. The Grand Mosque of Divriği (1229) a) general view of dome b) the dome with muqarnas c) drawings by author	34
Figure 2.20. Milas Firuz Bey Mosque, Muğla a) muqarnas detail b) transition to dome in front of mihrab c) drawing and e) axonometry by author.....	36
Figure 2.21. Bursa Green Mosque a) exterior b) sketch drawing and c) interior d) Green Tomb	37
Figure 2.22. Edirne Muradiye Mosque (1426) a) exterior b) interior c) triangles and d) drawing by author	38
Figure 2.23. Edirne Üç Şerefeli Mosque (1437) a) axonometry b) interior c) muqarnas detail and d) drawing by author.....	39
Figure 3.1. Şehzade Mosque (1543) a) general view b) interior view of the dome c) muqarnas detail d) other view of muqarnas with semi domes.....	45
Figure 3.2. Exploded axonometry of Şehzade Mosque by author	46
Figure 3.3. a) axonometry and b) schematic section of Şehzade Mosque by author.....	47
Figure 3.4. Süleymaniye Mosque (1551) a) general view b) interior view c) muqarnas detail with exedras d) other view of muqarnas with exedras and semi domes.....	49

Figure	Page
Figure 3.5. Exploded axonometry of Süleymaniye Mosque that shows the transition elements to dome	50
Figure 3.6. a) axonometry and b) schematic section of Süleymaniye Mosque	51
Figure 3.7. Selimiye Mosque (1569) a) general view b) interior c) gradual transition of elements with muqarnas d) another view of elements with muqarnas	53
Figure 3.8. Exploded axonometry of Selimiye Mosque	54
Figure 3.9. a) axonometry and b) schematic section of Selimiye Mosque	55
Figure 3.10. Gradual Transition Elements to Dome in Sinan's structures	56
Figure 4.1. Alhambra Palace, 1338-1390 a) Muqarnas Dome b) muqarnas pendentives	63

1. INTRODUCTION

Kant's transcendental philosophy

The debated role of ornament in other arts was revealed by the requirement of ornament in the context of the shifting aesthetic conception of the machine age. In order to address ornament, a holistic approach to artistic beauty that takes into account both the fine and decorative arts was used. Transcendental philosophy was introduced by Immanuel Kant, a German philosopher. It is a foundation for the indivisible link between object and subject. In this theory, the subjective order of knowledge equivalent to 'transcendental' knowledge is discussed. It is necessary to create the object (Kant, 1998: 133). A priori knowledge that differs from experimental knowledge was pointed out by Kant (Kant, 1998: 137). Based on this, the category of reason is different from intuition and understanding, which are considered to be experimental (Kant, 1998: 52,155). The integrity between these pure and experimental categories is provided by 'transcendental schema' transforming pure knowledge into empirical (Kant, 1998: 272).

The synthetic unity of the many types of knowledge (Kant, 1998: 231) and synthetic a priori judgments was pointed out by Kant in his theory (Kant, 1998: 146). The transcendental system that emerges in aesthetic experience is also the issue that Kant dealt with besides the transcendental system of forms of knowledge. In *Critique of the Power of Judgement* (Kant, 1987), also highlighted by Kant are the concepts of purpose and the concept of purposiveness. The concept of purpose is referred to a concept where the object serves as the origin of the cause. The situation in which the causality does not stem from the object is purposiveness without purpose. In this state, the concept does not belong to the object and there seems to be no purpose (Kant 1987: 220-221). Following that, free beauty that reflects purposiveness without purpose and adherent beauty are distinguished in Kant's theory. These two are detailly expressed in the following manner:

There are two kinds of beauty, free beauty (*pulchritudo vaga*) and merely accessory beauty (*pulchritudo adhaerens*). Free beauty does not presuppose a concept of what the object is [meant] to be. Adherent beauty does presuppose such a concept as well as the object's perfection in terms of that concept (Kant 1987: 229-230).

The human being, the horse, and the building are examples of adherent beauty. On the other hand, free beauty can be seen in pure forms such as flowers, birds, and even pure synthetic objects as decorative wallpapers devoid of any superficial meanings (Kant 1987: 230). In this manner, free beauties are about the subject's boundless imagination instead of how an object is represented (Kant 1987: 230). Adherent beauty is a type of judgment in which part and entire relationship are taken into consideration at the same time. On the contrary, free beauty are embodied in natural and pure forms of integrity. As a result, adherent beauty is related with "uniting taste with reason" (Kant 1987: 231). The aim of searching for evidence of nature's complete completeness has connections to many conceptions of adherent beauty. Allison emphasizes that it would be possible to consider Kant's distinction between free and adherent beauty as 'on its own' or as a part of a larger connection (Allison, 2001: 142). Kant's statement of "complete power of presentation that gains when the two states of mind harmonize" is revealed as an example of combination of the part and whole (Kant 1987: 231). Kant's critique that ornament is detached from true beauty when it exists only as 'merely attached' to the whole (Kant 1987: 226) supports these two models of free and adherent beauty.

In summary, Kant's contrast between 'free beauty' and 'adherent beauty' in aesthetic judgment refers to a new interpretation of the separation between pure artistic production and impure creations as building, painting, sculpture, music, and poem. Historical shifts in the hierarchy of the arts gave rise to this problem of aesthetic assessment. This issue of aesthetic judgment arose as a result of historical shifts in the hierarchy of arts. The phrase decorative art was used in Greek and Latin to refer to a broad idea of art linked to the skill or sciences, which included both the arts and fine arts (Kristeller, 1951). In Medieval, the humanistic notion follows Late Antiquity, high and low arts are distinguished. Mathematics, geometry, astronomy, rhetoric, and language are examples of higher-level arts with a greater scientific and philosophical substance known as liberal arts. Different types of art associated with crafts or human activities that were formerly not separated from architecture and sculpture are referred to as mechanical art (Kristeller, 1951). However, during the Renaissance, the notion of holistic creative beauty and aesthetics had no link to the visual arts, which included sculpture, painting, and architecture (Kristeller, 1951). Philosophers like Kant come up with a new theoretical basis for aesthetic beauty in response to this split between the visual arts during the Renaissance. It has been difficult to determine the

ornament's position in the interaction between architecture and other arts and to draw a definite framework about it since the Renaissance (Figure 1.1).

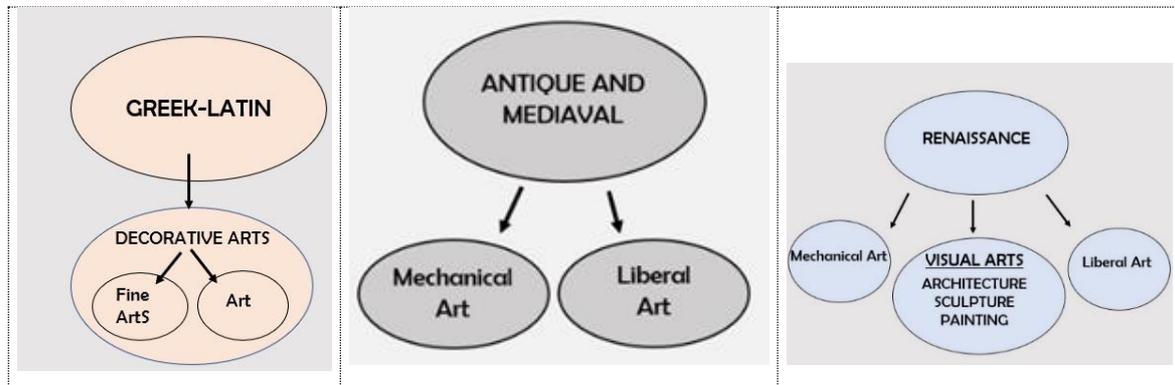


Figure 1.1. Differences in the classifications of the arts (generated from Kristeller, 1951)

Ernst Cassirer's transcendental philosophy: symbol & representation

Kant's transcendental schema constitutes the basis for Cassirer's symbolic form theory, a member of the Marburg School, and draws inspiration from writers like Hegel (Coşkun, 2007: 240-241-242). The human mind's integrity in relation to the object form constructed by the human mind means how knowledge takes shape is the issue that Cassirer emphasizes. In this manner, the human mind and the object are the same things (Cassirer, 1955: 38). The core idea in Cassirer's symbolic form theory relates to each person's individual construction of meaning (Schilpp, 1949: 14) based on transcendental philosophy. Therefore, the human mind does not produce a ready-made object. The unique symbolic form, a whole is produced by human mind. As Cassirer points out, "the sources of real light, the prerequisite of visualization and the wellsprings of all formation" express the symbolic forms (Cassirer, 1953: 93). Cassirer asserts that the construction of geometric forms as well as natural is based on the notion of Kant's purposiveness where there appears to be no purpose, in which each component is ordered in accordance with the synthetic unity (Cassirer, 1981: 288). The harmony of the parts and the total as well as their mutually exclusive connection is pointed out in Cassirer's statement as "the general expression for every harmonious unification of the parts of a manifold" (Cassirer, 1981: 287). Beauty is a reflection of the perfection that can be attained via the complete union of the human intellect and the object.

The symbol and representation are the concepts introduced in Cassirer's philosophy (Table 1.1). There is no connection between the previous one as representation and the idea of a symbol. New meaning discoveries is made possible in symbol state. It appears as the perfection of the mind's moulding rather than readymade meaning (Cassirer, 1953: 50-51). The symbolic structure of human mind is emphasized with the phrase of 'symbolic animal' in Cassirer's expression (Cassirer, 1953: 65). The indivisible wholeness of all components is referred as the symbol. On the contrary, representations do not depict the unified connection between the part and the whole (Cassirer, 1953: 103). Symbols mirror reality, whereas representations express 'arbitrary' additions that conceal the truth (Cassirer, 1953: 49, 52). The exploration of one's own experiences is not a consideration in representations with predetermined meanings, which only pertain to precise imitations. As they prevent the production of new meanings, the imagination of person is limited (Cassirer, 1953: 51, 53). Both the oneness of nature and the unity of cultural forms can serve as the foundation for the idea of complete wholeness as a symbol in the symbolic form system of Cassirer (Cassirer, 1953: 52, 53, 56). In summary, the integrity that comes from the symbol as a perfect holistic system should also be reflected in all geometric forms.

Table 1.1. The distinction between symbol and representation

SYMBOL/ TRUTH	REPRESENTATIONS
THE WHOLE / INTEGRAL	CONSISTS OF PARTS
ALLOWS MEANING	READY-MADE MEANING- DON'T ALLOW EMOTIONAL MEANING
NO REPRODUCTION OF THE READY	REPEATED WITHOUT MAKING SENSE

As previously said, the reflection of the transcendental system in aesthetic perception is the issue that Kant emphasized in line with transcendental philosophy. In Cassirer's philosophy, the idea of symbolic form is derived from Kant's transcendental schema. Cassirer believes that it is difficult for cultural sciences to achieve a holistic form occurring in nature (Cassirer, 2005: 61-62). In accordance with Kant's thesis, both shapes in nature and pure meaningless human innovations serve as examples of free beauty that reflects free expression of 'ornament'. There is no separation between part and whole in the symbol of free beauty as a perfectly pure system. The beauty of a structure is inherent to it. When a specific goal stands out, the beauty in the arts such as architecture, painting, sculpture, music, and poetry can be associated with adherent beauty. In this structure, it becomes difficult to achieve pure

artistic expression while maintaining the integrity of part and total. There is a risk of matching a pure representation in a situation where parts do not belong to the holistic expression and only if it corresponds to a mere attachment. However, as assumed in this work, in the situation of complete wholeness of parts and whole (part and whole link is considered simultaneously), a potential exists to achieve a symbol in adherent beauty.

Free beauty & adherent beauty

Free beauty: John Ruskin

The connection of architecture with function and beauty is reconceptualized by John Ruskin, a well-known art and social critic. According to Ruskin, 'architecture and construction' are distinguished by qualities such as 'mental health, power, and pleasure'. Building architecture to appeal to these qualities provides it to become an art (Ruskin, 1889: 8). Discovering the ways to combine spiritual and aesthetic ideas in a hybrid approach by focusing on human power and beauty via abstraction is the challenging issue that Ruskin strives for. The point he focuses on in *Seven Lamps of Architecture* is various functions that bring artistic labour and craft to the maximum degree that makes architecture art; makes ornament art by focusing on Gothic. So, there appears a new hierarchy in which ornamentation appears as 'the principal part of architecture' that unites all of these values according to Ruskin's argument (Ruskin, 2007: 59).

There is no particular shape of the ornament in Ruskin's argument in respect to imitation (Ruskin, 1889: 117). Ruskin completely avoids 'additional representations' such as "curtains, pictures, and sculptures" to depict architecture (Ruskin, 2009a: 405). In this sense, 'painting or sculptures', which can be easily isolated from the whole, will never match to the notion of 'architectural ornament' (Ruskin, 2009a: 237). The precision and purity of natural lines constitute the architect's major concern, rather than sculpture that portrays the risky form of imitation (Ruskin, 1889: 135-136). In this sense, 'abstraction' is the crucial word, together with 'proportion', to discover a solution to the ornament's placement (Ruskin, 1889: 117, 124). The expression of the 'sense of human labor' and the beauty that results from the perfection of abstract forms are the two main concepts that constitute the ornament (Ruskin, 1889: 53). He stresses his holistic approach by linking of 'ornament and beauty' to the same concepts and insisting on the necessity of ornament. Additional representation has no place

in this holistic perfection which refers to a purely closed system without the removal and addition of the parts (Ruskin, 2009a: 405).

In the *Seven Lamps of Architecture*, the notion of beauty inspired by natural laws has the ability to create architecture by human power. On the other hand, the God spirit has also the power to arrange it (Ruskin, 1889: 72). In Ruskin's spiritual viewpoint, there is a connection between the part and a bigger total as a reflection of a transcendental idea. The part is related with divine energy. In *Modern Painters*, he says that completeness that depicts the relationship between 'God and Man' is conveyed through art (Ruskin, 2013: 154). In addition to other categories where Mallgrave discusses how the situation is represented in the object, he uses the term 'transcendental brain' while explaining Kant's purposiveness without purpose (Mallgrave, 2010). Ruskin's brain creates the whole by reflecting it with a new concept of integrity. The free beauty of Gothic is used to concentrate the greatest perfection level of purposiveness without purpose in Ruskin's theory. There emerges a 'sympathy' developed through spiritual relationship (Ruskin, 1889: 72). In this discussion, the symbol attitude in which it is not possible to add or remove parts is reflected that corresponds to Ruskin's holistic system. As also argued by Lars Spuybroek, there does not exist a distinction between ornament and structure in Gothic architecture that depicts a pure closed system (Spuybroek, 2011: 37). The key topic that Ruskin concentrates on in *Nature of Gothic* is the completeness of the elements rather than focusing on a single part, such as a pointed arch or a flying buttress, which brings Gothic expression to life (Ruskin, 2009b: 152).

The essential, common principles of the Gothic spirit constitute the point that Ruskin uses for conceptualizing the integrity of abstract invention and body. According to Ruskin, the irregularity of free abstract Gothic expression provides a basis to find the greatest unity as a symbol. He completely avoids describing this perfect unity with rigid geometric and symmetrical order. The Gothic expression's profound religious nature is generated by the 'savageness' and coupled with the approach of lawlessness. The 'imperfection' of the parts indicates divine expressiveness (Ruskin, 2009b: 160). Ruskin also mentions the term 'changefulness' or 'variety' as another keyword to conceptualize the holistic genesis of Gothic. He points out this concept with 'perpetual variety' by showing his antipathy to classical order (Ruskin, 2009b: 173, 176). Rigidity, as another essential concept in Gothic, provides the conceptualize a clear expression of holism, the fusion between ornament and

structure. Gothic free beauty and the excellence of structural relations are produced by the 'peculiar energy' of the entire system that refers to the term 'active rigidity' (Ruskin, 2009b: 203). The composition as an entire is permeated with the energy of Gothic ornament, which both activates it and dissolves the hard expression of Gothic stone elements. All bones are manifested by the same energy (Ruskin, 2009b: 203). Therefore, a symbol appears that is highlighted with sympathy generated by combining all elements. In this system, the whole system's relationship is determined by ornament. Therefore, there is an intersection of ornament and purposiveness without purpose (Figure 1.2). The whole in Ruskin's overly animistic argument can be seen as another reflection of Mallgrave's (Mallgrave, 2010), 'animistic brain' categorization which he uses for Gottfried Semper, who recognizes the distinction between ornament and structure. It is shown in Ruskin's argument that the symbol corresponds to the pinnacle of artistic perfection which reveals how the entire structure of an architectural body is constituted by the human brain.

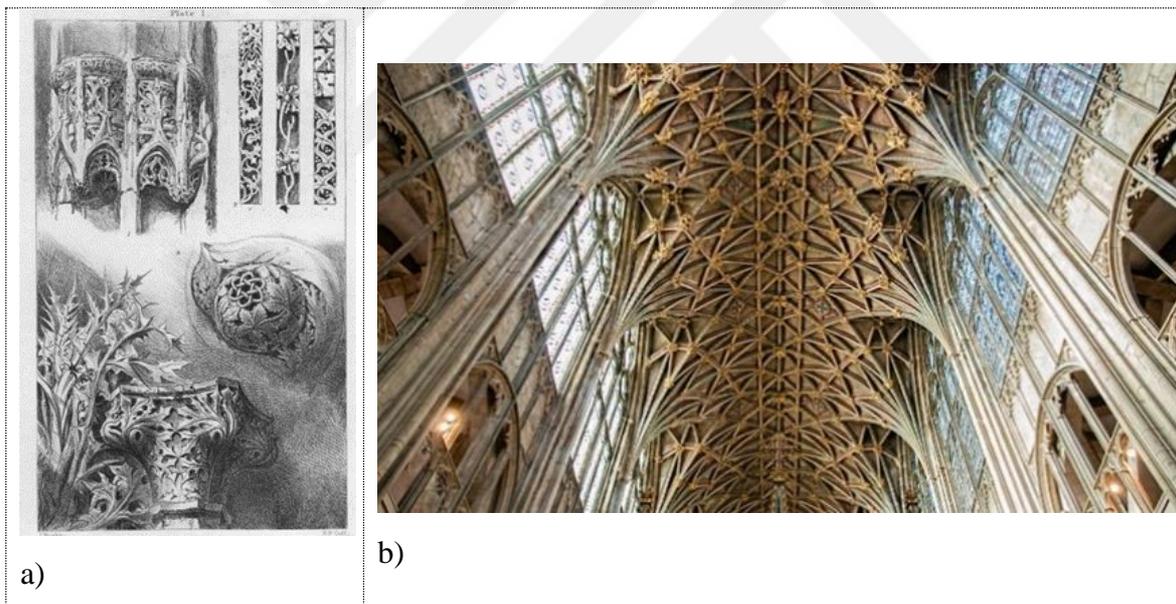


Figure 1.2. a) Pure abstract expressions of Gothic (Ruskin, 1889: 27), b) Holistic expression of Gothic as a symbol (URL-1)

Overall, Ruskin's holistic attitude is based entirely on abstraction, and he desires a symbol of free beauty while associating ornament with different values through Gothic architecture. He rejects the distinction between ornament and structure and completely separates the ornament from the notorious sculpture in relation to imitation.

Adherent beauty: Henry Louis Sullivan and Gottfried Semper

As indicated by Ruskin's argument that dissolves the distinction between ornament and structure, there is an inseparable relationship between aesthetics and general architectural concept that appears in the holistic symbol attitude of Gothic architecture. However, as Ameri (2005) points out, Ruskin's suggested hierarchy, by making ornament the primary concern of architecture, exacerbates the problematic position of ornament. By losing its limits, the ornament is unable to locate a specific location (Ameri, 2005). In this regard, determining how ornament might connect to the entire as an addition can help to resolve its confusing position. Louis Sullivan, a pioneer of modern architecture, deals with the attachment of the part to the whole through creative expression, as opposed to Modernism, which lacks artistic soul and isolates the part. Sullivan's idea supports a new poetic and organic style of thinking, based solely on spontaneous artistic creation (Sullivan, 1979: 50-51). Sullivan, like Ruskin, explores nature as a phenomenon in his search for a symbol. He argues that the differentiation of energy of all forms in nature can provide a reference to a creative artistic production (Sullivan, 1979: 56-57). He aims to reveal his own unique artistic production by employing different ornamental forms in the form of organic thought he follows. Sullivan presents a vast ornamental treasure, ranging from stylized plant motifs to organic and geometric shapes. His idea of ornament, in which 'organic and geometric' hybridized (Sprague, 1969: 178) in a poetic abstraction way of thinking, is the pinnacle of his artistic expression.

Sullivan expresses an original piece of art while rendering a fully emotionally animated whole. This emotional purpose permeates all parts of the structure. In this sense, his entire artistic endeavour, down to the smallest detail, reflects an emotional purpose. This creation process is based on ensuring the continuity of an 'organic' basic concept. According to Sullivan, '*decorative system*' and '*mass composition*' are manifestations of the same poetic purpose in architecture, which seeks poetic integrity in the same way that music does (Sullivan, 1979: 188). Sullivan promotes his organic system, in which the part and the whole are in 'sympathy' (Sullivan, 1979: 189). In his sculptural whole, which he defines as '*functionates in all of its parts*' (Sullivan, 1979: 160), ornament emerges as an inseparable concept of this living system. The continuity of function and form embodies Sullivan's idea of poetic purpose through articulating the part to the surface. In this sense, Sullivan conceptualizes ornament more with a transition function, mainly in transition to roofs and

column capitals. Therefore, Sullivan's strategy of pursuing his own artistic motif with hybrid figural forms and the animation of the ornament with the use of joints and its articulation to the surface is a reflection of his poetic and emotional brain. The artistic desire manifests itself in the whole organic system, beginning with the joints where ornamentation is integrated into the structure as in the case of the Union Trust Building and Guaranty Building (Figure 1.3.a, Figure 1.3.b).

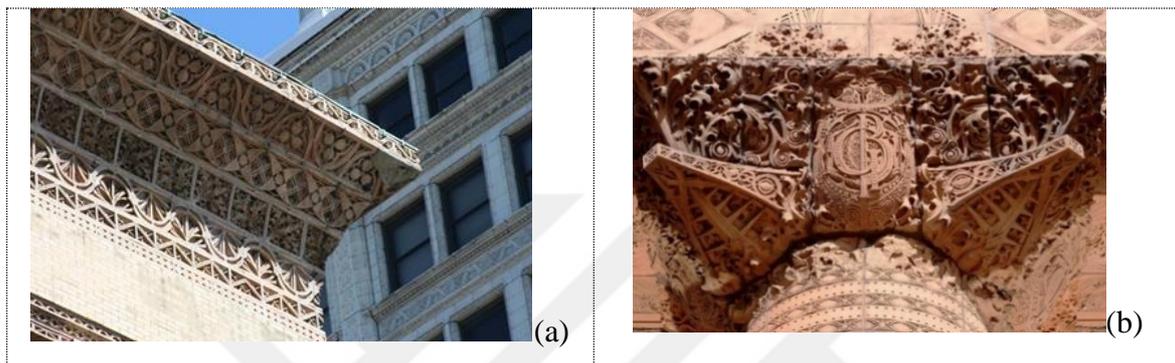


Figure 1.3. a) Structural integration of ornament at Union Trust Building (URL-2) and b) column detail of Guaranty Building by Henry Louis Sullivan (URL-3)

On the other hand, Gottfried Semper sheds light on a theoretical concept for another way of artistic thinking about ornament while conceiving artistic creation with a broader collection of events. Semper explores an alternative theoretical approach to unify ornament and structure, to reach a symbol with artistic expression developed from the artform and core form concept that Karl Bötticher based on Greek tectonics. Although Bötticher and Semper are both associated with an 'animistic' way of thinking, Semper's debate takes on a distinct shape (Mallgrave, 2010: 68). In Bötticher's distinction, while the structural form is based on Gothic architecture, the art form expresses the Greek symbolic dress that emphasizes mechanics (Mallgrave, 2005: 112). The fact that Bötticher mentions only just added representations (Oechslin, 1993: 379) and only focuses on a symbolic reading of the just structural lines causes him to leave Semper. Bötticher's approach cannot go beyond existing reality and refers to representation of materiality (Hvattum, 2004: 63). In Semper's theory, his animation, based on Greek tectonic imitation to form the whole, took on a different form. Semper focuses on how art form 'comes into being' (Semper, 2004: 71) and seeks a new manner of forming: a new way of ornament.

According to Semper, while architecture follows the rules that constitute the unity in nature, achieving harmonious wholeness is the result of the act of embellishing (Semper 1984: 219). In this sense, architecture appears as a 'cosmic art', it is the ornamentation itself. Semper emphasizes this process of artistic way of thinking of a perfect composition which manifests itself in cosmic arts like music, dance, and architecture. Semper focuses on these branches of fine arts as a reflection of cosmic order that is not 'imitative' (Semper, 1984: 220). In this sense, his understanding of art corresponds to a specific form of imitation, namely 'mimesis of praxis'. It appears as an imitation of human 'actions' rather than nature in Aristotle's concept (Hvattum, 2004: 75). In this sense, forming a building stems from textile art as a concept of art in its broadest sense for Semper (Semper, 2004: 247). The variety of motifs belonging to textile art emerged as a reflection of Semper's holistic search. For instance, in his theory of dressing, the mask does not represent an 'added' representation. As Mallgrave argues, Semper's dressing becomes different from just superficial covering (Semper, 2004: 50). Dressing corresponds to a metaphorical understanding that refers to carrying the current form beyond reality in order to attain a poetic spirit that emerged on the whole form (Semper, 2004: 379). Semper emphasizes the poetic spirit of art formed by human acts with the 'destruction of reality,' which Semper employs for all arts to reveal the artistic spirit to reach a harmonious whole (Semper, 2004: 439).

The comprehensive reflection of the mimetic approach of Semper's theory has clearly manifested itself in the transformation of architectural elements into ornaments. In his 'animistic' approach, artistic expression captures the architectural element and transforms it into a living form. This can be seen in Semper's 'knot', which refers to the 'structurally active' concept, reflecting the connection between artistic expression and technical issues (Semper, 2004: 156) (Figure 1.4.a). The structurally necessary elements 'become organisms' with artistic spirit. Semper defines even a column by exceeding its structural function with artistic conception (Semper, 2004: 728). Thus, the ornament becomes an inseparable part of the structure with artistic expression. Besides, Semper points out colour as an integrated significant element of the whole system (Semper, 1834: 350) to get a symbol. This poetic inseparable link between ornament and structure may be found in Dresden Opera House, completed in 1842. It clearly demonstrates Semper's ornamental thinking approach in which all parts relate to each other and reflects harmonious relationship, as Hermann emphasises (Hermann, 1984: 5) (Figure 1.4.b). Therefore, Semper's holistic search of mind in textile theory transforms artistic motifs from mere representations into a living organism; structural

elements form an ornament. In his ‘animistic’ approach, the transcendence of reality and the focus on poetic tone in artistic creation forms his search for unique symbol.

