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Comparative Studies of Tekyeh Dowlat in Tehran and Royal Albert in London

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Abstract

Problem statement: The building of Tekyeh Dowlat in Tehran has always created many arguments and questions among the researchers in conservation and architecture history. The main axis of these questions relates to the building's history and the relationship between Royal Albert Hall and Tekyeh Dowlat building. There are conflicting statements approving and neglecting Tekyeh Dowlat architectural originality within researchers. A number of people referred to the trip of Nasereddin Shah to Europe and his visit to Royal Albert Hall building and believed he wanted to construct a similar building in Iran. Others deny this idea believing that this trip occurred after the construction of Tekyeh Dowlat, thus this reasoning is wrong. **Research goal:** the main aims of this research is explaining the role of Tekyeh Dowlat in Iranian architecture history by comparing the construction technique to Royal Albert Hall. **Research Methodology:** In the present study tries to find evidence about building construction techniques for both buildings through historical studies and comparative-historical analysis of the documents, especially those dealing with the architecture and structure of Royal Albert Hall – that was found in British history archive – and finally answer the question “what is the relationship between Tekyeh Dowlat and Royal Albert Hall buildings. **Research result:** Results from this study suggest that despite the similarity of Tekyeh Dowlat and Royal Albert Hall, Tekyeh Dowlat building is recognized as a valuable and important example in Iranian architecture history due to its use of construction technique derived from Iranian architecture. Tekyeh Dowlat's construction began a year after Royal Albert Hall's on 1868. Based on this result, the present study emphasizes on the role of construction technique studies for answering architectural history questions and considering it as an unlimited component of architecture history studies, especially the history of Iranian architectural evolution. This study means to eliminate the existing weaknesses in Iranian architectural studies, trying to find logical and rational answers about construction date of historical buildings in general and Tekyeh Dowlat in particular, avoiding myths and providing a general method for similar studies

Keywords

Historical/Comparative Studies, Tekyeh Dowlat, Royal Albert Hall, Construction Technique.

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Introduction

Explaining the usage of comparison tools and the role of comparing construction technique structure in answering architectural history questions

In different periods of history, Tekyeh Dowlat has always been interesting for various groups of researchers in the fields of architecture and history, and even due to its special use cases, performing arts and theaters. Studying conducted studies and published papers regarding Tekyeh Dowlat suggests different views and sometimes serious disagreements between researchers. Despite different materials investigated, there are still many questions regarding this valuable establishment. One of the most important questions is whether Tekyeh Dowlat is a structure derived from Iranian architecture or one inspired by Western architecture.

The aim of this study is to clarify some dark corners of Iranian architectural history with comparative methods in considering building construction techniques in order to answer architectural history questions. In this method, it is attempted to comparatively investigate building construction techniques over construction periods along with comparing other social and architectural aspects. The next step would be explaining building development reasons and exploring various evidences regarding the construction quality of the technique, and eventually, find a due and reasonable answer to unanswered or unsatisfied questions with regard to the studied phenomena. The present study is based on the idea of continuity of construction technology evolution and impossibility of its one-time improvement over a historical period. Therefore, it tries to reach an accurate evaluation of how to build each of these buildings, thus clarifying the relationship between these two, in order to answer the main question of the study. Along with answering the questions regarding Tekyeh Dowlat, it attempts to explain the quality of using comparative tools in architectural, social, and constructional terms in architectural history studies. Therefore, in the present study, effort is made to present comparative tools especially in technical

terms as an important component in architectural history studies, especially Iranian architecture history, thus evaluating its usage along with other aspects of comparison.

Methodology (Theoretical Explanation)

The present study can be classified as a qualitative study in the area of architecture. It attempts to answer questions about the role of Tekyeh Dowlat in Iranian architectural history using comparative tools of the two buildings of Tekyeh Dowlat and Royal Albert Hall. Since historical events and subsequently, factors contributing to development of historical buildings often need complex explanations, it is very hard to obtain such explanations based on conventional rules in architectural studies. Therefore, it is necessary that comparative tools be used. In this comparison, all the factors influential in formation of the two buildings are compared (Regan, 2009: 45). Thus, first comparative method must be defined and the conditions for its usage in the present study specified. Accordingly, comparative method refers to comparison of two or more phenomena (subject or problem) in a specific area (by determining the principles explored among its various aspects) in order to discover commonalities and their disparities to achieve the study goal. Hence, comparison is a tool to build experimental regularities and evaluation and interpretation of cases with regard to a theoretical or realistic criterion (Regan, 2009: 31).

In comparative study, first, comparability of the items that are supposed to be investigated must be proved, that is, whether a common aspect between the items that are to be compared can be found.

