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# Dovecotes in Kayabağ village: an assessment of landscape and architectural characteristics

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## ABSTRACT

The dovecotes of Kayseri-Gesi stand out as unique examples of indigenous architecture of Anatolia. They are considered significant elements of the rural landscape. The purpose of the construction, the constructional and spatial characteristics peculiar to these dovecotes, make them an important element of global cultural and architectural heritage. Dovecotes that are built upon rocks, with mere building stones provided from the same rocks, look like a shaped form of the topography itself. This is very much to do with the geological features of the Cappadocia Region where Kayseri is located. In terms of construction techniques and spatial organization, the dramatic differences in the dovecotes' underground and aboveground parts make them even more outstanding. This research is based on the field studies conducted in the dovecotes of Kayabağ. The landscape was studied in all aspects and each dovecote is studied for its placement, topographical interactions, plan and section typologies, materiality and construction techniques. The structural problems stemmed from the geological features and the deterioration caused by external factors are taken into consideration. The study concludes with an overall approach for preservation, sustainability and conservation process of the heritage landscape of Dovecotes [*Güvercinlik*] of Kayabağ.

## KEYWORDS

Dovecotes [*Güvercinlik*]; landscape; masonry; tuff; carving; Kayabağ; indigenous

## 1. Introduction

Most of the studies on the vernacular architecture of Anatolia focus on conventional building typologies such as residential, religious, public, educational, and commercial. Some of these studies attempt to analyze the residential qualities, housing typologies, the use of local materials, and construction technologies,<sup>1</sup> while other studies are more interested in their physical transformation related to social and cultural changes in local life.<sup>2</sup> However, there is an immense architectural heritage that cannot be categorized in these conventional building classifications in different regions of Anatolia. The wooden granary houses [*serender*] of the Black Sea Region, the mud-brick pigeon houses [*boranhane*] of Eastern Anatolia, public laundries, molasses buildings [*şirahane*], and mills can be counted as some examples of such nonclassified structures. Comprehensive studies on these nonclassified structures are important in that they provide invaluable information

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about unique examples of the regional architecture and local life. Yet the number of regional architectural studies focusing on these informal buildings which are somehow left outside of formal classifications is quite limited.<sup>3</sup>

Dovecotes of Gesi-Kayabağ region, named as *güvercinlik* or *kuşluk* in Turkish, are good examples of such nonclassified structures. Despite having been built very skillfully, these dovecotes have not been used for years as they have lost their function in the course of time. Bird shelters were built in different ways exist in several regions of Anatolia. Some of these shelters were built for the mere purpose of protecting birds, whereas some others were used to collect fertilizer; that is, bird manure, to be used in regional agriculture. A number of bird shelters appear in the form of natural holes on the walls of buildings, while some shelters are the ones particularly designed on the facade of well-off family mansions or mosques as an extension. In another category, house chimneys were used as bird shelters. On the other hand, apart from the ones built in the walls of a variety of buildings, there are shelters carved into rocks in the Kayseri Region.<sup>4</sup> The most radical examples are the ones depicting the shelters as individually constructed structures. The dovecotes of the Kayseri-Gesi Region and the mud-brick pigeon houses found in the rural parts of Diyarbakır are bird shelters specifically constructed and used for collecting bird manure as fertilizer. This specific kind of fertilizer, called as *koğa* in the Ottoman Period, is mentioned in official documents for its use for commercial and agricultural purposes. Apparently, this specific kind of fertilizer was an export item during the Ottoman Era; in addition, it was used in the cultivation of buckthorn [*cehri*] in vineyards of the Cappadocian Region and similarly in watermelon agriculture in the Diyarbakır Region.<sup>5</sup>

A considerable number of the concerned dovecotes have kept their original shape in the dovecotes of Kayabağ, yet another considerable number of them are in poor condition, mostly due to the lack of maintenance, external factors, and geological conditions, and this destructive process is still in progress. Yet, a limited number of unqualified protective attempts to help these structures have been observed. In addition, some works of restoration aimed at advertising to the tourist industry in the region seem to have already started. All these factors show that all the original information regarding the dovecotes of the region faces the risk of getting lost or disappearing. Another threat to the sustainability of the dovecotes is the ongoing urbanization projects in rural areas leading to different construction work, which puts a lot of pressure for the transformation of the dovecotes together with many other historical buildings. Nevertheless, a considerable number of the dovecotes in Kayabağ remain sufficiently durable to provide enough information considering the material usage, construction techniques, and details, used at the time in the regional architecture. Yet, the scientific research on the dovecotes is very limited in content and scope. All of the research studies are based on a few academic sources in the analysis of construction techniques of dovecotes.

This article opens with a brief information of the historical background of the Kayseri-Gesi Region. Then, the dovecotes of the Kayabağ Village will be studied in terms of landscape characteristics, spatial qualities, construction techniques and the use of materials. It concludes with overall approach for preservation, sustainability and conservation process of the heritage landscape of Dovecotes of Kayabağ. The research is based on a field study involving 147 dovecotes found in Kayabağ Village.<sup>6</sup>

## 2. A brief history of the Kayseri region

Kayseri is a central Anatolian town located in Cappadocia that is listed on the World Heritage List. It is one of the most important cultural and tourist centers welcoming thousands of local and international tourists all year round, owing to its cultural and architectural heritage located in town and around. Since the very early periods in the history of Anatolia, Kayseri has been one of the most important settlements as it is located at the crossroads of important military and trade routes.