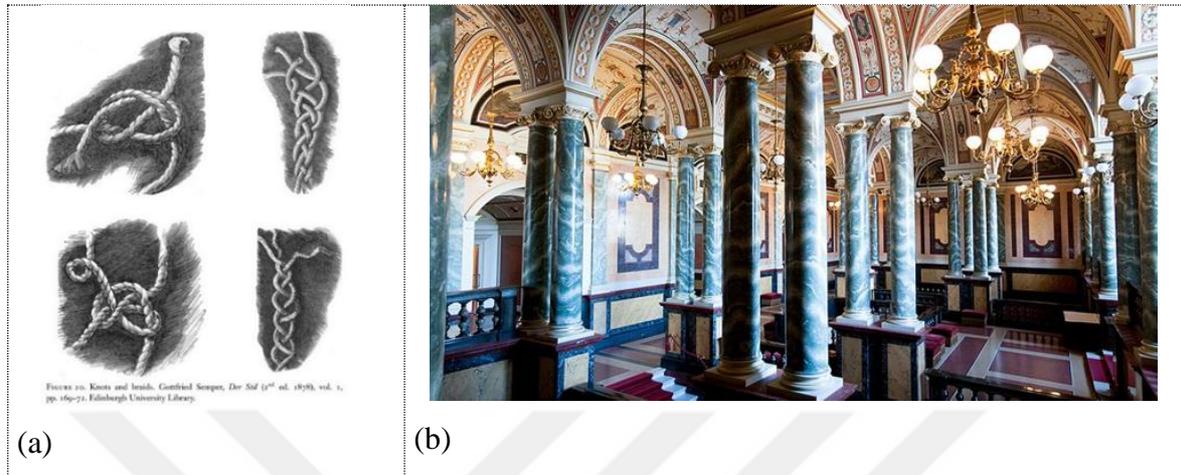


Figure 1.4. a) Semper’s knot as a structural approach (Hvattum, 2004: 68), b) The holistic expression of ornament and structure, Dresden Opera House (URL-4)

So, the small indications as continuity of the transitions achieved by Sullivan and the textile effect of Semper reveal that the perfect whole/symbol can also be formed in the solid geometry as an adherent beauty. So, despite the lack of coherent narrative that provides the perfect relationship between the part and the whole to achieve the symbol, the transformation of ornament from a representational artistic motif to a sculptural form requires the reconsideration of the link between figural arts and architecture.

Leon Battista Alberti

In *On the Art of Building in Ten Books as De Re Aedificatoria*, Alberti seeks for an embodiment whole. The metaphor of the human body emerges as parts of a supporting skeleton that corresponds to all parts of the structure, and 'skin' can be defined as a concept that completes and connects this whole system (Alberti, 1991: 71, 81, 180) and brings it to life. Payne refers to this as ‘anthropomorphism’ which alludes to Alberti’s human body concept (Payne, 2016: 148) in order to reframe the strategy of ornament through figural arts. Alberti's metaphorical understanding of the human body is emphasized by the links between figural ornamentation and bodily joints. The figural forms that refer to ‘humanoid’ and ‘zoomorphic’ or ‘organic’ used at the joints were also part of this metaphoric approach

utilised to bring these forms to life. The hybridizing power of the bodily approach emerges here (Payne, 2016: 151).

Alberti distinguishes between 'ornament' and 'beauty' by using Vitruvius's analogical approach to human body measurements to provide a clear foundation for a geometrically holistic system comprised of the harmonious unity of parts (Mallgrave, 2010: 13-14). According to Alberti, beauty is expressed by an 'inherent' concept derived from this holistic system, rather than by 'something attached or additional' ornament (Alberti, 1991: 156). He associates ornament with very different concepts such as 'stucco' or a 'mosaic work' and even statue (Alberti, 1991: 164, 240). He also expresses the concept of 'concinnitas', which states that all elements generated in this sequence interact with one another (Alberti, 1991: 302). As a result of 'concinnitas', ornamentation and all the parts that make up the building's skeleton emerge as an expression of a spiritual forming concept that goes beyond just bodily analogy (Mallgrave, 2010: 17). Semper's animated reading of 'dressing' theory, which completes the relations between the part and the whole, is reminiscent of Alberti's metaphor of 'skin' (Mallgrave, 2010: 69).

Alberti's harmonious geometric whole through 'concinnitas', which is the embodiment the integrity of the human mind in the object, somehow intersects Kant's purposiveness where there appears to be no purpose (purposeless purposiveness) reflecting the search for the highest form without any representation of concept based on his transcendental scheme (Mallgrave, 2010: 55), despite the fact that his humanist approach, which reflects the geometrical metaphorical order of a divine understanding, differs from Ruskin's holistic approach. Therefore, Alberti's harmonious geometric whole consists of perfect relationship of parts with whole based on human body concept shows that the desire of embodiment of Cassirer's perfect whole/single body in strict geometry as a symbol can only be achieved through abstraction and reinterpretation of figured forms in "adherent beauty".

In this study, it is believed that Cassirer's single body/symbol in adherent beauty in a strict geometry consists of harmonious unity of all parts can only be achieved through abstraction and reinterpretation of figural forms in the context of ornament and "body" relationship.

In this manner, this thesis focuses on the holistic role of sculptural ornament muqarnas¹ as a gradual transition element which is a fundamental element of Islam. It focuses on the use of muqarnas as a gradual transition element in the mosque architecture, which is the place of worship. The development of muqarnas by focusing on the dome-wall connection in the ornament and structure relationship is examined.²

The method of the research

The aim is to investigate this perfect whole/symbol in adherent beauty through the degree of fusion of the element(s) in the whole, whether it is a symbol/single body in a very deep relationship as a result of perfect abstraction or a representation if the parts do not belong to holistic expression with insufficient fusion.

This study is based on the fact that the use of muqarnas as a gradual transition element in dome-wall have different meanings in the historical process. The muqarnas chosen as the sample of the study is examined chronologically in the context of the degree of fusion in mosque architecture in the historical process. The degree of fusion in the whole is examined in the relationship of muqarnas with other structural elements in the dome-wall relationship. Due to the breaking point in the historical process emerging in mosques of Architect Sinan's period, three great monuments of Architect Sinan as Şehzade, Süleymaniye, and Selimiye Mosques were chosen. The change in the development in the use of muqarnas emerged before and after Architect Sinan's mosques provided to measure the degree of fusion which shows whether it is a symbol or representation. In this manner the work shows how the use of muqarnas as a gradual transition element / ornament in the Architect Sinan's period provide the fusion in the whole and ensure the harmonious unity of dome and wall revealing the adherent beauty of the perfect symbol/single body.

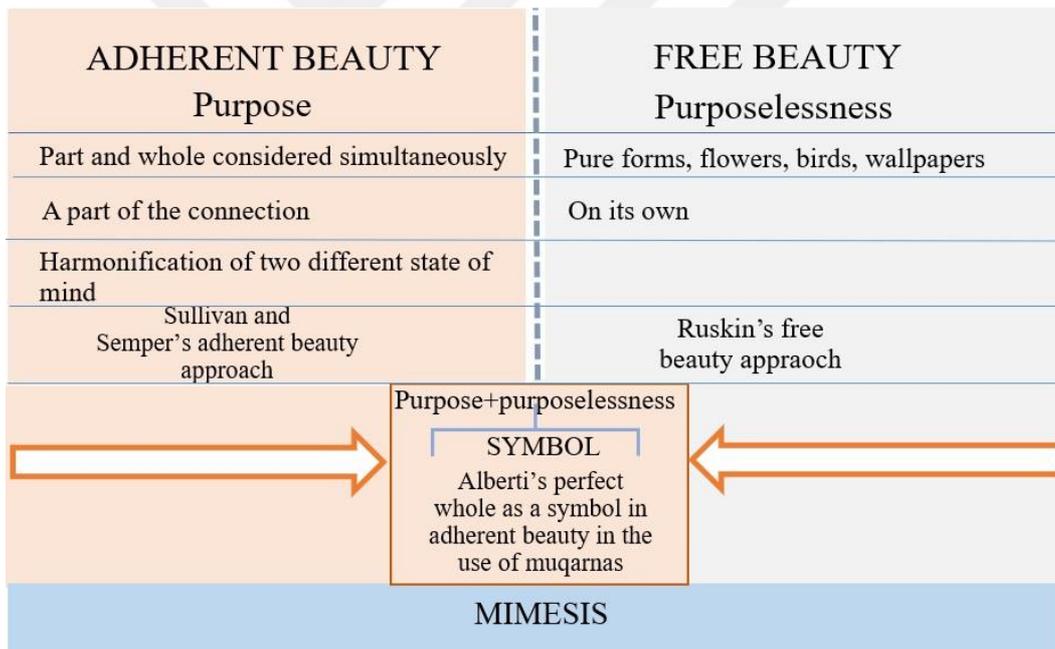
¹ Muqarnas refers to the 'honeycomb or stalactite vault' arrangement formed by overlapping systems (Necipoğlu, 1996: 349). The term muqarnas also refers to Greek cornice (Dold-Samplonius, 1992). While there was no definition of muqarnas in the early period of Islam and before, there is a definition from the Persian dictionary. While the Persians used it in a general sense such as "*something like a nose projecting in a mountain.*" architecturally, it is defined as a term that corresponds to a dome also covered with painting (Dold-Samplonius, 1992).

² As it is aimed to examine the relationship of the part and the whole that creates a single body/symbol in adherent beauty, muqarnas on the mihrab and portal element which was separated from the structure in the historical process, is not included in the scope of the thesis (see appendix-1).

The main hypothesis

As revealed, John Ruskin acts as if the single body/symbol is only possible with the attitude of free beauty where the distinction between ornament and structure disappears. However, in Sullivan and Semper’s artistic creation process, the key stages as the animation of ornament through the structural parts and the representational motifs turned into sculptural forms reveal that it is also possible for reaching an adherent beauty that also corresponds to the symbol. With this in mind, it is assumed in this study that a perfect symbol/single body can also be obtained as adherent beauty in strict geometry, although there is a danger that external parts may become pure representations detached from the structure (Table 1.2).

Table 1.2. From representation to single body/symbol in adherent beauty and intersection with holistic attitude in free beauty approach



Research’s objectives and importance

In this thesis, it is believed that the formation of a perfect whole/symbol is also possible in solid geometry as an adherent beauty. In this sense, while addressing the potential of the strong link between the figure arts and architecture, the main purpose of this thesis is to point out a strong potential that reveals Cassirer's perfect whole/symbol in the strict geometry of Kant's adherent beauty, which is believed to correspond to the harmonious geometric whole of Renaissance art historian and humanist Leon Battista Alberti.

Research's questions

- How Kant's adherent beauty in strict geometry referring to Alberti's harmonious geometric whole, the perfect symbol consisting of the harmonious unity of parts is realized in the use of muqarnas in Islam?
- What is the degree of fusion of muqarnas as a gradual transition element through the historical process?
- How Architect Sinan reveals the perfect symbol/single body in strict geometry of Kant's adherent beauty?

Within the scope of the thesis, the subject is addressed under four primary headings. *In the first part of thesis*, the subject is stated, the literature review research's objective and importance, research's question and the main hypothesis is mentioned. *In the second part of the thesis* the state of being a symbol or representation; the degree of fusion in the whole in dome-wall in relation to other transition elements of muqarnas as a gradual transition element; is examined in mosque architecture. The development in the use of transition element to dome is examined from its first use to the Seljuks in mosque architecture. Then, the use of muqarnas as a gradual transition element in relation to other transitional elements in the dome-wall relationship from Seljuks to Ottomans until Architect Sinan period is examined. *In the third part of the thesis*, in order to reveal the adherent beauty as a symbol, the development in the use of muqarnas in three great monuments; Şehzade, Süleymaniye and Selimiye Mosque of Architect Sinan period is examined. *In discussion and conclusion*, as a result of the evaluations, the hypothesis is evaluated and suggestions for future research are presented (Figure 1.5).

Chapter	Research Questions/Content	Method
1 Introduction	The subject, research objectives and importance, research questions and main hypothesis and method.	Literature Review
2 Theoretical Background	What is the degree of fusion of muqarnas as a gradual transition element through the historical process?	Literature Review
3 Case Studies	How Architect Sinan reveals the perfect symbol/single body in strict geometry of Kant's adherent beauty?	Literature Review
4 Discussion and Conclusion	By referring to Alberti's harmonious geometric whole, the answers to the research question of how a perfect symbol/one body as an adherent beauty embodied in the use of muqarnas in Islam are given. As a result of the evaluations, the hypothesis is confirmed and suggestions for future research are presented.	Analysis and evaluation of the obtained data and evaluation of results

Figure 1.5. Thesis flow-chart

2. MUQARNAS AS A GRADUAL TRANSITION ELEMENT IN THE HISTORICAL PROCESS

The emergence of muqarnas is associated with its use as a transitional element between the wall and the dome (Abu-ilğeit, 2009: 15, as cited in Dallal, 2019: 12). But, on the other hand, muqarnas is also associated with the use of different transition elements. In the historical process, different transition elements were used in the construction of the domed structure. Within the scope of this thesis, the use of these elements such as pendants, Turkish Triangles, and squinches, in relation to the use of muqarnas element in Islam will come to the fore. Pendentives, which are also defined as spherical triangles, provide the transition to the dome by closing the gap between the arch supporting the dome and the dome base (Hasol, 2014: 356). The pendant was developed by Byzantine architects (Uşma, 2018). The Turkish triangle was used as another different transition element in Anatolian-Turkish architecture. The Turkish triangle, which was first used in Uyghur domes, creates a belt from the wall to the dome (Hasol, 2014: 482). The Turkish triangle placed on each side of the dome base transfers loads of the dome to the lower part and provides the transition to the dome. It forms of a triangular base at the base of the dome and a hill at the corners of the square (Çamlıbel, 1998: 279, as cited in Uşma, 2018). Another transition element to dome; squinch developed in Iran (Uşma, 2018). Squinch is defined as the corbelled vault, which provides the transition from the square plan to the dome with the octagonal transition zone by settling at the corners. The Sassanid Empire was the first to use the squinch (Hasol, 2014: 470). Arches and corners at squinches support to distribute the load to the wall (Uşma, 2018). On the other hand, muqarnas, unlike all these structural elements, manifests itself as a gradual transition element in order to be a part of these elements; pendants, Turkish triangle, and squinches (Figure 2.1).

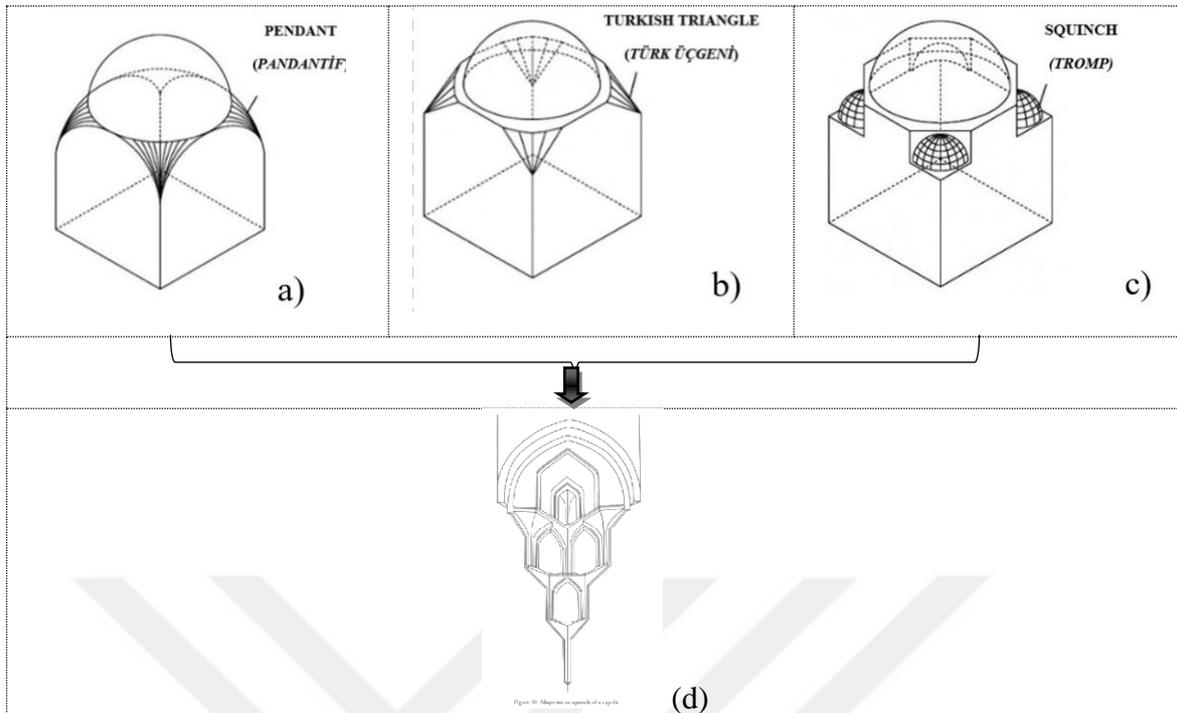


Figure 2.1. a) pendant b) Turkish triangle c) squinch and d) muqarnas (URL-5, URL-6)

Muqarnas stands out with its unique feature since it is not merely an ornamental element with the function it undertakes in the transition from one geometric scheme to another (Ödekan, 1988a). It is used in different parts of the building “to connect to two vertical, non-coplanar surfaces” or for “transition from square to circular” (Garofalo, 2011). Muqarnas appear in 'column capitals, minaret balconies, portals, niches or halls' and integrate into different elements. It can have a structural function when used in dome transition areas (Necipoğlu, 1996: 349). Muqarnas is an ‘abstract sculpture’ of Islam with its unique aesthetic and structural role that provides transition between geometries and surfaces (Ahmed and Ola, 2022). It transforms two-dimensional surface into a three-dimensional geometry with a parametric transformation in the connection between the wall surface and the ceiling volume (Islami and Mirgozar Langaroudi, 2021).

The geographic and chronological origin of muqarnas is uncertain and differs from researchers such as Tabbaa, Bloom, Ettinghausen, and Carrillo (Tabbaa, 1985; Bloom, 1988; Ettinghausen, Grabar and Jenkins, 2003; Carrillo, 2016). On the other hand, muqarnas takes on an Islamic form with various materials 'wood, stucco, brick, stone' and different features from Iran to Spain (Tabbaa, 1985). Depending on the geographical location, the

historical period, the section in the building and the use of materials, the muqarnas element can be in different compositions, sizes and forms (Garofalo, 2011).

Before examining the development of muqarnas as a gradual transition element in relation to other transition elements in mosque architecture, in search of a symbol/single body shaped according to the culture, it is necessary to explain the development in the use of transition elements to dome. Firstly, the mosque examples of Islamic period before Seljuks will be examined chronologically existing within the borders of the Great Seljuk Empire (1037–1194) and Anatolian Seljuks (1077–1308). Later, in the periods from Seljuks to Ottomans, the development in the relationship of muqarnas with other transition elements in the search for the perfect symbol in Islam will be examined. With the unity of structural development and aesthetic search, it will be shown how the muqarnas acts as a joint between the wall and the dome through the perfection in the fusion of elements.

2.1. Transition elements to the dome in pre-Seljuk mosques

The boundaries of Islam were expanded from Mecca through four caliphates following Prophet Muhammad's death in 632. Iraq, Iran, Khorasan, Azerbaijan, Syria, Palestine, Egypt and North Africa were recognized to be parts of Islamic territories (Figure 2.2).

The Great Seljuk Empire (1037–1194), was a high medieval, culturally Turco-Persian, Sunni Muslim empire, founded and ruled by the Qiniq branch of Oghuz Turks. It covered a total area of 3.9 million square kilometres (1.5 million square miles) from Anatolia and the Levant in the west to the Hindu Kush in the east, and from Central Asia in the north to the Persian Gulf in the south (URL-7). The mosque examples of Islamic period given in the first part below dated before Seljuks are given in chronological order (Figure 2.2).



Figure 2.2. The mosques before Seljuks in the boundary of The Great Seljuk Empire and Anatolian Seljuks (revised/adopted by the author from URL-8)

Masjid an Nabawi, 622 AD. in Saudi Arabia

Masjid an-Nabawi, which has an important place in the history of Islam, is one of the two mosques built by Prophet Muhammad in Medina. The simply designed masjid was built with mudbrick walls on a stone foundation. A six-posted porch roof was added to the section on the qibla side. 'Hücre-i saadetin' is one of the important parts of the mosque where the tomb of Prophet Muhammad is located. The mosque had some additions in later periods. The dome rising above 'hücre-i saadetin' was added in the period of Mameluks. This dome, also known as 'Kubbetü'n-nur', was replaced by a stone dome with the change emerged in the 19th century (Bozkurt and Küçükaşçı, 2004). The simple elements which were reflected on the exterior as Turkish triangle were used to provide the transition to this dome (Figure 2.3).

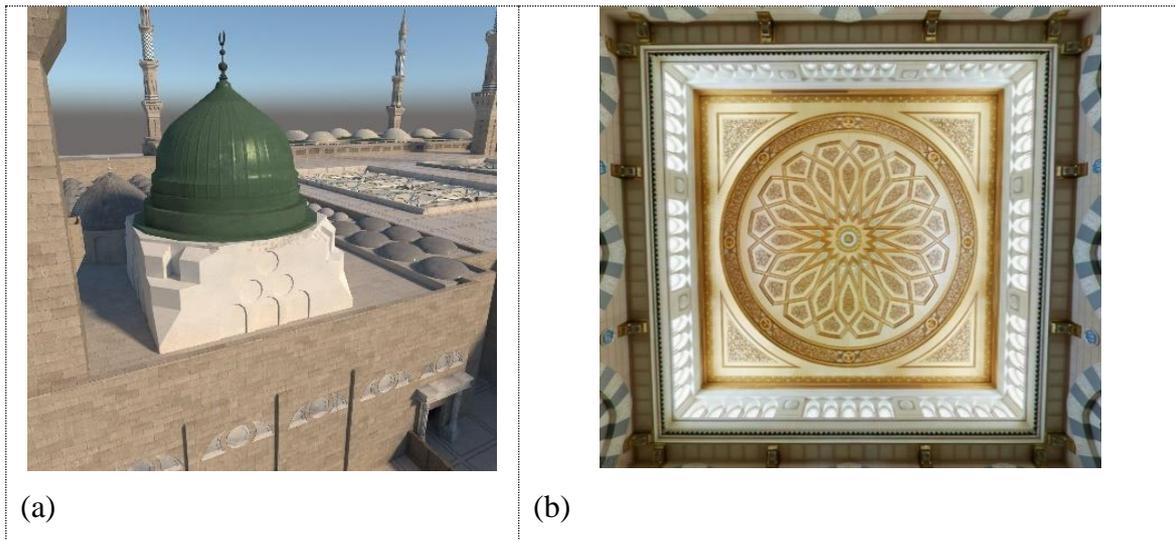


Figure 2.3. Masjid an Nabawi a) 3D model (URL-9) b) transition to dome with the simple use of transition elements (URL-10)

Quba Mosque is one of the first mosques in the history of Islam. It was built by the Prophet Muhammad in Madina similar to Masjid an Nabawi. The first four-walled masjid was later covered with a ceiling by adding the front wall and seven columns with the recognition of the qibla as the Kaaba (Algül, 2004). The mosque received different additions in the following periods and underwent a reconstruction process in the 20th century. In this construction, six large domes of different heights rising on double arches were included (Bozkurt, 2004). These six large domes have simple squinches and pendentives in the main prayer hall (Figure 2.4).

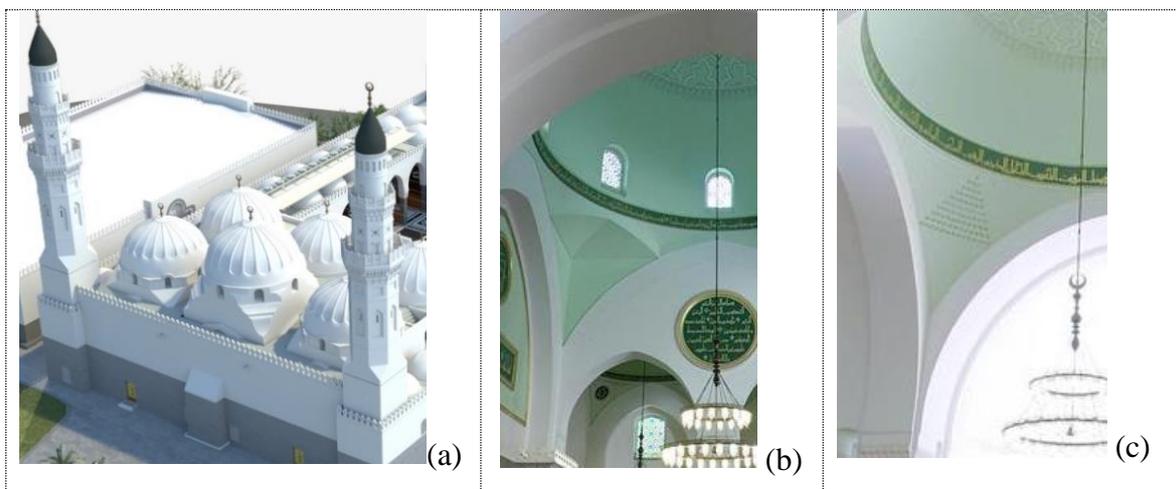


Figure 2.4. Quba Mosque a) 3D model (URL-11) b) c) simple use of pendants and squinch (URL-12)

Great Mosque of Damascus in Syria (715)

In the early Islamic period, the domination of the Umayyads (660 -750), who settled in Syria and ruled the Islamic state, continued until the domination of the Abbasids in 750. Some escaped Umayyads continued to exist in Spain until 1051. Umayyads preferred the use of stone, wood and brick as construction materials (Petersen, 1996: 296). The Great Mosque of Damascus (706-715) in Syria, a significant monumental mosque of Islam built by Umayyad caliph al Walid (Grabar, 1987: 110). It is one of the first examples of the domed space in the place of worship with the dome in front of the mihrab (Ögel, 1979). The transition to dome was provided by squinches (Yetkin, 1965: 10) (Figure 2.5).

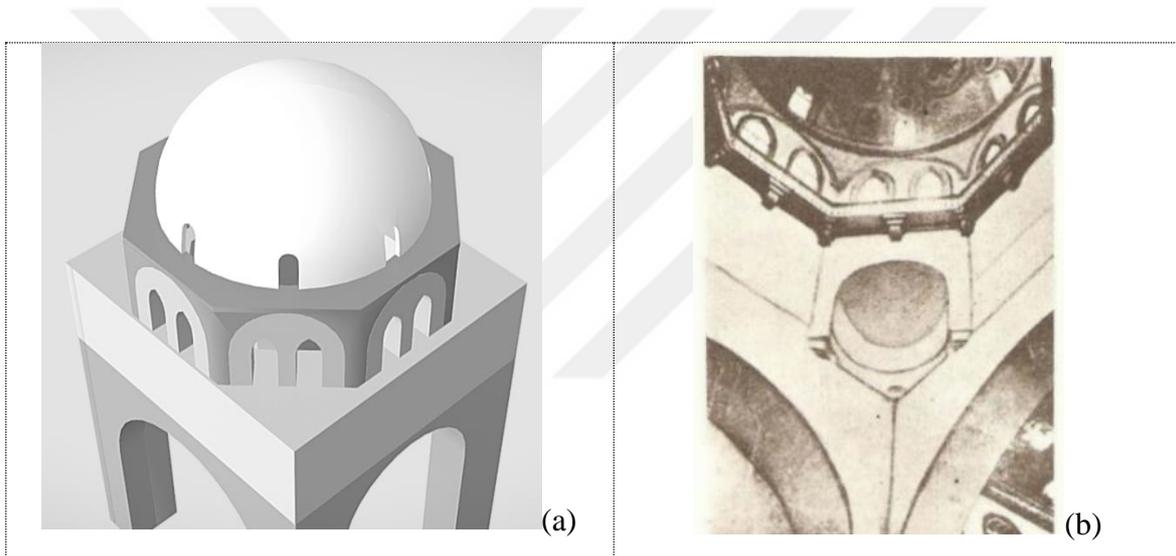


Figure 2.5. Great Mosque of Damascus a) 3D model (URL-13), b) semi-circular squinch detail (Yetkin, 1984: 19)

Although it is located outside the lands occupied by the Seljuks, the basic corner squinch element can also be seen in the dome-wall joins of the mosque in Al-Azhar Mosque (970-972) in Cairo, Egypt which is also the first mosque of the Fatimids built in Egypt (Yetkin, 1984: 33-34) (Figure 2.6).

