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# *ARCHITECTURAL GENEALOGY OF S. ERRORDUT'YUN IN ARAGATS BY FOCUSING ATTENTION ON THE FRAMEWORK OF THE DOMED BAY*

*Introduction.* **Within the military zone between Armenia and Turkey, S. Errordut'yun in Aragats, a centralized style church in hexagonal, is built on the northeastern slope of the Armenian side down to the Afrian River. The survey to its monument is required to obtain the permission to enter the border from the Russian Military Headquarter in Armenia. In 2009 and 2010, fortunately, the respective permissions for the surveys were provided to our team although the duration for stay was allowed only for 20 minutes in 2009[1]. Both surveys were carried out without any incident at the site, thanks to a surveillance of the military.**

**S. Errordut'yun in Aragats was allegedly constructed in the end of the sixth or the beginning of the seventh century by the so-called architect, Grigor, whose name is inscribed on the outside wall[2]. The architecture is composed of a hexagonal nave and, radially around the nave, six apses, shape of which is almost the same in size and similar to horseshoe with a pair of inflection points on the way of curved surface. At present, apart from the octagonal planned churches in Irind and in Zoravar near Eghvard, it is only the monument left in the republic of Armenia as a hexafoiled church[3]. In contrast to the former two churches constructed around the same century, the east apse of S. Errordut'yun has the same style as other apses in size as well as in arrangement, irrespective of opening on the wall[4]. Unlike the ordinary church layout, no emphasis is displayed in architectural expression to the east direction as an altar place. Therefore, in church planning, its undifferentiated orientation is very specific characteristic, in contrast to usual layout of the sacred edifices, in which space is articulated based on hierarchy.**

**This paper aims to evaluate the historical position of S. Errordut'yun in the genealogy of Armenian architecture, through comparing with the other architectural styles in the contemporary period, based on the observation of its present condition obtained by the previous surveys[5]. In particular, this paper focuses to the point how to frame a dome in a domed bay, rather than the standard concept of planimetric classification, since a framework as arranging order of**

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*[1] The survey is carried out under the grant of the scientific research fund, subsidized by Japanese Educational Ministry, and, thanks to the support of the Museum of Shirak Region, achieved the objective without trouble.*

*[2] Hasratian, M., Early Christian Architecture of Armenia, Moscow, 2000, p. 72. Regrettably, we could not confirm its inscription on the wall.*

*[3] Dr. Hasratian (op.cit.) indicates the architectural remain, as a multi-foiled plan type, which is left in Garni. However, a superstructure is completely lost in this remain to analyze the architectural framework inside.*

*[4] Windows are not opened on the east and the northwest side in the apse wall.*

*[5] The surveys of our team have been continuously carried out from 1998 in the Republic of Armenia, under the subsidies of the Japanese Educational Ministry.*

architectural components along a vertical direction exhibits diversity even in the same plan type[6]. In a sense, focusing the framework along a vertical direction is similar to an attitude to comprehend dynamically designing idea of architecture while planimetric classification is suitable for static iconology. In other words, considering the specific phenomenon that there emerged various types in the early stages of Armenian architecture, it is presumed that it might be more explainable how the diversified types were interrelated each other in architectural evolution if applying this analyzing method incorporating the concept of embryology.

*Present Condition of the Church.* The church, standing on the halfway up to the cliff of Afrian River, is set on the four-stepped stylobate in basalt in the northwest side while a main structural body is constructed in tufa by a rubble core construction-system. In the lower section below the drum section, an apse in trapezoidal shape protrudes radially from a nave, and a triangular niche hollows an outside wall between apses. In the lower section, apse windows are installed respectively in the southeast, the southwest, the northwest, and the west apse wall, in which only one entrance is opened below the window in spite of being in crucial destruction. Instead, no window is hollowed out on the east and the northeast apse walls in the lower section, the sides of which faces to a slope of the cliff.