In the present study, by using comparative tools in architectural history studies and investigating architectural, historical, and social aspects, and especially construction technique, which is the main area of comparing these two architectural buildings, answers are given as to whether the Tekyeh Dowlat building is built after Royal Albert Hall or is a building with independent structure and identity, with significant role in the evolution of Iranian architecture.

Like most comparative studies, first, background of the study is explored and the problem is scrutinized. After that, in the second step, major information regarding Tekyeh Dowlat and Royal Albert Hall are reviewed and finally, by comparing these two establishments in different aspects, a foundation for answering the main questions is obtained.

Research Background

● Tekyeh Dowlat and Its Role in Iranian

Architectural History

Following a review of the literature around Tekyeh Dowlat, given the discussion goals, three general approaches can be identified. These three approaches are:

1. Architectural history approach: aimed at emphasizing the role of Tekyeh Dowlat in Iran's contemporary architectural history.
2. Performing arts approach: aimed at putting emphasis on the historical-social significance of Tekyeh Dowlat in expressing the background of performing arts in Iran.
3. Preservation approach: aimed at conducting a skeletal study based on evidence remained from Tekyeh Dowlat.

Architectural History Approach

The first approach is discussed in Architecture of Naseri Palace (Ghobadian, 2006) and Iranian Contemporary Architecture (Bani Masoud, 2010) and other literature related to Tekyeh Dowlat. Qobadian gives Tekyeh Dowlat significance due to the fact that this structure is the first religious structure built under the influence of oversea amphitheatres (Qobadian, 2006: 126). He considers presence of privileged booths around the scene for watching ceremonies and its round shape the reason for similarity to performance and opera saloons in France and opera house hall (Ibid: 129).

Bani Masoud also explains regarding the architecture of Tekyeh Dowlat and the reason for building it that this structure is influenced by the architecture of opera buildings built by Laken because of its construction

date (1285 AH) and its chronological precedence to Naser al-Din Shah's first trip (1290 AH), has rejected the idea of its being influenced by the architecture of Royal Albert Hall (Bani Masoud, 2010: 95). In short, the following points can be mentioned regarding this approach:

1. Emphasis on the importance of Tekyeh Dowlat, the first religious establishment influenced by Western architecture in Iranian contemporary architecture by comparing the architectural structure of European opera houses with Tekyeh Dowlat. It is worth noting that the two are very similar from these two points of view.

2. Ambiguity in explaining the influence of Western architecture on development of Tekyeh Dowlat by incorporating social-historical evidence, so that Naser al-Din Shah's trip to overseas has been suggested as a historical evidence in rejecting the relationship between the two.

Performing Arts History Approach

This approach has often been mentioned by historians and researchers of performance domain. That is because Tekyeh Dowlat is an evidence for performance's background in Iran. Supporting this argument, Bahram Beyzaei writes in "Performance in Iran":

However, this artifact (Tekyeh Dowlat) was the biggest theater in Iran" (Beyzaei, 1965, 129).

Many books and articles have been published regarding the importance of Tekyeh Dowlat. In this regard, in a paper called Tekyeh Dowlat", Enayatollah Shahidi discusses the reasons and date of building Tekyeh Dowlat citing Aryan Pour based on the book "From Saba to Nima" (Aryan Pour, 1971), suggests the Shah's visit to overseas as the main reason for building the establishment (Aryan Pour, 1971, 323). Similarly, Homayouni (1974, 20) mentions similar items about the construction of Tekyeh Dowlat. In response to these views and in rejection of the architecture of Tekyeh Dowlat to Royal Albert Hall, several interested people including Enayatollah Shahidi (1999) have argued that the Shah's trip to overseas occurred in 1290 AH, whereas Tekyeh

Dowlat was built in 1285, so they have considered Tekyeh Dowlat a completely Iranian structure, and subsequently, employed this (presumable) originality to prove the origin of performance in Iran. Around this approach, the following points can be mentioned :

1. According to a number of researchers, construction of Tekyeh Dowlat as a result of Naser al-Din Shah's trip to overseas has been influenced by Western architecture, which has been rejected based on historical evidence. In this perspective, the origin of Tekyeh Dowlat which has been created by rejecting the relationship between the two buildings is an evidence in the deep root of performing arts, especially Ta'zieh in Iran.
2. Even in the first part which considers the building influenced by the West, it was concluded that the architecture of Tekyeh Dowlat has been built with collaboration of English engineers, so Iranian architects could not construct such a building. Hence, this argument can be related to the technological and technical aspects of the building. From this point of view, technological comparison of the two buildings whose evidence is not clear, has led to rejection of technical capability in Iranian architecture.