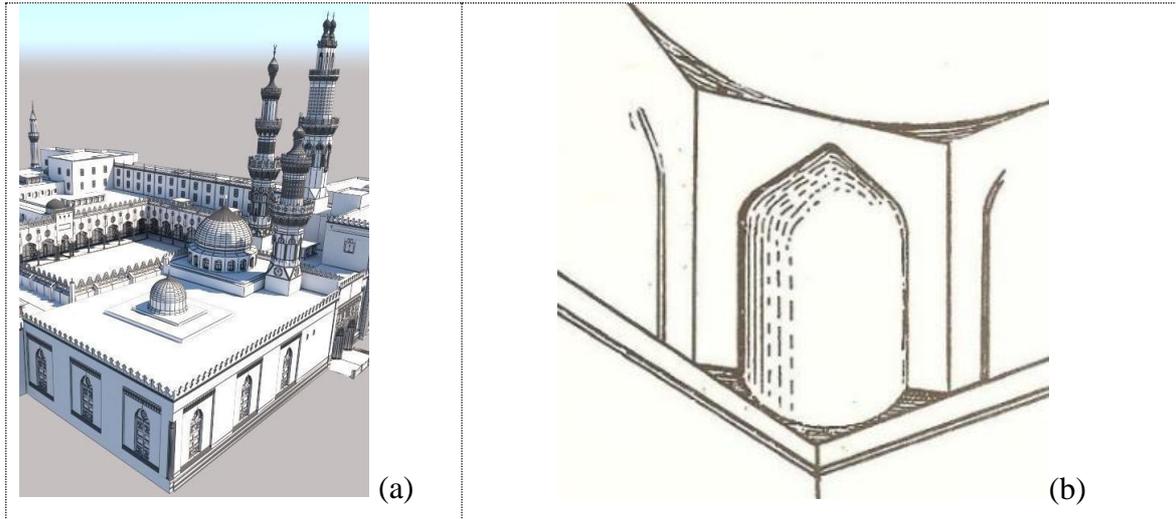


Figure 2.6. Al Azhar Mosque (970-972) a) 3D model (URL-14) b) squinch detail (Yetkin, 1984: 34)

Although in different forms, similar attitude in the use of simple squinch element can also be seen in another early period mosque located outside the borders of Seljuks which is The Great Mosque of Qayrawan Kairouan Mosque in Kairouan (670), Tunisia built by Uqba bin Nafi. Kairouan is the earliest example of the large main stone dome (836, 872, 875) in which the transition has a fragmented expression that is a clear. The mosque has a transition *'from square to octagonal zone, sixteen-sided zoneto ribbed cupola'* (Grabar, 1987: 130). The transition to this dome in front of mihrab is created by *'four shell-like squinches'* and *'four blind arches'* (Ettinghausen et al., 2003: 36) (Figure 2.7).

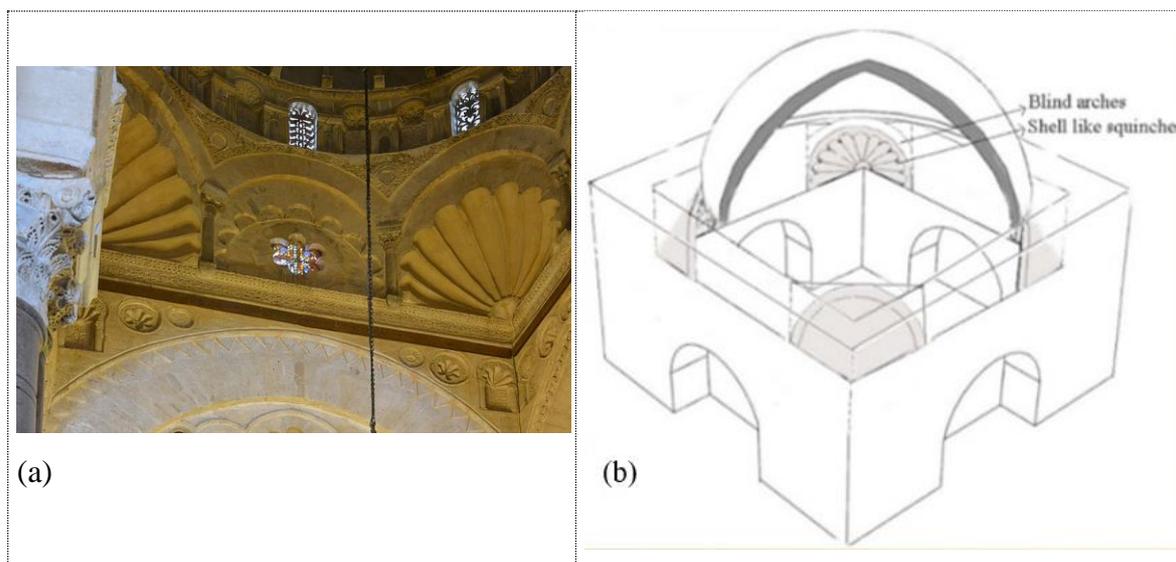


Figure 2.7. Kairouan Mosque a) detail of transition to mihrab dome (URL-15) b) axonometry by the author

Nain Friday Mosque in Nain, Iran (940)

After the destruction of the Umayyads, in 762, with the leadership of al-Mansur, the capital city of Damascus was moved, and the Abbasids (750-1258) appeared in Baghdad. The Abbasids, who will also rule in Samarra, their other capital city after Baghdad, had a widespread area (Petersen, 1996: 1). The Abbasids more tended to use mud brick and baked brick with plaster and geometric and floral ornament, technically in their buildings differ from the Umayyads as they used stone in Syria (Hattstein and Delius, 2010: 94). The mosque belongs to Abbasid period, Nain Friday Mosque in Nain, Iran (940) at mid-10th century, represents the Abbasid decoration approach in Iran (Hattstein and Delius, 2010: 110). In this mosque, the ‘round back squinches’ in vaults is one of the key examples of squinch development (Pope, 1938 as cited in Edwards and Edwards, 1999) which is thought to have existed before the Seljuk period (Hillenbrand, 1985). In addition to the complementary role in the corner along the extension of the two walls, the squinch-like elements used here serve as the shell for the entire vault (Dadkhah, Safaeipour, and Memarian, 2012). This example shows the development in the degree of fusion rather than the use of single squinch (Figure 2.8).

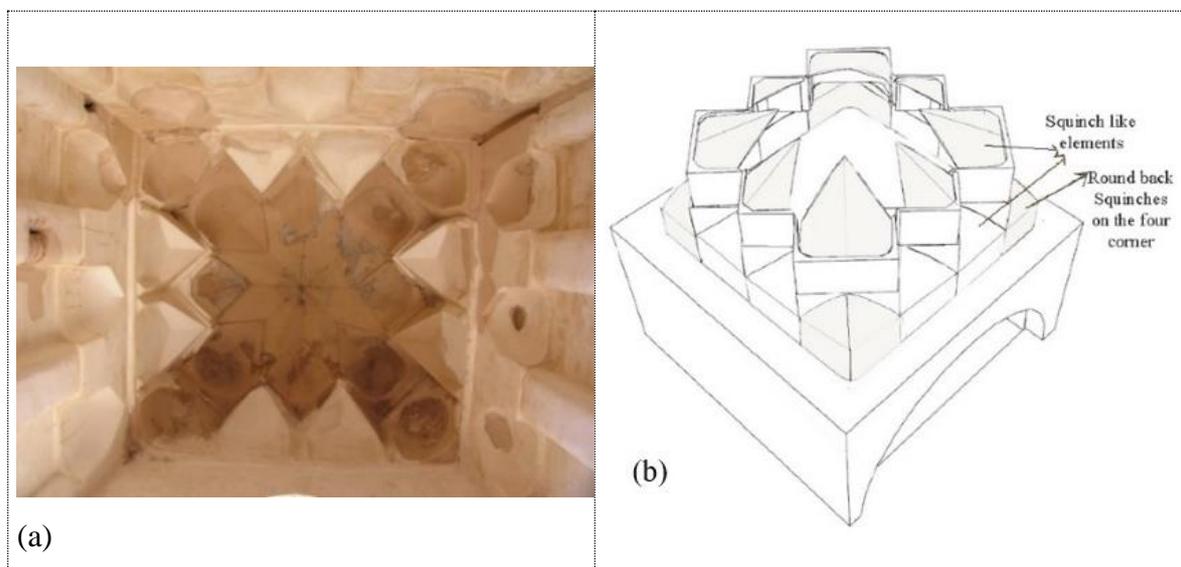


Figure 2.8. Nain Friday Mosque (940) a) Northern iwan shell vault squinches (URL-16), b) axonometry by author

As has been demonstrated in mosque architecture from the beginning of Islam, muqarnas was not common as a gradual transitional element, while other transitional elements were

often used simply. In this design approach, it is not possible to talk about the fusion of elements.

2.2. Seljuks period (1037-1308)

By the 10th century, Turks adopted Islam and spread in Islamic lands. With the emergence of Turkish states in Asia, this movement became apparent. The Karakhanids (840-1212) established in Asia are the first Islamic state (Aslanapa, 1989: 27). In period between the 11th and 12th centuries, when the Islamic lands were under the influence of the Turks, the entry of the Ghaznavids (977-1186) and then the Great Seljuks (1037-1194) reigned in Iran and Iraq, starting from the northeast of Iran and advancing to the west. Later, the Seljuks ruled Anatolia through the Battle of Manzikert (1071) (Ettinghausen et al., 2003: 134). The unity in the Muslim world was disrupted by the 13th century Mongolian Invasion, when Baghdad was captured in 1258.

The Anatolian Seljuks, on the other hand, continued their dominance until the end of the 13th century (Ettinghausen et al., 2003: 135). In this section, the mosques will be examined within the borders of Seljuks from the beginning of Seljuks period in 1037 (Figure 2.9).



Figure 2.9. The domination of Seljuk Empire in Islamic lands (revised/adopted by author from URL-17)

Degaron Mosque in Hazara city of Uzbekistan, 11th century

Degaron Mosque, which was built in the city of Hazar, Uzbekistan in the 11th century, is one of the Karakhanid mosques that developed the central plan scheme consisting of a central dome and four small domes. The mosque, which stands out with its plan and architecture, was built by using adobe and bricks (Aslanapa, 1989: 27). The central dome rises on four round piers and large pointed arches. Simple squinches and pendentives took place in the dome transition that provides this central formation. In the corner domes, corbelled brick simple muqarnas was used which as well became widespread in Central Asia in the 11th century. These stepped elements were built by overlapping each other (Çeşmeli, 2003). This formation provided a basis for the structural and artistic muqarnas examples that appear in subsequent periods (Hattstein and Delius, 2010: 355) (Figure 2.10).

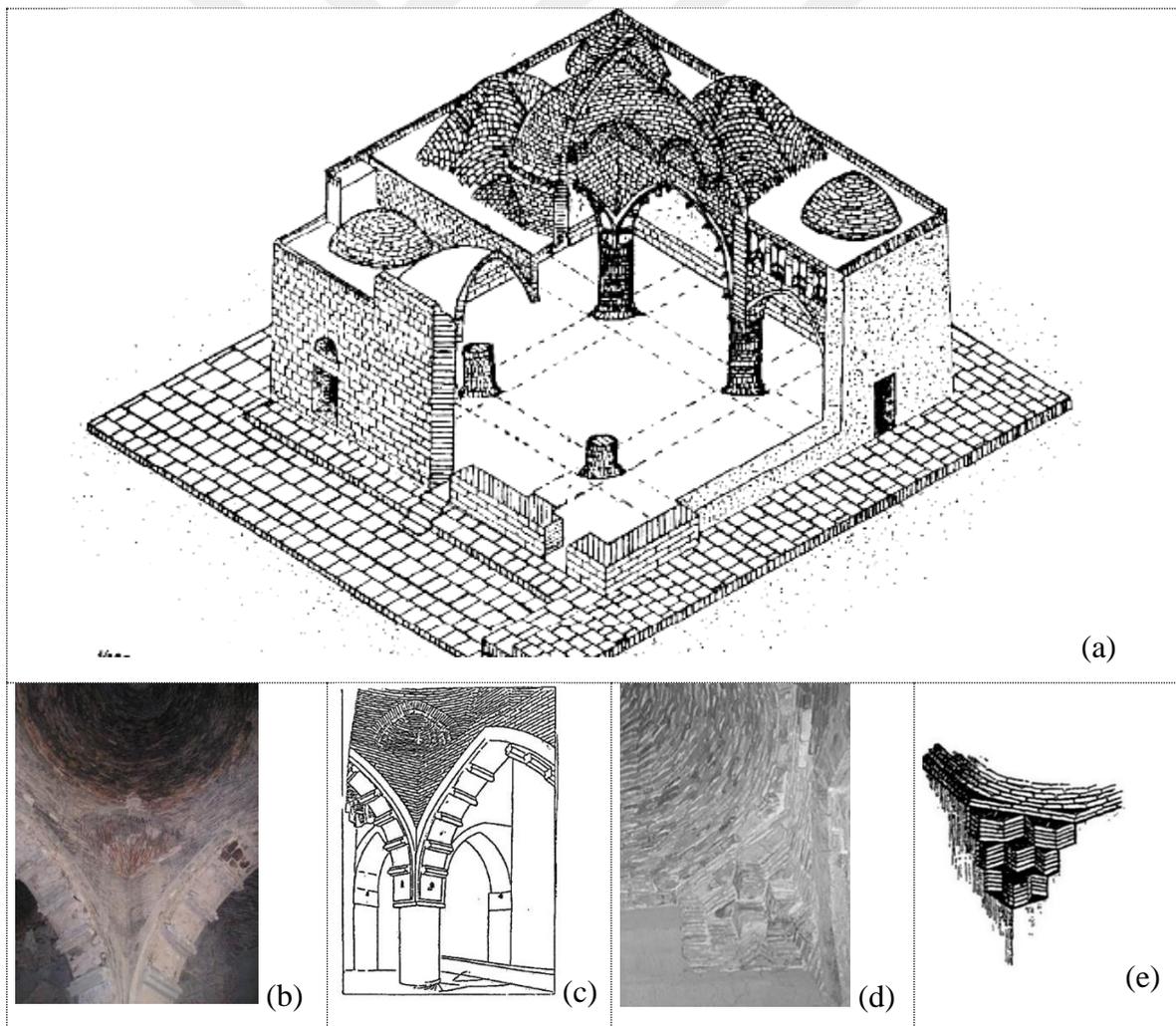


Figure 2.10. Degaron Mosque a) axonometry (Çeşmeli, 2003) b) (URL-18) c) drawing by (Çeşmeli, 2003) d) brick muqarnas (URL-18) and e) drawing (Çeşmeli, 2003)

Talhatan Baba Mosque in Merv, Turkmenistan in 11th- 12th century

The other Karakhanid Mosque is the Talhatan Baba Mosque built in Merv, Turkmenistan. The mosque, built of brick material, has a single-domed plan scheme expanding to the sides (Aslanapa, 1989: 29). Pointed arched squinches formed the transition to the dome. These squinches with geometric motifs have gradual triangular niches (Çeşmeli, 2005: 178) (Figure 2.11).

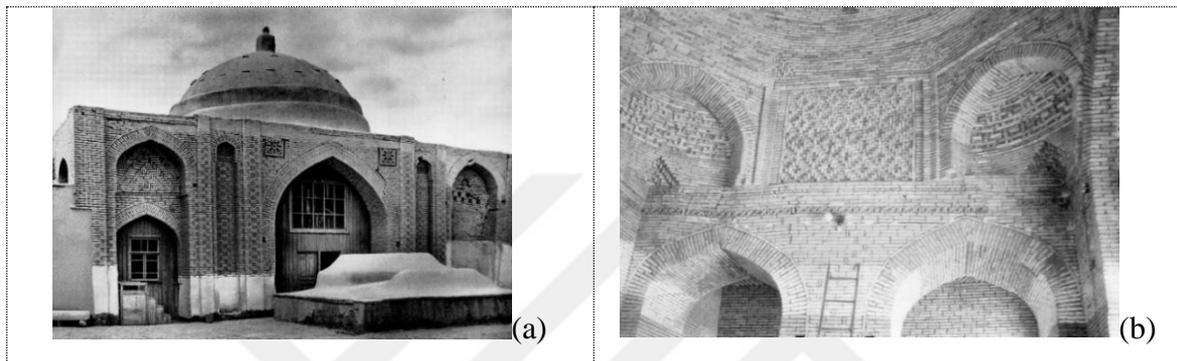


Figure 2.11. Talhatan Baba Mosque a) general view b) simple brick squinches (URL-19)

Mosques of Seljuks in Alborz School of Northwest Iran

Turkish Salyuqid dynasty (1037-1194) came to the fore with the technological invasion in the transition mechanism to dome change according to region of Iran. Northwest Iran, Alborz School and Central Iran change varies according the system of transition zone (Moradi, 2020). Gazvin, Qurva and Sujas Mosque (1100) as Seljuk structures in Northwest Iran used the just single arch in squinch which resembles the Sassanids transition mechanism. As Moradi argues although it differs from conical squinch this use of squinch just as a system of pointed frame is not very suitable for the transition to dome in large structures (Moradi, 2020). This single use of squinch as in the previous cases is weak for the combination of structural and decorative approach corresponds to situation where the degree of fusion is very low (Figure 2.12).

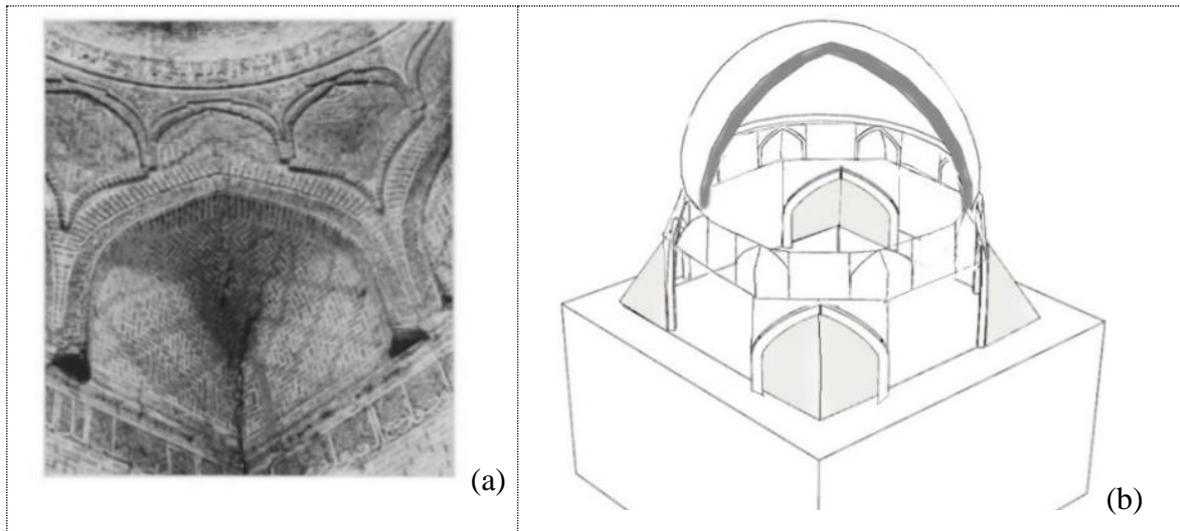


Figure 2.12. Sujas Mosque a) The squinch as a single arch (Hillenbrand, 1975)
b) axonometry by author

Mosques of Seljuks in Central Iran

Contrary the use of single squinch system, in Central Iran, there emerged system unity of shouldered arch system and pointed frame (Moradi, 2020). The Friday Mosque of Isfahan (Masjid-i Jomeh of Isfahan) is outstanding example with the south-east and north-east Salyuqid domes (1086-1088) with the design of squinches (Carrillo, 2016). It represents development for baked brick which produces devices such as ‘squinches, muqarnas, zones of transition, ornamental uses’ (Grabar, 1990: 19). The dome in front of the mihrab was built in brick by Malikshah and Nizam al-Mulk in 1086. The muqarnas on the transition to dome stands out with its large scale (Grabar, 1990: 49). The north dome chamber, added by the Taj al-Mulk in 1088/89, distinguishes out with its unique vertical alignment typical of Iranian architecture. Although it has similar sections to the other dome, such as the tripartite squinch and the 16-pass transition zone, the vertical emphasis was more emphasized. It represents the ‘masterpiece of mediaeval Persian architecture’ (Hattstein and Delius, 2010: 368-369). Shouldered arch system as a part of the structure in tri lobed squinch that emerged in Seljuks dome chambers provided both structural and decorative solution (Edwards and Edwards, 1999). The niche in the middle of the four-niche squinch has the role of a barrel vault. It was supported by a simple squinch. Literal niches with a pointed concave design are other elements of the squinch. The transition zone was supported by the hexadecimal squinch net as well (Carrillo, 2016). This hybridization of squinch with shouldered arch

system with the settlement of muqarnas provided an increase in the degree of fusion of ornament and structure (Figure 2.13).

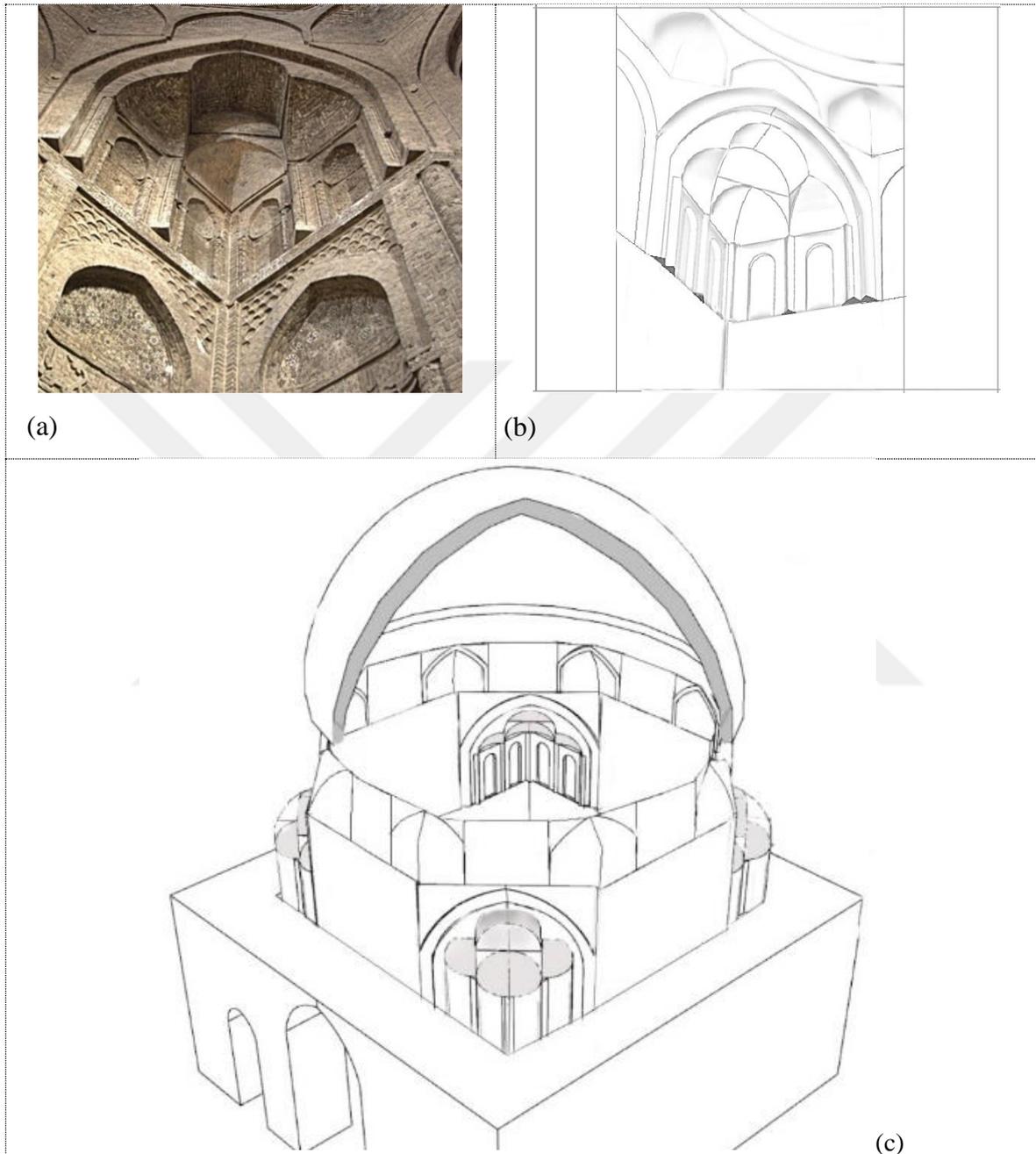


Figure 2.13. The Friday Mosque of Isfahan (Masjid-Jomeh of Isfahan) a) The detail of shouldered arch and squinch system in the north dome (URL-20), b) drawing by author, c) axonometry by author

In the other mosque of Seljuks, the solution of dome-wall relationship of north dome of the Friday Mosque of Isfahan was continued in Friday Mosque of Barsiyan (1104-1105), Friday Mosque of Ardistan (1158), and Friday Mosque of Zevareh (1135) (Korn, 2006).

*In Friday Mosque of Barsiyan (1104-1105), there is a gradual transition with three-segmented squinches and shallow niches with pointed arches at the transition to the dome in the domed chamber. Star, mesh and geometric patterns were found in shallow niches (Sepideh, 2021) (Figure 2.14.a).

*In Friday Mosque of Ardistan (1158), the squinch system at the transition to the dome is again similar to the Friday Mosque of Isfahan. The dome was covered with different patterns by the different arrangement of the bricks. The interior of the arches in the dome was decorated with ‘inscriptions and plaster ornaments’, making it different from other mosques (Aslanapa, 1989: 64-65) (Figure 2.14.b).

*In Friday Mosque of Zevareh (1135), geometric patterns formed by the different arranging of the bricks decorated the squinch area (Aslanapa, 1989: 64) (Figure 2.14. c).