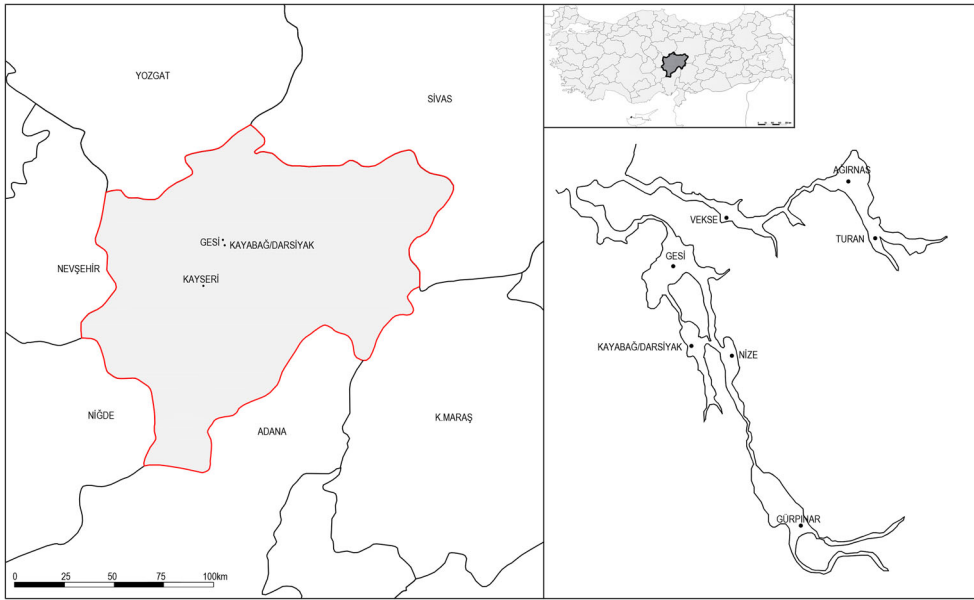
In a period of about 4500 years, Kayseri was ruled, in a chronological order, by Asurians, Hitites, Frigians, Meds, Romans, Persians, Byzantine and Seljuks, and later on during the Beylikler Period, it was under the control of İlhanians, Eretnanians, Kadı Burhaneddin Ahmed, Dulkadiroğulları, and Karamanoğulları. The town was captured by Ottomans in 1467.<sup>7</sup> Kayseri has been an important commercial and tourist center in the Turkish Republic since 1923. Today's Kayseri possesses the traces and material remains of this historical stratification within its contemporary urban fabric. However, in the last few decades, becoming one of the most important commercial and industrial towns in the country, Kayseri and its surroundings has gone through a fast urbanization because of the increasing population, and it is as a considerable threat to the sustainability of the current stock of the historical buildings and the historical traces in the city.

### 2.1. Historical significance of Kayabağ

Kayabağ (Darsiyak) is one of the villages of the city of Kayseri and is located in the south-east of Kayseri. It has been one of the most important settlements of Christianity in Kayseri Region. Although there are many rumors dating back the beginning of the history of the settlement in the fourth century, it first appeared with the name of Nekşana in cadastral registers in 1500. After the building of the church of Yanartaş dedicated to Taxiarches, it was known as Darsiyak and Yanartaş and finally it was named as Kayabağ in the Turkish Republic. According to cadastral registers dated 1500, 95 percentage of the population of Kayabağ were non-Muslim settlers, including Greeks and Armenians.<sup>8</sup> At the beginning of the twentieth century, the number of Greek house decreased to 60 and, because of population exchange in 1915 and 1923, the non-Muslim population had to return to their homelands.<sup>9</sup> Traces of multicultural history of Kayabağ present how cultural interaction affected social, cultural, and economic structure of Kayabağ. There are two Greek Churches, underground churches of Byzantine Period, some of which were transformed to dovecotes in Ottoman Period, and many houses built by Greeks, preserved in the village.

## 3. Analysing the dovecotes in Gesi-Kayabağ

The dovecotes that are specific to Gesi Region, including Kayabağ, are detached – individual – structures. The dovecotes of the Gesi Region are mostly located in the valley cliffs of Kayseri-Gesi, Gesi-Kayabağ/Darsiyak, Gesi-Nize and Nize-Gürpınar in Turkey (Figure 1). They were built for protecting doves, collecting manure as fertilizer and a source of food for humans.<sup>10</sup> The dovecotes were built during the Ottoman Era. The information regarding the identification of the builders varies from one source to another. According to some



**Figure 1.** Kayseri District and the valleys where dovescotes were placed.

resources, the dovescotes were originally built by non-Muslim residents of Kayabağ, and the same tradition was kept later on by Muslim settlers.<sup>11</sup> The dovescotes of Kayabağ are part of the landscape produced through interactions between cultural properties and natural environment by the people lived in Kayabağ.<sup>12</sup> The landscape was the result of the ecological interactions between the nature and man-made productions for human needs. Effectiveness of these factors on the landscape of dovescotes can be evaluated through: topography and vegetation, geology and climate and historic significance.

