

THE DEVELOPMENT OF ARRIS VAULTS IN ANATOLIAN AND ARMENIAN ARCHITECTURE OF THE 13TH CENTURY: DIVRIĞI COMPLEX AND HOROMOS MONASTERY

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Abstract

The Divriği Complex, constructed in the 13th century, presents one of the early examples of Anatolian stone vault tradition. Especially, the creative solutions applied to stone arris vault construction techniques reflect a uniqueness not seen in Anatolian Seljuk architecture before. On the other hand, Horomos Monastery, an original example of Armenian architecture, bears a striking resemblance to the arris vaults of the Divriği Complex and offers an earlier example of stone arris vault.

This research aims to solidify a possible relationship between these two medieval structures, emphasizing similar solutions, especially among the arris vaults, through decorative elements and construction techniques. By highlighting the architectural similarities these two structures offer, it sheds light on a better understanding of the uniqueness and historical context of medieval arris vaults. As a result, it is considered that the arris vault of Horomos Monastery, constructed before Divriği Complex, might have played a significant role in the development of arris vault construction in Western Europe and the Middle East.

Keywords

Arriis vault, Divriği Complex, Horomos Monastery, Armenian architecture, Stone vault

Architectural activity in Anatolia during the Seljuk period (1071-1308) experienced an exceptional peak in the field of stereotomy, specifically concerning stone vault construction. An extraordinary variety of arris vaults¹ can be classified based on the number of protruding arris patterns and recessed angles formed on the surface. In the 13th century, especially in the east of Anatolia, refined examples of stone vault tradition were created in many buildings. Among these, the stone vaults which cover the Divriği Complex², built in 1228-1229 on the initiative of Ahmad Shah Lord of the Mengügekids and Turan Malik, perhaps his wife, have a special place [fig. 1]. As they are among the earliest known examples of Seljuk Anatolian architecture, they are also of particular importance for regional building chronology³. Further east in the same geographical region, in the Armenian lands where the stone is skillfully worked, there are limited examples of arris vaults that date earlier than Anatolian Seljuk architecture. The arris vault of the Horomos Monastery, which went through various construction phases from the 10th to the 15th centuries, represents the first known example of this limited number. By reconstructing the design models and development of the arris vaults, which are not far from each other in terms of location, but were built for different purposes and under different kingdoms, the variations in technical and decorative solutions will be reconstructed and the differences or possible connec-

tions will be explored. On the other hand, compared to the European reality of the multi-arris vaults, which began to come to light with the gradual abandonment of ribs in Western Europe from the second half of the 15th century onwards, historical sources continue to raise unresolved questions either about the reasons for their invention and popularity or about their construction techniques. In the 13th century, the fact that Armenian and Anatolian architectural vaults met the criterion of duplicating the arris without realizing the ribs regardless of formal differences is interesting, as it shows the development of constructive solutions. This interesting fact in the Anatolian lands, the creation of arris vaults, is clearly visible between the vaults of the Divriği Complex. Surprisingly, the vault construction in the building multiplies in some cases until it reaches up to a six-arris pattern in each quarter of the vault⁴. This process is the result of the progression of the arris patterns, including complex and sometimes diagonal lines, as they take shape inward and outward on the surface of the vault. The number of arris patterns and, accordingly, the “protruding” or “angled” shapes of the arris patterns form the shape of the polygonal or cross-shaped segment in the center of the vault. The most complex ones added to these are those in the form of a rhombus, resulting in a flat end of the upper cover on the central sides of the vault, due to the increase in the number of arris patterns.

In the Divriği Complex, the vault system was conceived in more ornamental forms, rather than making the ribs of the diagonals like a simple form. Usually in non-square bays, but sometimes, new arches were inserted on the arris patterns to reduce the bay to a square, and sometimes domes or cloister vaults were constructed in longer rectangular bays [fig. 2]. Thus, in most cases, with the division of the vault plan into three units, a central square is formed. Therefore, each opening corresponds to a combination of various typologies, while the lateral parts are conceived as a junction between the walls and the central square section. Consequently, this regular geometry should have made the layout of the complex vaults easier to design and build.

By observing the diagonal lines of these bold stone arris vaults of the 13th century, some clues about their construction system can be gleaned. In the upper cover, if the diagonals of the vault form a “protruding arris pattern” on the surface, it is a cross vault, and if they form a “recessed arris pattern”, it is basically a cloister vault plan. In this case, the recessed or protruding shape of the diagonal lines characterizes the basic structure of the vault. Therefore, this fundamental difference between

protruding and recessed arris patterns is reflected in the cutting criteria of ashlar. This means that in terms of the process applied on site, the methods shown are used for protruding arris patterns in place of the cross vault, whereas the cloister vault is used for recessed arris patterns. Thus, the cross vault can be considered unpreferable. The preliminary graphic model drawings of the cut stone row, especially in cases where it is necessary to cut the shape of the protrusions and recesses on a single block of stone, this copying method is implemented with great convenience for the construction site. In Anatolian Seljuk architecture, which has a great variety of arris vaults, the more complex the constructive solution becomes, the more the spaces covered by the vaults are spatially emphasized, covering special areas such as entrances to buildings, *iwans*⁵, mausoleums, and rooms associated with specific activities⁶. These are vaults starting from two arris in each quadrant of the vault and consisting of three, five, six, seven, and nine arris lines⁷. While the three-arris vault is the most widely encountered in Anatolia⁸, the only known six-arris example, which tends to decrease as the number of arris increases, covers the main *iwan* of the Divriği Hospital⁹. The vault has six arris in each square and is composed of eight rows of ashlar beds overlapping each other. In 2017, under the leadership of prof. José Carlos Palacios Gonzalo, a small model of the six-arris vault of the main *iwan* of Divriği Hospital was reconstructed in the “*taller de construcción gótica*”¹⁰ (gothic construction workshop), as part of the master’s program at Higher Technical School of Architecture of Madrid (ETSAM). According to the progression of the hypothesis, the first six rows of the vault, consisting of eight rows of ashlar beds, form the springing, while the last two rows are not cut horizontally but are inclined. If this hypothesis, developed during the reconstruction experience, is correct, this experience procedure could also be valid for all arris vaults of the Divriği Complex. Assuming that the horizontal rows of cut stones that took place during the construction of the vault were fulfilled, it can be said that the impost was built too high¹¹ [fig. 3]. Because inclined cutting is uneconomical and involves more loss of stone material as well as more study of the operation by professionals. Therefore, the easier and more economical way of cutting in the horizontal direction by keeping the impost high should undoubtedly be a very important operation in a construction site in medieval Anatolia and one that cannot be ignored.