Preservation Approach

This approach is mostly based on the evidence obtained by tracking the "Sabet Pascal" building located behind the Bank Melli building in 1995, which is reported in two articles: "Tekyeh Dowlat Architecture" (Mansuri Fard, 1995) and "Arg-e Tehran" (Mokhtari, 1999).

Regarding the building's structure, Mansuri Fard writes in "Tekyeh Dowlat":

"With regard to the architecture of this building, given the number of the plan's axes, each having their own specifications, and also empty space of the second floor, which is further behind in some spans, and crowding of people in the middle area up to and near the stage of ceremonies, etc. and type of attachment of transoms to the main cylinder of the plan and considering the architecture of Tekyehs, round caravansaries, Iranian mosques and schools, it can

be suggested that this architecture has been inspired in all dominant components and principles by the traditional architecture. Design of Tekyeh Dowlat in terms of architectural form, deflection spacing and inner symmetry all indicate that its architecture has nothing to do with Western amphitheaters" (Mansuri Fard, 1995: 575).

It could be said regarding this approach that:

1. This approach emphasizes the architectural structure of Tekyeh Dowlat inspired by Iranian architecture, but for this claim, only a comparison of Tekyeh Dowlat and Iranian architecture information has developed in the author's mind (Mansurifard, 1995) and is a general conclusion.
2. In this approach too, based on the date of Naser al-Din Shah's trip, possible similarity of the architectures of Tekyeh Dowlat and Western amphitheaters is rejected, which is per se, a historical-social comparison.

Problem Statement

Given what was noted in the previous section from three different approaches to the Tekyeh Dowlat building (architectural structure, theater, and preservation), three aspects can be recognized in the comparison between Tekyeh Dowlat and Royal Albert Hall. First, comparison has been done in architectural terms which is often conducted by architectural historians. Considering this aspect, it has been concluded that the building is inspired by the Western architecture. Second, comparison is in historical-social terms which is far more evident in studies of performance historians, with the major reasoning of this comparison being the rejection of the relationship between Tekyeh Dowlat and Naser al-Din Shah's trip to the Europe. In this regard, other than comments by theater historians, no viewpoints have been given regarding building construction technique, and this can also be inferred from Mansuri Fard's explanations as well. On the contrary, contemporary theater historians believe the building technique is completely Iranian, but they have given no proof of their claim. Thus, it can be

concluded that in comparison of the two buildings and in order to apply the tools, comparison of two aspects i.e. architectural and historical-social based on limited evidence regarding Tekyeh Dowlat has been conducted without discussing the evidence regarding Royal Albert Hall, while the construction technique aspect as one of the three most important aspects of comparison has been neglected. Therefore, it can be suggested that despite the given answers, the argument of whether Tekyeh Dowlat originated from Iranian architecture or was inspired by Western architecture is still unanswered. Hence, the present study deals with proving or rejecting the similarity of Tekyeh Dowlat with European amphitheatres (Royal Albert Hall et al). This goal is achieved by using comparison tools via comparing the two buildings in terms of construction technique along with careful studies on architectural and historical-social aspects by entering information regarding the Royal Albert Hall.

The Main Discussion

• Tekyeh Dowlat: Social-Historical Development

Investigating documents, especially pictorial ones from Tekyeh Dowlat, information regarding building construction technique can be achieved. Earlier, these photos have been taken by Qajar photographers including Abdullah Qajar and Naser al-Din Shah himself, after 1300 AH. According to documents related to album house of Golestan Palace, there are 24 photos from Tekyeh Dowlat, most of which have been taken in 1308 AH by Abdullah Qajar, and two photos have been taken of Eastern and Western views by Paparian, which are undated. These documents provide the researchers with invaluable information regarding the building technique used in the construction. The above-mentioned photo which presents Tekyeh's structure, is divided into two construction periods, with the second being related to the interventions of Muzaffar al-Din Shah's period. It is worth noting that the photos of period one, due to their relationship with discussed questions, are the main topic of the present study. To analyze the

construction technique of Tekyeh, its structure was divided into three major parts, including foundation, horizontal bearing system, and vertical bearing system. With this classification and studies of the mentioned photos (photos 2 and 3), the following conclusions are made:

1. In its first construction period, Tekyeh consisted of three floors, as seen in the visual documents. According to historical sayings and documents, though, it has had a vault as well.
2. Materials used in construction, according to tracking evidence of 1995 and citations of "Al-Ma'aser wa al-Asar", are tile and clay-lime mortar. This building has been formed with tile dimensions $4.5 \times 20.5 \times 20.5$ cm and clay and lime mortar.
3. Structure of the building in the middle shaft consists of bearing walls extended beyond the roof level of Tekyeh. The reason for this can be the great weight applied to counterbalance the horizontal force produced by curved wooden bar. In building this system, according to the picture, a combination of wooden bars and metal clamps has been used.
4. According to the other evidence, the structure in chambers and the back part of the main shaft has consisted of bearing walls along with tile vaults. The structure of these vaults has been built following architectural building techniques using conventional arches. Benjamin's citations in the book "Iran and Iranians" in Naser al-Din Shah's era can be a reason for this claim:

"The semilunar roof of this entry was as high as 12 meters, in turn giving superiority to the building of Tekyeh..." (Benjamin, 2014: 352);(Fig. 1,2).

Royal Albert Hall

• Social-Historical Development Background

After London exhibition and establishment of Crystal Palace in 1851, the idea of a concert hall struck English architects. According to historical documents, the origin of this idea dates back to 1855. After 4 years, an architect named Fowke proposed the idea of a hall with the dimensions of 180×90 m and height of 70 m, with the capacity of 26000



Fig. 1. Outer area of Tekyeh Dowlat, special system for building roof, photo: Smithsonian Collections Online (Courtesy of Smithsonian). Source: Sevruguin, 1933.

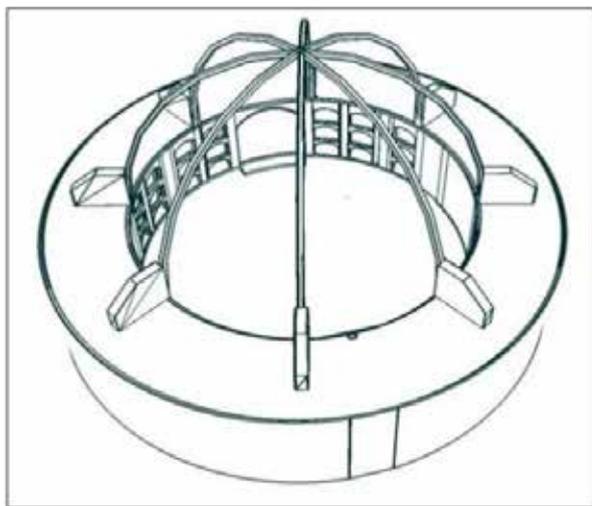


Fig. 2. Outer area of Tekyeh Dowlat, special system for building roof. Source: authors.

people (Sheppard, 1975: 177-195) (Fig. 3,4). Queen Victoria symbolically placed the first footstone in April 1867 and on May 20, 1867, the hall was named Royal Albert Hall to recognize Albert. After designing of the roof by the same engineers who had designed London's Railway, construction of the building was assigned to Manchester-based Fairbairn Corporation in 1869. The Administrative secretary of Royal Albert Hall announced in 1877 that construction of the building had cost around

214000 (almost equal to the initial cost), which must be provided for by selling seats for 150 pounds instead of 100 pounds. On March 29, 1871, Queen Victoria inaugurated the building and suggested that this hall is the most beautiful hall in the whole modern Europe (Sheppard, 1975: 196). Lighting of the hall and balcony were first supplied by gas lights, but after 1879, electrical lights were used to light it.

Architectural Structure

The architectural structure of the building had an elliptic plan based on the suggestion given by Fowke in 1864, and its coating consisted of projection in the plan, which had a light coating in the middle, but what was built in 1867 was a structure with elliptical plan with smaller elongation and like circle with truss roof and veil coating.

Construction Technique Structure

Following Tekyeh Dowlat, the construction technique for Royal Albert Hall is divided into three parts: foundation, horizontal load-bearing structure, and vertical load-bearing system. The main source about Royal Albert Hall is the survey report of London in British history (Sheppard, 1975:177-195). Accordingly, the technique used for building the foundation of this structure is expressed as follows: "As seen from evidence, foundation and remained images, the foundation structure of Royal Albert Hall can be a combination of stone and concrete, but accurate information and reviews regarding the foundation is not available with the data at hand" (Fig. 7).

According to evidence and citations from Sir Henry Scott, structure of the vertical load-bearing system of Royal Albert Hall is non-equipped walls with the width of 3 ft and 12 inches (almost 120 cm), which is made of red tile and sand-concrete mortar (Sheppard, 1975:185) (Plan 3).

The structure of the horizontal load-bearing system of the building in the first, second and third levels is made of primary concrete slabs, which, according to Scott, is resistant to fire and in the final level,



Fig. 3. Scott’s artistic design, 1867. Source: Sheppard, 1975.

cast iron trusses have been used. Structure of the main roof in the plans and the model that Foam had prepared in 1864 is like a projected edge. Finally, Scott who believed a high-tech roof consistent with Royal Albert Hall has to be designed, modified the structure of the roof.