### 3.1. Landscape

#### 3.1.1. Topography and vegetation

Kayabağ is located in Değirmendere Valley in which Darsiya Water divides the Village into two parts: the village settlement placed in the south part and dovescotes placed in the north part (Figure 2a). The length of the valley in which dovescotes are placed is about one kilometer and the slope degree is 35–40 degree. There is no other building apart from the dovescotes in the northern slope of the valley, however, the village is placed at the top of the southern slope of the valley. The topography is completely natural in the northern slope of the valley on which the dovescotes are placed. There is no any landscape organization produced by the handiwork of humans. Only the small part in the east was organized gradually.

The northern slope of the valley does also not include any natural entity on the topography that affect the tree-dimensional perception of the dovescotes. Both northern and southern sides of the Darsiya Water in the bottom of the valley and southern slope of valley have rich natural vegetation. Also, the southern slope of valley was organized gradually as vineyards (Figure 2b).



**Figure 2.** (a) The General View: Kayabağ Village and The Değirmendere Valley. (b) Natural Landscape of the Değirmendere Valley.

### 3.1.2. *Geology and climate*

Kayseri is bounded by Yozgat to the north, Sivas to the northeast, Kahramanmaraş to the east, Adana to the south, Niğde to the southwest and Nevşehir to the west. The Region where the town is located is a part of Anatolian Plateau. The region has a typical tundra climate of landlocked areas that show dramatic differences between summer and winter temperatures, and even the night and day temperatures differ enormously. This particular feature of having extreme temperature differences is important in that it leads to some mechanical decomposition in the rocks and the building stones made of the rocks.<sup>13</sup>

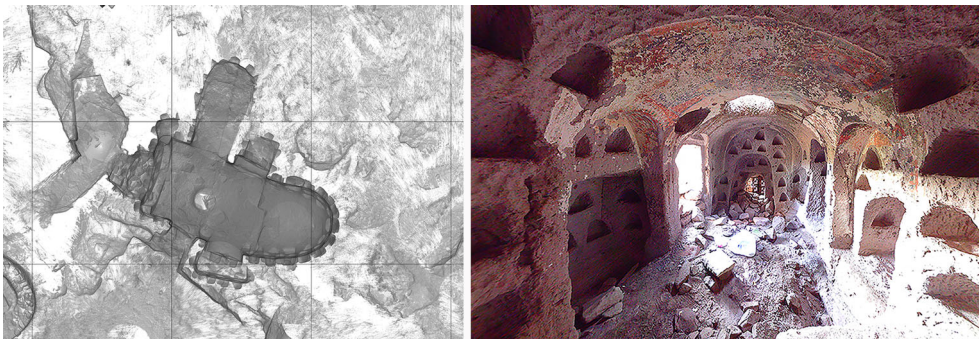
The rock-carved buildings and the buildings constructed of stones cut from the rocks dominate the traditional architecture in Kayseri and the area. Therefore, the geological formation of the region is very important. The Mount Erciyes in the south of Kayseri is a volcanic mass with a central cone at an altitude of 3916 m and is surrounded by 68 other cones of different sizes with varying diameters of 600 to 3000 m.<sup>14</sup> The pyroclastic and ignimbrites blown out of the volcano in different phases of formation were scattered all around an area which is about 100 km from the volcano. As a result, a volcanic pyroclastic layer that might get as thick as hundreds of meters at some places was formed around Nevşehir-Ürgüp-İncesu in the west, Kozaklı-Boğazlıyan in the north, Bünyan in the east and Tomarza-Develi in the south.<sup>15</sup> A number of underground settlements, caves, churches, chapels, and storage spaces, were created by carving into different volcanic layers. A big number of underground buildings were constructed in the Roman Era by Christian communities who fled the torture of polytheist Romans. Hence, the Region

played an important role in the spread of Christianity.<sup>16</sup> The field of this research, Kayabağ Village, is also a part of this historical geography. Local stone as a construction material is also used in the civilian and public buildings in Kayseri, even today. The subject of this research, the dovecotes of Kayabağ, are the buildings which were mainly constructed with same methods.