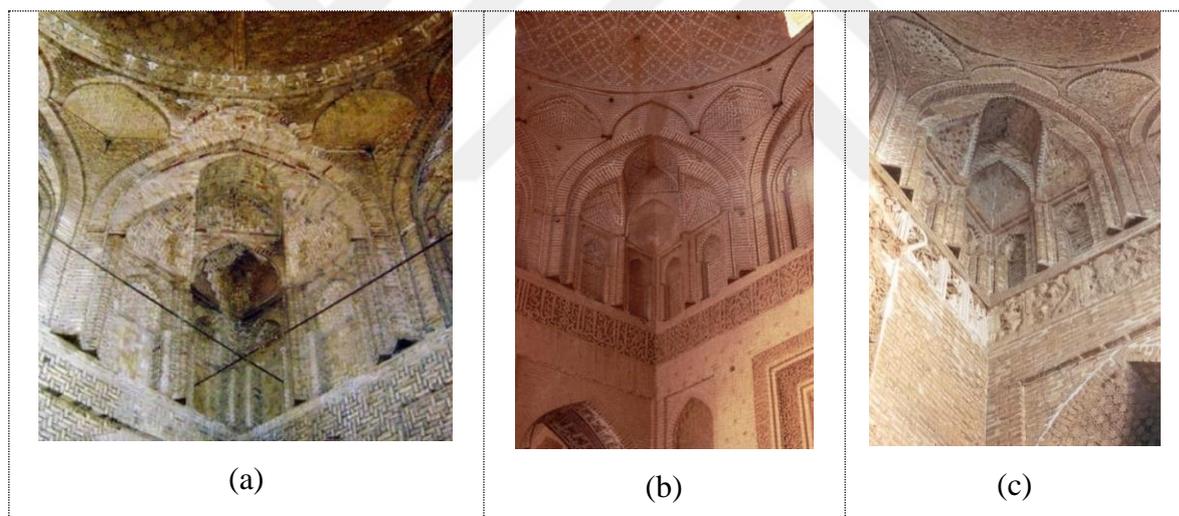


Figure 2.14. Transition detail of dome in a) The Friday Mosque of Barsiyan (1104-5), (URL-21) b) The Friday Mosque of Ardistan (1158) (URL-22) c) The Friday Mosque of Zevareh (1135) (URL-23)

Golpaygan Mosque (1114) has five layers differing from the tri-lobed design. It has the same transition mechanism of shouldered arch and squinch system as in the other Seljuk mosques in central Iran (Moradi, 2020). Unlike the two domes in the Isfahan Mosque, in the transitions to dome in Golpaygan Mosque, the tripartite squinch was replaced brick muqarnas with fragmented small niches that fills the corner arch. This transition zone solution differs from the wall segment design (Korn, 2012). It differs from Isfahan domes

with 'large triple cells' with its aesthetic pursuit in the gradual transition zone (Korn, 2012) (Figure 2.15).

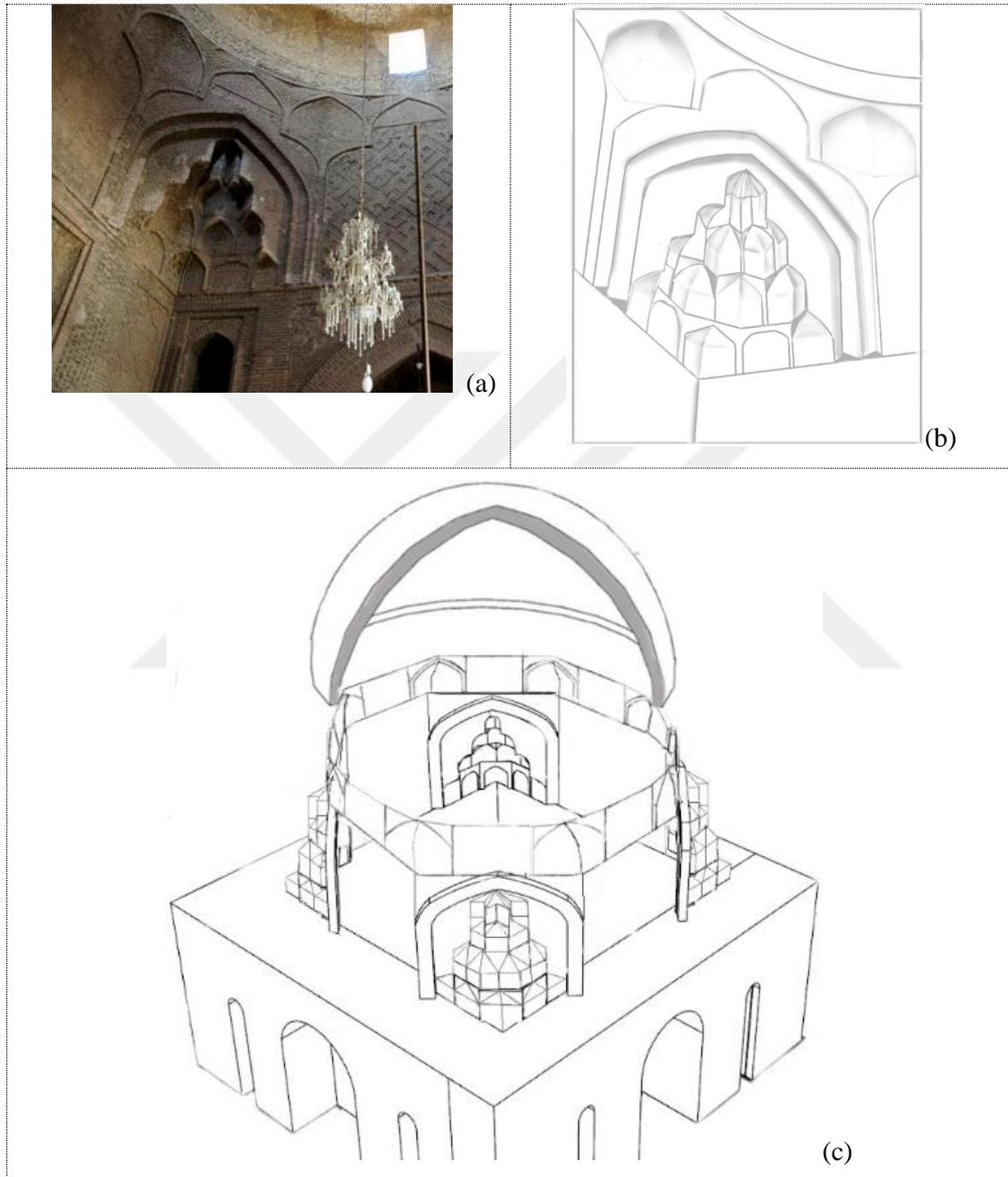


Figure 2.15. Golpaygan Mosque, a) detail of muqarnas (URL-24), b) drawing of muqarnas by author c) axonometry by author

Although it is outside the borders of Seljuk Empire, the development of this kind of muqarnas system can be seen in perfect artistic forms of Mameluks in the following periods.

In the Mameluks architecture, ornamentation manifests itself in each tier through the use of muqarnas with horizontal beds (Gonzalo and Alkadi, 2018). Sultan Baybars Al-Jashankir Masjid of Mameluks of Mameluks in Egypt (1309-40) can be given as an example of the muqarnas squinches created with different formations by carving the stone (Elkhateeb, 2012). It consists of a 3-layered vaulting in the transition to dome (Figure 2.15).

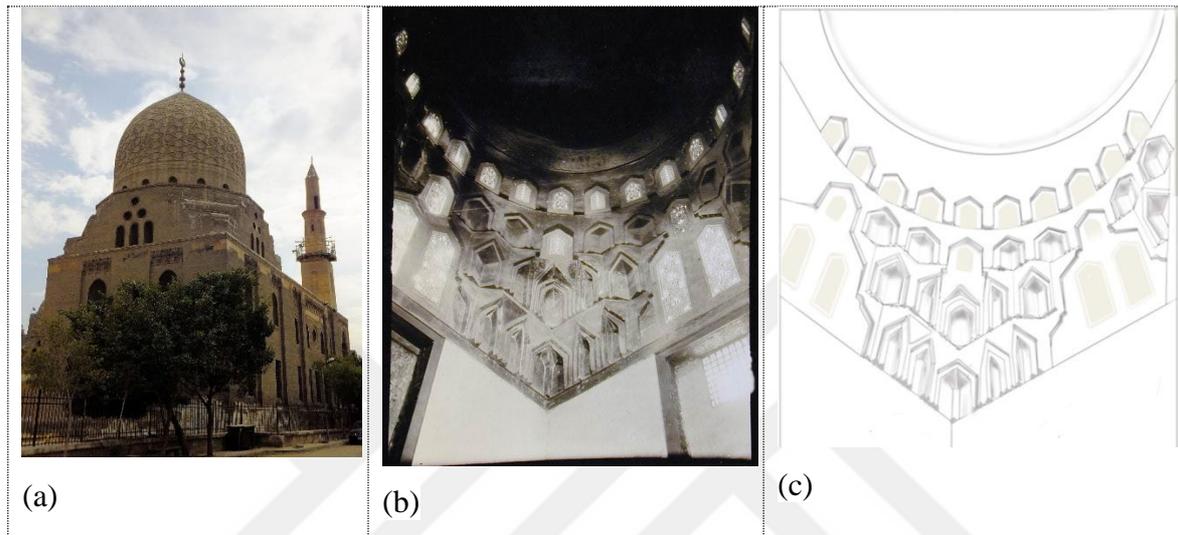


Figure 2.16. Sultan Baybars Al-Jashankir Masjid of Mameluks (1309-40) a) general view of the dome (URL-25), b) muqarnas squinch (URL-26) c) drawing by author

Seljuks in Anatolia (1077-1308)

Anatolian Seljuks preferred stone as the main material of their architecture (Öney, 1978: 9). The embellishment, materials, and their own distinct design approach separate the Anatolian Seljuks from the Great Seljuks (Karpuz, 2001: 3). Anatolian Seljuks continued to use similar transition mechanisms.

The squinch system with muqarnas, developed with ‘multi-layered’ squinch system during the Great Seljuk period, was continued in Anatolian Seljuks period with the use of stone material. Silvan Grand Mosque is the mosque that serves a first example of this squinch system filled with muqarnas during Anatolian Seljuks period (Baş, 2009). In Silvan Grand Mosque (1157), the squinches used in the transition to the dome in front of the mihrab in the *maqsura* area were part of the original design (Durukan, 2002: 96-97). In the gradual transition formed by pointed arches, muqarnas filling was used. Transition to the dome was provided with a hexagonal base along with the niches used in addition to these corner

squinches (Durukan, 2002: 98). Different motifs such as 'curled branch, rumi and palmette' were preferred in the cells of muqarnas squinches, consisting of different compositions in the structure where carving and relief techniques were applied in the decoration technique (Durukan, 2002: 99-100). Contrary to the patterns seen in the southwest and northwest muqarnas filled squinches, the southeast and northeast squinches have pure muqarnas cells (Baş, 2009) (Figure 2.17).

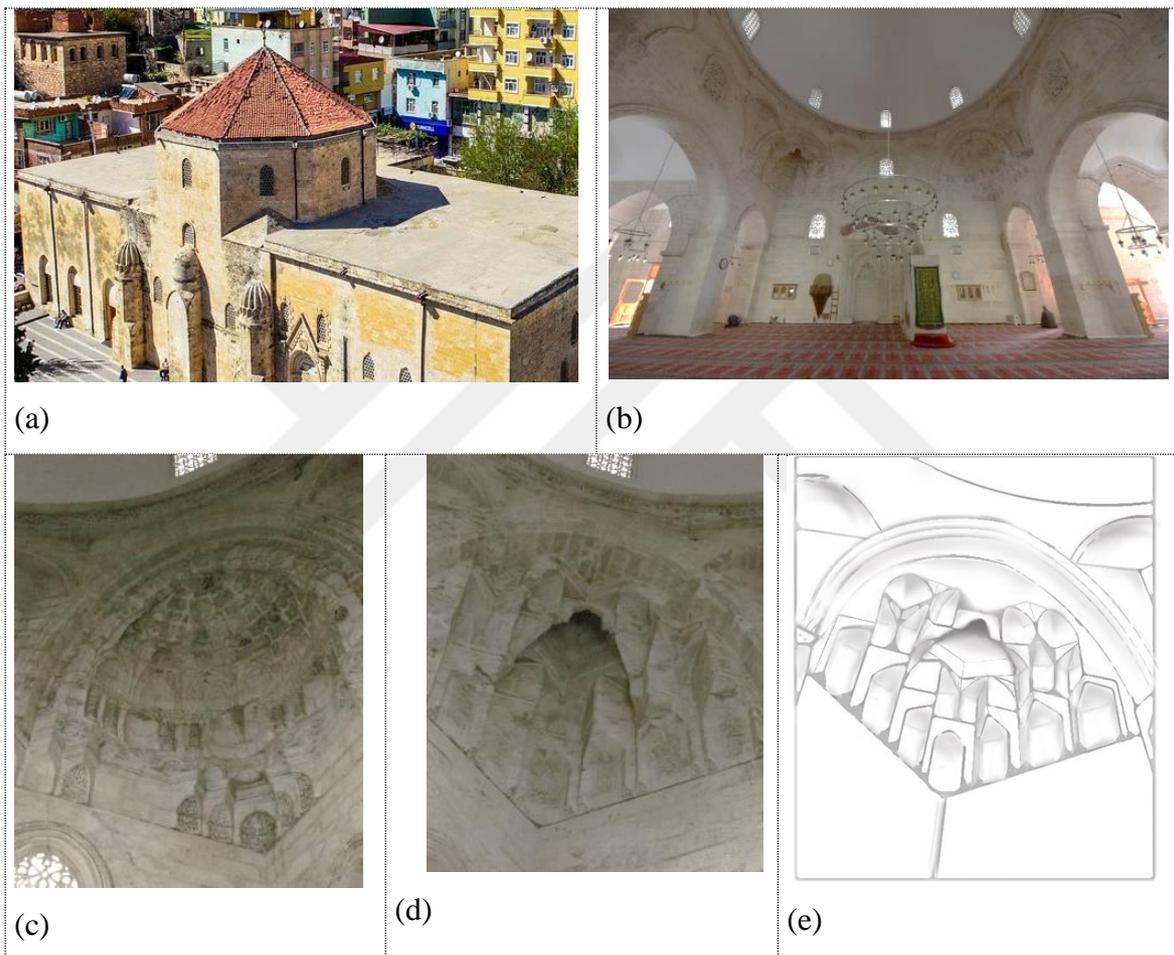


Figure 2.17. Silvan Grand Mosque (1157) a) general view of dome (URL-27) b) muqarnas squinches (URL-28) c) muqarnas squinches with motifs d) pure muqarnas squinches (URL-29) e) drawing by author

In Niğde Alaaddin Mosque (1223), gradual transition from the dome was provided by squinches filled with stone muqarnas (Aslanapa, 1989: 123). The mosque has a muqarnas system with motifs formed with 'yivli' niches contrary to the geometric order. It differs from the examples of the period with its muqarnas design (Kuban, 2002: 141). The three domes

in front of the qibla wall each has one of these squinches with muqarnas (Yetkin, 1965: 101) (Figure 2.18).

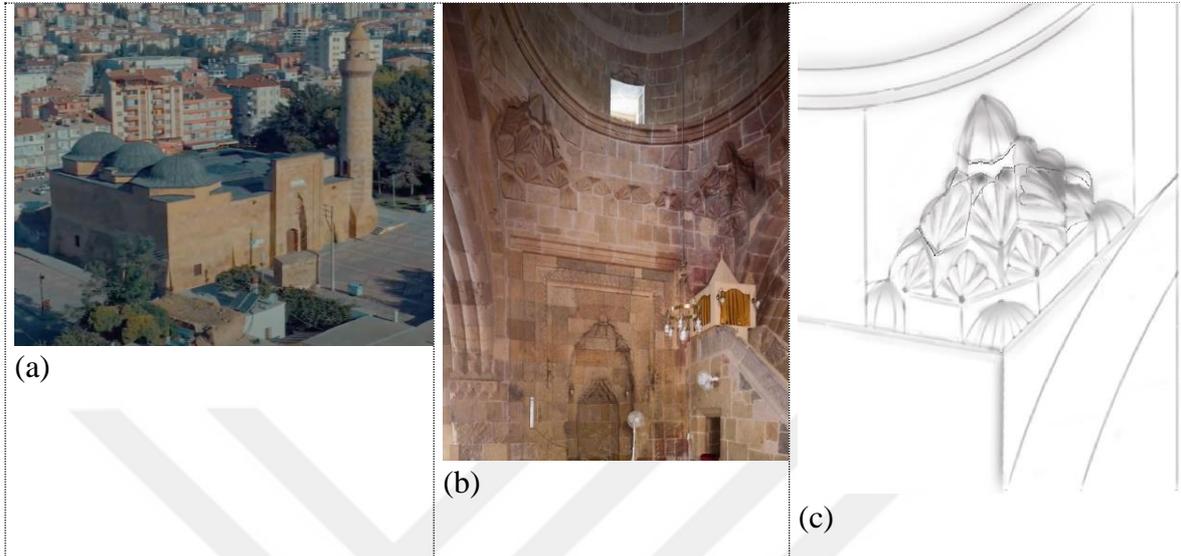


Figure 2.18. Niğde Alaaddin Mosque (1223), a) general view of dome (URL-30) b) muqarnas on the dome transition (URL-31) c) drawing by author

The Grand Mosque of Divriği (1229), also stands out with its pyramidal dome in front of the mihrab (Kuban, 2002: 115) which has squinches with muqarnas (Kuban and Emden, 2010: 42) (Figure 2.19).

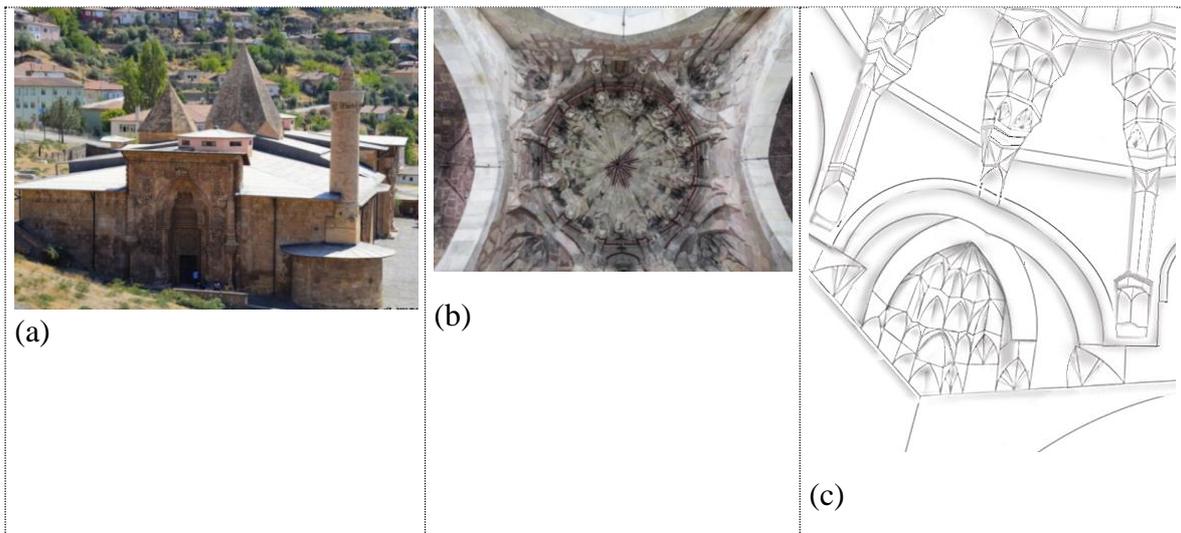


Figure 2.19. The Grand Mosque of Divriği (1229) a) general view of dome (URL-32) b) the dome with muqarnas (URL-33) c) drawing by author

2.3. Ottomans (1299-1453)

The Anatolian Seljuk State fell into a decline with the Battle of Köseadağ in 1243. While Seljuks Empire were finally disappeared in 1308, different principalities emerged in Anatolia as the continuation of the Seljuk state. These were the Karamanids, Germiyanids, Hamidids, Eshrefids, Mentеше, Jandarids, Beylik of Pervane, Sarukhanids, Aydinids, Beylik of Dulkadir, Beylik of Ramazan. The last one of these principalities was the Ottoman principality (Aslanapa, 1989: 193), which was built in 1299 by Osman Bey (Aslanapa, 1989: 218). Materials such as brick, tile, stucco and wood were also used during the period of principalities (Demiriz, 1979: 11-25). Geometric, vegetal, figurative and inscriptions, which manifest themselves in stone ornamentation during the Anatolian Seljuk period, were also preferred during the Principalities period. Geometric, vegetal and inscriptions decorative program were used in early Ottoman period as well (Görür, 1999: 474). In the Early Ottoman period, the use of muqarnas in the dome-transition were mostly applied with surface decorations.

Milas Firuz Bey Mosque (1394) in Muğla is a mosque that was built in the type of mosques with zawiya and maintains the approach of the Principalities period with its architecture (Durukan, 1996). In the dome in front of mihrab of the Milas Firuz Bey Mosque (1394), semi-domed muqarnas squinches and two rows of muqarnas transition elements with blue colored 'kalem işi' decorations were part of this design approach. The semi-domed squinches with muqarnas and arched sections with round windows and 'kalem işi' provided the transition to dome (Kayhan and Etikan, 2017). Similar to this, small muqarnas squinches were located in the right tabhane room of the mosque, between the transitional squinch to the dome and the dome decorated with pencil work (Kayhan and Etikan, 2017) (Figure 2.20).

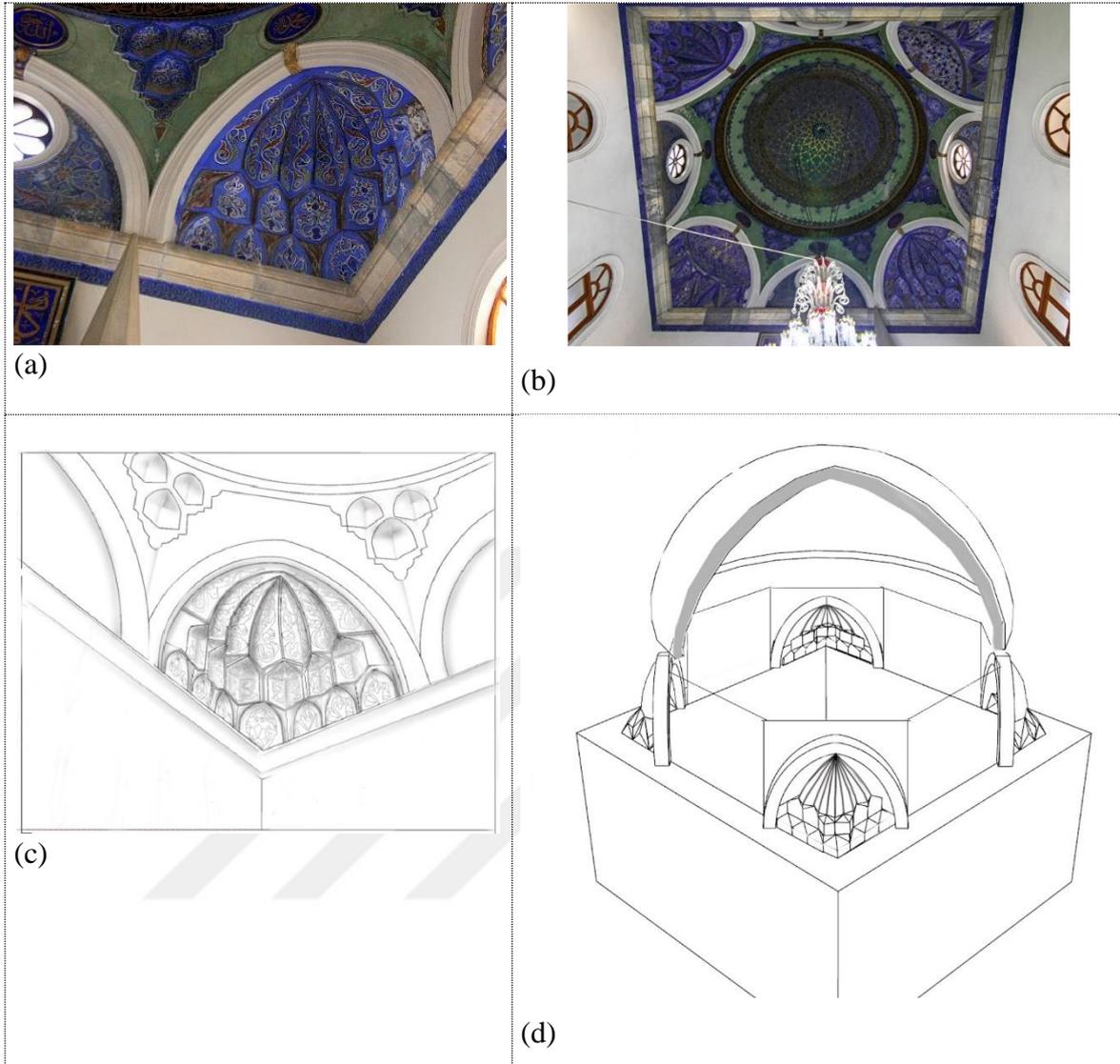


Figure 2.20. Milas Firuz Bey Mosque, Muğla a) muqarnas detail (URL-34) b) transition to dome in front of mihrab (URL-35) c) drawing and d) axonometry by author

Similar to Milas Firuz Bey Mosque, in Bursa Green Mosque (1419), hand-drawn decorations were used on the transition surfaces of the large domes and the south-eastern tabhane dome (Demiriz, 1979: 346), referring to general use of dome transitions in Ottomans where the surface of the plaster used on the brick is covered with ‘kalem işi’ and paint (Dallal, 2019: 223). The main domed space of the mosque has ‘triangular and baklavalı’ transition elements with hand-drawn decorations made of plaster (Demiriz, 1979: 346). Although the embroidery decorations in the mosque are only visible in the dome and on the skirt of the dome rising above the triangles, the hand-drawn embroidery covered all the walls in the continuation of tiled decoration in its first construction period (Yavaş, 2013). We can see similar triangle elements in Bursa Green Tomb (1421) next to the Green Mosque, where all

the walls were covered with tiles. It is the unique example of a tomb with tiles covering all its exteriors in Ottoman architecture (Yavaş, 2013). Although the Green Tomb has similar triangles as in the Bursa Green Mosque, it differs from the Green Mosque in terms of the relation between the dome and wall. In Green Tomb, fusion can be seen in the relation between the dome and the wall through perfect use of material by covering the wall and cover together with transition zone with tiles (Figure 2.21).