Covered tiles on the lower roof are almost lost although its roof shape is possibly reproduced from its present condition as a shed roof along each apse projection. Its cornice however is lost. In the drum section, its plan shape corresponds to the nave shape as a hexagonal and one arched window is opened in each side of hexagon. A cornice that articulates usually the drum section from the lower is not inserted on the drum surface. The drum section comes up to a cornice which is composed of two layers: the lower layer is designed in dentil shape as seen in the cornice of Aparan[7], as an archaic style of cornice, while the upper layer with Ω-style molding, as seen generally in the Armenian architecture constructed around the seventh century[8]. The cornice found on the east and the northeast sides indicates an aged deterioration, if compared with other sides. In particular, the height of the lower cornice is so abruptly altered along the way of the southeast side that the low height of the lower cornice running from the southeast to the northwest sides might be inserted at the restoration in the later period. If the date of the upper cornice is attributed to the seventh century, the replacement of the lower cornice must have taken place earlier than the date of the upper cornice. Consequently, the lower cornice might be fixed at least earlier than the seventh century. In fact, no example of the layered cornice in such motifs has been discovered in the early Armenian architecture although each motif is generally found as a single layer cornice[9]. Furthermore, if a restoration was carried out on the dome-roof level, the church of

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[6] *In this paper, the concept of the "plan type" conforms to the classification expressed by Strzygowski, regarding the planimetric classification. Cf. Strzygowski, J., Die Baukunst der Armenier und Europa, vol. 1 & 2, Wien, 1918.*

[7] *Cf. Cuneo, P., op.cit., pp.168-169.*

[8] *Donabedian, P., L'âge d'or de l'architecture arménienne VIIe siècle, Marseille, 2008, P. 78. Prof. Donabedian presumes that the cornice was restored during the period between 630 and 650.*

[9] *In this paper, the concept of the "early Armenian architecture" conforms to the classification indicated in the*

**Aragats must have been restored at least within the seventh century.**

**The roof covering the dome, in spite of being partial collapse on its zenith, is presumed to have formed in six-sided pyramid. At present, it is possible to distinguish that ceramic tiles were employed for the roof material, as seen in the small churches, Karmravor in Ashtalak and S. Sion in Oshakan, both of which were constructed in the seventh century although its employment seems to have been restricted in Armenian architecture. In particular, in both cases, the roofline exhibits convex curve, contrary to the church of Aragats whose domed roof corresponds to a straight pyramid. Although both were restored in the modern time, the style for using the ceramic is attributed approximately to the seventh century as far as their restoration was trustworthy[10].**

**Two styles of the window hood in the lower section are distinguished: one is chiseled into Ω shape in one stone lintel while the other is framed in arch by assembling stones. In contrast to the lower section, the window hood is chiseled from one lintel stone put above the arched window opening in the drum section although the extent of their deterioration varies. Such aged deterioration is also recognized on the surface of the window hood in the lower section. As far as observing the present condition of the outside wall, replacement of stones seems to have taken place in a certain past although it is believed as a rule that the church has maintained its original condition without drastic renovation. In general, such deterioration is less distinctive on the surface from the southeast to the northwest sides in a clockwise direction than from the northeast to the east sides. Taking into account the fact that the outside surfaces from the southeast to the northwest were exposed to open land without any barrier to prevent wind or rain while the slope to the river is in close to the church-surfaces at the northeast and the east side. Therefore, due to the building orientation, the weathered surface is logically presumed to indicate aged deterioration much more than the other sides protected by a barrier standing near the building. This inverse phenomenon observed on the surface deterioration highly implies that architectural members must have been more or less replaced in a certain past time on the heavy damaged surface. Therefore, the window hood on the east and the northeast must have been preserved almost as an original shape. Based on this premise, examining the window hood on the east and the northeast side of the drum section, it is carved out from one stone by hollowing its underside as an arch shape for a window arch, as well as by carving out Ω-shape with simple molding. Its same style is discovered in the church of S. Stepanos, Lmbatavank, constructed in the seventh century, the church in Kurtan, constructed around the fifth to the sixth century, and the church of S. Gevorg, Sverdlov, constructed in the sixth century. Especially given the employment of the similar style for**

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*following authors. Cf. Diehl, C., "L'architecture arménienne aux VIe et VIIe siècle", Revue des Etudes ArmEena, 1921, p.224; Hasratian, M., Essai sur l'architecture ArmEenienne, Moscow, 1985, pp. 5-25; Jakobson, A.L., "Les Rapports et les Corrélations des Architectures ArmEenienne et Géorgienne au Moyen Age", Terzo Simposio Internazionale di Arte Armena, 1971, pp.229-249; Kouymjian, D., "The Formative Period of Armenian Architecture: the IVth to the VIIth Century", Armenian Review, 1978, pp. 17-41: Cuneo, P., "Profilo Storico dell ARchitettura Armena", Architettura Armena, Rome, 1988, vol.1, pp. 23-30. Cuneo separetes the early period into two terms: from the fourth to the fifth centuries and from the sixth to the seventh centuries.*