### 3.1.3. Historic significance

Dovecotes are examples of indigenous architecture in the Ottoman Period in Anatolia. They have also traces of historical stratification in Kayabağ. The remains of some underground Byzantine churches are still visible. The ruined walls of these churches are used for some of the dovecotes (Figure 3). The functions of dovecotes provide a detailed information about agricultural and commercial production, and also food culture and human life of the Ottoman Period on a local scale. Dove manure was used in agriculture because of its composition. Specifically, it was used in the cultivation of vineyard and buckthorn [*cehri*], and also, it was known that dove manure was a trade product in the Ottoman period. The cultivation of vineyard was the most important traditional agricultural production of the region, and buckthorn whose fruits were used for dyestuff in the production of silk and wool, was the one of the main trade products of the region in the Ottoman Period. Because the region had an ideal atmosphere in terms of soil structure and climate, buckthorn was cultivated because of the demand for raw materials in industry of some Western countries in the nineteenth century. The trade of buckthorn was the main source of income for the people of Kayseri at the end of the century. The importance of buckthorn in agricultural trade production was clearly understood through the international trade relations between Ottoman Empire and European countries, including England, Holland, France. For example, England established a commercial consular to control the trade of buckthorn in Kayseri. Buckthorn was harvested by locals and sold to Armenian from Tarsus and İzmir, who exported it.<sup>17</sup>

Information from interviews with local people shows that birds were also a source of food for humans. In addition, dovecotes presented the characteristic relation between human and nature in this period. They were constructed for protecting the birds from natural effects and the other animals that could harm them. Many special details of the



**Figure 3.** An underground church in the site: plan produced by 3D terrestrial laser scanner and spatial organization and the traces of frescos.

buildings were produced for the use of birds. They are also examples of the ecological sensitivity of Kayabağ in this period. The Ecological interaction between birds, Darsiya Water, vegetation of the area, the other animal population, and humans was unique in the world ecosystem.

### 3.2. Dovecotes

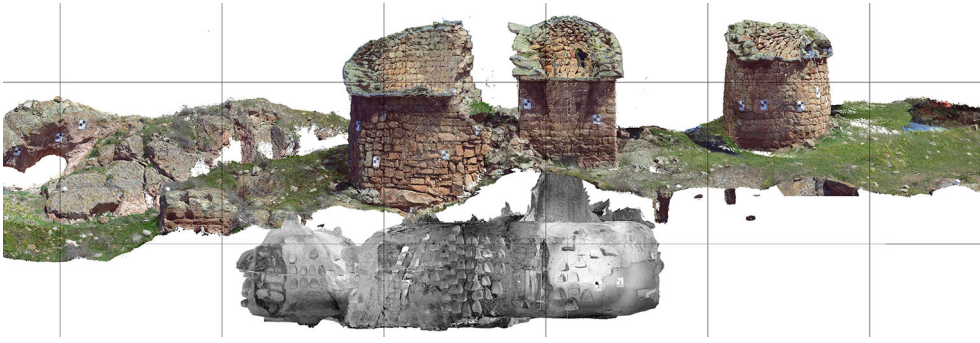
A total of 147 dovecotes in Kayabağ have been examined for this study (Figure 4). The dovecotes of the Gesi-Kayabağ region have two main parts: above the ground and the underground parts. The part above the ground is usually named as either ‘tower’ or ‘chimney’ by the researchers. The tower parts of the dovecotes can be defined in terms of conventional architectural interpretations with their defined geometrical features, construction techniques, materials and rational space definitions. On the other hand, the underground part named as ‘nest,’ which is impossible to be observed from outside, has totally different features in terms of spatial organization, practice of construction techniques, and material usage. Each dovecote is unique regarding its interaction with the ground. The same quality of uniqueness complies with the interactions among dovecotes themselves, as well (Figure 5).

Most of the architectural research on the dovecotes of Gesi are based on field studies. Field studies require observations, and they are conducted with conventional methods of manual measuring, two-dimensional drawings and photography. On the other hand, the spatial and constructional features of the dovecotes are interpreted from a rational point of view. Even though the underground part, the interaction between the upper and underground parts, and the interaction among dovecotes are underlined for their uniqueness,



**Figure 4.** Gesi-Darsiyak dovecotes: Site Plan; General view from southern west and northern east of the valley.





**Figure 5.** Aboveground and underground parts of the dovecotes produced by terrestrial laser scanner.

architectural interpretations and collected data seem rather limited, which leads to an insufficient presentation of the current information. In some studies, the dovecotes are analyzed through typical plan and section drawings<sup>18</sup>; however, in some other studies in which structural and spatial data are introduced in more detail, the interpretations are also supported with rational explanations and typologies.<sup>19</sup>

Unlike the studies mentioned above, in this study, the spatial and physical features of the dovecotes are re-analyzed through different tools of data collection. The information collected about the dovecotes through observations is supported by the use of some advanced technologies (3D terrestrial laser scanner) and is presented in detail. In addition to usage of high technology in documentation, knowledge about construction material are derived from field observations and literature research supported through laboratory analysis (Table 1).

### 3.2.1. Spatial characteristics of the dovecotes

Dovecotes are mainly composed of the parts of tower/chimney, the nest, the bird entrance, human entrance, pool, perches, and a feeding tunnel (Figure 6).