“This ringlet-shaped roof is made of iron and glass with a three-percent girder in between and placed on the walls with its truss network. In the design of this roof, experience and knowledge of engineers of London Railway, Fowler and Hawkshawn along with two other engineers J. W. Grover & R. M. Ordish were used as calculators. The roof design

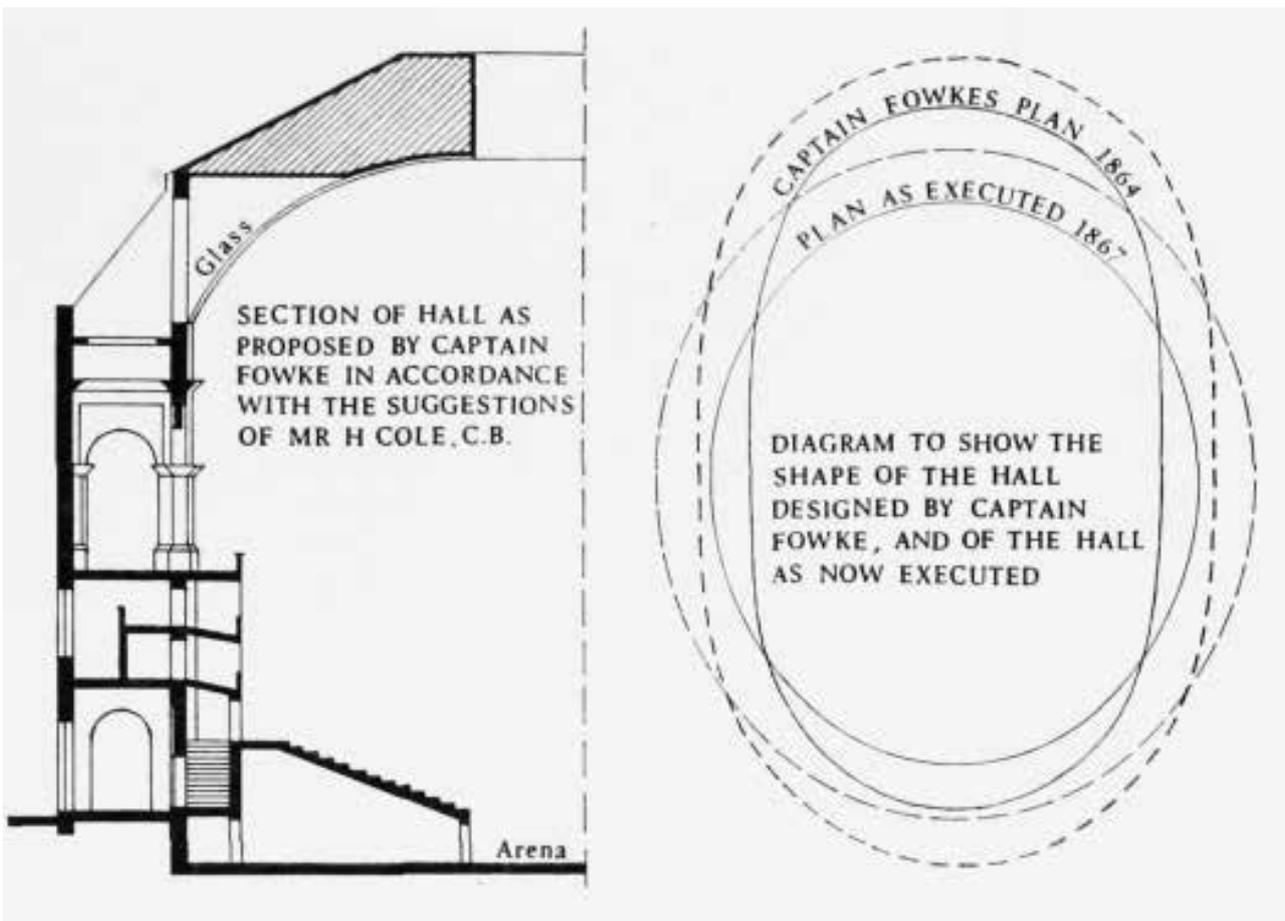


Fig. 4. Folk’s design, 1864. Source: Sheppard, 1975.