[10] *Cf. Cuneo, P., op.cit., p.180 & 190.*

the window hood of architecture constructed around the sixth century, it might be reasonable to a considerable extent that the construction of the drum section might be attributed to earlier than the seventh century. Furthermore, the fact that the architectural style in Kurtan and in Sverdlov is similar to the Syrian church as seen in Yereryuk located near Aragats might be well explainable about the architectural origin of the church of Aragats. As it turns out, this style of the window hood, even if employed in the architecture constructed in later periods, emerged already from the early period, the time earlier than the seventh century.

Inside, ashlar masonry in tufa is principally used as a wall material although basalt is partially found as wall material in the lower part of the wall. Lime plaster is distinguishable from the present interior surface, where its thin layer is partially left on the wall. The external corner at the lower part of the apse wall facing to the domed bay crumbles at present although its upper part is still preserved as a slender pilaster which reaches to a blank impost. Arches framed between imposts surround the domed bay. The hexagonal plan is still maintained up to the top level of the window vertical frame, where a fan is inserted at a corner of the hexagon. Just above its level, the small fans are fixed on both side of its previous lower fan. If the dome base corresponds to the first layer above the small fans by which an architectural plan at the drum level is transformed into 24 sides, the drum section is composed of three layers of piled ashlar masonry, at the top of which a pseudo-circle for a dome base is acquired.

The diameter of the domed bay roughly corresponds to 5 m. although it is hard to take exact measurement due to collapse of the edge wall of the nave at every corner. An altar is not clearly distinguished inside since the inside floor is completely lost. In fact, apart from the west apse in which only one entrance communicates to outside, discrepancy of architectural formation between apses is not discerned, except the point whether there is a window or not. One characteristic is that each apse forms a horseshoe shape, whose curvature is altered in mid-course where the ceiling shape is converted from a half dome to a barrel vault, corresponding from the depth to the opening of the nave. However, a half dome as a ceiling covers the front side to nave's opening in the southeast and the west apse niches. The width of each apse approximately corresponds to 200 cm. between its flexion points where a curvature is changed. Therefore, each apse is covered in two-stepped ceiling, instead of smoothly continued surface. In a deep portion of an apse, a height from a floor to a zenith of a half dome is approximately 660 – 670 cm. while a height rises to 780 - 800 cm. at a front face of an apse opening to a nave.

From the above discussion, as indicated by Prof. Donabedian, the church of Aragats seems to have been restored in the seventh century, in which the dome roof level was at least replaced, even if it is vague that the restoration extended to how much extent to the total structure. On this premise, the main body of architecture below the cornice level must have been constructed earlier than the date of the restoration in the middle of the seventh century. Since it is hard to reckon that a stone building became deteriorated within several decades after construction, the

**original church might be constructed in the sixth century. Furthermore, since the dome is still maintained in spite of the lack of the edged wall at the lower portion, the apse wall seems to function as a buttress wall for supporting the dome system.**

***Architectural Genealogy of the Church of Aragats in the Early Armenian Architecture.*** **Armenian architecture covered with a dome was constructed in rubble core system and articulated into three sections along a vertical course from the beginning to the last period: respectively the lower, the drum, and the dome section. However, an interior articulation is not clearly discerned since a cornice is not necessarily employed inside the Armenian architecture. In the case of the church of Aragats, it is defined that the level where two fans along a vertical row are employed approximately corresponds to the height of the outside cornice in dentil shape. Therefore, it is appropriate to define that two fans are settled on the top of the drum section and the dome base in pseudo-circle is formed at the upper surface of the second fan. In addition, based on the previous result of structural analysis on Armenian architecture[11], the structural stability of the Armenian dome is irrelevant to any structural system whatever style is employed for constructing a dome. In other words, any architectural components for transforming a plan shape along a vertical direction of a domed bay play an equivalent role in structural point of view. Therefore, any architectural component for transformation of a plan does not indicate superiority to the other components in a structural dynamics, and hence its selection seems to have depended on a preference of the craftsmen. In Armenian architecture, there exist five architectural components for transforming a plan from a square to a circle or a pseudo-circle: fan, fan-vault, squinch, pendentive, and curved spandrel. In this paper for reasons of expediency, these components are called as a frame-system from the fact that they are utilized at the construction system to incorporate in a frame for the purpose adjusting a dome.**