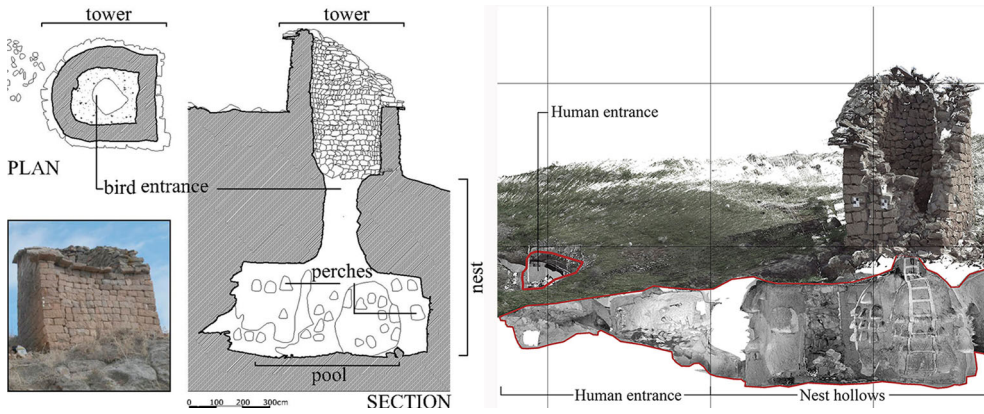
**3.2.1.1. Tower.** The upper part above the ground of Kayabağ dovecotes is the entrance for the birds. This part is built with high walls in order to protect the nests from outside factors. These parts are named as towers or chimneys in related resources.

A tower is formed as a hollow surrounded by walls. The upper parts of the walls are topped with eaves which are designed to allow birds to land. In some dovecotes, the walls end in a parallel way to the incline, and the eaves are arranged accordingly. On the other hand, in other dovecotes, the wall endings and eaves are arranged in a stepping way. The ground is basically mantle rock. In the middle of the floor is an entry hollow carved into rocks to enable the birds to enter the nest. The hollow does not fit into any particular plan geometry. Especially, the plan geometry of towers varies, which could be interpreted as a kind of parallelism with the construction techniques applied to the walls. In some dovecotes, the walls display rough-cut stone masonry, and in others the walls are built in cut-stone technique. Forty-nine examples of the dovecotes in the area display an almost-rectangular plan geometry. Yet, in the eighty-eight of the dovecotes, the walls, which form a right angle with the incline of the topography and are placed in the lower part of the incline, are plain walls, while the walls on the upper parts of the incline look rather curvilinear.

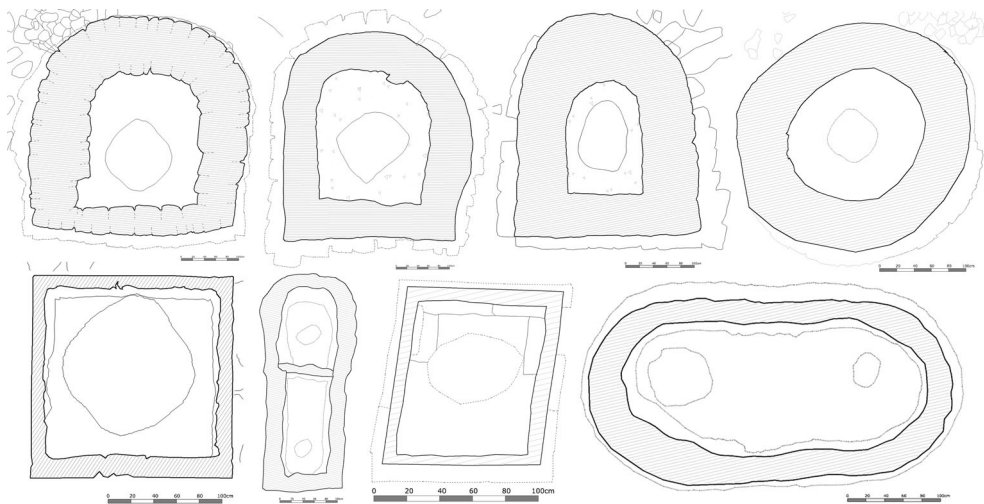
**Table 1.** Analysis results of towers of dovecotes in Kayabağ in terms of plan geometry, plan organization, wall construction technique, and types of eaves.

Definition	Number	General View [sampling]	Plan Organisation [sampling]	Wall Construction Technique [sampling]	Eaves [sampling]
the dovecotes display an almost U shape plan geometry	88				
the dovecotes, having two bird entrances, display an almost U shape plan geometry	1				
the dovecotes display an almost-circular plan geometry	8				
the dovecote, having two bird entrances, display an almost-elliptic plan geometry	1				
the dovecotes displaying an almost-rectangular plan geometry	49				

Ten of the dovecotes display an almost-circular plan geometry. All of the towers with the cut-stone work have a rectangular plan geometry (Figures 7 and 8). The material analysis of mortars shows that two different mortar compositions were used in the walls. Lime mortar was defined in the dovecote display as an almost-circular plan geometry, and lime-cement mortar was defined in the dovecote display as a rectangular plan geometry. According to the material analysis and the construction techniques, the differentiation in plan geometries can be associated with the construction period of the dovecotes. Consequently, it could be accepted that the dovecote display rectangular plan geometry was constructed in a later period. However, this information could not be verified by the interviews with local people.