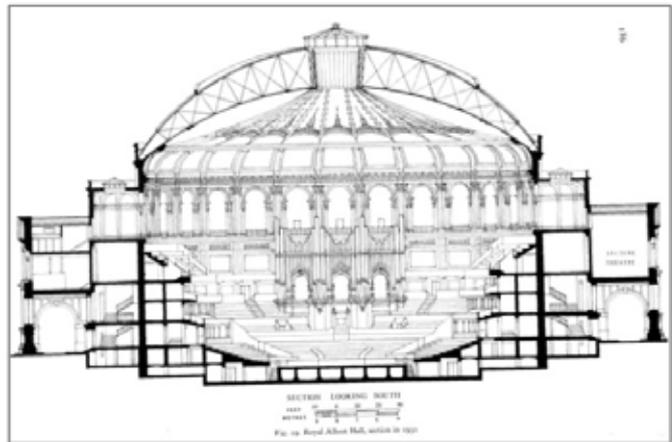
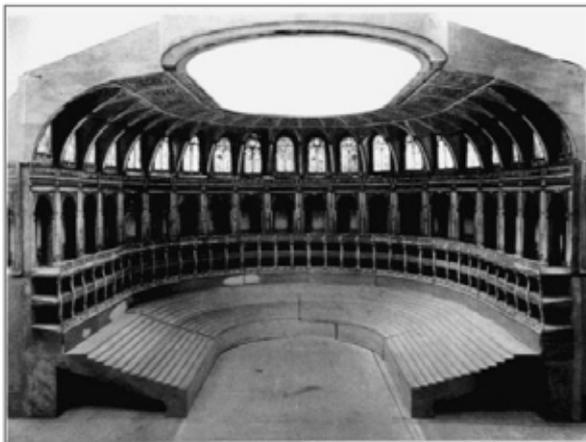


Fig. 5. (Left) Fowke’s design mock-up dated 1864 and projected roof with light coating in the middle.

Fig. 6. (Right) Cross-section of the structure in 1932. Source: Sheppard, 1975.

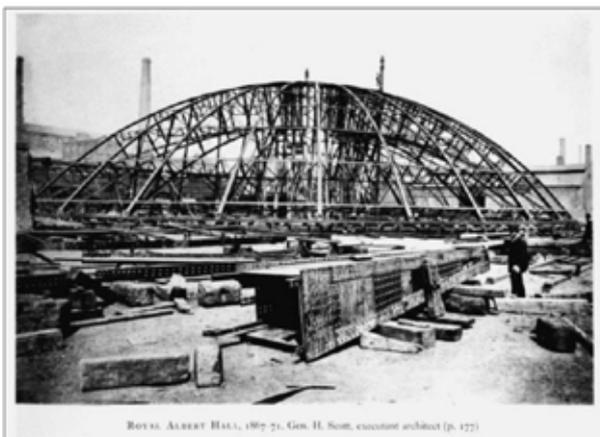


Fig. 7. Experimental construction (1869), Roof in Manchester, Fairbairn Corporation (1975). Source: Sheppard, 1975.

was assigned to Fairbairn Company in Manchester, where Sir William Fairbairn conducted correction in response to Scott (Sheppard, 1975: 185)”. The main cross-section of the truss was installed in May 1869 by placing the scaffold under the truss. The scaffolds were removed in May 1870 and the roof stood stably. Considering this as an engineering achievements of his time, Scott announced it first to Prime Minister Goldstone and Wales’ prince suggesting that placing a veil over this roof is easier

than putting skin on the thigh of a slaughtered sheep. In fact, the latest advanced technologies of that era along with truss in the widest mouth have been used in the construction of Royal Albert Hall. Comparison of Royal Albert Hall and Tekyeh Dowlat

As suggested in the methodology part, comparison of the two buildings is conducted in terms of historical and social backgrounds of development, architectural structure, and construction technique structure so that answering the main question becomes possible and meanwhile weaknesses of the studies mentioned in the literature are avoided.

Comparison of Social-Historical Development Background

As mentioned earlier, construction of Royal Albert Hall started in 1867 (1284 AH), which is almost one year before Tekyeh Dowlat began to be built, i.e. 1285. Given the fact that construction of Tekyeh Dowlat took 5 years, it has had a 3-year concurrency with the construction period of Royal Albert Hall. With regard to Iranian government’s knowledge of the construction of Royal Albert Hall, especially on the side of Doust Ali Khan Moayer al-Mamalek – head in charge of Tekyeh Dowlat’s construction – there have been two probabilities; the first is