**A squinch is employed generally at an orthogonal corner to transform a rectangle plan-shape into an octagonal just above a lower section while a fan or a fan vault is inserted for the purpose of doubling a number of sides at corners, whose angle is wider than orthogonal. In this meaning, these three frame-systems have the same function to multiply the sides of the plan-shape. In this paper, the fan vault is defined in the cases where the component is organized by assembling several stones as well as being employed at obtuse angle, while a fan is carved out from one stone. A pendentive is employed on a triangular side framed between juxtaposed transversal arches in the lower section of a domed bay. In Armenian architecture, a pendentive, as seen in the Byzantine architecture, is employed in the stereotyped technique without any variation. It is likely judged as a**

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[11] *In structural analysis, two types of structure are categorized: one is the architecture whose dome is supported by columns while the other by walls. According to the result of the analysis, the dome of Armenian architecture is structurally stable whichever system is applied. Cf. Motoyui, S., "Structural Characteristics of S. Hripsime", The Armenian Architecture in the Transitional Period (Private Edition), Tokyo Institute of Technology, pp.185-191: idem.,"Structural Characteristics of Armenian Architecture in the Case of the Church of Arutsh (in Japanese)", Survey for Preservation on the Armenian Architecture(Private Edition)(in Japanese), Tokyo Institute of Technology, 2001, pp.139-153.*

most advantageous technique to form a circle for a dome base, due to devising a true circle on its upper surface. Regarding the monuments of Armenian architecture left at present, its employment emerged from the seventh century and, in so far as focusing to the seventh century, is predominantly restricted to a rather large scaled architecture, a domed hall type or a domed basilican type[12]. A curved spandrel is applied just to two monuments of the Armenian architecture in the seventh century, classified into the centralized plan type although being half destroyed: respectively the church of S. Teodoros in Eghvart and the church of the village Irind. In both churches, apse spaces are radially attached around a nave space in octagonal. While reflecting an octagon at a basement level confined by columns which are fixed just in front of edges of apse walls, the nave plan above a capital of its column organizes a circle, above the level of which a curved spandrel is set between a cornice of the lower section and an arcade of the domed bay. Therefore, the double shells' system is employed for a dome-construction by attaching an inner circular shell to an outer octagonal shell of a basement level. This framework for making a dome base was rather popular in the early Christian architecture[13]. By employing these frame-systems, the domed base is formed in Armenian architecture. A real circle is possibly acquired at the end of the lower section by using a pendentive or a curved spandrel. In contrast, a squinch itself is not enough so much to create a perfect circle that various frame-systems are employed in complex technique for transforming a square plan to a pseudo-circle at a domed base. In fact, various complex styles of the frame systems are distinguished even in the same plan type of the early Armenian architecture.

As far as structure stability is immune to whatever frame-system is applied to construct a dome, the complex of the frame-systems indicates the architectural idea, the logic of design-thinking, for a dome construction in a process of its development, which is analogized likewise as a genealogy in biology. In other words, the organization of transformation by using the complex of the frame-systems seems to indicate one stage of architectural evolution for a concept of a dome construction. In addition, given the premise that the evolution proceeds from a simple style to a complex for synthesizing a domed space along a vertical direction up to a dome base, it could be possible to say that one forward stage of a complex for a dome is generated from a previous one through a logical development of architectural idea. In this way of thinking, even if its original date indicates earlier than other, one architectural monument does not necessarily settle the position to indicate an earlier stage of evolution than other monument. As far as taking a required pervasive

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[12] *A pendentive is employed in a small chapel of S. Astvacacin, Morjorivank, the plan of which is quatrefoil. Although the constructing date is allegedly attributed to the sixth or the seventh century, the dome section seems to have been drastically renovated in the 13th century. The present author considers that the pendentive was employed at the time when the chapel was renovated. Cf. Cueo,P., Architettura Armena,*