**Figure 6.** Tower plan, section and general view; Section including human entrance and nest relation.



**Figure 7.** Different plan organizations of the tower of dovescotes.



**Figure 8.** Examples for the towers of dovescotes in Kayabağ: U shape plan, circular plan and rectilinear plan.



**Figure 9.** Different examples for the tower and topography relation.

Some internal hollows of tower might comply with some main geometrical definitions; while there are some non-compliant ones. For example, a dovecote with rectangular outer borders might include a hollow with more curvilinear lines. The side length of the dovecotes with a rectangular plan is between 2 and 4 m; whereas the outer diameter of the circle-like dovecotes is between 1.5 and 3 m.

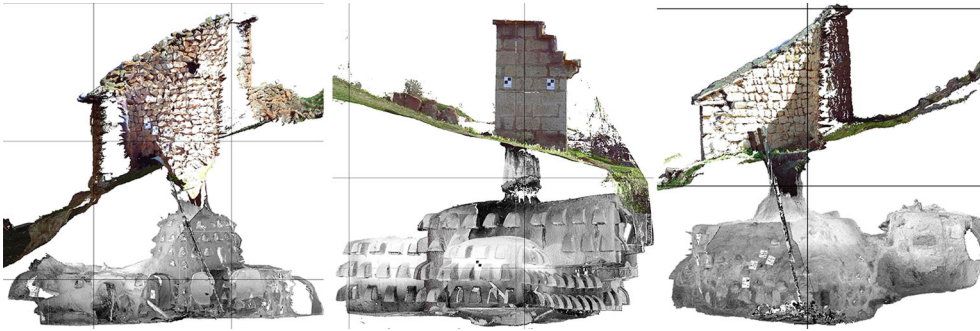
Each dovecote is constructed on either side of the valley in full compliance with the features of the topography. Therefore, the interaction between each tower and the topography is unique (Figure 9).

**3.2.1.2. Nest.** The nest is made of a hollow place or places in an amorphous form. In other words, the underground part does not have any defined geometries. While there are dovecotes with one single hollow, some dovecotes might have several. The passages between these parts are provided with the hollows of different shapes and sizes. The floors are organized according to the features of the topography, so the multi-part nests have different section interactions.

The walls of all parts of the nest accommodate perches for the birds which are formed by carving the rocks. The hollows are not arranged according to a strict plan and section organization. However, a large number of them are observed in the shape of a triangle with rounded angles, and their depth is about the right size to allow the birds to perch. There is a water pool in the floor. The hole where the water accumulates is situated right under the hollow through which the doves enter the nest. There are also feeding canals carved the nest walls. Through these canals, people can feed the birds.

There is even a human access point to the nest, but the entry is not possible through the tower part. Parallel to the inclination of the topography, there is a small tunnel connecting the nest to the outside. The entrance to the hollow is blocked with a small wooden door which would give access to the collection of bird manure as fertilizer.

The dovecotes are placed on the cliffs at intervals. The towers do not have any spatial interactions among themselves. However, there are some passages between some dovecotes in the nests (Figure 10).



**Figure 10.** Examples for nest (images produced through 3D terrestrial scanner).

### 3.2.1.3. Construction techniques and materials.

- Walls

Regarding their load-bearing systems, tower walls can be defined as a masonry structure that is traditional construction system used in the region. Even though the walls do not have a standard thickness, the rough-cut stone walls have a width of 60–100 cm. The height of the walls varies between 2.00 and 4.50 m. The width of cut stone walls is about 15 cm. Relating to local geology of the area, the stone material which is used in rough-cut and cut-stone walls is obtained from tuff rocks in the region. In the field observation, different masonry techniques have been observed. In some of the samples, the rough-cut masonry is applied to the inner and outer leaf in the same construction technique. However, in some of the dovecotes, the outer leaf has been constructed with rough-cut masonry, but the inner leaf is the rough-cut rubble masonry. The use of relatively larger-sized and better-shaped stones in the corner of the walls is common for all towers (Figures 11–13).

The nests of all dovecotes are created by carvings into the tuff rocks. The floor of the lower section is 7.00–9.00 m deep from the ground level. The hollow spaces cannot be defined in Cartesian geometries.

- Openings

The dovecotes have two openings to the outer space, one of which is the ceiling-entrance hole created through carving, which gives an access to the nest for the birds. It does not comply with any strict geometries, and its size varies. The diameter of hole is around 60–150 cm. The entrance hollows begin and continue deeper inside horizontally in an almost cylindrical form. The length varies in all dovecotes, owing to the topographical inclination. While some of them might have a length of 1.5 m, some others might have a height of 3.5 m. The entrance hollow expands gradually deeper inside, and it eventually gets linked to the nest (Figure 14).

The other opening is the one used for the human entry. These openings giving access to humans are carved into the rocks away from the tower parts. They might be seen as short tunnels, depending on the topographical inclination. The entry holes are just wide and high enough for crawling into. The entrance part of the opening is framed with a stone



**Figure 11.** Use of stone in the outer leaf of the walls.



**Figure 12.** The outer stone masonry leaf: Different applications for the edges of tower and a wall with double-leaf.



**Figure 13.** The inner stone masonry leaf: rough-cut masonry and cut stone masonry

wall. The door opening is spanned with flat stone arch. The doors are simple batten doors that consist of vertical planks (Figure 15).