Containing challenging geometric scheme, this vault, unlike the other vaults in the building, does not have its diagonals on the center arris pattern line. Unusually, the diagonal lines were carved in a conical shape instead of being shaped inward or outward. In this

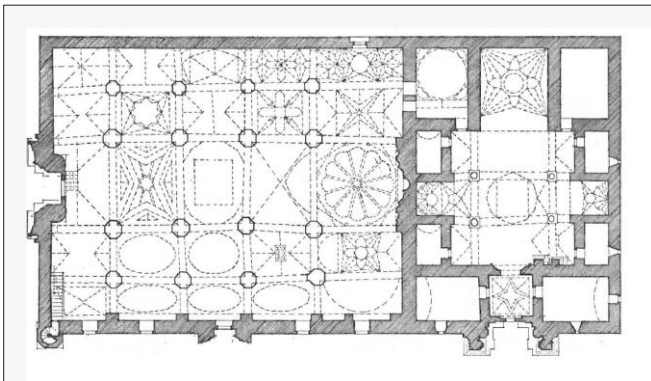


Fig. 1. Divriği, plan of Divriği Great Mosque and Hospital. 1228.

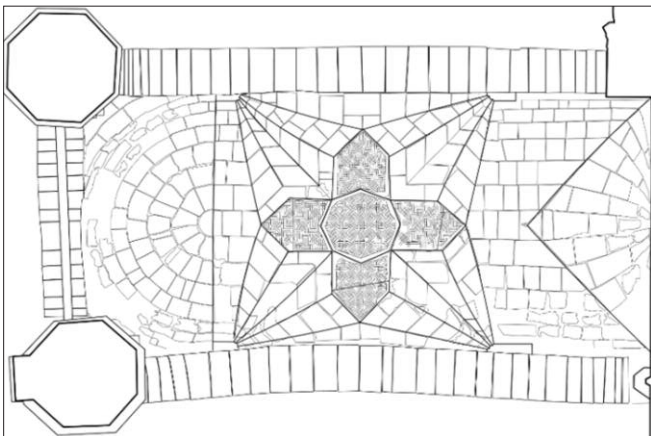


Fig. 2. Resolved Divriği Great Mosque vault with cloister vault and semi-dome on the sides.

case, it is not possible to argue that the basic vault structure is a cross or cloister design. These conical areas along the diagonal are terminated with cut stones in the form of half clams. Thus, they form a joint between the octagon in the center of the vault and the arris patterns. Perhaps representing the apex of complex stereotomy, the six-arris structure in each quadrant of this superstructure ends in an octagon with unequal arris patterns in the center of the vault¹². On the four arris patterns of the octagon, uneven pentagons¹³ decorated with geometric patterns were added to form a cross in the center of the vault. Inside the octagonal center is a pair of pseudo spirals carved with red lines like a flat plate. Only some sections of this central part, which is occupied with the spiral design, coincide with the actual joints of the cut stones. The central design of the vault, given the appearance of a single spiral by the red lines, conceals an optical deception depending on the shape of the slab beds, which are essentially double spiral. The actual arrangement of the ashlar, in fact, consists of two opposing rows and a shifting of the concentric semicircle. Thus, contrary to superficial appearances, the number of ashlar forming the center of the vault was considerably diminished¹⁴ [fig. 4]. Nevertheless, the method of stone vault construction must have required a more demanding geometrical procedure. This, in keeping with the character of arris vaults, is not coincidental but emphasizes the exceptional character of the vault with the most arris patterns of the entire structure.



Fig. 3. 3D View of the main iwan vault of the Divriği Hospital (by F. Agnello).

In Anatolian Seljuk architecture, where brick arris vaults were also used in addition to stone, there are only two known precedents for brick arris vaults constructed prior to those of the Divriği Complex. Both of these are located in the Sivas Şifaiye Madrasah, which was built in the first quarter of the 13th century by the order of Kaykaus I (or Izz ad-Din Kaykaus ibn Kayhkusraw). These two¹⁵ and three-arris vaults were constructed of brick instead of the cut stone that dominated the vaults of the building¹⁶ [fig. 5].

Earlier examples of stone arris vaults known before Divriği are located in Ani¹⁷, one of the most controversial border regions between Turkey and Armenia, the gateway of Central Asian civilizations to Anatolia. Located on the territory of today's Turkey, Ani was

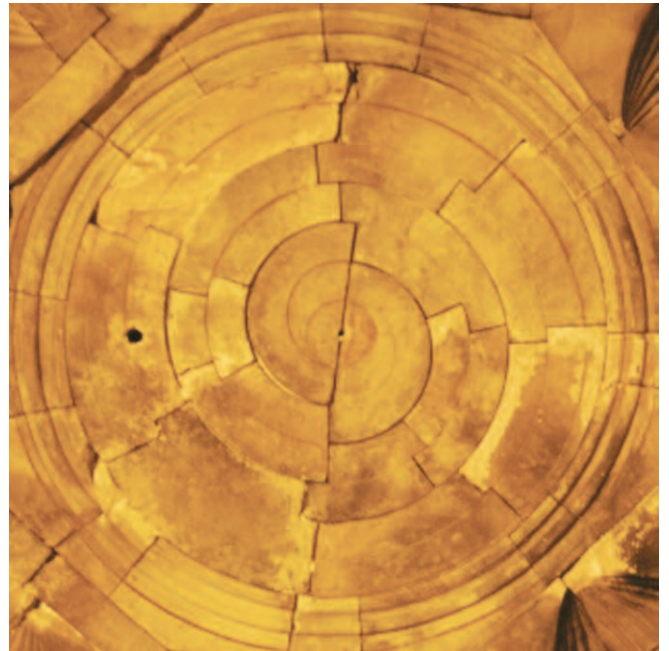


Fig. 4. Divriği, central part of the vault.



Fig. 5. Sivas, three-arris vault of Sivas Şifaiye Madrasah. 13th century.

transformed into a capital city during the reign of Ashot III (953-977) and then rapidly developed into an important walled fortress for the Armenian Kingdom. Today, in this area, the Menuchehr structure of obscure and mysterious origin is home to a series of stone vaults, all original and distinct, just as in Divriği. Of the original possible eleven vaults, there are only nine surviving today, which can be reconstructed according to remaining traces.

The very high quality of the execution, and furthermore the early date of the building site, demonstrate that in the last decades of the 11th century, there were teams of masters who were capable of elaborating vaulted structures which were characterized by the presence of edges, recessed angles, muqarnas, flat fragments, and even a surprising calligraphic use of bichrome materials [fig. 6]. The building surprises not only for the typological variety of the covers, but also for the exceptional level of stereotomy perfection achieved thanks to its small size.