possible relationship between Europe and Iranian government via newspaper. In this regard, as it was said, plans for Royal Albert Hall were put on exhibition in 1863 (1280 AH) in the Victoria Albert Museum and public British media published it. The second possibility is based on the idea that because of the huge impact of this project on architectural and social atmosphere of England, it was probably introduced to Iranians through diplomatic ties between the English ambassadors. Although architectural structure of Tekyeh and its circular plan support this probability and awareness of Iranian builders with construction and architecture of second period i.e. 1867 and after changing the plan of Royal Albert Hall (1867 – 1284 AH), the author thinks that this reasoning would bring essential changes in unfolding the reasons and construction of Tekyeh. By incorporating this assumption, in contrary to arguments around the effect of Naser al-Din Shah's trip to Europe in 1290 AH it could be suggested that Tekyeh Dowlat has been built in a competition between Iranian king and the English queen. Several reasons can be given for this claim, among which the following items are mentioned based on the results obtained from comparing the events related to Tekyeh, architectural structure, and building technique:

1- Similarity between special presentation of construction architecture in the newspapers of that

time i.e. London Times and Sharaf Newspaper. For instance, description of architectural structure and build quality by Scott and Moayer al-Mamalek as their samples were given in the above section.

2. Painting by Kamal al-Molk in 1297 follows the same angle as in the photo taken from inauguration of Royal Albert Hall in the newspapers. This type of presentation can be used to explain splendour of Tekyeh Dowlat in comparison with Royal Albert Hall (Fig. 9).

3. The roof structure of Tekyeh Dowlat is very similar to that of Royal Albert Hall, but the construction technique for buildings is very different as will be explained next (Fig. 10 and 11).

4. Because of competition between Iranian king and English queen in 1296 AH (1877), Tekyeh Dowlat is the first building in Iran which is equipped with electricity simultaneous with Royal Albert Hall to be on par with it.



Fig. 8-a. Inauguration of Royal Albert Hall in 1871.
Source: Sheppard, 1975.

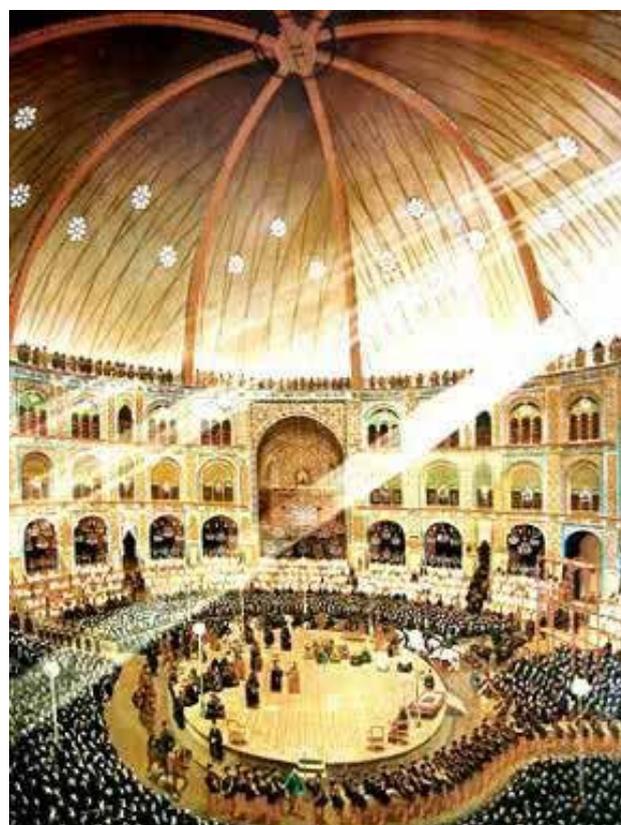


Fig. 8-b. Kamal al-Molk's painting, 1297 AH.
Source: Golestan Palace Album House.



Fig. 9. (left). Outer view of Royal Albert Hall, London. Source: Sheppard, 1975.

Fig. 10. (Right). Outer view of Tekyeh Dowlat, Special coating system for the building (photographer: Abdullah Qajar, 1310 AH. Source: Golestan Palace Album House.

Comparison of Architectural Structures

Based on comparison of architectural structures of the two buildings, views of Iranian architecture historians, Tekyeh Dowlat's being inspired by Royal Albert Hall should be confirmed. In fact, as stated earlier, this building has been created in the competition between Naser al-Din Shah and Queen Victoria. Meanwhile, given the acquaintance of Doust Ali as the person in charge of building Tekyeh Dowlat, this building can be seen as influenced by his idea and inspired by Western architecture. To support this claim, the architecture of Ferdows Garden as well as Shams al-Imarah can be mentioned. In fig. 9 and 10 an attempt to make Tekyeh Dowlat look like Albert Hall using Iranian architectural elements is observable.