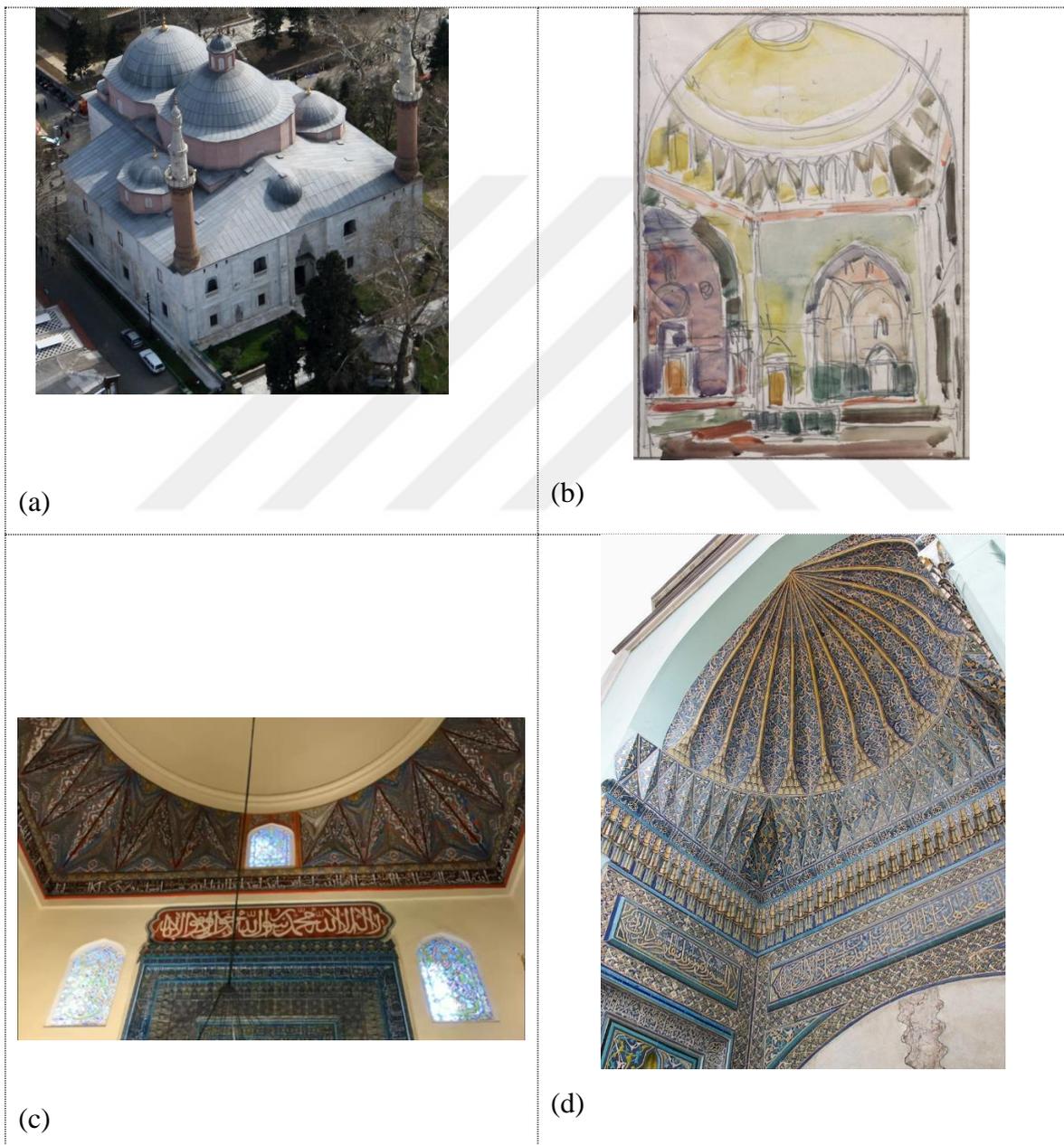


Figure 2.21. Bursa Green Mosque, a) exterior (URL-36) b) sketch drawing (URL-37) and c) interior (URL-38) d) Green Tomb (URL-39)

Similar to Bursa Green Tomb, the fusion search through the use of the material can be seen in Edirne Muradiye Mosque (1436). The middle dome in the mosque rises on prismatic triangles (Aslanapa, 2004: 232). The mosque, which stands out with its tile and hand-drawn decorations, has pieces showing that the upper half of the walls and the dome system were covered with multi-colored hand-drawn decorations (Akçıl and Özer, 2020). While the eastern and western walls of the mihrab section were covered with tiles, the inner face of the large arch in the mosque and the upper walls were adorned with these hand-drawn decorations (Aslanapa, 2004: 232). In this manner, the use of material penetrated into the wall and dome system connected by triangles, shows a parallel approach to achieve fusion with the material in the Bursa Green Tomb (Figure 2.22).

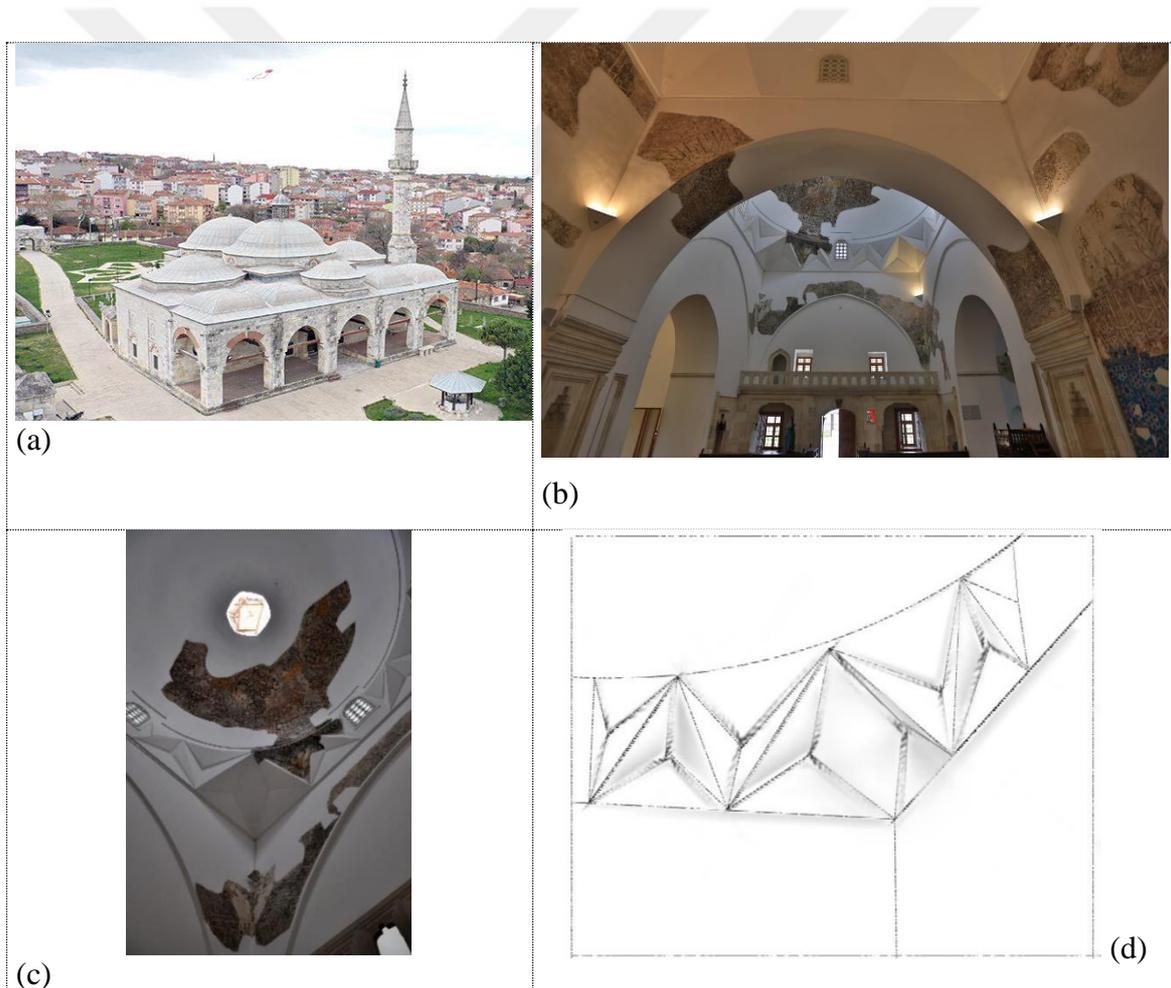


Figure 2.22. Edirne Muradiye Mosque (1426) a) exterior (URL-40) b) interior (URL-41) c) triangles (URL-42) and d) drawing by author

In Edirne Üç Şerefeli Mosque (1433), a ‘prismatic belt with muqarnas’ was used in the main dome, and gradual transitions in different forms took place in the side domes (Akçıl, 2012).

The transition elements in the main dome of the mosque serves an example of the 'muqarnas squinch' transition type integrated into the pendentive (Dallal, 2019: 225). The muqarnas, consisting of different layers, used in the transition from square to dome in the main and side spaces, were made of plaster and covered with paint and 'kalem işi' later period (Dallal, 2019: 162-163). Here, muqarnas emerges as a part of search to provide the fusion by adapting in a new form (Figure 2.23).

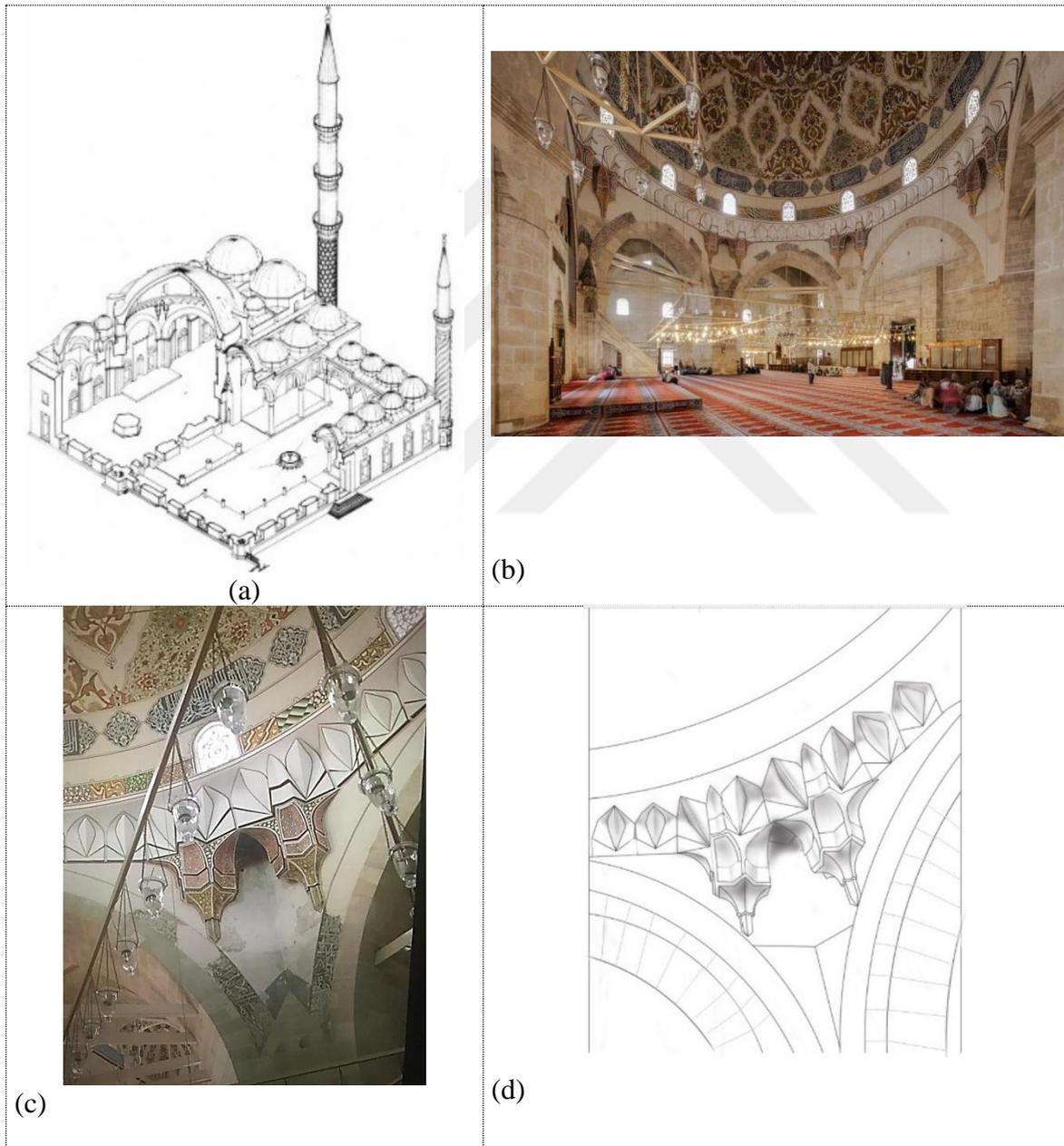
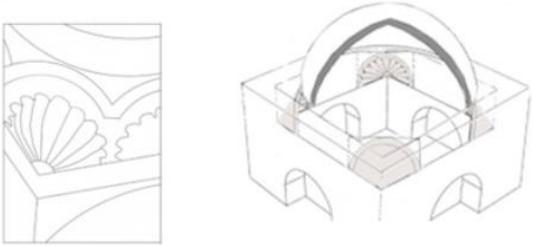
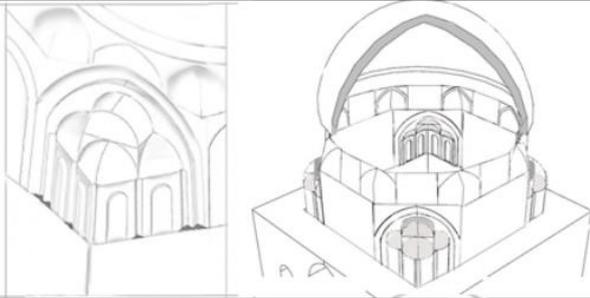
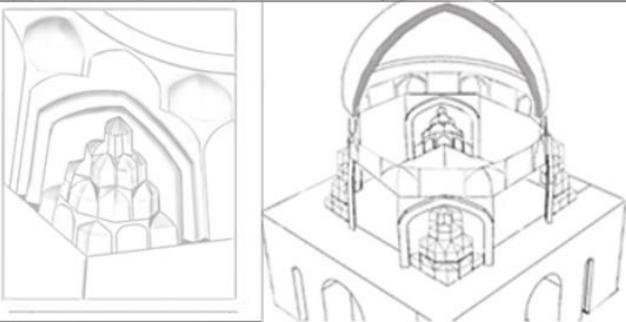
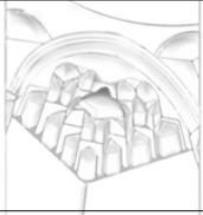


Figure 2.23. Edirne Üç Şerefeli Mosque (1437) a) axonometry (URL-43) b) interior (URL-44) c) muqarnas detail (URL-45) and d) drawing by author

2.4. Section Evaluation

When we looked the historical process, after the hybridization of squinch and shouldered arch system in the transition to dome during the Great Seljuk period, the degree of fusion was increased through emergence of muqarnas rather than preferring single use of transition elements to dome as pendants, Turkish triangles and squinches (Table 2.1). The muqarnas element, which was placed on the squinches and used as a gradual transition element in the transition to the dome, successfully contributed to the structural cohesion. Anatolian Seljuks and Ottomans developed the use of muqarnas system with different artistic designs in the transition to dome. It took on fascinating artistic expressions with the various use of the material and pattern as geometric and vegetal surface decorations in different geographies. The perfection in the use of the material in this process provided the increase in the fusion in the dome-wall relationship. Later, muqarnas also took on a different form with the differentiation in the use of squinches by trying to be a part of pendant.

Table 2.1. The Development of Muqarnas as a Gradual Transition Element

THE DEVELOPMENT OF MUQARNAS AS A GRADUAL TRANSITION ELEMENT		
Pre Seljuks		Squinch
Seljuks		Squinch+ Shouldered Arch
		Muqarnas
Anatolian Seljuks		
Ottomans		

In the next section, the development of the relationship between muqarnas and other transitional elements in the period of the genius Architect Sinan, together with the advance use of technology, will be examined in order to achieve an adherent beauty symbol/ single body.



3. THE DEVELOPMENT OF MUQARNAS IN RELATION TO SYMBOL IN ARCHITECT SINAN'S PERIOD

The usage of muqarnas on mihrabs, niches, balconies, and column capitals, niche in the inside and outside was also maintained in Architect Sinan's structure (Ödekan, 1988a: 476). Stone or special shaped bricks were used for muqarnas in the period of Sinan (Ahunbay, 1988: 536-537). Muqarnas became an integral part of the whole architectural expression in Sinan's stone structures. Sinan used muqarnas as part of a poetic holistic fiction. The portal with muqarnas give a preliminary image of the interior entire composition. In the use of column headings and other transition part, it destroys the materiality. The muqarnas, which can also be seen in the transition in the interior, takes on a spiritual expression, as if to emphasize the transition to the sky, far beyond materiality. The materialistic transition function of muqarnas now turns into a metaphoric transition in the holistic attitude of Sinan (Ögel, 1989).

In the development of the structural innovation in the classical scheme of the Ottoman period, the independent elements in the cover system became to part of integral approach. So, semi domes emerged to realize the gradual holistic structural order. These elements were important in terms of both internal and external integrity (Erzen, 1996: 99-100). While the use of muqarnas as a gradual transition element was continued in Sinan's period, Sinan's effort of integrity to achieve a symbol/single body in adherent beauty became visible with other structural elements through technological development. Examining Şehzade, Süleymaniye and Selimiye Mosque will reveal the process of fusion of muqarnas into the whole.

3.1. Şehzade Mosque (1543)

The Şehzade Mosque stands out as Sinan's first major work. In the mosque, there are central dome rises on the piers and four semi-domes that connect the central dome with the outer walls, exedras, and smaller domes at the four corners (Kuran, 1968: 198). Sinan's search for solutions to the problems related to the semi-dome comes to the fore (Aslanapa, 2004: 208). He aimed to design the semi dome, dome and all other elements with a holistic understanding unlike the mosques built before him (Erzen, 1996: 87). The interior and exterior of the mosque are in unity. The central dome and four semi-domes were strongly integrated into

the structure thanks to these towers. Exedras also soften the pyramidal shaping of the mosque (Necipoğlu, 2013: 264).

The mosque represents both a spatial and a structural development with the system formed by the transition from the main dome to the smaller domes (Kuran, 1968: 198). After the fifth stage where the main dome is located, the semi-dome stage manifests itself and then third stage consisting of exedra and arches emerges (Necipoğlu, 2013: 268). The transition to wall through semi domes and exedra were used to support the integration to provide inseparable relationship of the parts (Erzen, 1996: 87). Muqarnas plays a role in the gradual transition of the mosque, which was constructed as five levels with stone body walls at the bottom. The muqarnas and arches with windows are a part of the transition to the dome in the stone second level within the five levels of mouldings in the central integrity formed by the main dome and the semi-dome with the space. At the same level there are four fluted piers on which the central dome rises (Necipoğlu, 2013: 268). The fusion of ornament and structure manifests itself in the holistic relationship of elements in which muqarnas is a part (Figure 3.1, Figure 3.2. Figure 3.3).

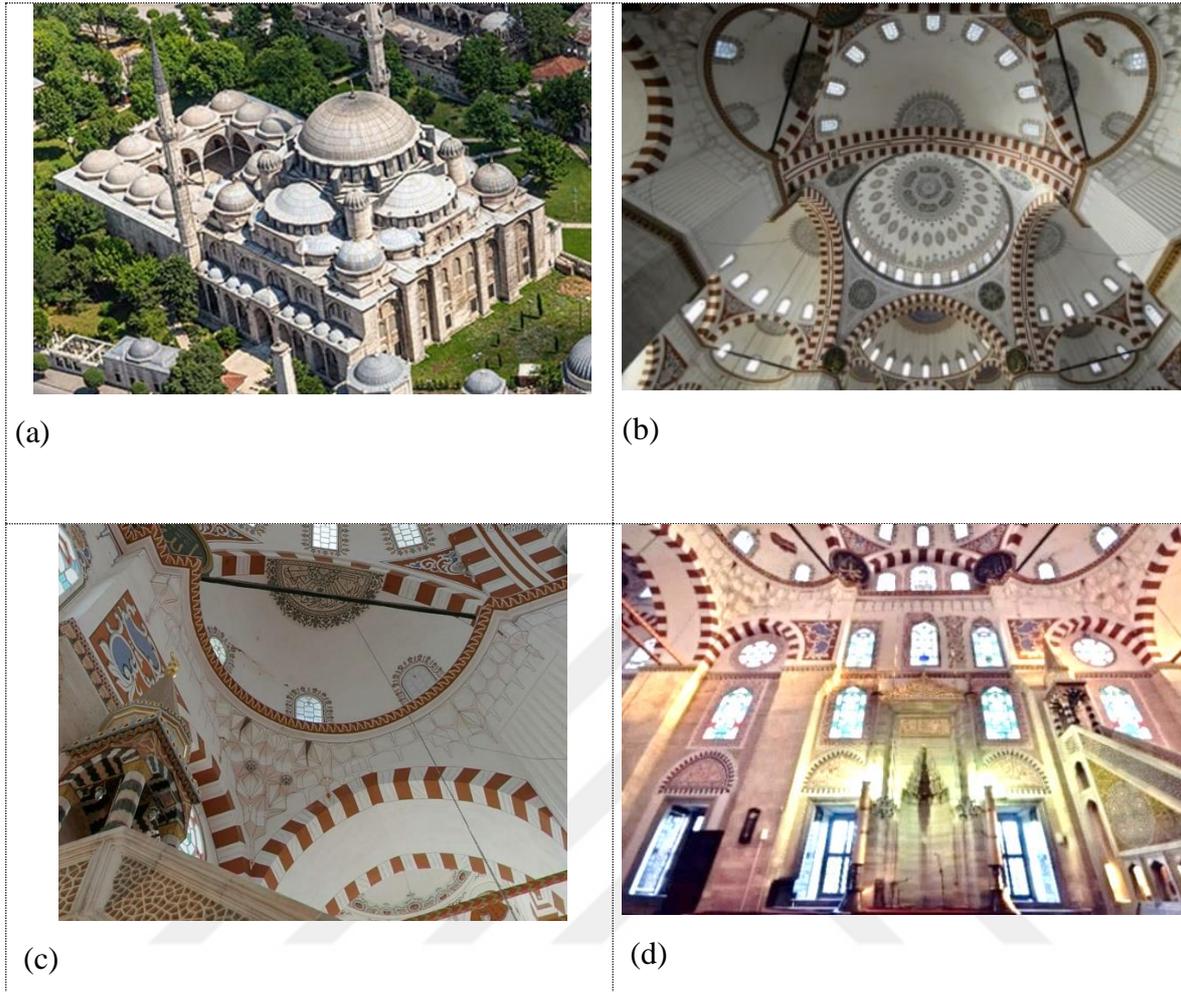


Figure 3.1. Şehzade Mosque (1543) a) general view (URL-46) b) interior view of the dome (URL-47) c) muqarnas detail (URL-48) d) other view of muqarnas with semi domes (URL-49)

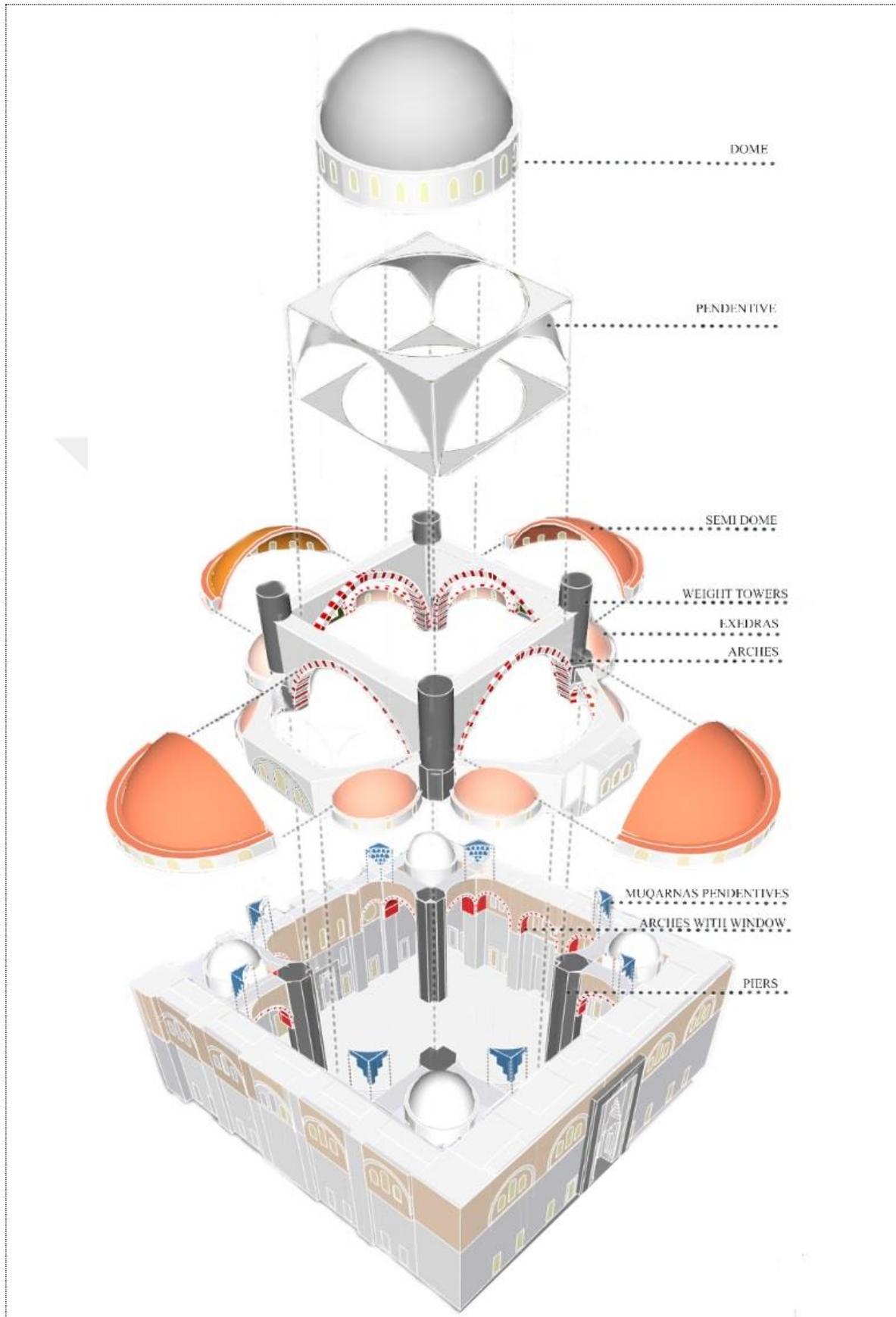


Figure 3.2. Exploded axonometry of Şehzade Mosque by author

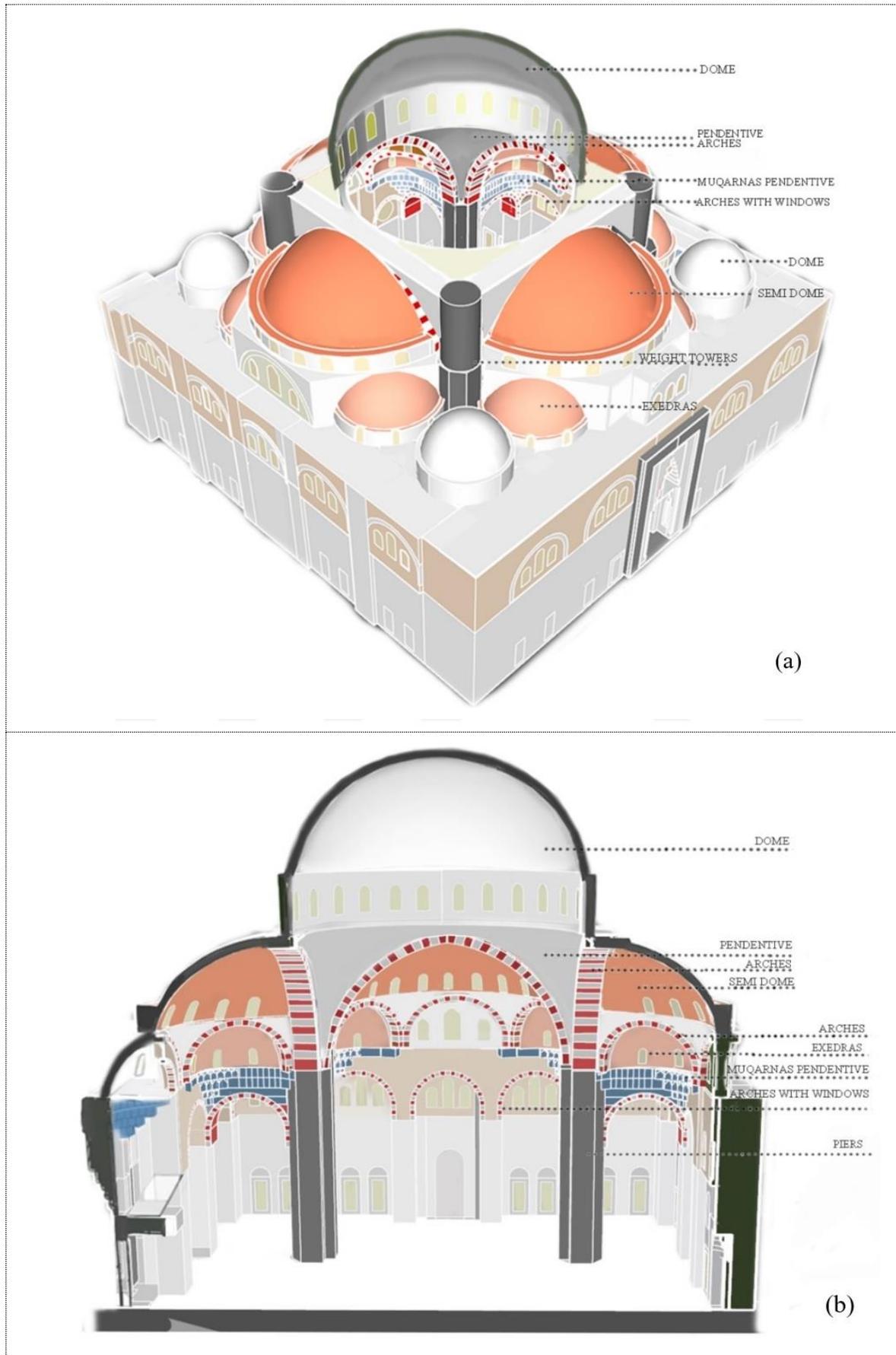


Figure 3.3. a) axonometry and b) schematic section of Şehzade Mosque by author

3.2. Süleymaniye Mosque (1551-57)

Süleymaniye Mosque is one of the Sinan masterpieces and designed as part of the complex using a cut stone (Aslanapa, 2004: 222). In the mosque the main dome was supported by two semi-domes and there are five domes surrounding the main dome nave (Kuran, 1988: 198). Süleymaniye Mosque is in a unique position as a result of the success achieved by the gradual relationship of the domes (Erzen, 1996: 104). Starting from the main dome, a stepped superstructure emerges that follows to semi domes, domes of weight towers and small domes.