An inscription shows the name of the patron, the Emir Ebu Suca Menuchehr (or Manuçeher)¹⁸, who would have ordered its construction in 1072, perhaps to replace a smaller building¹⁹. It is a mosque with an octagonal minaret, perhaps among the first built by the Seljuk Turks in Anatolia²⁰. Unfortunately, the hostile Turkish policy towards the Armenian heritage in the eastern

provinces has not made the research of these monuments impartial. We do not know enough about this building, which is quite different from the known mosque typology. It may have been a madrasah, or it may have been a palace of public dignitaries or government officials. The city of Ani experienced, on several occasions, moments of great prosperity, due to its strategic position along the commercial road between the Black Sea and the East; definitively entering the Seljuk orbit, it was endowed with monumental buildings that made it famous and show the influence of Armenian construction and architectural routines. While the bichrome technique has been compared to the Syrian tradition²¹, most of the bays are covered by flat vaults connected to walls with lunettes, according to a use that has numerous precedents in Armenia. Domes and octagonal cloisters mark the central spaces of the *Gawits*²² of Armenian monasteries, while the lateral spaces are often covered by flat or barrel vaults. In the latter case, muqarnas, portions of cloisters or lunettes fulfil the task of generating the impost, connecting the horizontal roofing slabs sometimes functioning as real corbels. The availability of two different lithotypes was the starting point for the elaboration of decorative solutions with geometric motifs obtained from the alternation of black and reddish ashlar,



Fig. 6. Ani, arris vault of the Menuchehr Mosque. 11th century.

which implies an accurate design of the vault apparatus and its impeccable execution.

The similarity between the two complexes of Ani and Divriği²³ has been underlined several times, underscored by the singular variety of their roofing solution among which the widespread use of arris vaults stands out, such as cross vaults, lunettes, cloisters and umbrella vaults. From a more detailed observation of these, however, some differences emerge, which lead us to consider with caution the temptation to establish direct connections between the two buildings. The vaults of Ani generally appear more regular, adhering with greater precision to the size of the spans to be covered. In Divriği, on the other hand, perhaps the vicissitudes of a longer and certainly more complex construction site, primarily due to the size, have led to the adaptation of specially-designed roofs for the spaces below, which, more often than not, have been reduced to a square. A simpler control of the building site phases, therefore, would explain at least in part the extraordinary level achieved at Ani. Yet the bichrome of the vaults seems to highlight the attention placed on the design of the ashlar, while in Divriği it is above all on the complexity of the shapes, on the intersection of different typologies, on the multiplication of arris (groins or edges) that the constructive ambition of the Seljuk masters seems to go, perhaps even in order to compete with a precedent like Ani which certainly had to constitute a famous reference model.

Arris Vault of Armenian architecture

Horomos Monastery²⁴ is located to the north of the medieval capital of Ani, on the banks of the Akhuryan (or Arpachay river), not far from the Menuchehr structure. The building presents an example of a stone arris vault that is more independent of the Menuchehr vaults, more closely resembling the Divriği arris vault, but earlier. One of the most prominent religious and cultural attractions of the Kingdom of Ani, the structure was built during the reign of King Abas Bagratuni I (929-953). The monastery underwent renovations and additions until the 14th century and continued to function until the 1920s²⁵ [fig. 7].

The area covered by the great monastery consists of the main complex, the church of St. John (Surb-Yovhannēs) and *zamatun*²⁶ (Armenian type of fore-church structure), the Ruzukan burial structure located just south of the church, and the chapel of Khatun of Ani adjacent to its south²⁷. Some of the facades, including the dome, of the main church of the monastery, the church of St. John, have not survived. The church and *zamatun* were built

in 1038 by King Simbat III (1020-1040), according to an inscription on the western entrance gate of *zamatun*²⁸. Dating to the 11th century, *zamatun* has a special place in Armenian architecture in terms of both its plan type and ornamentation. Moreover, the *zamatun*, an unexperimented building type until then, established the tradition of centrally-planned four-columned halls that spread widely in Armenian monastic communities. While the flat stone superstructure with its elaborate ornamentation displays great architectural mastery, the cone-shaped octagonal opening in the central part of *zamatun* and the belfry above it are unique for Armenian architecture, both architecturally and ornamentally²⁹. The unknown architect of Horomos undoubtedly used eight large stone slabs to construct his unique interpretation of this octagonal opening [fig. 8]. The ornamentation on the large surfaces of the ceilings and their contrast with the walls is unique to *zamatun*³⁰. These features make the building unusual among Armenian church architecture.

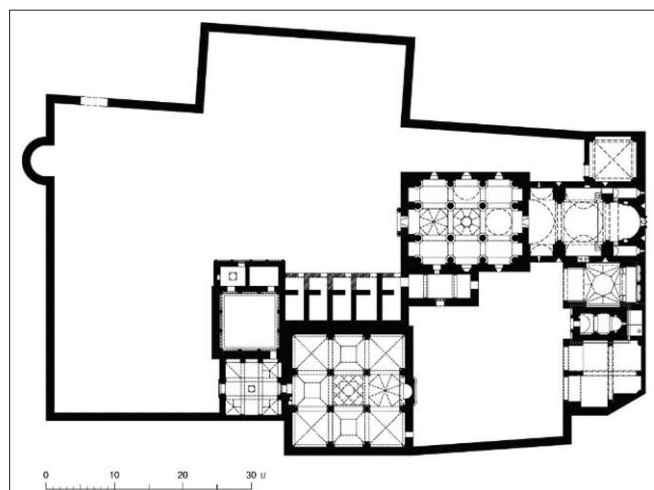


Fig. 7. The plan of the Monastery of Horomos.



Fig. 8. Octagonal cover in the center of the zamantun. (<https://www.vanker.org/fiche/monuments/horormos>).

The two-storey Ruzukan chapel, which is accessible from the south wall of St. John's church through a doorway, displays the well-preserved three-arris vault in all its glory, despite the damage to its facades. On the rectangular ground floor, the vault covers a square space that opens to the west through a large arch. At the eastern end of this room are four *khatchkars*³¹, each with a different ornamentation. Immediately on the upper floor of the area are three chapels placed one after the other, covering only the eastern part of the ground floor. The central chapel is covered by a dome, while the north and south chapels are covered by a barrel vault. The lower hall, shaped by the original three-arris vault construction, adjoins the walls of the domed church and the Khatun chapel. More complex than a vault with Gothic ribs, this elegant version of this unique upper cover, built without the use of any ribs, successfully covers this large area.



Fig. 9. Three-arris vault of the Ruzukan Mausoleum. (<https://www.vanker.org/fiche/monuments/horormos>).



Fig. 10. Ceiling of vault of the Ruzukan Mausoleum (by Ivan Folletti).