Comparison of Construction Technique

Given the comparison conducted between the two buildings, it can be suggested that in the design of Royal Albert Hall, the latest standards of industrial world as well as experience from London's train station construction have been used, while only a simple technique that was popular at the time of construction was used in construction of Tekyeh

Dowlat, and this technique was used to bear the load for over 25 years until its maintenance in Muzaffar al-Din Shah's era.

Therefore, the construction technique of Tekyeh Dowlat is completely native. That is, the architects of this building have attempted to turn the information received from plan, inner view, etc. obtained from various ways into a real building using existing construction techniques, which is, in turn, a very great and valuable job.

Findings

Given what was discussed, the question asked at the beginning of research can be answered this way: despite all citations, Tekyeh Dowlat's construction is a building not quite originated from Iranian architecture, and not quite alien. Tekyeh's construction has been performed with king's will and with inspiration from European amphitheaters, especially Royal Albert Hall. However, in realizing the king's wish in having a European amphitheater, Iranian architects have employed construction techniques popular in Iranian architecture, which is, in turn, an artistic move. Even, application of popular architectural construction method can be witnessed

in repeated subsidence of Tekyeh Dowlat after construction due to the type of foundation used in Qajar period, as general weakness of its construction technique.

Conclusion

Analyzing architectural structure is not possible by only using architectural comparison and one-way historical-social studies without considering the building construction techniques. An evidence for this claim can be inability in giving reasonable answer regarding the relationship between Tekyeh Dowlat and London's Royal Albert Hall in the reviewed literature of this study. In cases where all three aspects i.e. development background, architectural structure, and construction technique are not considered, adjustment is reduced to comparison, thus giving no considerable result.

Studying the construction technique of an artifact in cases where the two buildings can be matched, is done by comparing the construction's foundation and building vertical loader bearer and horizontal structure. In any of these stages, the researcher must consider the architectural development trend in any of the communities containing either building in terms of technological developments. For example, regarding Royal Albert Hall, progress in constructing cast iron structures in the nineteenth century Europe led to cast iron being used in the mentioned structure. However, in the same era, given their technological capability, architects formed the roof structure by using wooden trusses and canvas coating, with all these items owing themselves to technological advancements of the communities building these artifacts.

Reference list

- Aryan Pour, Y. (1971). *From Saba to Nima, Iranian Persian literature over 150 years*. Tehran: Pocket Edition.
- Banimasud, A. (2010). *Contemporary Iranian architecture in the trade-off between tradition and modernity*. Tehran: Art and architecture of the century.
- Benjamin, W. (2014). *Iran and Iranians in Naser al-Din Shah's era*. Tehran: Etela'at Publishing.
- Beyza'ei, B. (1965). *Performance in Iran*. Tehran: Kavian.
- Parsi, F. (2014). Architectural evolution language. *Art and Architecture*, (5): 50-66.
- Pourmand, H. Lezgi, S. H. (2008). Tekyeh Dowlat. *Moon of Art*, (13): 4-124.
- Zoka, Y. (1974). *History of royal palaces*. Tehran: National works forum.
- Shahidi, E. (1998). Tekyeh Dowlat and improper evaluations. *Theater Journal*, issue 37-102.
- Qobadian, V. (2006). *Architecture of Naseri caliphate*. Tehran: Pashton.
- Mokhtari Taleghani, E. (1999). Tehran Citadel. *Articles for Iranian architectural and urbanization history conference*, issue 2. Tehran: National Cultural Heritage Organization.
- Mansurifard, M. (1996). Tekyeh Dowlat's architecture. *Articles for Iranian architectural and urbanization history conference*, National Cultural Heritage Organization, Tehran.
- Homayouni, S. (1974). *Tazieh and Performance*. Tehran: Art Festival.
- Regan, C. (2009). Adaptive method beyond qualitative and quantitative approaches. Translated by Fazeli, M.

Tehran : Agah Pub.

- www.asia.si.edu. (access date: 20/09/2009).
- Civil Engineer's and Architect's Journal. 264. (1862)
- Sevruguin, A. (1933). Available from: www.asia.si.edu/Iran-in-photographs/gallery.asp?set=FSA_A. Retrieved from Smithsonian Collections Online: <https://www.si.edu/collection>
- Sheppard, F H W(ed.). (1975). Royal Albert Hall. in *Survey of London: Volume 38, South Kensington Museums Area*, ed. British History Online <http://www.british-history.ac.uk/survey-london/vol38/pp177-195>. accessed 27 November 2016.
- Technical-downloads/. (2014). Available from: <http://www.royalalberthall.com/about-the-hall/hiring-the-hall/technical-services/technical-downloads/> (access date: 20/09/2009).