Compared to Şehzade Mosque, in Süleymaniye Mosque the relationship of the components with each other and with the dome became stronger due to differentiation in the size of the domes (Erzen, 1996: 88). While simple pendants were used in the central dome transition system rising on four piers, the system of semi-circular squinches with arches were created in the transition to the semi-domes (Yetkin, 1965: 249). On the upper levels four squinches emerges on the two axes of the structure. Elephant feet and support columns shared the load with semi domes and squinches (Yağlı, 2010: 125). Pendentives with muqarnas fillings appeared in the transition to semi-domes in Süleymaniye (Cansever, 2005: 212). These fillings were also located in the transition to the domes in the side galleries (Yetkin, 1965: 249). The almond muqarnas used in the mosque has wide niches (Ödekan, 1988a: 478). The colourful arches on the wall and the transitions with muqarnas contributes to the integrity of the interior, where all the structural elements are perceived as a whole. Each element was connected vertically and horizontally to complement each other (Erzen, 1996: 93). The muqarnas located on the mihrab wall emerge after the semi-domes and exedras (Aslanapa, 2004: 236) (Figure 3.4, Figure 3.5, Figure 3.6.).

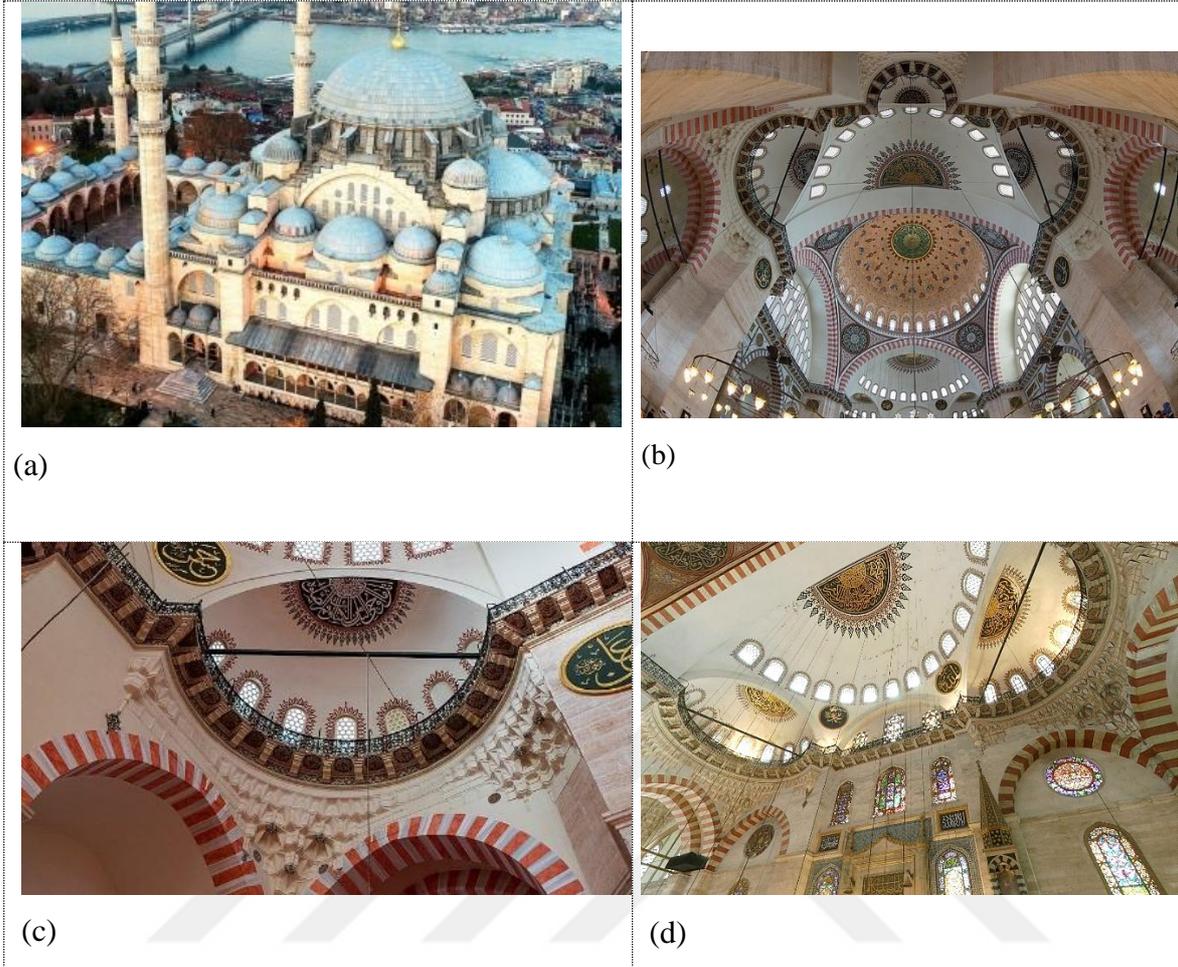


Figure 3.4. Süleymaniye Mosque (1551) a) general view (URL-50) b) interior view (URL-51) c) muqarnas detail with exedras (URL-52) d) other view of muqarnas with exedras and semi domes (URL-53)

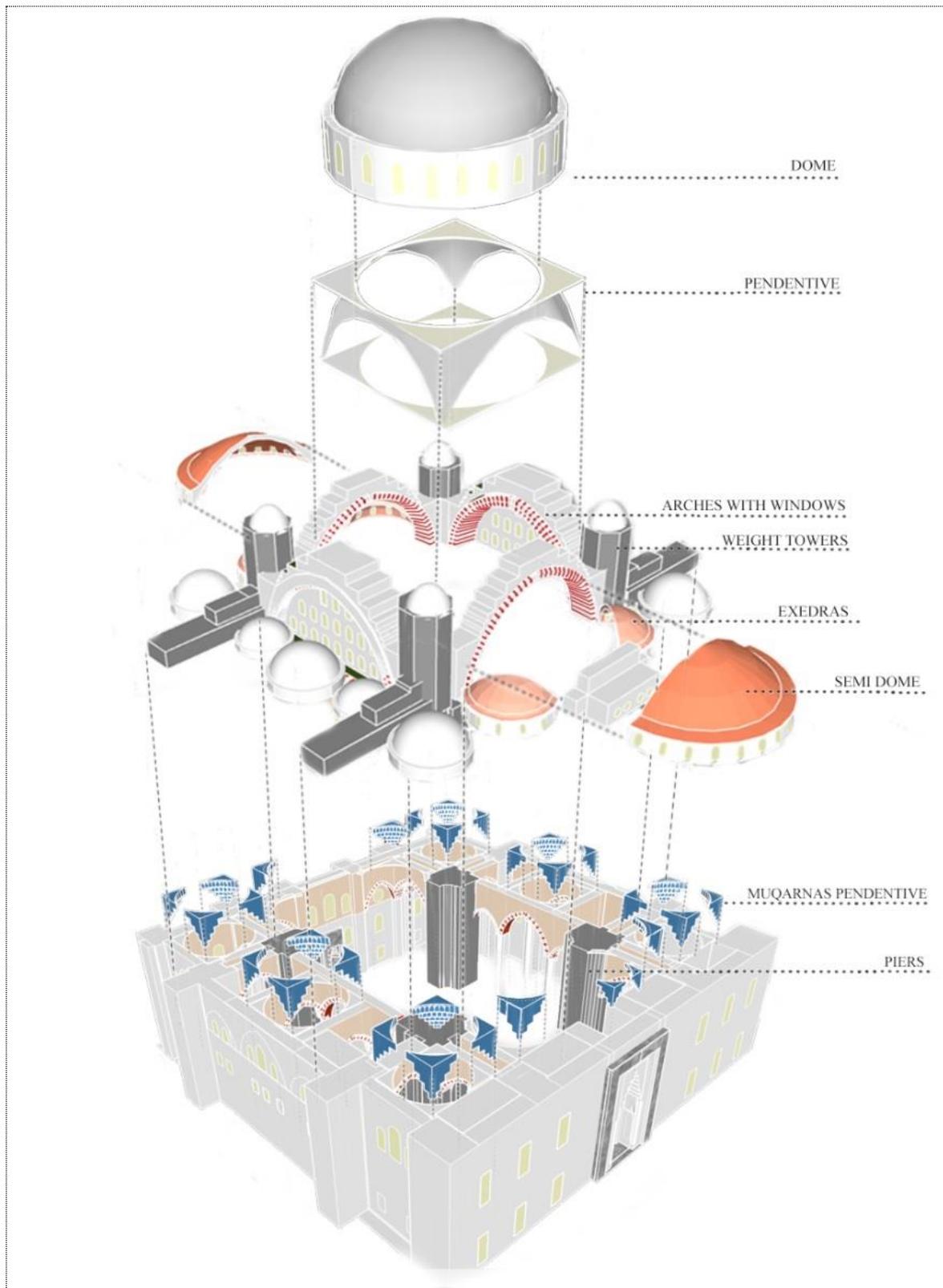


Figure 3.5. Exploded axonometry of Süleymaniye Mosque that shows the transition elements to dome (model revised/adopted from URL-54)

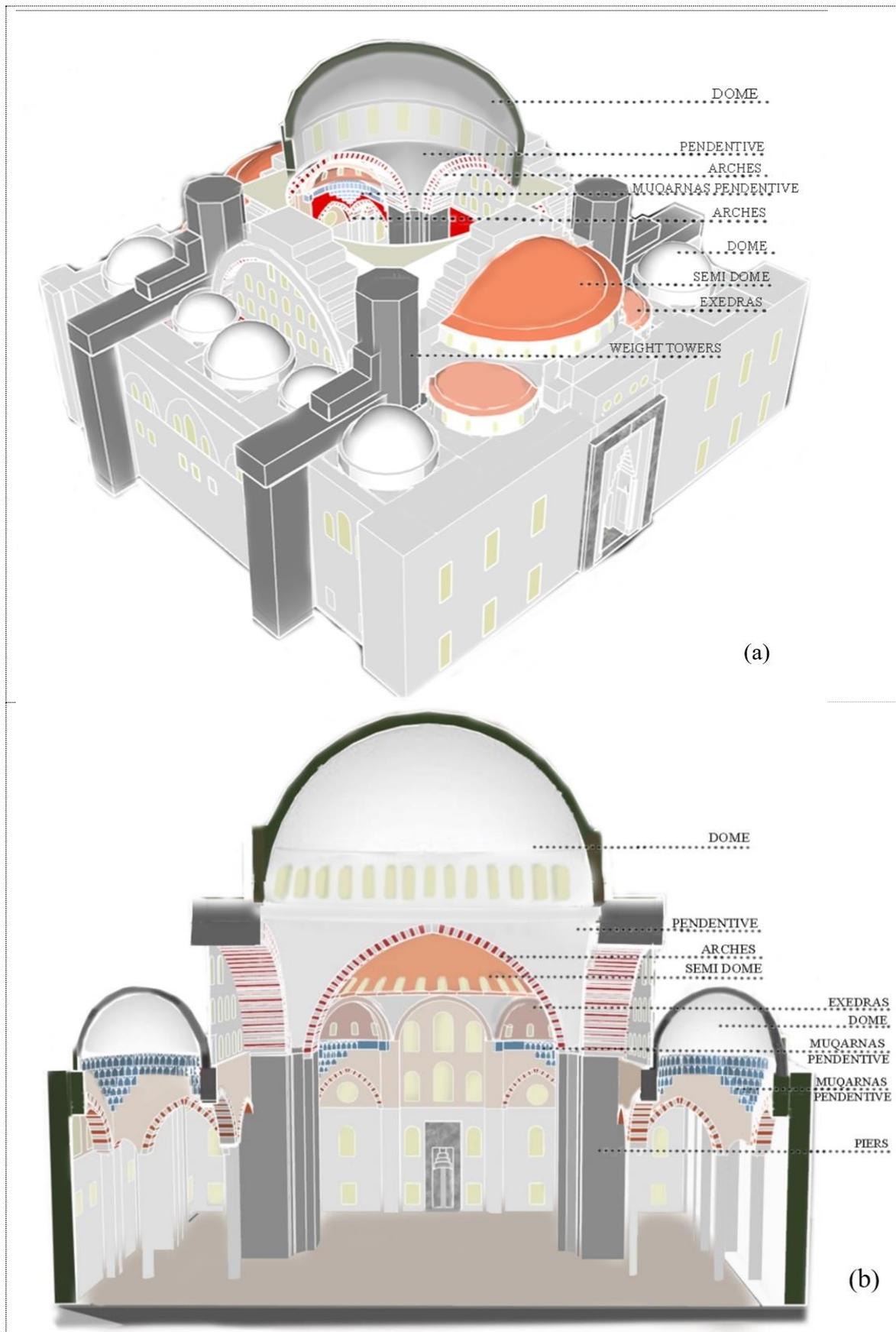


Figure 3.6. a) axonometry and b) schematic section of Süleymaniye Mosque (drawings revised/adopted from URL-54)

3.3. Selimiye Mosque (1569-75)

Edirne Selimiye Mosque (1569-75) in complex, the greatest masterpiece of Sinan, consists of a single dome with four levels. The dome rises on the eight pillars externally reflected as eight towers. The semi-domed mihrab section was designed to protrude outward (Aslanapa, 2004: 285-286). And semi domes and other domes were replaced by both horizontal and vertical movement with wall and horizontal layers on façades. Between the second and third horizontal layers, arches with windows appear on the side façade. This transition layer between the main dome and the wall has semi-domed squinches at the four corners (Necipoğlu, 2013: 329-330). The fusion of the inside and outside with the dome of Selimiye represents the highest development of dome architecture (Aslanapa, 2004: 291).

The fusion of dome and body makes it unique among other structures. The dome spread over the whole as the only covering element (Erzen, 1996: 111). In Selimiye Mosque (1569), which is Sinan's highest artistic expression, Sinan balanced the horizontal movement with a vertical movement and transformed each layer into a transition element in the transition to the dome (Erzen, 1996: 97). The muqarnas filling, located in different stages, was integrated with the structure. Muqarnas appeared as a part of 'transition to the semi dome in front of the mihrab, 'transition to the corner semi dome of the main space' and 'under the suspender arches'. The muqarnas elements were differentiated at each stage (Ödekan, 1988a: 478). The transition elements filled with muqarnas, located under the light belt at the top level, eliminate the weight of the dome. The semi-dome squinches in the corners and windowed tympanums was framed by the triangle projections with muqarnas filling frame (Necipoğlu, 2013: 334). The transition from octagonal to circular of which muqarnas fillings are parts provide both structural balance and integrity of interior space (Necipoğlu, 2013: 330-331). The use of muqarnas in the development of the relationship between 'infrastructure' and 'cover' in Sinan mosques reflects a unique expression of the relationship between ornament and structure in Selimiye Mosque (Ödekan, 1988a: 478). The domed system, in which exedras, arches with windows and even the mihrab section is covered with a semi dome, was equipped in such a way that there is no space left (Aslanapa, 2004: 293). Selimiye Mosque is perceived as a perfect geometric volume where 'bone and flesh' integration emerged (Kuban, 1987). Dome creates the integrity by capturing all architectural elements (Necipoğlu, 2013: 330-331) (Figure 3.7, Figure 3.8, Figure 3.9.).

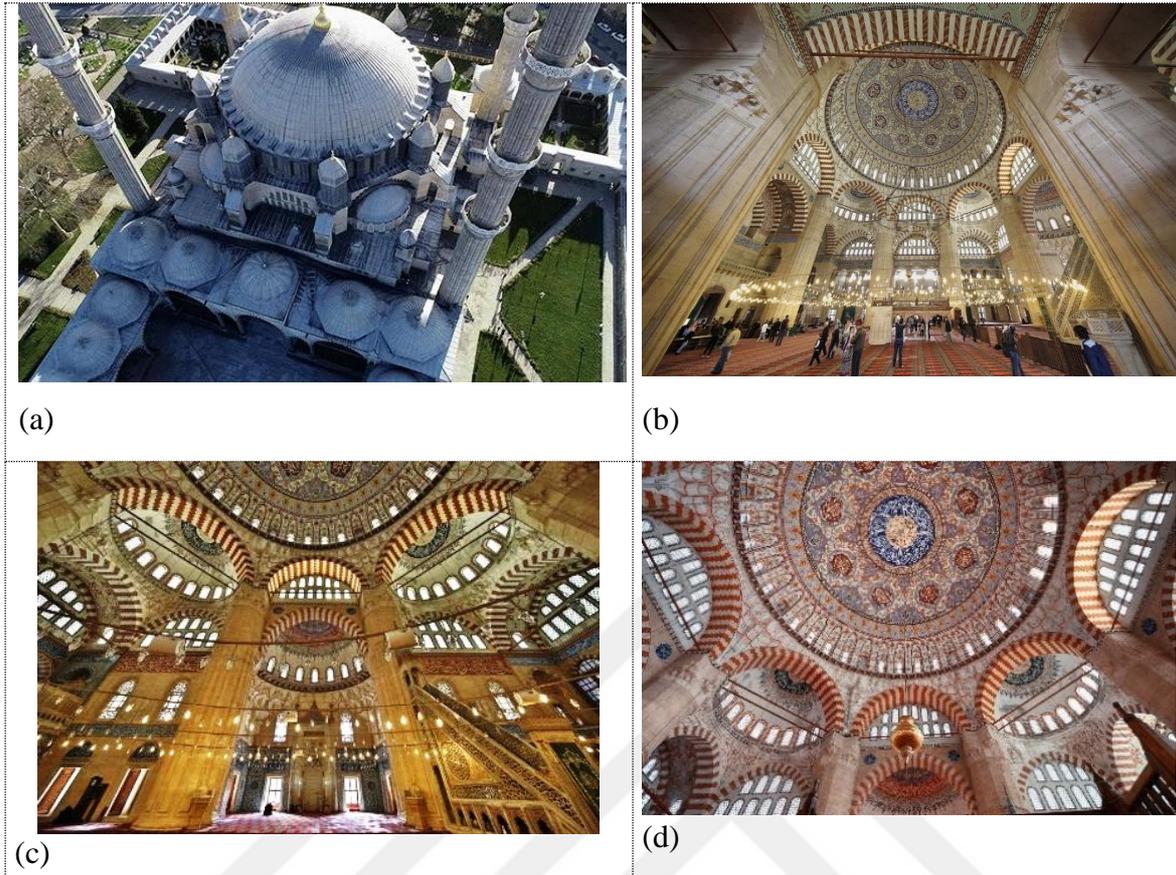


Figure 3.7. Selimiye Mosque (1569) a) general view (URL-55), b) interior (URL-56) c) gradual transition of elements with muqarnas (URL-56) d) another view of muqarnas with other elements (URL-57)

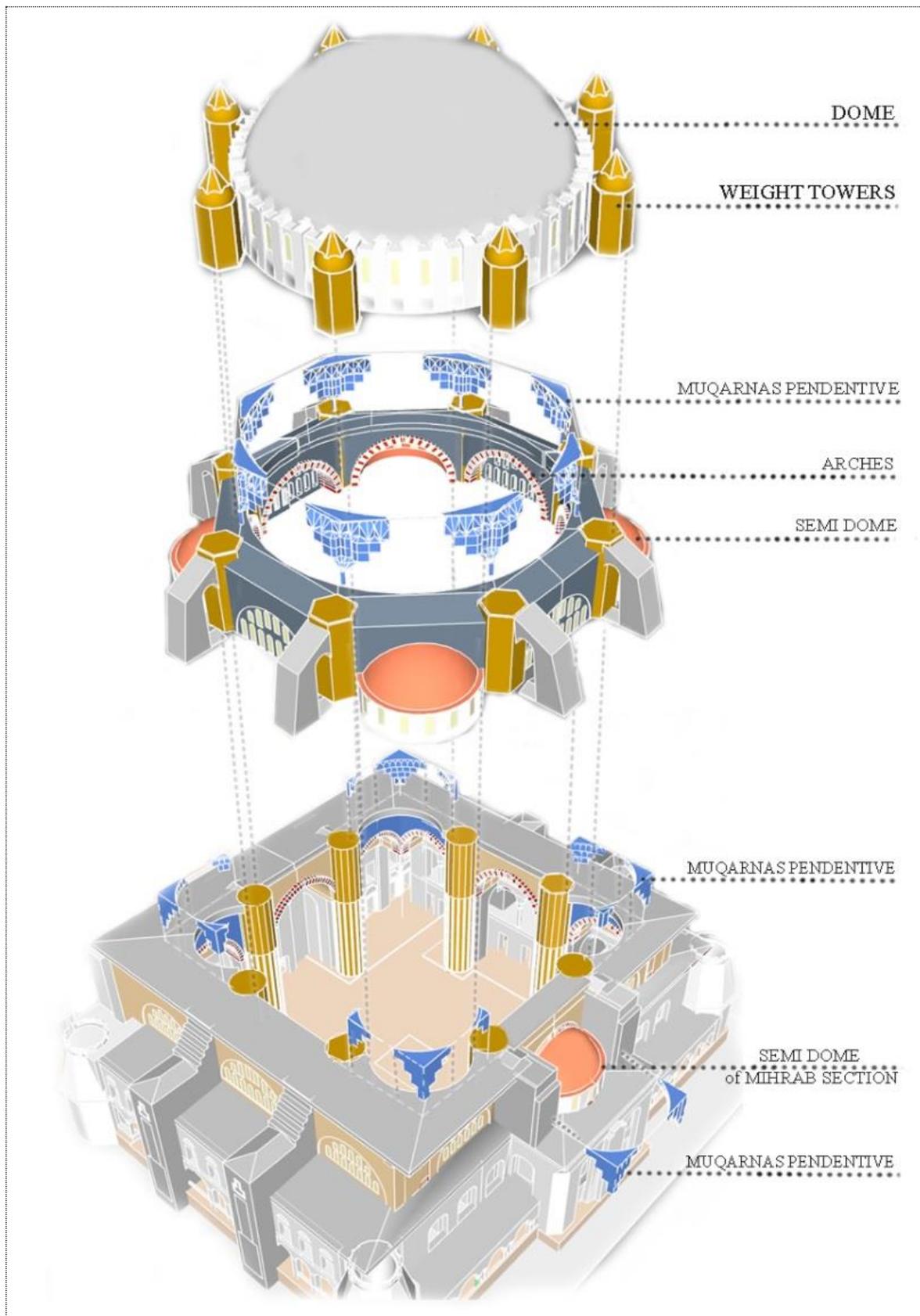


Figure 3.8. Exploded axonometry of Selimiye Mosque (model revised/adopted by author From URL-58)

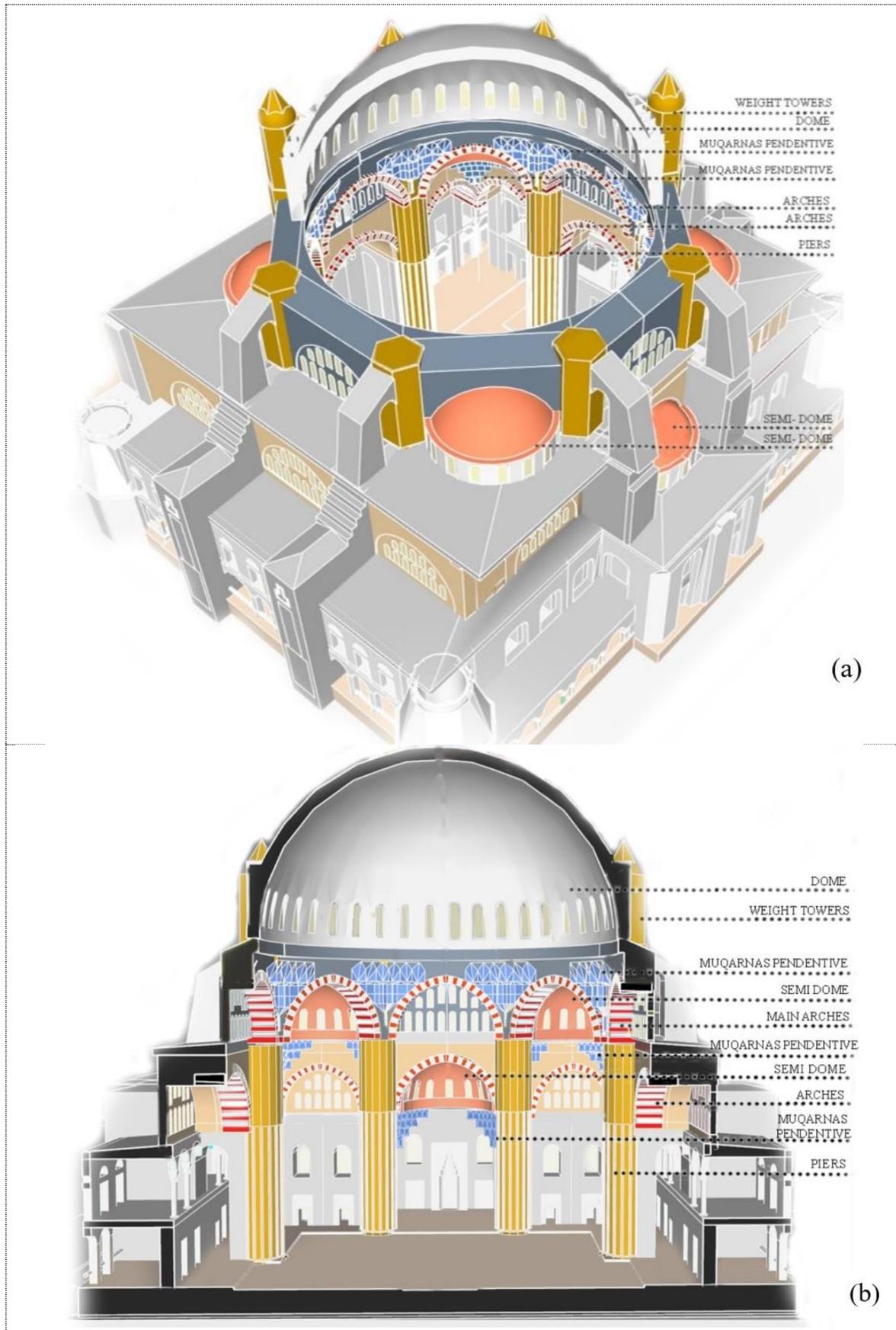


Figure 3.9. a) axonometry and b) schematic section of Selimiye Mosque (drawings revised/adopted by author from URL-58)

3.4. Section Evaluation

As it revealed in the previous section, in the cultural journey of muqarnas before Sinan period, the degree of fusion was enhanced through the muqarnas as a gradual transition element come to the fore compared to the simple use of squinch, Turkish triangle and pendentive elements) (Figure 3.10).