The desire to attain a square area, which is more in line with the geometric scheme of the arris vault, is ensured here by wide arches on both sides. Unusually, the arris pattern lines of the vault are built in reference to the ground. Thus, the three-arris pattern lines are formed by the overlapping of nine rows of ashlar beds at the four corners. At each of the four corners of the vault, the rows, including the chain motif ashlar bed surrounding the perimeter wall (the first three rows), were built in the same ashlar bed alignment together with the side walls [fig. 9]. Like all the three-arris vaults in Anatolian Seljuk architecture, it can be argued that the vault of the Ruzukan Mausoleum adopted a cloister vault plan since its diagonal line takes an inward form.

An inscription informs us that in 1215 Kutlu Khatun commissioned the construction of a chapel for her mother Ruzukan under the supervision of Bishop Sargis³². From the inscriptions of the Divriği Complex, it is known that the construction of the building began in 1228. If the value of the vaults of the latter consists in the extraordinarily wide range of constructive solutions put into practice, the stone arris vault of the Ruzukan Mausoleum on the current Turkish border with Armenia represents, until proven otherwise, the only identifiable example in Anatolia. In 13th century Anatolian Seljuk architecture, all three-arris stone vaults built after the Divriği Complex have an octagon in their center panels³³. This is because the construction typology of arris vaults requires that each arris line of the vault be connected to a corner in the center. In three-arris vaults, this usually requires the formation of an octagonal form in the center. However, if the arris line on the diagonal of the vault is made longer than the others, as in the case of the three-arris vault of the Sivas Shifaiye Madrasah, a star form appears in the center panel instead of an octagon³⁴.

In the case under study, the three arris lines converge in an octagonal flat center, and another octagonal form repeats inside this octagonal panel. Inside this, two intertwined eight-pointed stars are designed. In fact, it is the result of a particular preference for square ashlars in the central layout, rotated 45 around its axis [fig. 10]³⁵. Moreover, a similar three-arris vault centered on two intertwined eight-pointed stars is the only example of the three-arris vault in the Great Mosque of Divriği³⁶ [fig. 11]. At Divriği, the ends of these eight-pointed stars join the octagonal panel and are highlighted with red ornaments, while in the Ruzukan Mausoleum, they join at the corners of vertically placed squares³⁷.

The church of S. Astvatsatsin is the second and last known example of Armenian architecture, after the Ruzukan Mausoleum, in which experiments with the theme of arris patterns were conducted. This small

building, dated 1339³⁸ and built east side of the wall of the Amaghov Noravank Monastery complex, was constructed by Prince Burtel Orbelyan as a family tomb on the ground floor and a chapel on the upper floor. In this context, it should be noted that the prevalence of two-story funerary churches with tombs on the ground floor and a chapel on the upper floor is a feature of Armenian architecture dating back to the early Christian tradition. However, in the architectural tradition of the 11th century, a building like the Ruzukan Mausoleum, known for its tall domed chapel and elongated tower-like dimensions, appears in Tat'ev Monastery dated 1087, again as a burial ground³⁹. The Ruzukan Mausoleum represents the second known example of this style. According to Kazaryan, these structures, like Novarak, perhaps served as a basis for modelling a composition of tower-like funerary churches in Armenian architecture from the late 13th to the early 14th centuries⁴⁰. The two-arris vault⁴¹ in the Novarak Mausoleum ends with a rotated square around which the figures of the four heralds are carved. Although it was built a century after the three-arris vault of Ruzukan, it is the product of a simpler construction [fig. 12]. Such vault solutions seem to be quite exceptional in the Armenian context. This is because this architecture is dominated by a constructive practice that makes great use of barrel and cloister vaults. The best-known method is represented by structures built from intertwined pairs of ribs, a system that repeatedly underlines the possible role of the ribbed vault in the development of Gothic technology. However, these two known examples of stone arris vaults continue to provide information that can contradict beliefs and undermine the historical narrative. How many cultural artifacts were lost in the Armenian region during the Turkish conquest of Anatolia and the subsequent period of upheaval, and perhaps also by earthquakes and disasters or how many of them we do not know yet.

Similar decorative ornaments

An invisible chain between the arris vaults of the architectural structures under examination is further emphasized by the ornamentation of the structures, proving this connection. For example, in the Ruzukan Mausoleum, there is a specially selected and decorated motif that encircles a part of the wall surface, including the third row of ashlar beds that form the vault⁴² [fig. 13]. This motif, known as the Seljuk chain, was used in Armenia even before the Seljuks arrived in their territory⁴³. A similarity can be seen in the arch relief of the main iwan of the six-arris vault of the Divriği Hospital, in a

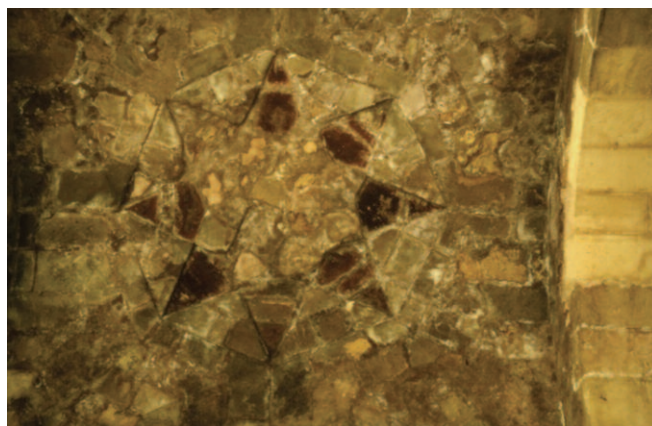


Fig. 11. Divriği, ceiling of vault of the Great Mosque.



Fig. 12. Noravank, ceiling of vault of the Church of St. Astvatsatsin.



Fig. 13. Relief of the arris vault of the Ruzukan Mausoleum. (<https://www.vanker.org/fiche/monuments/horormos>).



Fig. 14. Relief of the iwan of Divriği Hospital.

slightly smaller ornament of intertwined bands⁴⁴ [fig. 14]. In the twilight of the architectural tradition of the 11th century, full surface ornamentation, not practiced in earlier Armenian architecture, came here from the East. The increase in architectural production in Iran, where the idea of covering surfaces with ornaments was developed in the last quarter of the 10th and early 11th centuries, must have had an impact on the builders of the monastery at Horomos, where the architect's familiarity with eastern inclination was evident⁴⁵. While the same influence can be seen in the details of the Divriği building, when viewed as a whole, it would not be wrong to say that this building was realized with a rich, fantastic ornament program that is rare in the architecture of Islamic countries in the 11th - 13th centuries. That such an ornamentation was not repeated or even imitated afterward is one of the most interesting facts in the history of Anatolian-Turkish art.