[13] *In the baptistery of Orthodox, Ravenna, constructed in the fifth century, the inner shell is composed of the pilasters on the upper wall above the lower wall, which corresponds to the outer shell in octagon. Cf. Krautheimer, R., Early Christian and Byzantine Architecture,New Haven and London, 1986 (1965), pp.176-177. In addition, Ristow (S., Frühchristliche Baptisterien, Münster, 1998, pp.15-26) implies that the baptisteries in octagonal plan were built in the north and northwest regions of the Roman Empire and derived from the architecture of Roman bath and the mausoleum in its origin. At any rate, the style incorporating an outer shell with an inner shell must have been widely known in the late Roman Empire, by organizing an interior wall from multilayered surfaces.*

time of architectural style into consideration, as well as anticipating the existence of missing links in styles, it is possible to envisage that there was once the appropriate style of architecture, lost in the course of time, in a broad range of areas as in the Eastern Anatolia.

Based on these premises mentioned above, various complexes of the frame-systems for framing a dome are discovered in the early Armenian architecture. Besides the church in Aragats, there are seven plan types covered with a dome in the early Armenian architecture; the centralized (octafoil) plan type, the quatrefoil plan type, the domed basilica plan type, the domed hall plan type, the so-called Mastara plan type, the so-called Hripsime (Dzvari in Georgia) plan type, and the cruciform plan type.[14] In the domed basilica and the domed hall plan types, except the churches in Ptghni[15], Ojun, and Mren, the pendentive is simply employed at a corner of a domed bay just above an impost of a protruding wall or a thick pillar. By this constructing technique, a circular for a dome base is acquired at the level just above the lower section, corresponding to the starting level of the drum section. This position of a pendentive is common to the other architecture in the other periods and the other areas, as recognized broadly in the Byzantine architecture. In the Eastern Anatolia, including the Armenian and the Georgian architecture, a heterogeneous pendentive, called as a stepped pendentive in which a squinch-like concaved portion is inserted into an underside of a pendentive, did not come out up to the ninth or tenth century[16]. Regarding the case of the churches in Ptghni, Ojun, and Mren, a squinch is employed at a corner just above the lower section without any cornice for articulating the drum from the lower section and, furthermore, a fan is inserted on the top at a corner of a drum section to double sides of a plan figure. This technique for multiplying sides of a plan figure in a domed bay is also common to the cruciform plan type. Frame-systems are utilized at both a top and a bottom level of a drum section in the domed bay, respectively at a position corresponding to an edge of the plan figure by setting out of alignment along a vertical direction. As seen the complex organized from two frame-systems in the cruciform plan type, the similar style of the complex is found in the church of S. Kiriaki in Arzni, that is classified into a quatrefoil plan type inscribed in octagonal external figure, although the position of a squinch differs from the previous ones. In Arzni, while a fan is inserted on the top at the corner of the drum section, a squinch is fixed on the top at the corner of the lower section, corresponding to the same level of the transversal arch, instead of the position of the drum section just above the lower section. Therefore, craftsmen attempted to transform a plan figure at the level

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[14] *Grigoriyan, V., "Small Centric Monuments in Early Medieval Aremenia", II International Symposium on Armenian Art, Yerevan, 1978. Grigoriyan classifies the 38 small churches in the centralized type based on their plan. According to his classification, the cruciform type is included into the centralized type. Although the plan is recognized as a norm for classification in the previous research, Krautheimer (Krautheimer, R., Early Christian and Byzantine Architecture, Harmondsworth, 1965, pp.321-330) points out that the Armenian architecture is incommensurable with its plan.*

[15] *In Ptghni, a portion of the squinch is barely distinguishable on the wall of the lower section*

[16] *The stepped pendentive is common to the churches of Tao-Klarjet'i, Turkey, constructed around the 10th century. Cf. Djobadze, W., Early Medieval Georgian Monasteries in the Historic Tao, Klarjet'i, and Savset'i, Stuttgart, 1992.*