- Eaves

The walls of the towers are topped with eaves. The eaves are placed in a way to indicate the end of the walls, and they also enable the birds to sunbathe. Different eaves applications are observed in the dovecotes. In the dovecotes built with rough-cut stone



**Figure 14.** Entrance hollow between tower and nest.



**Figure 15.** Relation types between tower and human entrance.

masonry, the flat-cut stones are placed on the inclined walls, and they form a console of 30–35 cm. In the front, the bordering eaves stones on the edges are placed to form a console on the final layer of the wall (Figure 16).

In the towers with cut stone masonry, flat stones are placed on the top of the walls which end in steps. While the eaves of the side and back walls are placed as a console of 15–20 cm, the applications onto the front walls differ in details (Figure 17).



**Figure 16.** Eaves in the dovetails built with rough-cut stone masonry: different applications and special details.



**Figure 17.** Eaves in the dovescotes built with cut-stone masonry: different applications.

- **Materials**

The stones used in the towers are different types of tuff rocks derived from volcanic rocks. In addition, tuff rocks are the natural materials of the nest. In a sub-category, tuff rocks are lytic, argillised and crystalized types of rocks. The evidence of structural argillisation is visible in some rocks. The features of the rocks explained here also reflect the local formation of the rocks on the landscape where the dovescotes are placed.

The laboratory analysis<sup>20</sup> on the samples collected from the joint used in the masonry and the mortar samples obtained from the walls shows similarities in the mortar components as far as the ratio of the aggregate component used in construction. These findings might be interpreted as either the applications belong to the same period or they are the later examples of the same traditional method. The mortar samples show a clay-silt combination in high amounts. It is also understood that the component of aggregate in mortar samples is found in the rocks of the region. The mortar samples are studied in two different categories for the analysis of the aggregate component. In the dovescotes with the cut-stone masonry, the combination of lime-cement is preferred, whereas in the samples obtained from other dovescotes, only lime is detected. It is also understood that in some of the dovescotes, some repair work has been done with applied cement mortar in recent years.

**3.2.1.4. Structural problems.** The dovescotes are not functional at the moment. Most of them suffer from some structural problems, owing to the lack of any comprehensive maintenance. And it seems the current deterioration will continue unless necessary precautions are taken.

The biggest structural problem witnessed in the towers is the collapse of the walls due to some external factors. In some of the dovescotes, the tower walls seem either partly or completely damaged (**Figure 18**).

The deformation and the collapse of the tower walls is to do with the damage observed on the eaves. The irregularities in the structure of the eaves and the resulting destruction caused the walls to be exposed to water, which resulted in the loss of mortar and serious damage to the wall structure.

In most of the existing walls, some structural cracks, loss of mortar, loss of stones and structural deformation are visible. On the other hand, on most of the walls, some kind of plant formation, moss and humidity-based color changes have been observed, which can be defined as a kind of biological deterioration.





**Figure 18.** Damaged dovecotes in the valley.

Another important problem observed in the walls is the unqualified repair work. In some towers, unsuitable applications that do not comply with the original masonry techniques are observed. In some other walls, cement-mortar, which is extremely detrimental to natural porous building material, has been used in repair work.<sup>21</sup>

In a large number of the dovecotes, there is serious damage in the nests. The damage is mostly caused by the external factors penetrating into the inner parts of the nest. The pool area on the nest floors and manure collection canals have become unnoticeable in many of the dovecotes. Inside the nest section of many dovecotes is a heap of rubble, or the bird entries are blocked. Some superficial and structural cracking exist on the walls. Some bird perches are partly damaged, and there are cracks and breaks around them.

The deformation in the walls of the nest is to do with the geological structure of the region. The type of the rock, the type of discontinuity, discontinuity tendency, discontinuity intervals, the duration of discontinuity, roughness of the discontinuity surface and the level of roughness, the width of cracks and fills, have an effect on the deformation of rocks. On the other hand, as tuff rocks are not durable types of rocks with a high sensibility to atmospherically factors, their durability is weakened by humidity and other natural factors such as rain, soil accumulation, frost, and sudden changes in temperature.<sup>22</sup> In addition, having a big amount of clay mineral in their formation, tuff rocks absorb water in wet seasons, and this causes the rocks to swell and get heavier (Figures 19 and 20).



**Figure 19.** Structural failures: Cracks in the walls of the towers and cracks in the walls of the nests and superficial erosion in the rocks.



**Figure 20.** Material deteriorations and unqualified repairs in the towers in the masonry walls.

In addition to the structural failures, the passages allowing the human entry to the dovecotes are blocked in many of the dovecotes. The manure collection canals leading into the nests are either filled up or destroyed.