The Armenian Saghmosavank convent⁴⁶, a hundred kilometers to the east and of the same date as the Ruzukan Mausoleum, presents another ornament [fig. 15] with surprising similarities to Divriği⁴⁷. In this Armenian building, the fan-shaped ornamentation just below a vault seems to be identical to that on the lower part of the six-arris vaults in the main iwan of the Divriği Hospital [fig. 16]⁴⁸. Fan-shaped ornamentation



Fig. 15. Armenia. Monastery of Salmosavank, fan-shaped decoration, 1215.



Fig. 16. Fan-shaped decoration of the vault of the Divriği Hospital's iwan.

on this last one is applied in different ways on all three facades except the arch opening. Moreover, the central one has also an inscription with the name of the craftsman who is thought to have played a primary role in the construction of the vault⁴⁹. Another example of this fan ornament, which is quite rare in the Islamic world, dated 1319, is present at the entrance of the Emir Hussein Mosque in Cairo⁵⁰. Turkish architectural historian Doğan Kuban has already linked this motif to Divriği, suggesting that it is a common root favored by Seljuk sultans⁵¹. This similarity in Armenian architecture with this decorative ornament, on which the builder boldly carved his name, is yet another emphasis on the partial Armenian influence on the structure of these multifaceted architectural elements in Divriği. The decorative solutions in the Divriği Complex, which underline the lack of symmetry in each case, are repeated in the different, richly decorated columns and their capitals. Similar solutions have already been experienced in the apsidal hall, the largest of the three large unusual halls located to the southwest of the main buildings of Horomos. This hall was built by repeating the details of the basic composition and columns of the *zamatun* of Horomos, with some modifications to achieve specific spatial effects and imagery⁵². The repetition of a pair of cylindrical columns on the west and a

pair of octagonal columns on the east [fig. 17] of this large apsidal hall is repeated in the columns of the Divriği Hospital in accordance with the same geometric scheme. The two smooth octagonal columns of the two different capitals of this last one. The other two columns, which are located directly opposite them, are in the form of cylindrical shapes that have been highlighted with embossed patterns. The first two octagonal columns resemble the columns of the Great Mosque of Divriği in the variety of ornamental repertoires used in their capitals, while the other two cylindrical supports constitute an enigmatic exception [fig. 18].

The construction of a mosque and a hospital side by side, as in the Divriği Complex, seems to be the first application of a fresh and innovative architectural idea in 13th century Seljuk Anatolia, both in terms of its functional aspect and its plan. A similar approach has already been practiced in the Horomos building, the first prototype of *zamatun*, built adjoining the church. Therefore, the suggestion that the pair of buildings at Horomos (church and *zamatun*) perhaps served as a model for the Divriği Complex (mosque and hospital) can also be based on their functional characteristics. The architect used only some creative quotations in his complex Horomos *zamatun* idea. Therefore, this unusual architectural work was neither a step in a process nor a direct copy of any



Fig. 17. Interior looking of the large hall of the Monastery of Horomos. (<https://www.vankar.org/fiche/monuments/horomos>).

model, just like the Divriği building. In this transfer of form, we do not encounter with the mere adoption of a famous pattern; instead, some impressive and prominent forms or methods were reinterpreted in the artistic formulation of a new idea. In this case, the architect did not employ ready-made shapes and traditional solutions but must have extended the idea by quoting vividly from various sources⁵³.

This innovative phenomenon established at Horomos seems was rare with their well-established typologies and the limited number of architectural plans, as in the

Divriği Complex. Often, these were only slightly modified and reproduced. However, the main difference here is perhaps the product of a joint creation by a patron and an architect, added to individual creativity. In the case of the Ruzukan Mausoleum, where a different attempt was made from that of Armenian vaults, this is perhaps a repetition in the Divriği context, with the same architect under a different suzerainty and in a more developed form. While the similarities between these two medieval structures cannot be ignored, it cannot be argued that they are the works of the same mas-

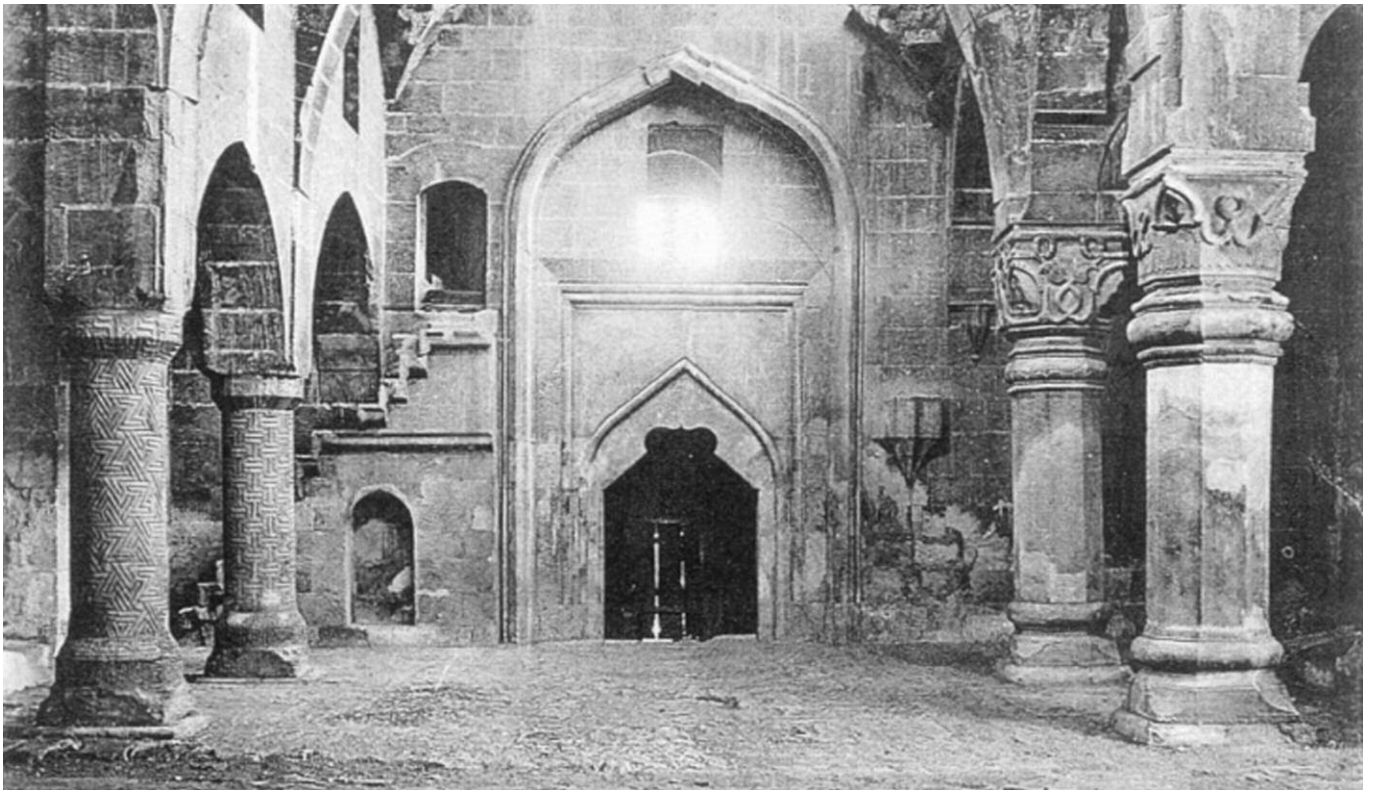


Fig. 18. Interior looking of the Divriği Hospital (by Directorate of Waqf Archives in Ankara).