**of the lower section in Arzni. If compared its technique in Arzni with the others applied in the previous cruciform plan type, it is presumed that a dome construction in the church of Arzni was contrived synthetically from the first stage of construction work to prepare an octagonal plan figure at the drum base. In contrast, craftsmen did not need theoretically and thoughtfully to consider a dome construction until completing the lower section in other cruciform plan type. Therefore, the difference on the squinch position along a vertical direction seems to indicate the difference of the evolutional stages in the Armenian architecture. Specifically, the fact that a squinch was fixed on the drum section implies ad hoc method of construction since it had been possibly applied to a non-domical space as in the small church of Voghjaberd, in which it is presumed that the dome was fixed directly on the lower section without the drum section. In this sense, the idea to frame a dome was theoretically devised after constructing the lower section at construction site. Since the constructing system on the dome in Voghjaberd is generally said to have been the oldest in Armenian land, the devise of its arrangement is considered to have taken place at the forward stage of architectural evolution that the frame-system for a dome construction was shifted downward to the lower section. In fact, compared with the squinch set on the base of the drum section, the squinch fixed in the lower section as in Arzni was required to be fabricated so intricately for setting within a curved triangle space that the technique employed in Arzni was complicate than the previous, backward stage of the evolution. Therefore, the position of squinch in the cruciform plan type occupies the earlier stage of the genealogy than in the Arzni style, against the fact that the constructed date, around the sixth century, categorizes it into the earlier monument than the common monuments as a cruciform plan type left at present. Under such a logical consideration, it is possible to shift a squinch downward to frame a dome by adjusting from ad hoc technique to a systematic.**

**Except the architecture employing the pendentive, there are three plan types in which the frame-system was applied to the lower section, as seen in Arzni: the so-called Mastara plan type, the so-called Hripsime plan type, and the octafoil plan type. Regarding the Mastara plan type which is discovered only in the Armenian architecture, two species are distinguished by focusing the position of the frame-systems in the seventh century. In S. Hovhannes of Mastara, a squinch was employed on the lower section at the same level of the apse's arch while a fan-vault on the drum section, on both the shifted positions just above the squinch[17]. Instead, no fan was applied to the top of the drum section although its adoption had an advantage to bring a dome base close to an approximated circle for a dome construction. In this manner of construction, except displacement of the positions for the frame-systems, the number of frame-systems, two frame-systems along a vertical direction, is the same between S. Hovhannes of Mastara and the architecture in the cruciform plan type. Regarding S. Astvacacin in Oskepar, the other monument**

[17] *In the church of Mastra, plaster painted on the surface to a certain extent so thick that it is hard to distinguish whether the frame-system utilized above the squinch is a fan-vault or a fan. But, taking into account its size, it may as well correspond to a fan-vault.*

of the Mastara plan type in the seventh century, in contrast, the position of the frame-systems follows the setting rule defined in the cruciform plan type. From the structural point of view, a foreground arch of a squinch plays so important role for supporting an upper structure, the drum and the dome sections, that a massive underlying wall should be desirable for supporting its foreground arch. In this case, instead of devising the new arranging order for applying the frame-systems, it was possible to acquire the new plan type with a dome in the Mastara plan type, if only the arranging order of the frame-systems took over from the cruciform plan type. In addition, it must have become possible to enlarge easily a domed bay by inheriting the arranging order in the pre-evolutional stage as constructing method. As a next stage of evolution, it was not so difficult for constructing technique to displace a squinch downward at the same level of an apse's arch for making a drum set along a horizontal level inside. In S. Hovhannes of Mastara, however, a domed bay was too enlarged to coordinate the previous arranging order of the frame-systems for conforming a pseudo-circle at a dome base. In this case, adjustment was forced to manage within the drum section along a vertical direction to acquire a pseudo-circle base for a dome. Consequently, the fan-vault was displaced downward to the shifted position just above the squinch and, then, the masonry wall was adjusted in a stepwise fashion along a vertical direction to acquire a pseudo-circle for a dome base up to the top level of the drum section. In a sense, the fact that the arranging order applied in S. Hovhannes of Mastara had disadvantage to form a dome base caused no similar monument until the 10th century when the new arranging order was devised as seen in Havalier Kilise of Kars, Turkey[18]. For the sake of descriptive discrimination, the arranging order applied in S. Hovhannes is defined as a Mastara A style while in S. Astvacacin of Oskepar as a Mastara B style.