#### 4. Evaluation and conclusion

As examples of an unusual building type in regional and global terms, the dovecotes of Kayabağ can be regarded as outstanding representatives of regional architecture as a part of world's cultural and architectural heritage. Apart from being extraordinary buildings, the dovecotes are also very important in that they provide invaluable information about daily life and commercial, cultural and social features of this particular region at that time. The heritage landscape of dovecotes of Kayabağ has an architectural and cultural composition, consisting of indigenous architecture and natural features. By analyzing the landscape of dovecotes of Kayabağ, cultural and architectural significance of dovecotes was evaluated. It was inferred that the landscape of dovecotes of Kayabağ has some problems in ensuring the sustainability of it. In solving the problems, two issues are important; sustainability of the values including buildings and natural landscape, and conservation of the process.

#### 4.1. Sustainability

##### 4.1.1. Buildings

As a result of nonfunctioning buildings and the lack of maintenance, the dovecotes have faced serious damages owing to some external factors. Nonetheless, when the entire number of the dovecotes in the region are considered, a large number of them are still in good shape to a certain extent. As a result, it is still possible to collect some sufficient and accurate knowledge regarding the conveying system, construction technique, the use of the material, spatial organization, the function, and details that the dovecotes display. This study shows that even though the structures could be structurally and spatially evaluated according to conventional definitions, the detailed examination of each dovecote reflects the fact that some of those evaluations are incomplete and might lead to inaccurate conclusions. Taking this into consideration, in this study, more reasonable and detailed information has been collected through field studies, necessary laboratory work, and literature scanning with the help of cutting-edge technology. As a result,

- As for the spatial arrangements, each dovecote is unique. Even though the tower sections could be classified for some similarities concerning plans and sections, the nest seem completely out of such classifications.
- In all of the dovecotes, the tower is built in a stone masonry technique. Some of them might display different applications depending on the construction techniques. Forty-nine examples of the dovecotes are constructed with cut-stone masonry, whereas the other examples are of rough-cut masonry. In either example, the wall-construction technique peculiar to the corners with the purpose of sealing provides the towers extra stability against external factors.
- Even though the mortar used in the construction of the tower walls and made of regional rock aggregate and high-density clay does not have a strong cementing/unifying factor, the application of the hollow grouting technique prevented the walls from the exposure to the environmental factors, and it was strong enough to stabilize the towers. However, the destruction or damage on the eaves makes the walls vulnerable to external factors and thus causes the mortar to dissolve or disappear, which leads to deformations in the wall structure.
- The nest of the dovecotes with no tower damage is expectedly undamaged. Yet, owing to some damage in the tower parts, the nest might be exposed to external factors, which might result in some structural problems. While some of the damages can be repaired, some problems like destruction of the nests cannot be solved. Although this study is not specifically focused on geological problems in the rocks, there are also natural deformations in the rocks.
- The use of materials which do not conform with the original material causes irreparable structural damages to the rocks and the building stones obtained from the rocks.

#### ***4.1.2. Natural landscape***

In the ecological interaction of the landscape, all of natural topography, vegetation, Darsiya Water and climate of the region has had determinant role. So, the conservation of the dovecotes as a part of the landscape is completely related with the sustainability of the natural cyclic interaction between natural landscape, doves, and humans. Humans actions over the natural landscape were permitted in a controlled form in the historical process. The location of the dovecotes, such as nearness to the Darsiya Water, distance from the village, and direction of dovecotes, is connected to the natural landscape. The sustainability of the landscape of dovecotes completely depends on the conservation of the natural landscape naturally.

#### ***4.2. Conservation of the heritage landscape of dovecotes of Kayabağ***

For the sustainability of the dovecotes of Kayabağ as cultural and architectural heritage, conservation issues need to be discussed because the conservation of the dovecotes is not a simple conservation of the buildings, but also it should be evaluated as part of a complex heritage process. The dovecotes of Kayabağ with natural landscape has been protected by being registered as natural and archeological site by Conservation Council of Cultural and Natural Landscape. In this decision, any kind of construction work apart from official restoration work has been prevented.<sup>23</sup> However, until last five years, any

project related the conservation, restoration, sustainability of dovecotes was not produced. Some local projects have been start to produce through the collaboration of the Ministry of Melikgazi and private sector for about five years, without the comprehensive plan including all dovecotes in the Kayseri region. There are some critical issues about the conservation of the heritage landscape of dovecotes of Kayabağ specifically:

- Conservation and sustainability of the landscape of the dovecotes of Kayabağ,
- Restoration of the dovecotes,

Under these objectives, some points which are effective in the heritage process. These are:

- Creating conservation awareness and participation in the regional, national and international platforms for the significance of the dovecotes in cultural and architectural heritage is needed.
- Encouraging corporate collaboration between the ministry, private sector, academicians, specialists in restoration projects of the dovecotes. Therefore, some constructional intervention has to be taken to prevent further damage before it is too late. Restoration projects should include the methods of high technology archiving and comprehensive field studies. As the original material, the construction technique, details can be studied in the dovecotes, it is essential that all remedial applications conform with the original technique and all non-conforming applications be removed without damaging the original structure.

The conservation and sustainability of the cultural and architectural heritage landscape of Kayabağ dovecotes in this comprehensive approach will enable the survival of cultural and architectural values of the region to the future in a local and national scale.

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