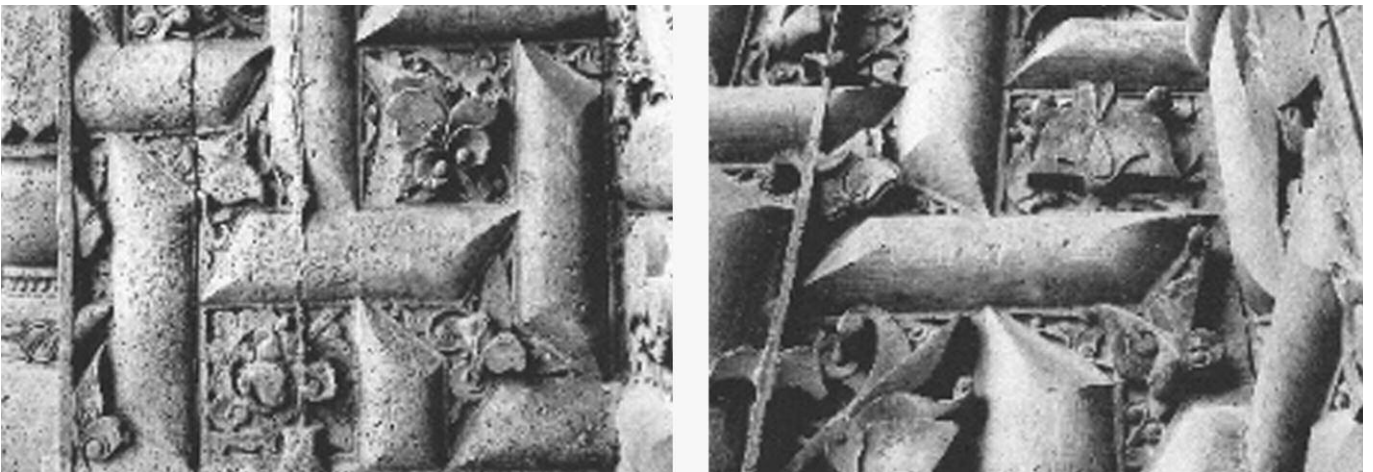


Fig. 19. Ornamental detail of the northern portal of the Great Mosque of the Divriği (by Directorate of Waqf Archives in Ankara).

ter's design, nor can it be claimed that they are not. The last similarity in the decorative elements of the buildings in question is found in the northern crown door frame and lintels of the Great Mosque of Divriği. A different interpretation of the ornamental capitals of truncated cylindrical rods in vertical and horizontal forms with lily motifs and *rumi* patterns between them [fig. 19] is seen in a simpler form in the ornamentation of the ashlar at the beginning of the intersecting pairs of ribs in the Ariwc hall [fig. 20], the smallest of the three halls of the Horomos convent, dated 1277⁵⁴.

The innovative architectural activities and ornamental solutions that characterized the first half of the thirteenth century in Divriği and Horomos bring with them the idea of a new interpretation of meaning for both buildings. In both structures, new architectural types, particularly in the theme of arris vaults, have emerged. Furthermore, arris vaults, which began to appear in Western Europe starting from the second half of the 15th century as ribs were gradually abandoned, continue to raise unanswered questions in historical sources, both regarding the reasons for their invention and popularity, as well as their construction techniques⁵⁵. However, these vaults, regardless of formal differences, develo-

ped constructive solutions in Anatolia in the 13th century that met the criteria of duplicating the arris, without the need for ribs, and adhering to the criterion of multiplying the arris. Until proven otherwise, this Armenian building on the territory of modern-day Turkey serves as the earliest known instance of a stone arris vault before Divriği. Additionally, the arris vault of the Horomos Monastery is perhaps one of the first and most important foundations of the invisible bridge connecting stone arris vaults between Western Europe and the Middle East⁵⁶.



Fig. 20. Ornamental detail of Ariwc hall.
(<https://www.vanker.org/fiche/monuments/horormos>).

¹ In Anatolian Seljuk architecture, the term “star vaults” has been used in Turkish architectural literature for this type of vault (TÜKEL YAVUZ, 1993, p. 165), which was first encountered in the second quarter of the 13th century. However, this term is quite a general one and has been applied to almost all vaults with a star-like form at their center. In Europe, similar examples of vaults, on the other hand, emerged in the Iberian Peninsula from the middle of the 15th century, a period that coincides with the peak of the architectural activities of master Francesc Baldomar (1425-1476). Baldomar, in structures such as the towers of Cuarte Gate (1446) and the royal chapel of San Domenico Monastery (1451-1459), developed a new architectural system using multi-sided vaults. These vaults are referred to today in Spanish as “*bovedas aristadas*” (ZARAGOZA CATALAN, 2012). In the late 15th century, similar examples of this vault type can be found in the new palace built for the Saxon princes in Meissen, designed by the famous architect Arnold von Westfalia, and they are called “*zellengewölbe*” (cell vaults, also known as “diamond vaults”) (WENDLAND, 2009). In the 16th century, examples of the same vault type can be found in the Salento region of Italy, described in Italian as “*volte a spigoli*” (NOBILE, 2015; 2016). This vault type has not yet been defined in English terminology, and in this study, it will be temporarily referred to as “arris vaults”.

² Many studies have been done on the Divriği Complex. Among these; ÖNGE et al., 1978; KUBAN, 1999; PANCAROĞLU, 2009, pp. 169-232; KUBAN, 2010; ATAŞ, 2019.