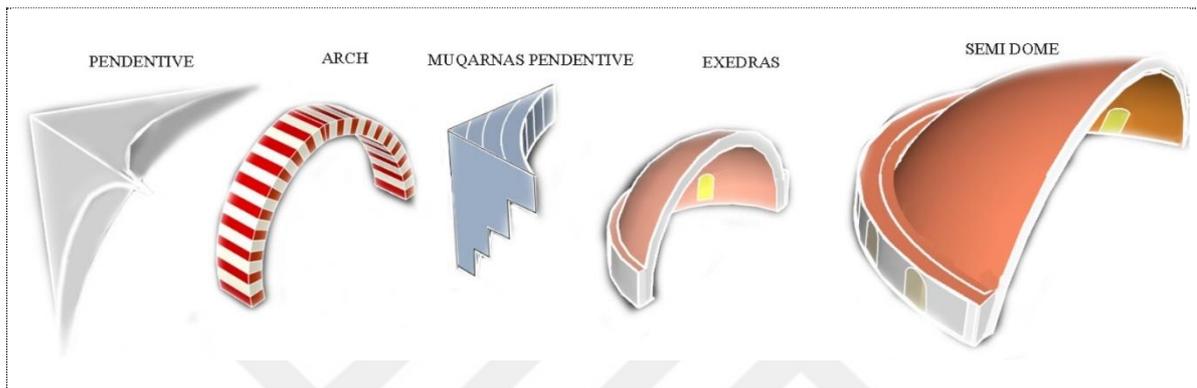


Figure 3.10. Gradual Transition Elements to Dome in Sinan's structures (drawings by author)

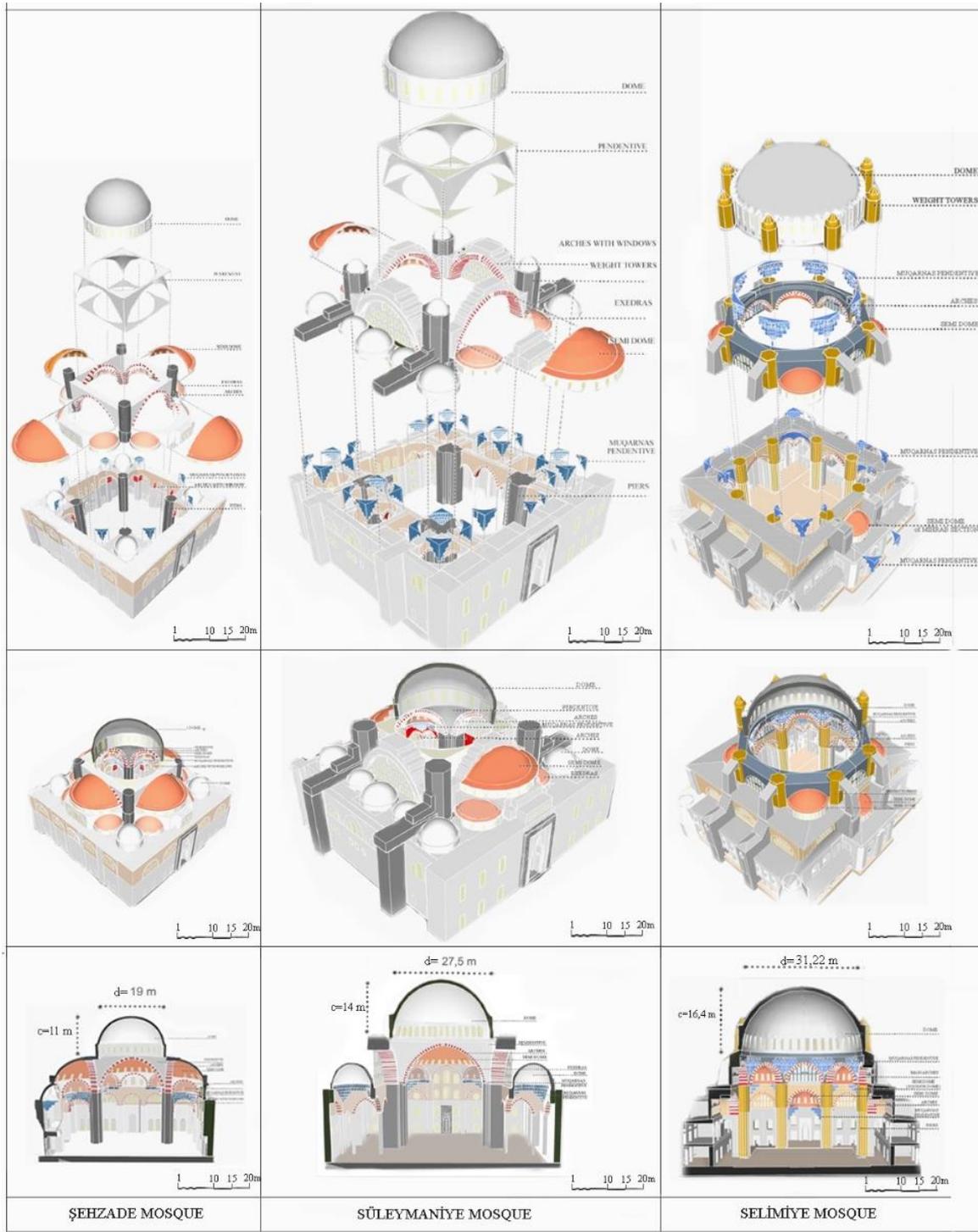
The period of Architect Sinan reveals the struggle for a single body/symbol in adherent beauty where all the elements are tried to be integrated through the fusion of muqarnas to the whole which emerges in a new form; as can be seen, the muqarnas pendant is a synthesis of squinches, Turkish triangle and pendant elements. With the use of technology at the peak, besides the muqarnas, semi domes and coloured arches come to the fore which we perceive as muqarnas to fuse the dome and the wall with the bodily movement in gradual transition. When we looked at the development of fusion with this integration, the muqarnas that emerged in a single layer contribute to the holistic relationship of the elements by emphasizing the transition to the semi-domes with coloured arches in the pyramidal stepped formation of the Şehzade Mosque (and similarly in Süleymaniye Mosque). The horizontal and vertical relationship emerged by the integration of these elements was not yet completely dominant in the whole. The gradual formation manifests itself in the cover system through domes and semi domes allowing horizontal expansion to provide integrity.

In Selimiye Mosque, Sinan's highest artistic work, there is a fusion in dome and wall relationship in the ultimate degree with the complete clear emergence of both horizontal and

vertical bodily movements in the gradual transition to dome through perfect integration of three elements by pushing the technology utmost. Muqarnas, by penetrating each layer, ceases to be a separate tool and provides a perfect integration with building elements such as semi-domes and coloured arches in the gradual transition from wall to dome, resulting in a symbol/single body. Through this integration, muqarnas pendentive perfectly fuses into whole which refers to a stepped and parametric formation between two different system. Being single body/symbol was forced to reach to highest level in Selimiye Mosque. As a result of this perfect fusion from dome to wall (or vice versa), all elements that remained members of different worlds before Sinan act as a whole (Table 3.1).



Table 3.1. Development in the use of muqarnas in three mosques of Sinan’s to achieve a single body/symbol in adherent beauty.



4. DISCUSSION AND CONCLUSION

The relationship between macrocosm and microcosm in Islam establishes a relationship with the Renaissance man 'Vitruvian Man'. This parallelism reveals an “alternative humanistic approach” to Islam (Necipoğlu, 2015). In this context, Necipoğlu, also Belting mentions in his argument (Belting, 2011: 213-214), refers to Leon Battista Alberti (d.1472)’s statement that is also about reflection of divine expression. Thus, ‘anthropomorphism’ of Renaissance manifests itself as a parallel understanding of mimesis which corresponds to term differs from the negative imitation both in Christian and Islamic lands (Necipoğlu, 2015). Examining the gaze in Islam in the intersection of two cultures from different sources, clearly reveal the realization of Alberti’s perfect whole; how this stepped and parametric formation also connects two different worlds beyond the materiality to achieve a symbol situation. As Payne mentions through Gallacini’s mathematical approach developing Alberti’s “anthropomorphism”, the relation between the mechanical working principle as the folding movement that exists to provide balance in the human body and the construction style of the building provided the intersection of figural arts and science with architecture (Payne, 2016: 153-154).

This issue brings us to the intersection of adherent beauty and free beauty. As discussed in the introduction part of the thesis, Ruskin pretends a perfect holistic attitude; a perfect whole/single body can only be achieved based on complete abstraction in free beauty approach by rejecting the reality of architecture through Gothic architecture. In this process, the simple efforts of Semper and Sullivan to transform ornament into sculptural parts with perfect artistic expression became evident as the key stages of adherent beauty.

In this study, in order to reveal the perfect poetic whole/single body in solid geometry as an adherent beauty, the development in the degree of fusion of muqarnas as a sample of the study, as a gradual transition element by focusing on its relation to other structural elements in the dome-wall relationship has been examined in mosque architecture. A breaking point became apparent in the mosques built during the period of architect Sinan. This has resulted in the selection of three of Sinan's three great mosques: the Şehzade, Süleymaniye, and Selimiye Mosques. Muqarnas refers to a 'stepped, parametric and geometric' element that connects the ‘soul’ and the ‘body’ just as the concept fold which ensures the continuity of

different parts in a single system (Islami and Mirgozar Langaroudi, 2021). In the historical process, from the beginning of pre-Seljuks to the Ottomans period that started with the simple use of structural elements, the muqarnas squinch, which was used in connection with the shouldered arch system before the era of Sinan increased the degree of fusion. In Architect Sinan's period, it was included in the bodily relationship as a muqarnas pendant in the era of Sinan, and by using the technology of the period, the highest level of fusion and a perfect artistic integrity is achieved. Through this integration, which he used to achieve a perfect symbol/single body in his perfect reinterpretation and abstraction of muqarnas, Sinan perfectly fused the past with advanced technological use and fascinating artistic expression, revealing the holistic role of ornamentation. By fusing the muqarnas into the whole with the peak use of the technology in the mimetic process, Genius Sinan struggled the being of a single body/symbol with both horizontal and vertical bodily movement in gradual transition fused the dome and wall. In the perfect combination of the dome and the wall with the bodily relationship, Sinan has succeeded in perceiving the whole as a single body.

This effort of Architect Sinan leads us to Alberti's desire for one body/symbol in human-centered harmony. The bodily movement which results in a stunning unification of all elements makes Alberti's perfect harmonious geometrical whole in solid geometry to be noticed in adherent beauty as a symbol/single body. In the perfect whole/symbol of adherent beauty in solid geometry, Architect Sinan achieves poetic holistic attitude (Kant's purposeless purposiveness) which is realized in the reinterpretation and abstraction of muqarnas in Islam. The gradual transition to dome where muqarnas spread to whole expression is accomplished by integrating muqarnas with structural elements as semi-domes with coloured arches perceived as if muqarnas. This development of muqarnas as a gradual transition element refers to a new perspective in formation of perfect symbol in Islam. Sinan's perfect abstraction through bodily movement both horizontally and vertically, and his forcing the use of technology to fuse the dome and the wall, ensure that the harmonious geometric whole built on Alberti's theory of the adherent beauty is realized as a perfect symbol/single body.

Comparing the gaze in Islam and Renaissance: East and West

Going back to Baghdad, the capital of Abbasid, Hans Belting in his *Florence and Baghdad Renaissance Art and Arab Science*, in his theory, compares mathematics in Arab culture with

the theory of painting in Western culture. Belting refers to Arabic science as purely aniconic in his comparison between the theory of light in Arab optic and the Renaissance painting (Belting, 2011: 27). By examining medieval visual perceptions and Safavid texts, Necipoğlu draws a new framework for the gaze and aesthetics through figurative representation in Islam, based on Belting's argument. According to Necipoğlu, the restriction of figurative representation did not come to the fore in Islam, except only certain types of buildings and objects. It is associated with an aesthetic pursuit rather than religious restrictions. In this sense, Necipoğlu reconsiders the relationship between two cultures through Belting's argument and focuses on humanist thought through mimetic abstraction by leaving the negative interpretation of mimesis in Islam (Necipoğlu, 2015).

By referring perfect geometrical fiction of muqarnas, Belting rejects figurative representation in Islam (Belting, 2011: 31). He argues the geometry of muqarnas corresponds to perspective painting in the West culture as a symbolic form (Belting, 2017: 210). He states that the muqarnas, used since the 11th century, the age of Ibn al-Haytham, “reached a peak in the fifteenth century, when Florence was discovering perspective” (Belting, 2011: 205). This explains why he compares Renaissance perspective with Topkapı scroll. On the other hand, as Necipoğlu states, the pinnacle of muqarnas emerged in the 13th and 14th centuries. Thus, while Belting associates Western culture with a historical process, the Arab-Islamic past is covered (Necipoğlu, 2015). As Necipoğlu emphasizes, the ‘figurative images’ that mixed with ‘geometric, vegetal, calligraphic,’ were an integral component of muqarnas surfaces in Fatimid Egypt and other medias when Ibn al-Haytham produced texts about painting. Although this figural representation is different West painting, figural representation is valuable for both cultures (Necipoğlu, 2015). On the other hand, Belting accepts that the statement of Ibn al-Haytham about ‘figures’ just refers to ‘geometric patterns on an object or a wall’ (Belting, 2011: 64). In this sense, Necipoğlu debunks Belting’s argument that accepts the optic theory in Islam as ‘aniconic’ (Necipoğlu, 2015).

Necipoğlu, on the other hand, acknowledges the difference in perspective theory in Belting's comparison of Renaissance and Baghdad. Psychological faculties arising from the Aristotelian view manifest in both 'late medieval' and 'renaissance pictorial' theory. There is an overlap in visual cultures of both cultures, in terms of classical texts they use (Necipoğlu, 2015). In terms of subject-object relationship, the 'neutral' view in theory of Renaissance

does not exist in the 'infinite' view in Islam (Necipoğlu, 1996: 166, 210). Belting mentions that contrary to the gaze that includes body and space, perspective just refers to two-dimensional gaze (Belting, 2011: 15). Ibn al-Haytham deals with this issue through theory 'on the physiological structure of the eye' and 'the psychology of perception' in his book of optic. In the model proposed by Ibn al-Haytham, it stands out with the presence of a moving eye instead of an 'immobilized and disembodied eye' in perspective painting. Lorenzo Ghiberti (d.1455), who is the sculptor of early Renaissance, drew on knowledge of Ibn al-Haytham optic theory in the part of book relates with beauty (Necipoğlu, 2015).

Ibn al-Haytham talks about twenty-two visual features that produces beauty in his theory "*such as light, shape, size, colour, position, order*" that refers to forms of visible objects. According to Ibn al-Haytham "*sight perceives visible objects in two ways: by glancing and by contemplation*". The whole of an object is only perceived by "scrutinizing all its parts" and contemplating it (Al-Haytham, 1989: 207-209). As Necipoğlu (2015) emphasizes Ibn al-Haytham theory: "*unlike light and colour that are perceived by "pure sensation," other visual properties require "perceptual inferences" of two kinds, mediated by the sense of sight: glancing and contemplation*" (Al-Haytham, 1989: 208-9, 221-24). 'Painted design and designed and decorated wall' are also forms in Ibn al-Haytham's examples that necessitates contemplation (Al-Haytham, 1989: 208-222).

Alhambra Palace appears one of the structures to explain the 'contemplative gaze' of Ibn al-Haytham and mimetic approach (Necipoğlu, 1996: 204; 2005) (Figure 4.1). The Alhambra Palace in the West also expresses a poetic whole with its muqarnas domes, cupolas, and niches integrated with architectural elements and ornaments. Here, the important function of ornament is the fully integrating with the participant (Gonzalez, 2018: 387). It has also revealed muqarnas' relationship with architectural elements in shaping the whole structure. Gordo and Blanco reveal the existence of the relationship between muqarnas and 'simple architectural elements' (Gámiz Gordo and Pérez-Blanco, 2019). As also Necipoğlu refers (Necipoğlu, 2015), the metaphorical construction of the Alhambra is revealed in the text described by Ibn Zamrak: "*I am the garden appearing every morning with adorned beauty; contemplate my beauty and you will be penetrated with understanding;*" (Gonzalez, 2001: 81). Alhambra encourages an imaginary power with its poetic integrity and visual feast (Necipoğlu, 1996: 204).

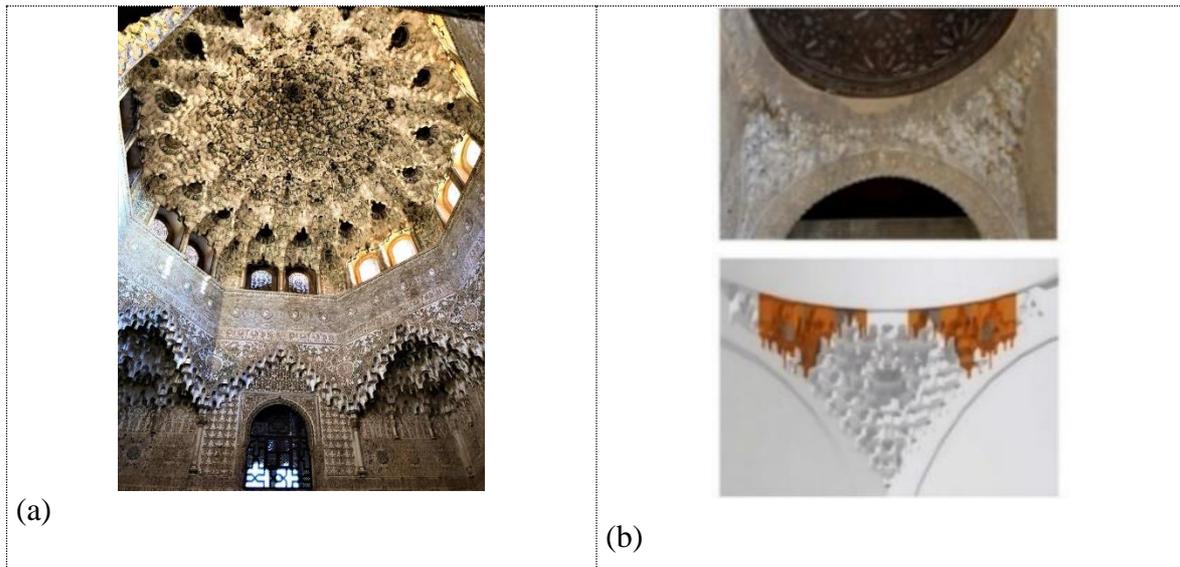


Figure 4.1. Alhambra Palace, 1338-1390 a) Muqarnas dome (URL- 59) b) muqarnas pendentives (Gámiz Gordo and Pérez-Blanco, 2019)

As Erzen emphasizes in the mosque architecture; looking upwards towards the mihrab, the perfection of the interior is emphasized with the integrity of all elements that will evoke the garden of heaven (Erzen, 2014: 5-9). With the change of visual gaze, contemplative perception appears in the perfection of the architectural forms of architect Sinan's mosques. There are several observers that emphasizes the contemplative gaze in the amazing holistic fiction of Sinan's mosques (Necipoğlu, 2015). In order to conceptualize this part and whole relationship, Necipoğlu focuses on the mimetic abstraction in Islam (Necipoğlu, 2015), based on window and 'mirror' metaphor explanation of Belting which he used to referring to gaze both in Renaissance and Islam (Belting, 2011: 162-163). Sinan's autobiographies reveal his creativity as a 'divine artist'. The 'humanist' concept that refers to 'mirror of God's perfection' paved the way for artistic inspiration and its reflection on special humankind. Sinan as a 'divine architect' produces microcosmic mosques as a reflection of God's wisdom. Sinan's counterparts reveal this 'mimetic' approach of Sinan in his amazing mosques. The columns, arches, domes and other elements are part of poetic integral composition in Sinan's mosques (Necioğlu, 2005: 146).

As revealed, Genius Sinan revealed the artistic design process that successfully reinterprets and abstracts the previous ones by fusing technology and artistic imagination to achieve the perfect one body/symbol as a cohesive beauty. At this point, the power of ornament enables this multiple integration once again revealed the necessity, vital importance of it. This way

of dealing with ornament has been an excellent guide to architects in reaching the highest artistic creation by innovative approach while preserving the essence in contrast with today's architecture dominated by technology and innovative approach.



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APPENDIX

APPENDIX-1. The Development of Muqarnas on Mihrab and Portal Elements

Muqarnas on Mihrab Element

The use of muqarnas as a gradual transition element on mihrab, emerges with simple gradual transition in early period of Islam. In Ibn Tolun Mosque (876-879) in Cairo, among the six mihrabs on the qibla wall in the mosque, the tallest mihrab, belonging to the period when the mosque was built, has a pointed arch and a semi-circular deep mihrab cell (Yetkin, 1965: 58). There are plaster mouldings at the top of the gradual transition. The interior of the niche is covered with marble and mosaics which was renewed by Sultan Lajin (Behrens-Abouseif, 1992: 54) (Figure 1.1).

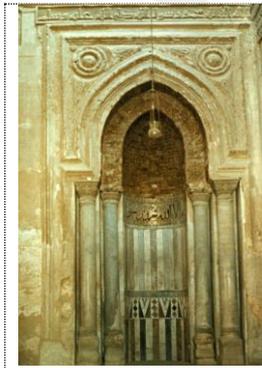


Figure 1.1. Ibn Tolun Mosque (876-879) in Cairo, gradual transition with muqarnas on the mihrab of qibla wall (URL-60)

Seljuks

The “pointed arched muqarnas kavsara” as a mihrab niche appeared in the Barsiyan Friday Mosque belongs to Seljuk period. Different patterns are engraved on the pointed arched kavsara cells of the mihrab, which consists of three rows of muqarnas. It has star and star-like shapes from brick pieces, geometric shapes and vegetal patterns with plaster joint in scraping technique with kufic calligraphy (Sokhanpardaz, 2020: 70-71) (Figure 1.2).

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

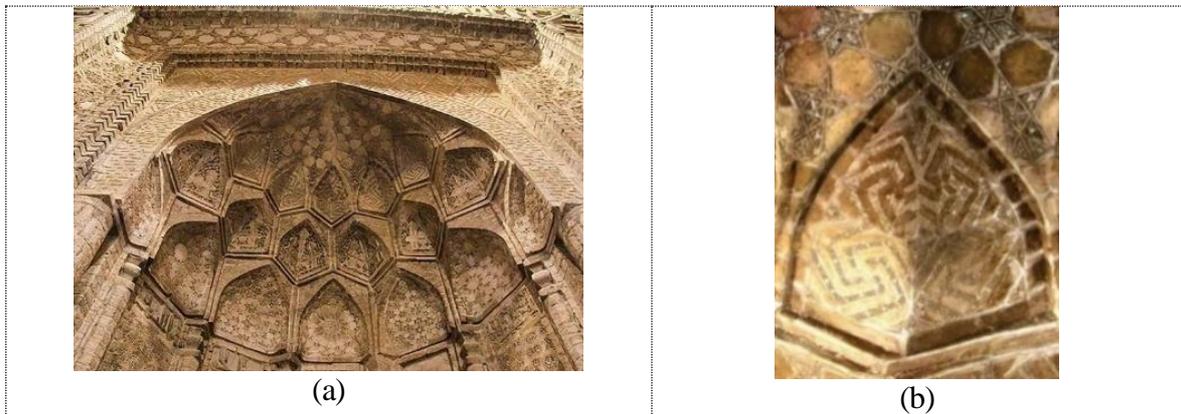


Figure 1.2. Barsiyan Friday Mosque (1114) a) mihrab (URL-61) b) the detail of muqarnas cells (URL-62)

Anatolian Seljuks

In Anatolian Seljuks period, the mihrab was also used with stone material of the period. Niğde Alaaddin Mosque (1223)'s mihrab one of the earliest examples of big stone mihrab of Anatolian Seljuks, consisting of two intertwined niches, was designed like a portal. It consists of two muqarnas recessed. There are small mihrab niches as well on the side walls of this mihrab (Erzincan, 2020; Ögel, 1966: 15) (Figure 1.3.a). Kayseri Hunad (Mahperi) Hatun Complex's (1238), mihrab is also example of the stone carved muqarnas of the period. The mihrab section in the mosque consists of a niche with muqarnas with multiple corners (Kuban, 2002: 135) (Figure 1.3.b, Figure 1.3.c).