Instead of sidewalls of the church of Oskepar, a niche of three-quarters circle is attached to a diagonal side of an octagonal plan with the same arranging order of the frame-systems in the churches of Sisavan and of Garnahovit, although the technique applied in the church of Garnahovit seems to be rude to some extent. This plan type is called the Hripsime plan type from its salient characteristic in planning. Although the planning between the Mastara (Oskepar) and the Hripsime (Garnahovit and Sisavan) is conspicuously different, the same architectural idea for framing a dome is attained by adjusting almost the same frame-systems in both types. That is, a squinch was employed at the bottom level of the drum section in the diagonal side while a fan-vault at the top level of the drum section. In fact, as seen in the Mastara (Oskepar) plan type which is produced from the cruciform plan type, the same process for altering a nave plan are recognized at

[18] *In fact, there are two monuments of the seventh century left in Artik and Harichavank. S. Grigor in Harichavank, although constructed in the seventh century, is presumed to have been restored in later priod. In fact, at the corner of the domed bay, a pendentive is employed for a frame-system for transforming the plan figure. In S. Sarkis of Artik, the size of which is comparable to S. Hovhannes of Mastara, it is almost hard to reconstruct the arranging order along the vertical direction since the upper section from the drum section is completely lost. Regarding the upper part of the lower section, a same arranging order employed in S. Astvatsatsin of Oskepar might be applied in this church from the fact that any frame-system is not distinguished at present. Cf. Cueno, P., op. cit. pp.244.*

transformation from the Mastara to the Hripsime plan type by modifying the orthogonal side walls to the octagonal diagonal wall. In contrast to these churches in the Hripsime plan type, the unlike arranging order was employed in S. Hripsime, Etchmiadzin, although the category's name derives innately from its own church name. In this church, a dome is directly laid on a drum in circular plan by forming a drum base, which provides enough width for setting a circular drum base at the top of the lower section. A transformation from an octagonal to a pseudo-circle plan is acquired on the vertical diagonal section between the impost of the apse wall and the cornice of the lower section by incorporating with three frame-systems. At arranging the order, a bizarre squinch, a mutated squinch in a sense, is fixed on the ceiling in a front side of a diagonal niche for connecting with an upper diagonal wall of the nave. Then, a pair of fans is inserted on both sides of an upper corner wall above its squinch within a diagonal curved spandrel. This complex style of the frame-systems at an upper corner wall of the lower section is devised by compounding squinches (squinch and fans) with a curved spandrel. Instead of the fan-vault in the Mastara A style, the fans are inserted just above the squinch in S. Hripsime although each frame-system in the Mastara A style is applied respectively to different sections, the lower and the drum sections. If only the top of the lower section lifts upward above the level of the fan-vaults in the Mastara A style, the plan figure simply corresponds to a sixteen-sided polygon, instead of a round figure. Therefore, as a next stage for producing mutation, a curved spandrel is compounded to an upper level above a squinch to form a pseudo-circle plan as adopted in the octafoil plan type. In fact, a cornice articulates the drum section from the lower section in S. Hripsime as seen in the architecture of the octafoil plan type, while the other Hripsime plan type, as seen in S. Hovhannes of Sisavan and S. Gevorg of Garnahovit, applies no articulation between the lower and the drum section. Contrary, the fans of S. Hripsime are left in the curved spandrel surface, although they are not necessarily required to attain the pseudo-circle from the fact that it is enough in normal case to use a curved spandrel for obtaining a circle in octagonal plan. The very fact that the fans are still yet left at the diagonal surface in S. Hripsime, in spite of a needless frame-system, indicates that two styles of arranging orders are simply compounded in the church of S. Hripsime. For the sake of descriptive discrimination, the arranging order applied in S. Hripsime is defined as a Hripsime A style while in S. Hovhannes and S. Gevorg, respectively in Sisavan and Garnahovit, as a Hripsime B style.

From the above discussion, regarding domed constructions in the early Armenian architecture apart from the church of Aragats, there are two families in the architectural genealogy, based on a concept of the biological classification in which each plan type corresponds to a genus. The origin of one family attributes to the cruciform plan type in which a squinch and a fan are applied respectively to the top of the lower and to the drum section, while the other origin to the polygonal plan type in which a spandrel is applied to an inner shell in the lower section. As a next, forward stage of the evolution, the cruciform plan type metamorphoses into the Mastara plan type by producing orthogonal corner walls against the previous type. At the same time, by shifting a

squinch downward, the church of Arzni is created from the cruciform style.