³ In my doctoral thesis titled “*Costruzione e Taglio della Pietra in Anatolia dal XIII al XV secolo: La Moschea e l’Ospedale di Divriği*” (Construction and stone-cutting in Anatolia from the 13th to the 15th century: The Mosque and the Hospital of Divriği), I explored the transfer and development of stone construction techniques in Anatolia during the mentioned period. The study aimed to establish a route starting from Seljuk Anatolia and extending along the Mediterranean coast, through Syria and Egypt, towards Europe, focusing specifically on the stereotomy of arris vaults. This research attempted to connect the experiences of stereotomy in the Middle East during the Middle Ages with the emergence of arris vaults in certain European regions, such as the Kingdom of Valencia, Northern Germany, and Southern Italy, between the 15th and 16th centuries.

⁴ ATAŞ, 2022.

⁵ “*Iwan*” o “*eyvan*” is a rectangular hall or space, usually vaulted, walled on three sides, with one end entirely open. Since the definition allows for some interpretation, the overall forms and characteristics can vary greatly in terms of scale, material, or decoration. Iwans are most commonly associated with Islamic architecture.

⁶ TÜKEL YAVUZ, 1993, p. 548; ŞAMAN, 1985, pp. 130-131.

⁷ Some of these two-arris vaults are: in the Tomb of Yusuf bin Yakup located in Çay, dated 1278-1279 (made of brick), another example is the fountain iwan cover of the Mardin Latifiye Mosque, dated 1371, another later example is the two rooms of Bursa Yeşil Mosque (1419-1420), designed for the reception of foreign guests and placed at the corners of the building, are covered with two-arris vaults. There are also examples of two-arris vaults in the Yeşil Madrasah, which is also located in the Bursa Yeşil Complex. Some of three-arris vaults examples are; the fountain iwan vault of Alara Han (1231), the entrance iwan vault of Tuzhisar Sultan Han (1230-1234), cover of the south side room of the entrance iwan of Karatay Han (1241), the western iwan vault of Erzurum Çifte Minareli Madrasah (13th century), the entrance iwan vault of Sivas Gök Madrasah

(1271) and, finally, in the Seljuk Isa Bey Mosque (1374), which is a work of the principalities period. Can be given as examples five-arriss vaults: the cover of the entrance area in the İğdır Caravanserai (13th century), the cover of the Mardin Zinciriye Madrasah (1385), the entrance iwan cover of Mardin Melik Mahmut Mosque (14th century) and the two vaults on either side of the central vault of the portico in Mardin Kasimiye Madrasah (14th-15th century). Finally, an example of a nine-arriss vault: the central vault of the cloister of the Mardin Kasimiye Madrasah (14th-15th century) and the cover of the two fountain iwans are the nine-arriss vaults covering the center of the central nave of the Şanlıurfa Pazar Mosque.

⁸ ATAĞ, 2021.

⁹ However, there are vaults with two, three, five arriss and combinations of these arriss in the Divriği Complex. ATAĞ, 2021.

¹⁰ Madrid Polytechnic University used to offer a master's program focusing on traditional wood, brick, stone, and plaster construction techniques in previous years. One of the significant aspects of the educational course was the simulation of a Gothic architectural construction site, often involving the modelling (frequently at a 1:2 scale) of Iberian vaults that had been previously examined and recreated using 3D graphics software. Except for the support of multimedia technologies, the entire construction process drew from methods and tools comparable to those used in a Gothic construction site, allowing for the testing and application of historical research in stereotomy for specific cases. The spiral-centered arriss vault of Divriği Hospital was the subject of the workshop held between March and July 2017.

¹¹ ATAĞ, 2020B.

¹² Similar to this, there is also a cross vault located on the north-eastern of the dome of the Divriği Great Mosque.

¹³ Possibly, today the irregular state of the properly constructed octagon and the pentagonal forms may also be the result of the deformations caused by the earthquake that the building went through.

¹⁴ ATAĞ, 2020A.

¹⁵ This two-arriss vault was located in the section covering the eastern end of the northern portico of Sivas Şifaiye Madrasah. The partially reconstructed building unfortunately does not keep track of the original top cover. However, we can reconstruct the brick and two-arriss shape of the vault from an archive photograph. (TÜKEL YAVUZ, 1993, p. 563). Unfortunately, this cannot be said for the center of the vault. However, it can be argued that it most likely ends with a rhombus in the centre, which is more suited to the geometry of the two-arriss vault (Ivi, 1993, p. 549).

¹⁶ The vault, located in the south portico of the building, was designed as a cover of a square area that is more suitable for its geometric establishment. In the center of the three-arriss vault, a four-armed star is formed due to the inward and outward forms of the edge lines.

¹⁷ The city of Ani, today in the territory of north-eastern Turkey, was a thriving Armenian city, on several occasions the capital of a kingdom that prospered thanks to its strategic position along the commercial axis between the Black Sea and the East. Due to the transfer of the population wanted by the emperor of Byzantium, who distrusted the loyalty of the local dynasties, it was the target of the first Seljuk raids and later lost and reconquered several times by the different forces in the field (Byzantines, Armenians, Georgians, Turks) each of which he gave his contribution to the history of the city: MOZZATI, 2002, p. 146.

¹⁸ According to the information provided by Bedirhan, the mosque was built in 1064 at the behest of King Ani Manuçahr, from whom it takes its name, since in those years the Turkish-Islamic population was growing rapidly. BEDIRHAN, 1999, p. 239.

¹⁹ KIRZIOĞLU, 1982, pp. 40-44; BOSWORTH, 1996, pp. 151-152; HILLENBRAND, 1994, p. 583.

²⁰ GÜNDOĞDU, 2006, p. 61. Kuban suggests that the minaret was added later, casting doubt on whether the building was originally intended as a mosque. KUBAN, 1965, p. 70.

²¹ *Ibidem*

²² The word *gawit* is ancient one attested in 5th century texts with the meaning of an open courtyard, an inner court of a church or a house. In Armenian ecclesiology the term *gawit* marked the entire open air a church, as well as the westernmost section inside the church, which during the liturgy in the early Christian period was set aside for the catechumens and penitents. Thus, that the same word *gawit* in architecture was applied to four-column halls with a funerary function was due to the fact that the graves of the nobility were usually located in the courtyards - or *gawit's* - of churches founded by them. VARDANYAN, 2015, pp. 207-234.

²³ KARAMAĞARALI, 1995, pp. 323-339.

²⁴ Horomos Monastery was founded by Armenian monks exiled from Byzantine lands during the reign of Emperor Romanos I Lekapenos (920-944). The shelters built by a monk named Hovhannes Baba between 931 and 936 for the monks fleeing from Byzantium to stay formed the core of this monastery. These monks fleeing the Byzantine Empire were named "Horom Erec", meaning priest in Greek, and the monastery became famous as Horomosivank (Greek monastery). About the building see: THIERRY, 1980; CUNEO, 1988, pp. 673-679; SAĞIR, 2014, pp. 857-888; BALADIAN et al., 2002; VARDANYAN, 2015. SAĞIR, 2012.

²⁵ Under the reign of King II Gagik (1042-1045), the monastery gained importance and underwent extensions. Byzantine Emperor IX. Constantine Monomachos (1042-1054) annexed these lands to the Byzantine Empire by putting an end to the Bagratid Kingdom of Ani in 1045. However, this annexation was short-lived, and in 1064, Ani and its surroundings came under the rule of the Seljuk State. Due to the wars between the Seljuk State's Shaddadids and Georgians, Ani and its surroundings changed hands periodically, and stability could not be maintained. Therefore, there was no construction activity and development at Horomos Monastery for over a century (late 11th century to the early 12th century). After a hiatus, inscriptions began to reappear in the buildings around 1174, and a text from 1180 mentions this place as a famous religious and cultural site. Horomos became an important cemetery for feudal families ruling Ani in the 13th century on behalf of the Mkhargrdzeli dynasty. The latest inscription in Horomos dating back to the medieval period is from 1336. From that time until the 17th century, the history of the monastery is unknown, and it is possible that it was abandoned during this interim period.

²⁶ VARDANYAN, 2015, pp. 207-234.

²⁷ There is another two-story burial chapel attached to the northeast corner of the church. According to an inscription that has not survived, it was built by Ter Dawit in 1305. This chapel repeats the layout of Ruzukan's two-story burial chapel: SAĞIR, 2014, p. 869. To the southwest of Zamutun is the Recs House. The structure, which consists of a combination of different areas, is covered with a muqarnas vault in the center of its square planned main section: KAZARYAN, 2015, p. 189, fig. II-132.

²⁸ KARAPETYAN, MAHÉ, 2015, p. 417.

²⁹ SAĞIR, 2014, p. 870.

³⁰ Considering that most of the front churches in Armenian monasteries served as burial places or closed cemeteries, it is clear that Horomos *zamatun* had a similar function and was probably built as the Mausoleum of Hovhannes Smbat. Historians of 11th century Armenian architecture argue that the origins of the *zamatun* plan are based on the ancient tradition of four-column wooden structures of traditional houses and palace halls.

³¹ Sculpted funerary cippus typical of Armenian culture. It was the pagan beliefs, merged into Christianity, that transformed the khachkars into one of the distinctive elements of Armenian religious architecture. These stone crosses were usually made from rectangular blocks and often served to support various functions, such as the celebration of important historical events. The first identified crosses date back to the end of the 9th century. On the subject, see KADIROĞLU, 2006, pp. 221-222; DONABÉDIAN, 2007, pp. 153-161.

³² KARAPETYAN, MAHÉ, p. 471.

³³ ATAĞ, 2021.

³⁴ EAD., 2022, p. 118, fig. 14.

³⁵ I would like to express my sincere thanks to Prof. Ivan Foletti and research assistant Katarína Kravčíková from Masaryk University for their kind gesture in sending me the photograph.

³⁶ The vault mentioned is the cover of the second opening on the south-east side of the north portal of the mosque. *Ivi*, pp. 118-119.

³⁷ Another known three-arris vault in Anatolian lands, with an intertwined star form on the central panel, is found in the Karatay Caravanseraı of 1241: ATAĞ, 2019, pp. 194-195.

³⁸ CUNEO, 1988, pp. 390-393; SHAHINIAN, 1999.

³⁹ KAZARYAN, 2015, p. 174.

⁴⁰ *Ivi*, p. 179.

⁴¹ An earlier example of a two-arris vault (before 1215) known outside of Anatolia was stated by Yavuz (YAVUZ 1983, p. 42) to be located in the Hammam Gazi in Aleppo. While this information cannot be verified, the only building plan actually found shows the row of two-arris vaults along a corridor (SAUVAGET, 1941, p. 142, fig. 32). It is not correct to suggest the possibility that this vault is an incorrectly drawn vault plan as in many examples, or to claim the opposite situation.

⁴² In Armenian architecture, a similar example includes the decoration of interlocking bands on the columns of the library of the Sanahin Monastery. For further information, please refer to CUNEO, 1970; ID., 1988, pp. 290-298; ATAĞ, 2019, p. 60, fig. 31.

⁴³ KAZARYAN, 2015, p. 174.

⁴⁴ A similar one is embroidered as a half-polygon interlaced motif on the columnar base of the Divriği Hospital portal: ATAĞ, 2019, pp. 63-67.

⁴⁵ KAZARYAN, MIKAYELYAN, 2019, p. 86. The broad influence of the Armenian ornamentation tradition is even more evident on the hospital portal. The same ornamental motif consisting of five-pointed stars in the upper part of the window in the Divriği portal appears once again in the Saghmosavank Monastery: ATAĞ, 2019, p. 66, figg. 39-40.

⁴⁶ For further information, please refer to CUNEO, 1988, pp. 202-206.

⁴⁷ It is known that there are some close similarities between the same building and the Relics house of Horomos: KAZARYAN, 2015, pp. 194-197.

⁴⁸ Here too there is a fan-shaped decorative element as well as in the portal of the monastery of San Giorgio in Mughni (Armenia), dating back to the 17th century: see UTUDIJAN, 1968 fig. 231.

⁴⁹ The two ashlar that welcome the inscription are considerably corroded, so that it is not clear whether the correct name is Hurşad or Horşah. In any case, the evident phonetic assonance has led more than one scholar to compare the name of Khurshad to that of Khurramshah: today historiography agrees in the identification of the two names in the same master, to whom, therefore, the execution is attributed of the two roofs and, consequently, a central role in the construction of the building. ATAĞ, 2017.

⁵⁰ ATAĞ, 2019, fig. 34.

⁵¹ KUBAN, 1999, p. 159. For more information, refer to CRESWELL, 1978, plate 103.

⁵² KAZARYAN, 2015, p. 185.

⁵³ ID., 2014, p. 11.

⁵⁴ ID., 2015, p. 184.

⁵⁵ WENDLAND, DEGENÈVE, 2017, pp. 159-170.

⁵⁶ In the 15th century, Catholic Europe experienced the diffusion of arris-vaulted systems whose constructive and formal analogies with the cases of the Middle East cannot be ignored. Some of those: the royal chapel of the convent of St. Domingo in Valencia (1451-1459), the Castel of the Albrechtsburg of Meissen in Germany 15th, in Sobeslav church of St. Peter and Paul and monastery of Kladruby (in Czech Republic), college Massimo in Krakow, monastery of San Bernardino in Warsaw (1515), church of St. Francesco di Paola and church of St. Croce in Lecce, church of St. Domenico in Molfetta.

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