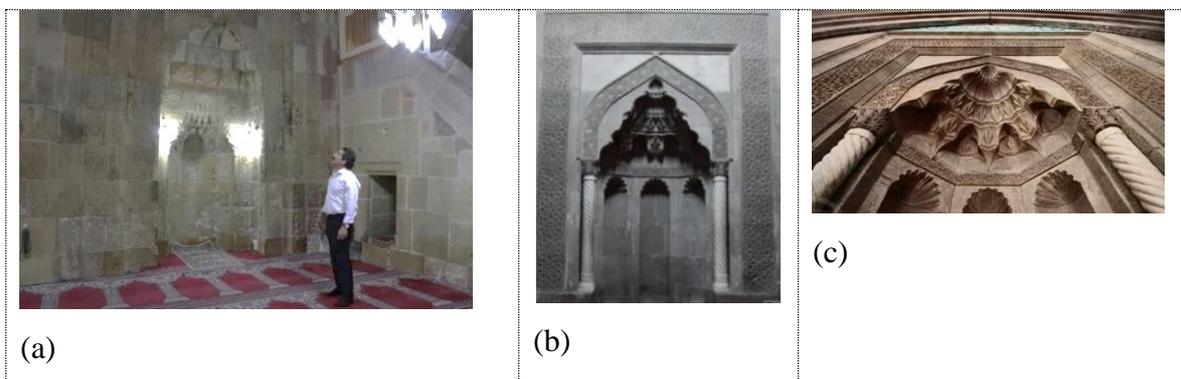


Figure 1.3. a) Niğde Aladdin Mosque (1223)'s detail of stone mihrab niche with two niches with muqarnas (URL-63), b) Kayseri Hunad (Mahperi) Hatun Complex's (1238) mihrabiye niche (URL-64), muqarnas detail, c) (URL-65)

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

In addition to stone mihrabs, there emerges muqarnas on mihrabs with surface decorations. Sahip Ata Mosque, Konya (1259) is among the structures where there is a muqarnas mihrab with mosaic tiles, which brings only a rectangular plan compared to stone mihrabs. It has a superficial gradation which can be seen in the mihrabs of another Anatolian Seljuks mihrabs such as Konya Sırçalı Medrese (1259) (Ödekan, 2002: 334). This mosaic tile altar was decorated with geometric and floral motifs (Aslanapa, 1989: 134-135) (Figure 1.4). This superficial mihrab is the first example formed by 'the combined use of plaster and tiles' (Erzincan, 2020). This muqarnas can be included in superimposed muqarnas defined by (Hamekasi, Samavati, and Nasri, 2011), in which refers to the muqarnas cells are built in combination with supporting face while the dome or vault is constructed first.



Figure 1.4. Sahip Ata Mosque (1259), plain mihrab niche covered with glazed tile (URL-66)

Ottomans

In mihrabs of the Early Ottoman period, there mostly emerged surface decorated mihrabs with plaster. In Bursa Orhan Gazi Mosque (1339)'s mihrab with muqarnas kavsara on the qibla wall was made in plaster with moulding technique and then its surface covered with oil paint and pencil work (Top, 1997: 35) (Figure 1.5.a). In the Bursa Grand Mosque (1399), there is a rectangular shaped mihrab niche with a muqarnas kavsara made of eight layers arranged in different orders (Dallal, 2019: 67). The plaster, which can be seen in the mihrabs of Early Ottoman mosques such as Bursa Orhan Gazi during the 14th and 15th centuries (Erzincan, 2020), was used to form muqarnas of mihrab with painted decorations on the surface were added later (Top, 1997: 66) (Figure 1.5.b). Tile mihrab in Bursa Green Mosque, which also can be seen in the another mihrabs with different tiles of Ottoman as in Edirne

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

Muradiye (1426), covered with vegetal decorations, consists of a multi-surface niche and a muqarnas kavsara (Erzincan, 2020) (Figure 1.5.c).

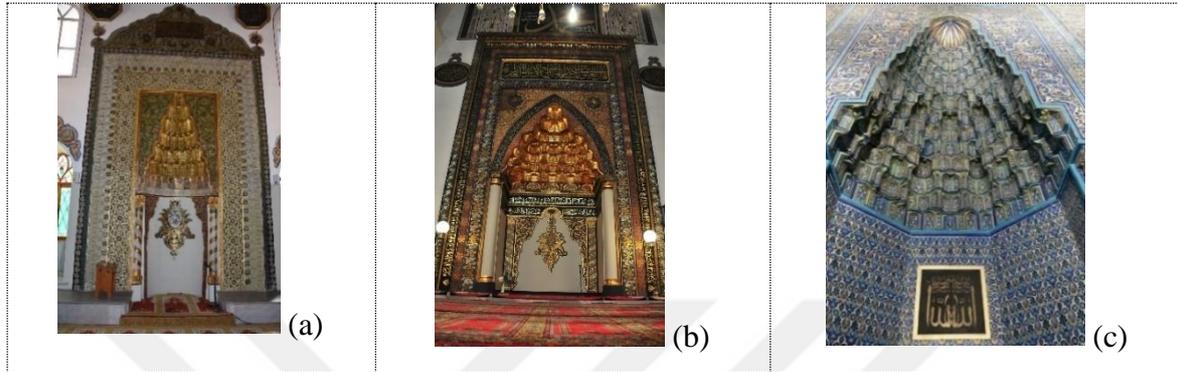


Figure 1.5. a) Bursa Orhan Gazi Mosque (1339), mihrab (URL-67), b) Bursa Grand Mosque (1399)'s mihrab (URL-68), c) Bursa Green Mosque (1419)'s mihrab detail (URL-69)

In mihrabs of the period, there emerges also stone mihrabs as well as surface decorated mihrabs with plaster. The stone mihrab of the Iznik Green Mosque (1391) is among the Early Ottoman Period stone altars preserved in its original state (Erzincan, 2020). The mihrab consists of six layers of muqarnas, which were designed differently from each other (Dallal, 2019: 46) (Figure 1.6.a). In Milas Firuz Bey Mosque, there is a detailed column head with muqarnas on both sides (Kayhan and Etikan, 2017) (Figure 1.6.b). Balat Ilyas Mosque, (1404)'s mihrab niche of the mosque made of marble consists of eight rows of gradual system (Figure. 1.6.c).

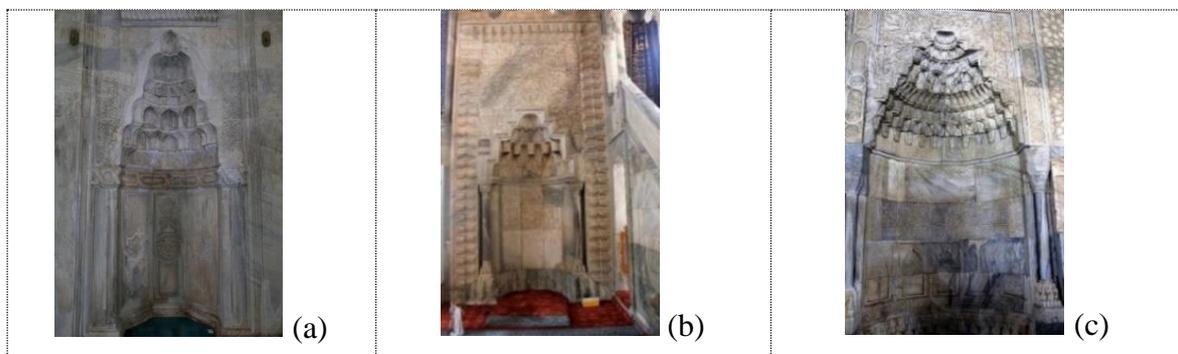


Figure 1.6. a) Iznik Green Mosque (1391) 's stone mihrab with muqarnas (URL-70), b) Milas Firuz Bey Mosque (1394) (URL-71), c) Balat Ilyas Mosque, 1404's mihrab (URL-72)

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

Architect Sinan

The stone mihrab appears on the same axis as the portal in the Şehzade Mosque (Necipoğlu, 2013: 271) (Figure 1.7.a). The mihrab with a five-sided niche emerges on the qibla wall with ten rows of muqarnas cavsara in Süleymaniye Mosque (Doğanay, 2007: 169) (Figure 1.7.b). Similar mihrab design can be seen in Selimiye Mosque (Figure 1.7.c).

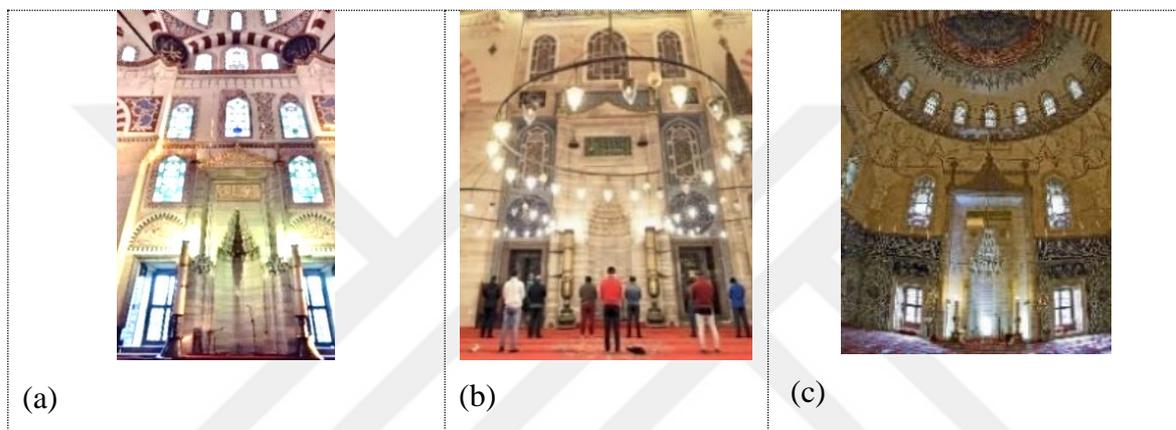


Figure 1.7. a) Şehzade Mosque, mihrab section (URL-73), b) Süleymaniye Mosque, mihrab (URL-74), c) Selimiye Mosque, mihrab section with semi domes (URL-75)

Muqarnas on Portal Element

In the context of muqarnas on portal, The Friday Mosque of Isfahan's iwan come to the fore in the historical process. In the Friday Mosque of Isfahan, muqarnas ceilings were penetrated into three of iwans elements (Grabar, 1990: 65-66), which can be included in the one of the usages of muqarnas that can be appear in "vaulting over portal, niche or hall" defined by Necipoğlu (Necipoğlu, 1996: 349). The qibla iwan, or south iwan which was also equipped with tiers of muqarnas stands out with its size and length compared to other iwans (Hattstein and Delius, 2010: 369). The muqarnas system, built of bricks, consisting of squinches in the half pavilion in the iwan of the Isfahan Mosque, formed with "dividing a pavilion vault by its horizontal axes" which is unique to Eastern. This feature in the vault system differs from the new concave triangular muqarnas of Western domes where wood and stucco materials are used (Gonzalo and Alkadi, 2018) (Figure 1.8).

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

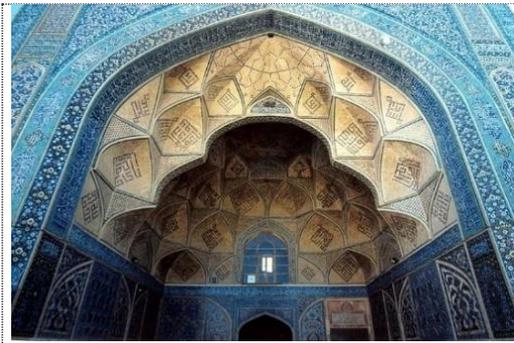


Figure 1.8. The Friday Mosque of Isfahan' s the half pavilion vaults on qibla iwans, the south iwan, 13th century (URL-76)

Anatolian Seljuks

Muqarnas semi-vaulting over an entry portal stands out in Anatolian Seljuks stone ornamentation in search of a different system (Ödekan, 2002: 332). Vaulting over an entry portal which is among the parts of the structures muqarnas emerges (Necipoğlu, 1996: 349), is peculiar to North Africa and Anatolia (Yakar, Yılmaz, Güleç, and Korumaz, 2009). The muqarnas portal covers have a structural system based on console as in the case of muqarnas filled dome. The muqarnas has a function of transforming a rectangular base into a polygon to construct these kinds of structural system (Ödekan, 1975: 442). In the corbeled method, consists of wooden or stone defined by (Hamekasi et al., 2011) the muqarnas cells becomes part of structural approach. Cells are “*carved outwards from the middle of the block face, either before or after assembling*”. Thus, in stone or wood muqarnas’s relationship with structure is stronger with the structure. In the construction technique of stone and marble material of muqarnas, besides adding the prepared pieces later, it offers the opportunity to be processed into structures (Özbek, 2002: 26-30). Anatolian Seljuks stone carving of muqarnas semi vaulting which can be included in this approach represents a fine example of this with stone material.

The rich ornamental groups on the portals consist of ornamental curbs, rosettes and hobnails, recessed arches, corner columns and capitals, inscriptions and mihrabiyes (Ertunç, 2016: 15) mouldings and cornices that form a frame as a complement to the holistic composition (Bayburtluoğlu, 1978). The niches called ‘mihrabiyes’ similar to portal also appear on

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

the side walls of it (Ünal, 1982: 69). The mouldings, which are a part of the whole composition on the portals of the Anatolian Seljuk period, become a part of the ornamentation by shaping their surfaces in different forms such as pipe or hollow (Ögel, 1966 : 93). Sitti Melik Tomb in Sivas is one of the first examples of a semi dome with muqarnas. Alay Khan (1192) in Aksaray, which can be considered as one of the first monumental portals of the Seljuks, and ‘Evdır’ Khan (1215) in Antalya, which also has side niches, are also among the early portal examples with a similar muqarnas semi-domed arrangement (Ögel, 2002: 320) (Figure 1.9).

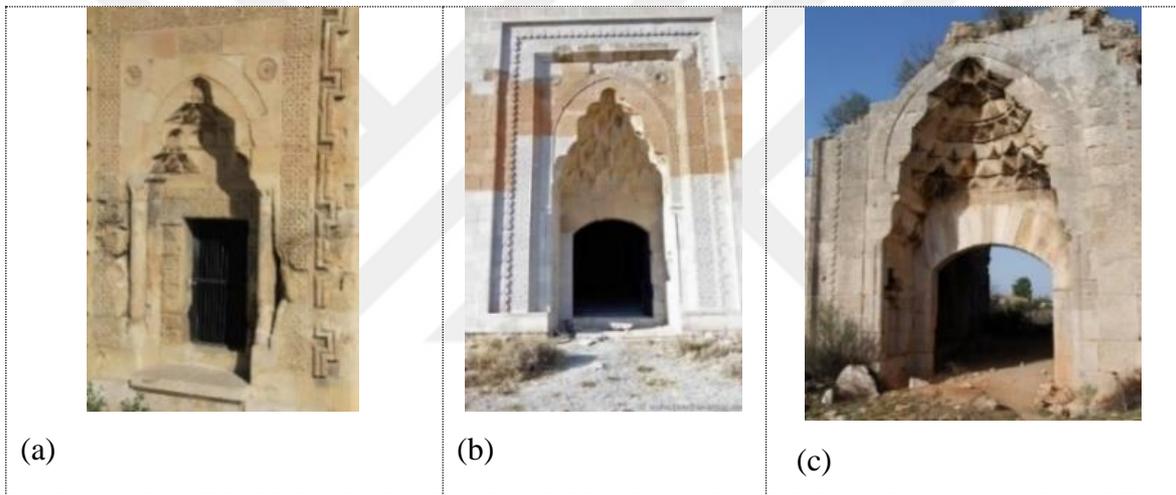


Figure 1.9. a) Sitti Melik Tomb, (1195), general view and portal (URL-77), b) Alay Khan (1192), general view and portal muqarnas vaulting and moulding frame (URL-78), c) Evdir Khan (1215), general view and portal with mihrabiye niches on the side wall (URL-79)

In the context of the mosque architecture, the use of muqarnas vaulting on portal elements with stone material continues in Anatolian Seljuks period. Niğde Alaaddin Mosque (1223)’s asymmetrical arrangement in the portal semi-domed niche and the different visual vistas apart from examples with certain types of period (Ödekan, 2002: 333) (Figure 1.10.a). In Kayseri Hunad (Mahperi) Hatun Complex, (1238), the stone portal element in the madrasah has a gradual transition with muqarnas similar to the portals of the period (Kuban, 2002: 136). There are mihrabiyes with muqarnas cavsara surrounded by moulding on the side walls of the portal (Ünal, 1982: 71) (Figure 1.10.b). The stalactite system consisting of fourteen rows in the portal niche in the Sahip Ata Mosque (1259) in Konya has the most advanced

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

muqarnas system of the Seljuk period with its 'radial' system (Ödekan, 2002: 332-333) (Figure 1.10.c).

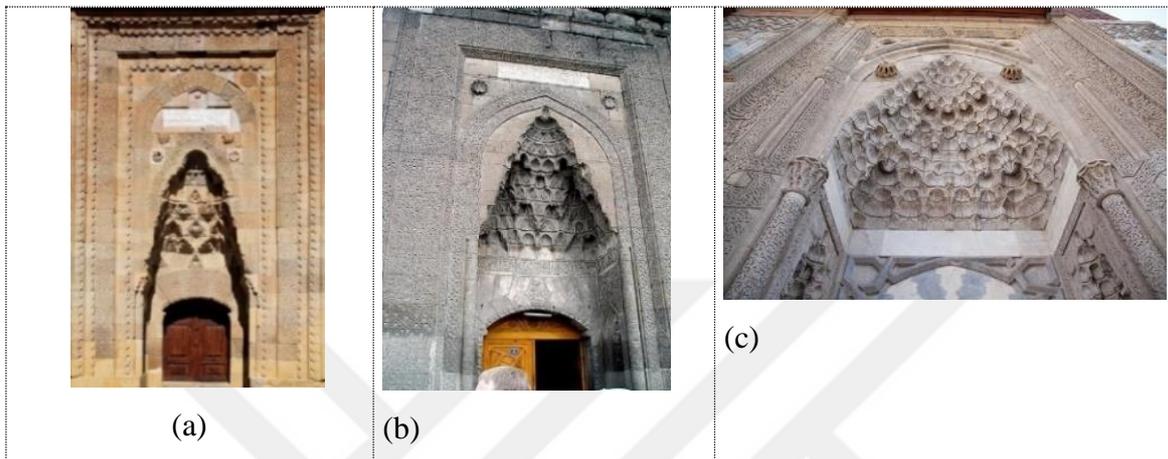


Figure 1.10. a) Niğde Alaaddin Mosque (1223)'s muqarnas on portal (URL-80), b) Kayseri Hunad (Mahperi) Hatun Complex (1238)'s portal with muqarnas vaulting (URL-81) c) Sahip Ata Mosque, 1259, muqarnas semi vaulting at portal (URL-82)

Mamluk structures have a characteristic that distinguishes them from other regions with their 'sculptural' form of muqarnas (Hillenbrand, 1999: 148). The use of stalactite portal emerges with its unique sculptural form. Al Nasir Muhammed Mosque (1318-1335)'s portal in the mosque is part of the development process of the innovative Bahri Mamluk period with architectonic and structural approach of stone carved muqarnas that emerged in Egypt as a continuation of the Syrian tradition. A grooved semi-dome and a three-storey superimposed muqarnas scheme was transformed with the search for a sculptural form. The portal of the mosque contributed to this process by adding dripping stalactites (Kashef, 2017) (Figure 1.11.a). Another portal in the period of Sultan Hasan Mosque refers to the portal system of Sivas Gök Madrasa with a stalactite vault and other ornamental scheme and portal of Anatolian Seljuk mosques. This portal in the complex has a fluted semi dome with a stalactite (Behrens-Abouseif, 1992: 125) (Figure 1.11.b). As in the portal of Khanqah of Faraj ibn Barquq (1399-1411), stalactites formation is designed with three lobes form (Behrens-Abouseif, 1992: 136). Another example is trilobed portal in Sultan Qaybtay Mosque (1472-1475) with groin vault. In this portal cover, in which the ablaq stone is also used, there are some stalactites in the corners (Behrens-Abouseif, 1992: 145) (Figure 1.11.c).

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

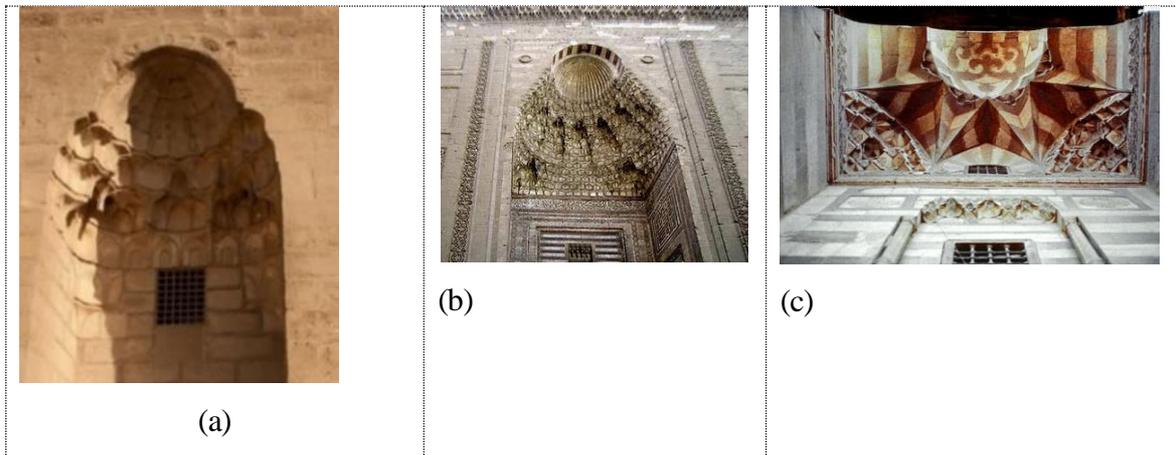


Figure 1.11. a) Al Nasir Muhammed Mosque (1318-1335) (URL-83), b) Sultan Hasan portal with muqarnas (URL-84), c) Sultan Qaybtay Mosque (1472-1475)'s portal (URL-85)

Ottomans

In Ottoman period, there emerges portal similar to Seljuk order as in created with squinches with muqarnas of portal in Bursa Green Mosque (1419) (Şakir, 2007) (Figure 1.12.a). The muqarnas schema of the Edirne Üç Şerefeli Mosque (1437) represent the development of the unique Anatolian stalactite portal design in marble (Senalp, 2012: 68). Among the portals on all three sides of the mosque, the stalactite portal in the gateway stands out (Aslanapa, 2004: 74-75). In the ten rows of muqarnas vaulting, muqarnas cells are carved in different shapes, with large stalactites in the middle and small stalactites on the sides (Özbek, 1999: 515) (Figure 1.12.b, Figure 1.12.c).

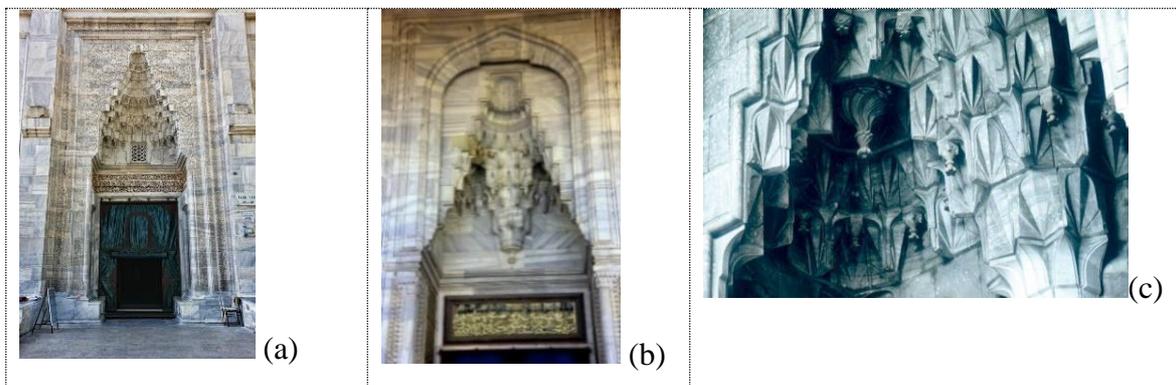


Figure 1.12. a) Bursa Green Mosque (1419) (URL-86), b) Edirne Üç Şerefeli Mosque (1437), muqarnas detail of portal (URL-87), c) (URL-88)

APPENDIX-1. (continue) The Development of Muqarnas on Mihrab and Portal Elements

Architect Sinan

Sinan, who continued the early Ottoman scheme in the portal geometric scheme (Ödekan, 1988b: 521-522), designed the simple muqarnas kavsara portal in the Şehzade Mosque, supporting the whole design concept (Karademir, 2016) (Figure 1.13.a). The monumental portal of the mosque with a muqarnas hood ends with a similar mihrab element supports the holistic attitude in Süleymaniye Mosque (Necipoğlu, 2013: 287) (Figure 1.13.b). The arched portico, where the entrance with portal to the narthex is located on the northern façade of Selimiye Mosque, also prepares for the transition to the dome and interior space (Necipoğlu, 2013: 330) (Figure 1.13.c).

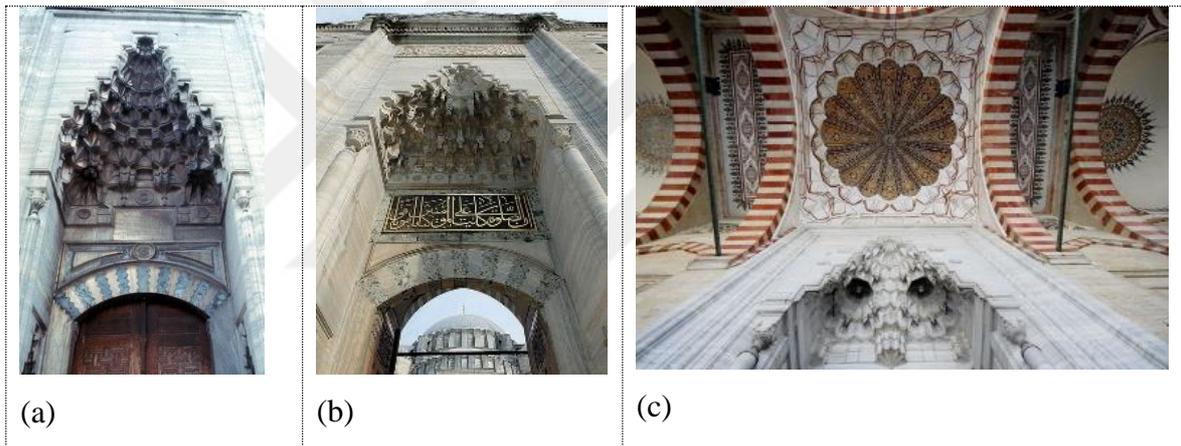


Figure 1.13. a) Şehzade Mosque portal with muqarnas (URL-89), b) Süleymaniye Mosque (1551) muqarnas with portal (URL-90), c) Selimiye Mosque, portal detail with muqarnas (URL-91)



Gazili olmak ayrıcalıktır