If compared with these arranging orders displayed in the early Armenian architecture, the architectural idea for framing a dome is diverse between the monuments discussed above. Particularly, in spite of a polygonal plan type as a hexagonal, the church of Aragats does not indicate the homology to the other polygonal plan type on architectural idea. Fundamentally, in the case of the polygonal plan type, a circular drum base is contoured at the top of the lower section with the curved spandrel. In the early Armenian architecture, the hexagonal plan type with superstructure is not left except the church of Aragats. However, if turning one's eyes to the later period, the number of its type stands at eight, which were almost constructed around the time and the region of the Ani kingdom. As far as confirming the arranging order inside although being restricted on its number, a curved spandrel is adopted in the lower section to acquire a circular drum base as recognized in the ordinary polygonal play type. In fact, for acquiring a dome base, a curved spandrel was applied to the chapels of Hripsime monastery and St. Grigor Abugahamrents in Ani, the small chapels in hexafoil plan, which were constructed in the 10the to the 13th centuries. Therefore, it must have been possible to choose a curved spandrel as a frame-system to the hexagonal plan type as well as the octagonal plan type. In particular, since the churches in Irind and in Eghvard dates around the seventh century, it is highly probable that the craftsmen were familiar to utilize the same system. Eventually, they selected a different style for framing a dome by inserting fans in two steps at the top of the drum section, keeping the hexagonal plan figure up to the fan. Furthermore, this style of the arranging order is not discovered in the other monuments constructed around the seventh century. Its architectural idea, in its concept, is very similar to the system of construction, expressed in the traditional dome construction in wood around the Eastern Anatolia since the ancient period. Its style is called hazarashen in Armenia, a dome style formed by horizontally displacing hanging racks as horizontal members one by one along a vertical direction . Hazarachen itself is fundamentally the style of construction in wood. In Armenia, the earliest domed architecture is designated as the small chapel around the fourth or fifth century in Voghjaberd, in which the dome is framed directly on the lower section with edges on the dome surface. In this manner, it is presumed that the earliest dome, called gmbet, was constructed impromptu for creating a hemisphere shape. In contrast, the construction system of the dome in Aragats resembles a dome of the hazarashen style in architectural idea. Therefore, considering the evolution of early Armenian architecture, S. Errordut'yun in Aragats might suggest the existence of the different family in the architectural genealogy, besides the cruciform and the polygonal style as indicating the different constructing system of the dome. Taking account of its impromptu technique for a dome, its style as inheriting a primitive frame-system might derive from the ancient dome construction technique and then be lost at some stage of architectural evolution in the Armenian architecture.

*Conclusion.* The church of Aragats, compared with other styles, must be underscored in

**its special characteristic for the architectural idea in dome construction. Its technique for dome construction might imply the primitive indigenous technique of the Eastern Anatolia from the ancient period before the new technique was innovated from the neighbored land as typified by a squinch, a pendentive, or a curved spandrel. It might also display the technique, which had been dumped into oblivion under the pressure of technical innovation. In this meaning, in spite of its smallness, S. Errordut'yun in Aragats is evaluated as one of the important monuments to consider the evolution of the architectural technique in the Armenian architecture.**

## ԱՐԱԳԱԾԻ ՍԲ ԵՐՐՈՐԴՈՒԹՅՈՒՆ ԵԿԵՂԵՑՈՒ ՃԱՐՏԱՐԱՊԵՏՈՒԹՅԱՆ ԾԱԳՈՒՄՆԱԲԱՆՈՒԹՅՈՒՆՆ ԸՍՏ ԳՄԲԵԹԻ ԿԱՌՈՒՑՎԱԾՔԻ

*___ Անիտա Խուդինյան ___* *___ Շ. Սասանյան ___*

Արագածի եկեղեցու ոճը, համեմատած այլ ոճերի հետ, առանձնահատուկ ուշադրության է արժանի գմբեթի կառուցվածքի ճարտարապետական ուրույն մոտեցման տեսակետից: Հավանական է, որ գմբեթի կառուցվածքը պարունակում է Արևելյան Անատոլիայի եկեղեցիների կառուցման պարզագույն տեխնիկան: Գմբեթով ցույց է տրվում այն հմտությունը, որը մասնագիտական նորարարության ճնշման տակ մատնվել է մոռացության: Չնայած իր փոքրությանը՝ Արագածի Սբ Երրորդություն եկեղեցին շինարարական տեխնիկայի զարգացման առումով համարվում է կարևոր կոթողներից մեկը հայկական եկեղեցաշինական ճարտարապետության մեջ: