

Characteristics and Construction Techniques of Akseki Bucakalan Village Rural Dwellings

Özlem Sağırođlu

Department of Architecture, Gazi University Faculty of Architecture, Maltepe, Ankara, Turkey

ABSTRACT

Akseki Bucakalan villages are a unique type of indigenous rural settlement consisting of dwellings constructed of timber-reinforced rubble stone masonry with projecting tie-beams. The dwellings and the villages, which have preserved their authentic construction system and ritual lifestyles to this day, constitute important examples of authentic rural architecture in Anatolia. While this article includes brief descriptions of the settlements themselves and of village life, the focus here is on the construction techniques and materials used for the dwellings. The functional organization of the structures was assessed using plan schemas; then, their spatial characteristics were measured and their source materials explained. The structural elements have been discussed in terms of construction techniques, materials and organizations. The construction, material, and structural details of these authentic dwellings were collected with the goal of building a document library that the villages can preserve and hand down to future generations to aid in restoration and reconstruction work.

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Akseki; Bucakalan village; rural architecture; rural construction technique; rural heritage; stone masonry; timber

1. Introduction

The traditional Turkish house is an authentic architecture inside the borders of the Ottoman Empire that has been influential. Today, there are many examples of this building style not only inside the borders of Turkey but also in many other countries, especially Bulgaria, Greece, and the former Yugoslavia.

Many studies have been conducted on traditional Turkish houses. Some of these studies focus on typology. Asatekin divided the studies regarding the typology of traditional Turkish houses into three categories (Asatekin 2005). The first and most acknowledged typology classifies traditional Turkish houses in accordance with *piano nobile*. This classification is made according to the location of the rooms or sofa [the hall] and consists of the following four categories: without sofa, with an outer sofa, with an inner sofa, and with a centered sofa. (Eldem 1955, Eldem 1984; Erüzun 1989; Kuban 1995; Küçükerman 1973). The second typology is based on construction techniques and materials. Within this context, climate, the regional flora, and technical limitations and/or traditions affect the materials and construction technique. In this typology, traditional Turkish houses are sorted into three categories: with a rough ashlar blocking system, with a timber frame and infill system,

and with a composite system (Eriç 1979; Günay 1999; Kazmaođlu and Tanyeli 1979; Kuban 1975, 1995). The third typology is classifying traditional Turkish houses according to regional characteristics. This classification yields more productive results for determining the characteristics of rural settlements and special aspects of buildings. Among the typology studies that have been conducted within this context (Bektaş 2001; Eldem 1984; Kuban 1975, 1995; Sözen & Erüzun 1992), the most detailed study was that by Günay. In this study, traditional Turkish houses are categorized into 15 regions (Günay 1999). These regions are Marmara Region (i.e., Bursa, Edirne, and İstanbul) (Figure 1a), Black Seashores (i.e., Amasra-Trabzon) (Figure 1b), Eastern Black Sea (i.e., Trabzon-Coruh and Gumushane-Ardahan) (Figure 1c), Western Anatolia (the region between Canakkale-Balıkesir-Usak-Eđirdir-Antalya) (Figure 1d), Aegean shores and islands (i.e., Ayvalık-İzmir) (Figure 1e), Bodrum (i.e., Marmaris-Datca) (Figure 1f), Taurus plateau (i.e., Akseki-Pozanti) (Figure 1g), Mediterranean shores (i.e., Antalya-Adana) (Figure 1h), Northern Anatolia (i.e., Goynuk, Mudurnu, Safranbolu, Kastamonu, Cankırı, Corum, Yozgat, Merzifon, Amasya, and Tokat) (Figure 1i), Ankara (i.e., Ayas and Beypazarı) (Figure 1j), Central Anatolia (i.e., Konya, Akşehir,

CONTACT Özlem Sağırođlu ✉ ozlemsagiroglu@gmail.com, osagiroglu@gazi.edu.tr 📧 Gazi University, Faculty of Architecture, Department of Architecture, Maltepe, Ankara, Turkey.

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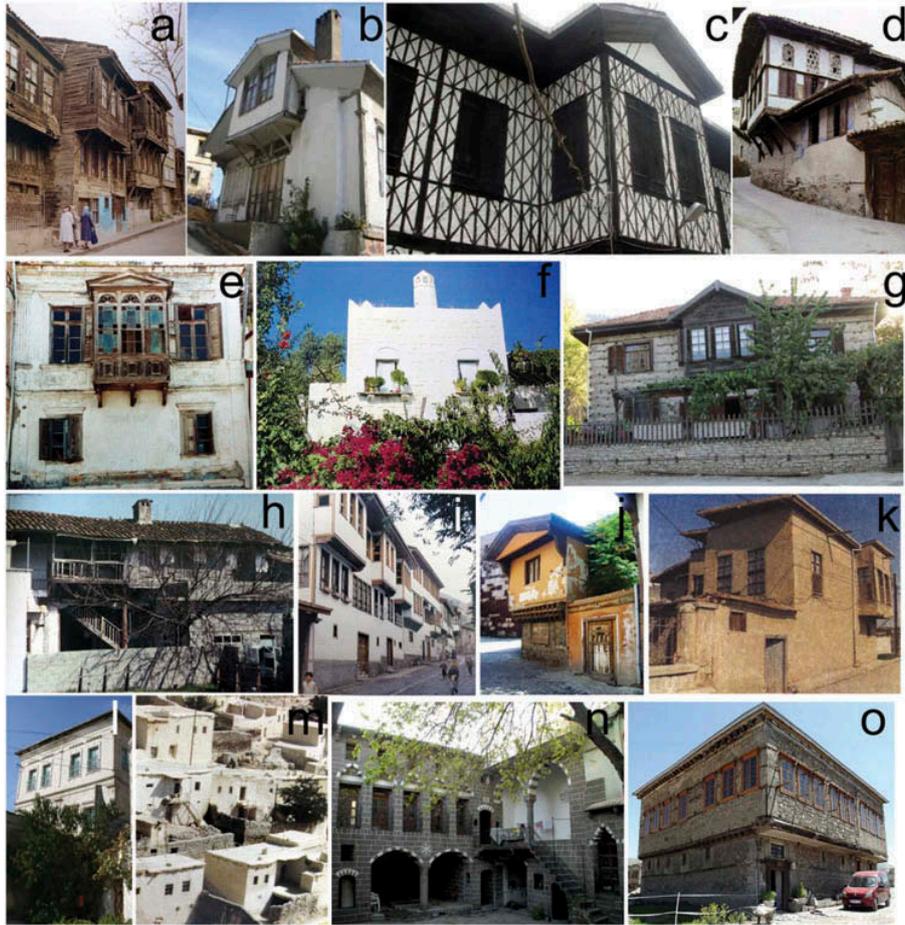


Figure 1. Examples of the houses for the typology with the regional characteristics, made by Günay (Günay 1999, 2007). © Günay 1999, 2007. Reproduced by permission of Günay. Permission to reuse must be obtained from the rightsholder.

Karaman, Ereğli, Aksaray, and Kırşehir) (Figure 1k), Kayseri (i.e., Niğde-Erzurum) (Figure 1l), East of Kayseri (i.e., Van) (Figure 1m), Southeast Anatolia (i.e., Mardin, Diyarbakır, Urfa, Gaziantep, and Antakya) (Figure 1n), and Eastern Anatolia (i.e., Erzurum-Van) (Figure 1o).

Günay states that the construction techniques and plan characteristics of the Traditional Turkish Houses in the Aegean shores and islands, Bodrum, part of Central Anatolia, Kayseri, Eastern Anatolia, Southeastern Anatolia, and the Taurus plateau, where Bucakalan village is situated, are affected by both foreign and local influences. Thus, we should address typological studies stating that cultural influences are important factors similar to climate and construction techniques (Günay 1999). For example, Aksoy states that the southern part of the East Taurus Mountains near Bucakalan village is affected by Mesopotamian culture due to its historical background and nomadic Turks (Aksoy 1963).

There are many studies on examples of traditional Turkish houses and settlements inside and outside the

country regarding special aspects (Akkoyunlu 1989; Aydın Öksüz and Sağdıç 2014; Bogojevic Kumbardzi 1998; Günay 1999; Hersek 1990; Turan and İbrahimgil 2004; Yenişehirlioğlu & Müderrisoğlu 1995), their creation and improvement (Akın 2001; Küçükerman 1995; Sözen et al. 2001), construction characteristics (Cruz et al. 2015; Günay 2007; Tayla 2007) and their preservation (Abu Al Haija 2012; Daher 1996; Esin, Aydın, and Başarık 2013; Grodach 2002; Hyland 1999; Şahin and Aksulu 2016). Some examples that include both urban and rural settlement textures were preserved inside the borders of Turkey as well as outside the country. Specifically, Safranbolu¹ and Bursa-Cumalıkızık², which are inside Turkey and are included in the UNESCO World Heritage List, are considered important. Outside Turkey, settlements such as Sarajevo (Bosnia and Herzegovina), Plovdiv, and Kjustendil (Bulgaria), Kastoria and Ambelakia (Greece), Ohrid and Bitola (Republic of Macedonia), Alexandria (Egypt), Dobrogea (Romania), and Pec

(Hungary) still offer examples of traditional Turkish houses and monumental architectural constructions. “Historic Centres of Berat and Gjirokastra” (Albania), “Natural and Cultural Heritage of the Ohrid Region” (Former Yugoslav Republic of Macedonia) and “Old Bridge Area of the Old City of Mostar” (Bosnia and Herzegovina) are included in the UNESCO World Heritage List due to their authentic textures and architectural characteristics. In addition, various studies have been conducted to preserve the a traditional textures of these settlements (Alik and Erdoğan 2016; Dapcev 1983; Dimoskva-Colovik et al. 1990; İbrahimgil, 2014; Namicev and Namiceva 2014; Pinon 2008; Polat et al. 2008; Sotirovic, 2011); there are also studies regarding the preservation of single buildings (Batur 2005; Eriç 1979; Kafesçioğlu 1949; Tunçoku et al. 2014; Özgüner 1970). The studies on single buildings concentrate on restoration, restitution, constructional analysis or reuse. Recently, resistance to earthquake and construction reinforcement have become important (Doğangün et al. 2006; Güllkan and Langenbach 2004; Hughes, 2000; Langenbach 2007; Şahin Güçhan 2007; Tobriner 2000).

However, throughout the world and in Turkey, studies regarding rural architecture are very recent and insufficient. These studies concentrate on documentation, sustainability, preservation and tourism (Davulcu 2009; Gezer 2013; Kaya et al. 2015; Konyalı and Yıldız 2007; Köşklük Kaya 2012; Şahinalp 2012). Although it offers a unique typology, traditional Turkish houses that were built with the beamed dry wall technique in the Akseki-İbradi basin in the Taurus Mountains have only few and insufficient studies. Within this context, it is appropriate to discuss master’s theses regarding single building restoration and determining authentic construction techniques and studies about ornamentation characteristics (Sarigül 2012), construction techniques, the traditions of master builders (Davulcu 2015; Günay 2008) and examples of integrating architecture with the surrounding environment (Kavas 2011). However, other than a photogrammetric documentation of a residence (Sağiroğlu 2009) and restoration suggestions for another residence (Şenocak and Sağiroğlu 2016), no other study addresses Bucakalan village, which is the subject of this article.

Bucakalan village is important because it constitutes a typology with the few villages around among Traditional Turkish Houses; contains authentic and qualified architectural examples and because it is one of the villages that maintains its traditional characteristics. It has a few authentic residences; their positioning on the land and ventilation were nourished by traditions and experiences for both winter and summer

uses. Wooden sections of the construction display delicate and authentic workmanship. Along with these residences, agriculture, husbandry, and the daily rituals of the village have also survived until today. Due to these qualities and its architectural culture, this village needs to be maintained and transferred to the next generation via preservation. However, the population of the village has decreased considerably, and the average age of the residents is high. The population has decreased due to fewer agricultural, husbandry, and employment opportunities over time; as a result, most of the residences in the village are no longer in use. The residences that have not been used have been left to deteriorate; there are also derelict residences that are unused. In the residences that are still being used, there are unqualified/nontraditional transformations with regard to architectural elements or spatial divisions.

Within the scope of this study, information about the characteristics of Bucakalan village, its houses and the construction technique used is presented; the current situation and problems for the buildings are determined and suggestions regarding the preservation of the settlement and the residences are presented.

2. Geographical characteristics and historical background of Akseki region and Bucakalan villages

Despite its location in the Mediterranean region, the climate of Akseki county is transitional between the expansive Mediterranean climate areas in the south and the continental climate in the north because of its altitude and geographic position (Çinbilgel and Gökçeoğlu 2010). The dominant wind direction is north-northeast. An oak-juniper layer is located at an altitude ranging from 1000–1200 m with clear borders above the maquis-calabrian pine belt. Junipers, a tree species that can be observed throughout Akseki county, have dominated the environment since an earlier destruction of the original forest cover. It is possible to find various species of juniper around the town of Akseki and the Belenealan, Bucakalan, Emiraşıklar, and Sarihaliller villages. While Taurus fir and cedar constitute the best-developed tree species in the region, onion-like and herbaceous plants, especially *Galanthus* (Snowdrop), are also prevalent (Çinbilgel 2010).

The Bucakalan village is located in the Akseki region, which is bordered on the east by Cilicia, near the border of Psidia, in the south and southeast by the Pamphylia civilization, and has harbored civilizations that can be traced back to ancient times. As evidenced by relics found in the Akseki settlements of Bademli, Ürünlü, Ormana, Cevizli, Gödene, Minareli, Sinanhoca,

Mahmutlu, Güzelsu and Karadere, which were founded in a mountainous region close to the headwaters of the ancient Melas (İbradı) river, Akseki has been home to human settlements since the time of ancient Greece and Rome (Enhoş 1974).

At various times, Akseki has fallen under the rule of many different groups, including the Persians after Alexander the Great's invasion in 329 BC, the Roman Empire, the Seljuks after being conquered by Alaeddin Keykubad in 1218, and the Ottoman Empire after being conquered by Mehmed the Conqueror in 1472 following the Beylik era of Karamanoğulları, Eşrefoğulları and Hamitoğulları. It has existed as a county of the Antalya province since the proclamation of the Turkish Republic in 1923 (Enhoş 1974; Kıvrım 2015).

The sparse historical documentation available about the village is insufficient to provide a clear history. The oldest document discovered that mentions the village is in the 166th book of accounts of the Anatolian provinces, named "muhasabe-i vilayet-i Anadolu". In this book, a village (it is uncertain whether this is the same village, but it is named "bucak") is shown at the same location where Bucakalan stands today (Konyalı and Yıldız 2009; Özkılınç et al. 1995). According to Özkaynak's unreferenced information, it was a district of the town of Yerle bearing the name of "Armağın bucak" in the old records (Özkaynak 1954). Information that it used to be a district of the Büyükilvat (Büyükalın) village has also been encountered (Enhoş 1974, Özkaynak 1954). Although there is information suggesting that artefacts found in the vicinity of Belenalan and Bucakalan villages are remnants of the Roman and Seljukian periods, no study carried out on this subject was found (Enhoş 1974).

Moreover, qualified dwellings have been dated to more than 200 years old, demonstrating that the settlement still existed in the Late Ottoman Era (Sağiroğlu 2009). The village is referred to as "Aşağıbucak" among the local populace (Enhoş 1974). The "alan" suffix present at the end of the names such as the Bucakalan village, the Belenalan village to the north, and the Büyükalın village to the west was added after the proclamation of the Republic by changing the "ilvat" suffix. Therefore, these three villages are referred to as the villages of the "İlvat region" among the local populace, and the Bucakalan village is also called Bucakilvat.

Starting in the 1950s, the lack of economic opportunity in the area caused rampant emigration from both the village and the entire region. Families who had been settled in the village for ages moved to İstanbul, Antalya and Akseki. Although population loss typically causes the abandoned houses to decay, the traditional architecture in rural settlements such as

Bucakalan is still well preserved. Even now, the village itself remains mostly original.

The village of Bucakalan is located at the 92nd km point along the Manavgat-Konya highway. (Figures 2a, b, c, d.) The villages of Çanakpınar, Dikmen, Büyükalın, and Belenalan are located to the east, south, west and north of the village, respectively.

The entire village of Bucakalan consists of 33 households, 11 of which are new construction made of reinforced concrete. However, 20 have preserved their authenticity, and these are concentrated in the north-northeast and south-southeast sections of the village. (Figure 2e)

The village mosque is made of reinforced concrete and was built in 1975 (Sümbül 1989). The school in the village has not been used for a long time because of a shortage of students. Students are instead educated in the village of Büyükalın and Akseki county schools.

The marketplace in the village square consists of a free field surrounded by temporary stalls constructed of timber with timber covers on top that have been placed in the form of a crescent. While it is known that the Akseki bazaar was active in this village in the past, it has partially lost its function in the modern age (Enhoş 1974). Although it is no longer in continuous year-round use, it is still activated during tours conducted in the summer, when local handicrafts, examples of timber workmanship, and regional ceramics are sold to tourists.

The Ömer Duruk Roadside Recreation and Service Facility, which is the employer of 80% of the villagers, is located along the Manavgat-Akseki highway that passes 1 km west of the village. This facility not only spurs development but has also caused unwanted changes to and degeneration of the historical texture by building new villa-type and multi-story buildings for senior employees and facilities for other employees over approximately the last 15 years. This textural effect is concentrated in the northern and western areas of the village that are closest to the facility.

3. Characteristics of Bucakalan dwellings

Bucakalan village dwellings were positioned in a garden/courtyard with one or two of their facades facing the street (Figure 2f, g, h, i, j, k, l). The timber courtyard doors are double-winged and were designed to be higher than the masonry garden wall (Figure 2m). A grape vine arbor called "iskanet" and a large oven are generally located in the garden. (Figure 2n)

The ground floors in the village dwellings were allocated to animal shelter and storage. The barns (Figure 3a (J)) were mainly specialized for goats, while the storerooms (Figure 3a (K)) open on a central space

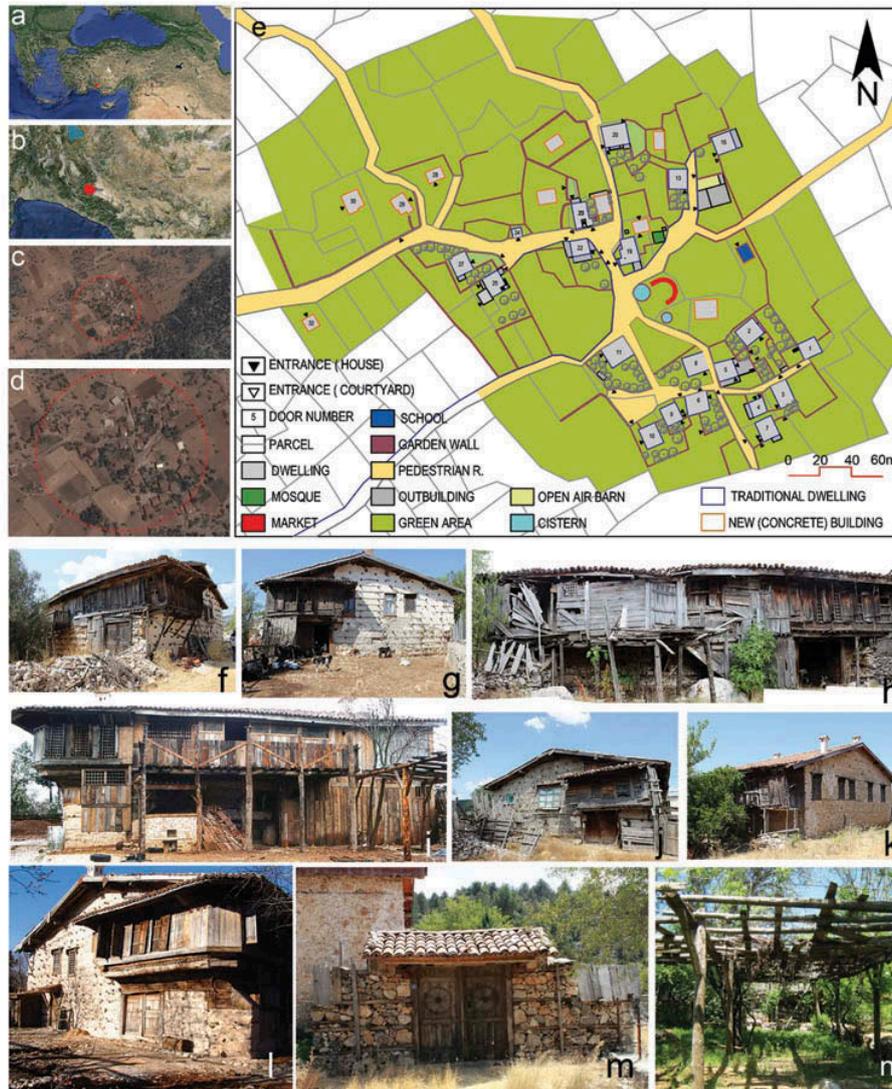


Figure 2. The location of Bucakalan village on satellite images (a,b,c,d); the land use plan(e) and examples from Bucakalan village: Rural dwellings (f,g,h,i,j,k,l), the courtyard door (m), the grapevine arbor “iskenet” (n).

called “evögün” or “ahıraltı” (Figure 3a (H)), which is a geometric projection of the common room or “sofa” (Figure 3a (A)) found on the second floor.

The upper floors of the dwellings were set up for residence by one family or multiple related families. There is a central space called a “sofa” (Figure 3a (A)) on the residence floor, which is available for all family members to use. Stairs (Figure 3a (B)) provide a connection to the ground floor. Other rooms include a bathroom (Figure 3a (D)), a balcony, named “ayazlık” (Figure 3a (E)), a hall, called “aralık” (Figure 3a (C)) which connects the ayazlık, bathroom, sofa and stairs, cellars (Figure 3a (G)) and bedrooms (Figure 3a (F)), which possess the facilities to meet all the needs of a single family.

Dwellings were designed to allow habitation by multiple elementary families. These families live together and consist of siblings or parents and married children. In this context, two types of room organizations stand out. In the first of these, the living quarters and cellar of each family are separate, and passage to the cellar is provided by a special room belonging to each family (Figure 3a; N:3, N:4). In the other organization, cellars open to the sofa because they are used collectively (Figure 3a; N:1, N:2). The sofa is a space where all members of the family come together (Figure 3a (A)). There is a cantilevered projection called “kafesönü” at one or two corners of the sofa, which is generally positioned to allow watching the

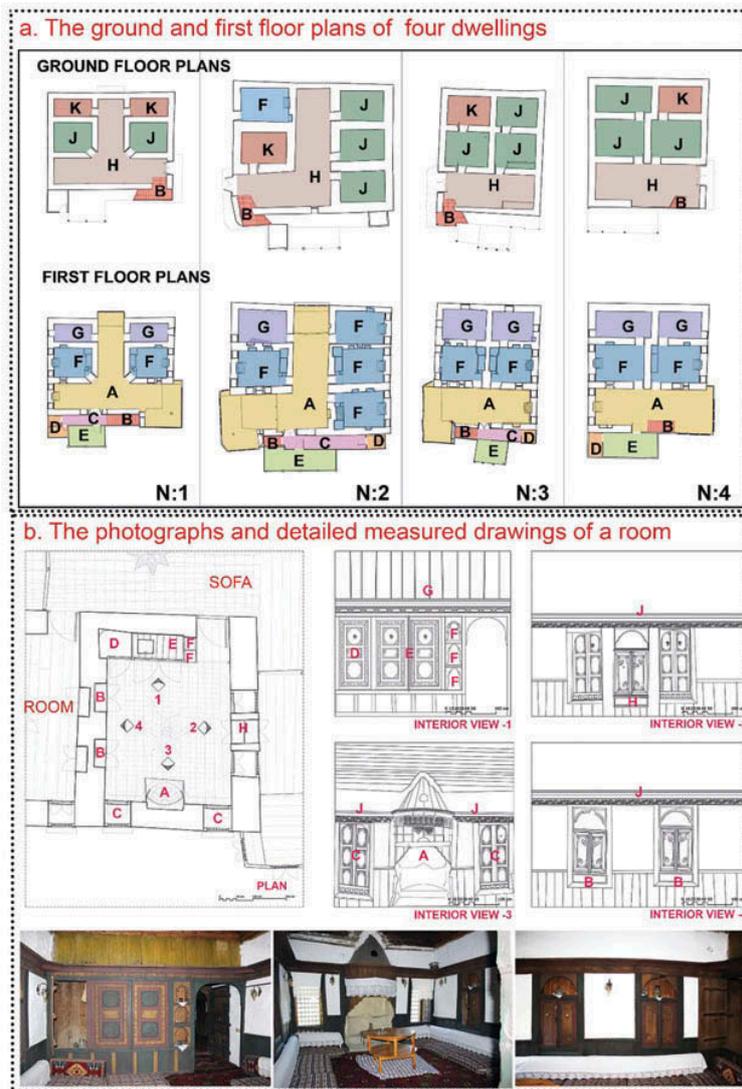


Figure 3. (a) The ground and first floor plans of four dwellings: (N:1) Ömer Duruk 1, (N:2) Ömer Duruk 2, (N:3) Mehmet Duruk and (N:4) Havva Petek. (b) The photographs and detailed measured drawings of a room in the Ömer Duruk dwelling: (A) the fireplace (“başmak”), (B) cupboards, (C) window, (D) ablution niche (“gusülhane”), (E) closet (“yükçük”), (F) the niches (“lambalık”), (G) “musandıra”, (H) inner window, (J) shelf (“terek”).

street from a seki (terrace). Meals are generally cooked collectively and eaten in the sofa. There are examples where a fireplace (“başmak”) used for both collective cooking and heating is set up at one corner of the sofa (Figure 3a; N:1,N:3,N:4). The sofa is also used as a summer room with large windows, high ceilings and interior windows opening toward the rooms or hall (“aralık”) (Asatekin 2005).

The rooms exclusive to each elementary family include a fireplace called “Başmak” (Figure 3b (A)), a main closet named “Yükçük” which provides storage for bulky objects such as bedding/quilts (Figure 3b (E)), an ablution niche (“Gusülhane”) which is used as a bathroom and constitutes

part of the closet (Figure 3b (D)), cupboards for the storage of small objects (Figure 3b (B)), niches, called “lambalık,” which were designed to hold oil/gas lamps and small belongings used daily (Figure 3b (F)), a sideboard called “musandıra,” used for storage as well as for drying fruits (Figure 3b (G)), and shelves, called “terek,” which encircle the entire room from end to end and are used to store objects that must be kept readily available (Figure 3b (J)). The ceilings of the rooms are made of superimposed wooden strips forming a pattern with a detailed wooden center-piece in the middle decorated with ornamental carving similar to other wooden structures such as windows, doors, or room elements (Figure 3b).

4. Construction techniques

4.1. The walls

The load-bearing walls of the dwellings in the village were built with a ‘timber-reinforced rubble stone masonry with projecting tie-beams’ technique (Kavas 2011). Because this is a dry-stone wall masonry technique; the rubble stones are interlocked using no mortar. Wall thickness varies from 70–90 cm. The stones used in the rubble stone wall, which are the formations of biomicrite³ (MTA, 2016), are referred to as “helik” in the region and are acquired from nearby areas (Tayla 2007). During the erection of the wall, the rubble stones are bolstered by timber bond beams (“hatıl”) and projecting tie beams (“düğme-piştuvan”) placed every 40–60 cm. This distance is called “destur” in the region and

is determined by the master builder, using his forearm as a measurement (Figure 4A). The beams are rectangular and from 7–10 cm thick. Deflection of the beams outside the wall from the incoming load is prevented with the help of projecting tie beams called “düğme-piştuvan”. These projecting tie beams can be positioned on the bottom and/or top of the bond beams. Rectangular or square buttons ranging from 7–20 cm extend along the entire width of the wall and are placed so that they protrude outside the wall for 10–20 cm, similar to a button. All these timber elements are joined by dovetails (Figure 4). The wall is formed by repeating this system constantly until it reaches the required height. Master builders have stated that they completed structures by climbing the piştuvan without erecting scaffolds.

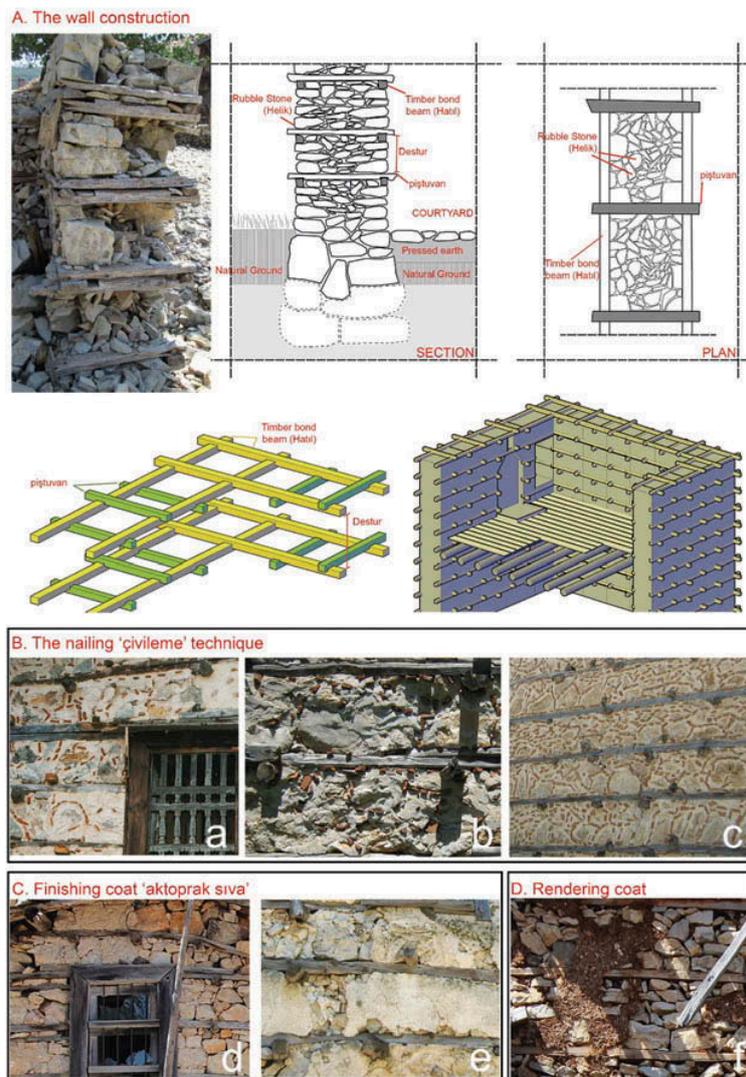


Figure 4. (A) 3D model and details of the wall construction used in the Bucakalan village; (B) examples of: (a,b,c) the nailing “çivileme” technique, (C) finishing coat “aktoprak siva” (d,e), and (D) rendering coat (f), from the Bucakalan village.

While the load-bearing walls continue on the upper floors of the dwellings, the projections, which include the hall (“aralık”), the toilet, the open projection (balcony—“ayazlık”), and kafesönü sections are built of timber. The timber elements used in these sections are also connected by dovetail joints. All the timber used in the structures was obtained from the nearby Taurus mountains. Taurus cedar (*C. Libani*), which is called “katran” locally, is the primary wood used for construction; however, wood from Taurus fir (*A. Cilicica*), Anatolian black pine (*P. Nigra*), and prickly juniper (*J. Oxycedrus*) trees can also be found in dwellings in the immediate vicinity.

The techniques described above were implemented in five different styles in Bucakalan village dwellings depending on whether single or double bond beams were used and on the positioning of the tie beams (“düğme-piştuvan”) (Figure 5). Co-usage of more than one of these techniques in the dwellings is common. A version of the technique in which tie beams are tightened by double bond beams at top and bottom was used where the load bearing walls needed strengthening, such as at corners or in the areas between windows (Figure 5, Type 2). The other versions are decided by the master builder according to the shape, condition, and stretch direction of the timber.

The external walls were left unplastered in most of the dwellings in the village, but an application of the limey plaster called “sakar siva”⁴ is present on a limited number of dwellings (Davulcu 2015). The bond beams and protruding tie beams are left uncovered during the plastering. This type of plaster is applied using a technique termed nailing (“çivileme”) in the region, which supports the plaster better and helps prevent spalling (Figure 4B. a, b, c). In this technique, small stone and tile/brick fragments are squeezed into the gaps between “helik”s so that they stick slightly out through the plastered surface, helping to enhance and ensure plaster adherence to the wall. The surfaces formed by this technique also constitute a decorative element.

A two-layered plaster application was used for the inner surfaces of walls in the village. First, a brownish coat consisting of a mix of mud, hay and sand⁵ was applied directly to the masonry (Figure 7D). After the first coat of plaster was dry, a white colored plaster composed of calcite and a mixture of fine sand and/or goat hair, called “akto-prak siva,”⁶ was applied over it (Figure 7C. d, e).

4.2. The floors

The ground floors of the dwellings in the village were allocated to animals and storage. Therefore, the floors were left as packed soil or were a combination of soil

interspersed with stones (Figure 6a, b). The floor height varies from 220–260 cm.

The second floors of the dwellings were intended as living space for the family. The timber cross girders placed on the load-bearing walls along the shortest dimension are rough-hewn, circular in cross-section, and were fashioned directly from tree trunks. Their diameter varies from 15–20 cm, and a typical floor width varies from 18–23 cm. There are approximately 40 cm gaps between the girders. These cross girders extend no less than 40 cm into the load-bearing walls (Figure 6c, d, e).

The clapboard floorboards of the upper story are placed side by side on the timber girders but are laid in the opposite direction. They are not dovetailed or lap jointed; instead, they are nailed to the cross girders below. The wooden floorboards are 1.5–2 cm thick and 15–25 cm wide (Figure 6f, g).

4.3. The stairs

The stairs that provide the connection between the ground floor used for animal shelter and storage and the upper floor reserved for living space were designed either in an “L” shape, in varying directions, or were straight, depending on whether an “aralık” exists. The short branches of the L-shaped staircases that connect to the “aralık” space were set up using 2 or 3 stone steps in the section that constitutes the common area of the ground floor, named “evögün”. The remainder of the stairway was built of timber and extends between the timber flooring that constitutes the landing and the timber flooring of the upper floor. In dwellings with no hall (“aralık”) space, the stairs were designed in a straight line and built entirely of timber. Either way, the stairs ensure easy passage between the evögün and the sofa. The stairs are supported by two notchboards: one adjacent to the wall and the other vaulted on timber columns. The distance between notchboards varies from 100–140 cm and their width varies from 25–40 cm. The length of the notchboards depends on the floor height. These notchboards are at least 10 cm thick and made of solid wood. They are constructed by cutting grooves at least 2 cm deep into the notchboards into which the step boards, called “basak”, and the timbers used as risers (Figure 7) were set.

4.4. The projections

The projections found in all of the dwellings located in the Bucakalan village are one of their most distinctive characteristics. They are positioned to either face the street or an outside view. One of these projections is semi-

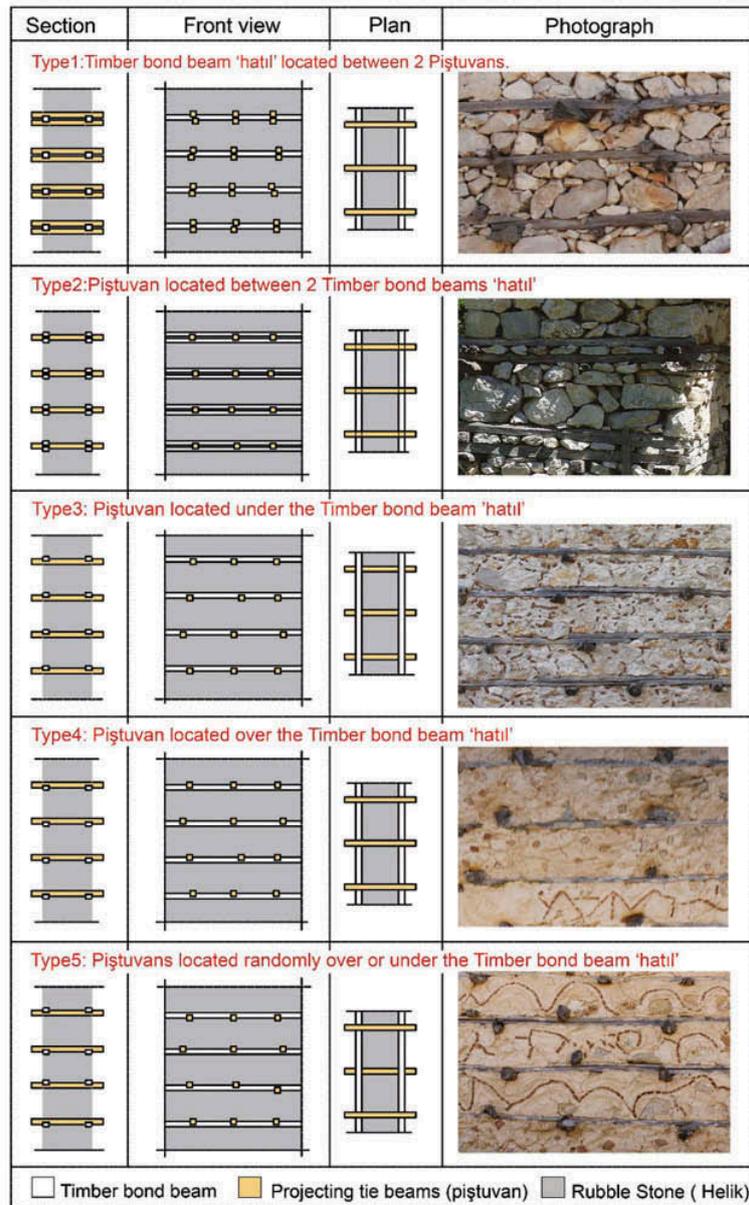


Figure 5. Types of timber-reinforced rubble stone masonry with projecting tie-beams used in Bucakalan village, according to the number and location of the beams.

enclosed, locally called a “kafeslik” or “kafesönü”, while the other is an open projection locally called an “ayazlık”.

The semi-enclosed projections (“kafesönü”) are built of wood using a method that extends one side or corner of the sofa outside the walls of the dwelling. Inside, they are elevated by 20–40 cm, a technique called “seki”, “peyke”, or “sedir” and constructed by placing girders built of rough-hewn timber 12–15 cm in diameter over the main girders. The tops of these girders are covered by wooden boards 12–15 cm in width. Cushions filled with hay are placed inside on which the residents could sit or lie down (Figure 8).

Support for these semi-closed projections is achieved by two methods. The first is simply console projections, obtained by extending the main floor girders through the wall. These semi-enclosed projections protrude outwards for a maximum of 80 cm from the ground floor’s weight-bearing wall surface. The second method used to support the semi-enclosed projections is by using knee braces that extend from the wall to the timber girders of the projection. This type of projection can protrude outwards for approximately 110–130 cm from the ground floor’s weight-bearing wall surface. The knee braces of the semi-enclosed projections built for this type were either

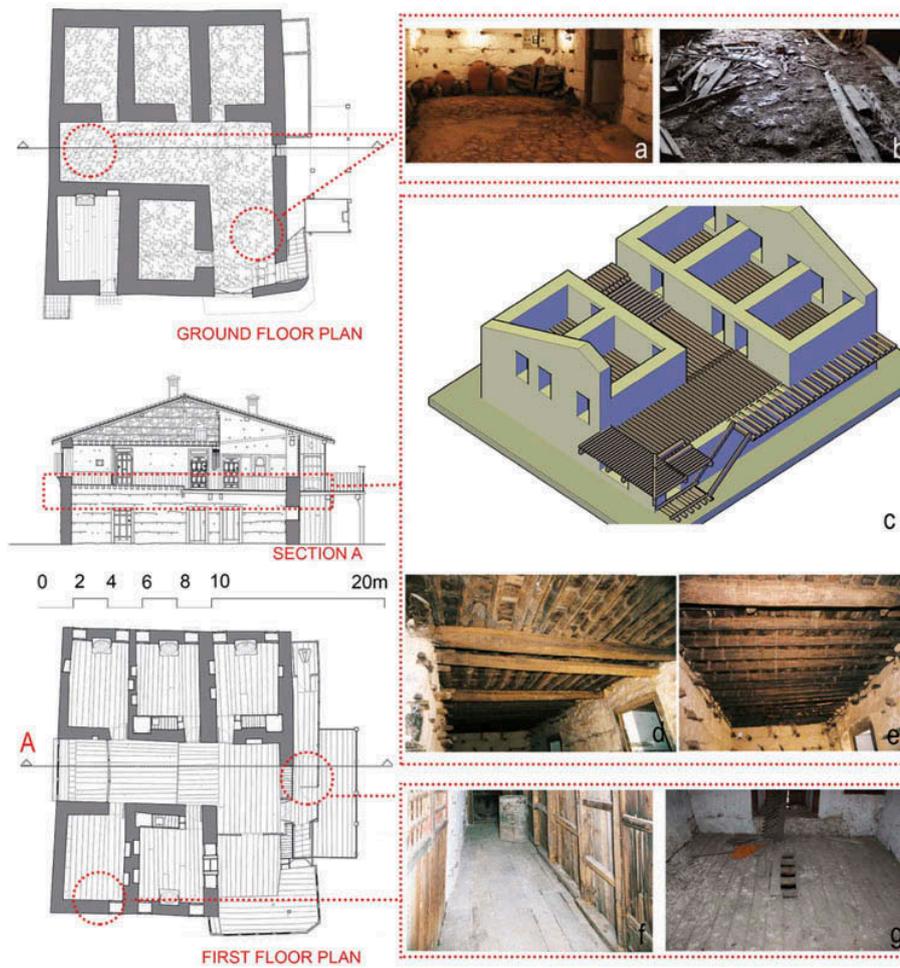


Figure 6. Detailed measured drawings and examples of: (c,d,e) timber floor construction, (a,b) ground floor covering, and (f,g) first floor covering of the Ömer Duruk Dwelling in the Bucakalan village.

left exposed or covered with lath and plaster, known as the “bagdadî” technique in Ottoman architecture.

The open projections (balconies), called “ayazlık” locally, are built with timber columns on girders extended from ayazlık or from the sofa floor. Ayazlık not only function as balconies but also as kitchens, especially in the summer. A fixed wooden platform has been observed to have been designed during the construction phase in some dwellings (Figure 9).

4.5. The top cover system

The dwellings of the Bucakalan village have gable roofs sloped in two directions (Figure 10). These roofs are built using light frame construction. Purlins, which constitute the spine of the roof, are rough-hewn tree trunks from 16–22 cm in diameter. These purlins are laid continuously on the load-bearing walls. While the distance between purlins varies, it is generally greater

than 1.5 m. The only space where purlins span a long distance without being supported by any load-bearing walls is over the sofa. In this section, buttresses were extended from the lower surfaces of the purlins every 2–3 m in the opposite direction towards the inside wall to prevent deformation of the purlins into the living space. The timbers used for the buttresses are rough-hewn tree trunks of at least the same diameter as the purlins. Rafters were placed in lines on top of the purlins at 30–70 cm intervals and function as the main supports. The rafter timbers are also made of rough-hewn tree trunks approximately 10 cm in diameter. Wooden panels, called “pardî” in the region, were fastened continuously on top of the rafters with nails. Roof tiles were then placed on top of the “pardî” timbers, generally without sheathing, and using stone or cement mortar when necessary.

Historically, the available information indicates that wooden shingles were applied rather than tiles, but the

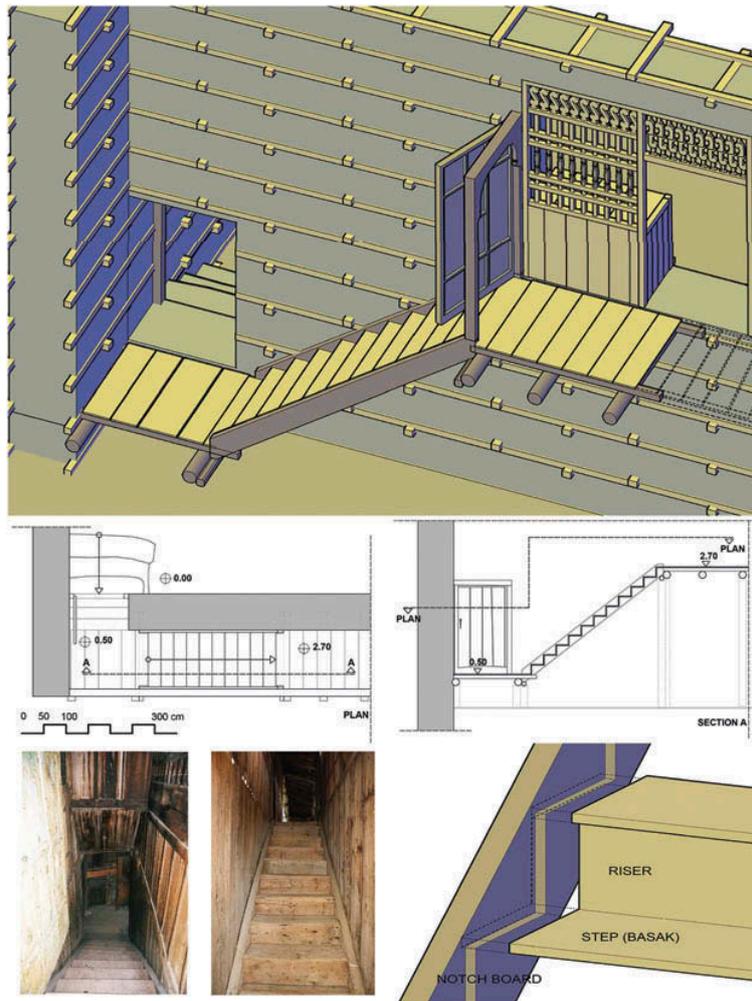


Figure 7. The measured drawings, details, photographs, and a 3D model from the stairs of Ömer Duruk’s dwelling in the Bucakalan village.

use of roof tiles became widespread after the Forest Administration issued restrictions on the use of wooden shingles.

4.6. Building elements

4.6.1. Doors

There are three different types of doors in the Bucakalan village. All the doors were made of wood, with boards fastened to each other, to load-bearing walls, or to timber poles using metal (iron) fasteners or nails.

The courtyards of the dwellings are surrounded with walls built using the timber-reinforced rubble stone masonry technique with projecting tie-beams in the same manner as the load bearing walls of the dwellings. The tops of these masonry walls are 70–100 cm wide and 100–140 cm long, 2 x 25 x

90–120 cm timbers are attached and angled side by side to extend past the wall. This part of the construction is locally known as “semerkandi” or “kuşkonmaz” (Figure 11b). This two-layered construction technique formed courtyard walls no smaller than 2 m high. Because the courtyard walls of the dwellings are too high to see over, the courtyard doors are the only visual and physical openings between the courtyards and the street at street level. These courtyard gates were double-winged and from 200–230 cm wide to allow for the passage of the animals, which are fed in the dwelling like the residents. A span or pent roof is always designed over the gate doors for inclement weather. As the courtyard wall which carries the roof was raised in the section where the door was placed, timber girders were extended from the wall approximately 1 m in both directions and a porch was constructed on them.

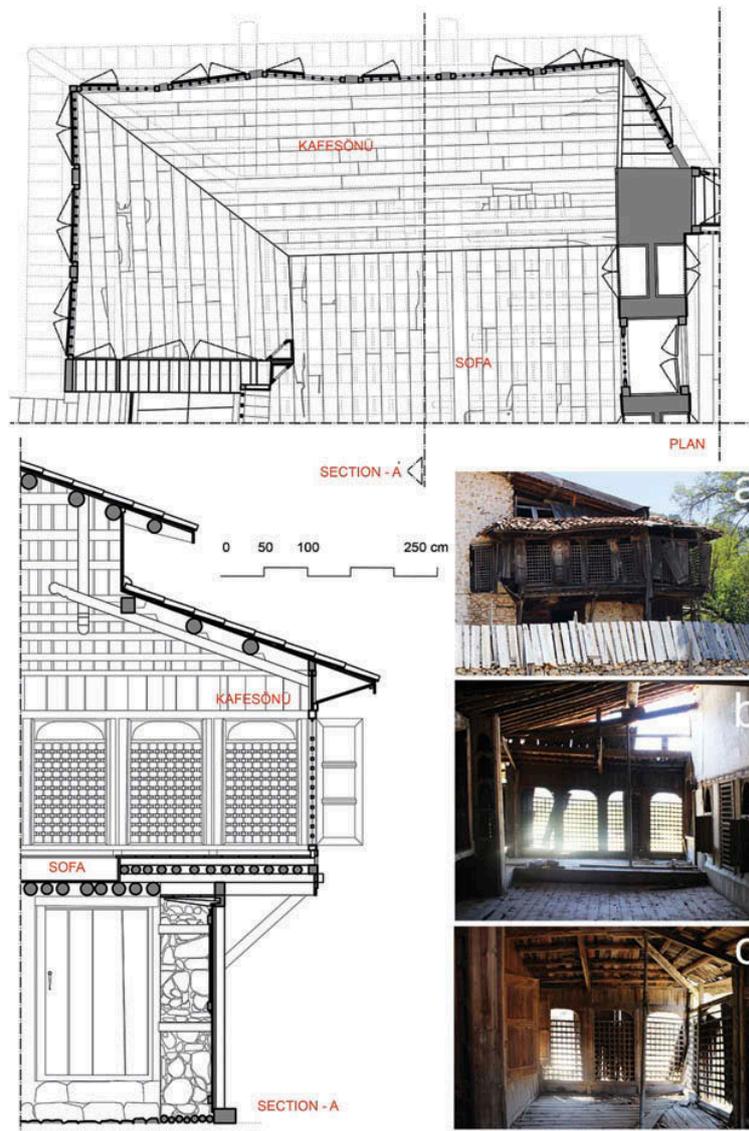


Figure 8. The detailed measured drawings and photographs of a semi-enclosed projection (“kafesönü”) of the Mehmet Duruk dwelling in the Bucakalan village.

These porches are named “borta,” which also functions as the name of the main door of the dwelling, regionally. Although the doors can be formed by combining simple wooden elements, they can also be ornamented by additional wood or metal elements.

The locking mechanism used for the courtyard door and other doors and windows of the dwellings is known in the region as “tufraz” or “traka”. The wooden parts used as locking elements in this mechanism—and which are observed only in this region—are set up on the back of the door vertically. In this locking system, a vertical wooden bar on the back of the door moves a latch over the top of the door. Moving the bar up pushes the latch upward and allows the door to open.

The latch is held in the closed position by the spring tension of the wood, preventing the door from opening. (Figure 11a).

The main entrance doors of the dwelling (“Borta”) were wide and double-winged like the courtyard gates, to allow animals to pass through them. They exhibit the same characteristics as the courtyard gate (Figure 11c).

For the animal shelters and storages on the ground floor, the interior doors of the dwelling were simple but thick and durable (Figure 12 l, m, n). The ground floor doors are quite wide despite being one-piece construction; their width varies between 120 and 140 cm. Their height is approximately 2 m. These doors were formed from a combination of timber siding at least 4 cm thick

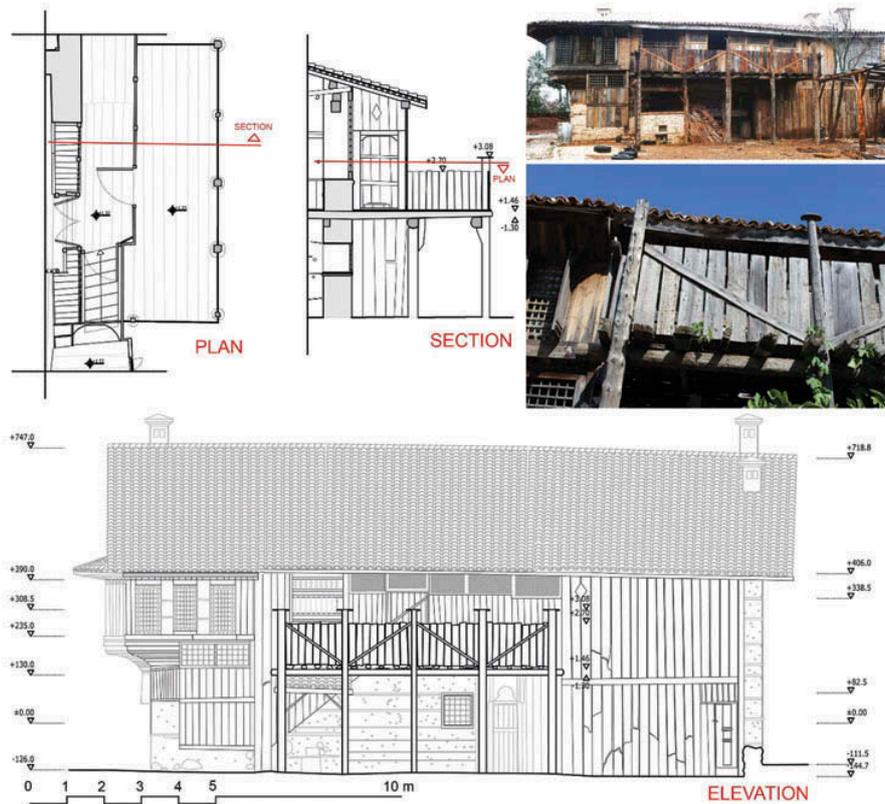


Figure 9. The detailed measured drawings and photographs of an open projection (“ayazlık”) of the Ömer Duruk dwelling in the Bucakalan village.

and 25–40 cm wide. The siding was nailed to a thick wooden panel (min. 4 cm) in at least 3 places from the back, and fastened to the door frame.

On the upper floor, where families live, the room doors constitute especially important examples of wood-working craftsmanship (Figure 12a–k). Square or rectangular flat timbers with geometric or plant patterns were used to form these doors, which were constructed by dovetailing the processed timber surfaces using tongue and groove joints. At the top, the door frame ended with a ornamented transom (“yaşmak”) with an arch below, where the door panel seated and locked. The same “traka-tufraz” system used to lock the courtyard and main doors of the dwelling was also used to lock interior doors, with slight modifications (Figure 12p).

4.6.2. Windows

The windows of Bucakalan village dwellings were all designed using a wooden grid system called “şebeke”, and shutters, called “kara kapak”; no glass was used. There are small windows (at 50 x 50–70 x 70 cm intervals) designed to ventilate the “evöğün” on the ground floors of most dwellings. Stable ventilation is achieved

using small circular cross-section ventilation pipes 15–20 cm in diameter—or simply openings that were intentionally left in the walls at sizes varying between 20 x 20 and 40 x 40 cm.

The windows of the upstairs family floor consist of two types. The first type is the “kafesönu” windows found in the semi-enclosed projection at the end of the sofa (Figure 13b). These windows are large, set within a single border that encircles the whole projection surface formed by siding on the timber walls whose thickness does not exceed 10 cm. The width of the windows varies from 70–90 cm, and their heights vary from 130–155 cm. Timber elements, generally 5–10 cm wide, were used for the window frames, while the wooden window sashes and bars were approximately 3–4 cm. Timber poles 3 cm in diameter were used to form the grids (“ahşap şebeke”), while wooden ties (“ahşap lokma”) of 4 x 4 x 4 cm in size were used on the intersections. These grids are fixed and cannot be opened. A double-sashed shutter “kara kapak” attached outside each window module could be closed to keep bad weather out. The shutters were built of wood like all the other construction materials of the

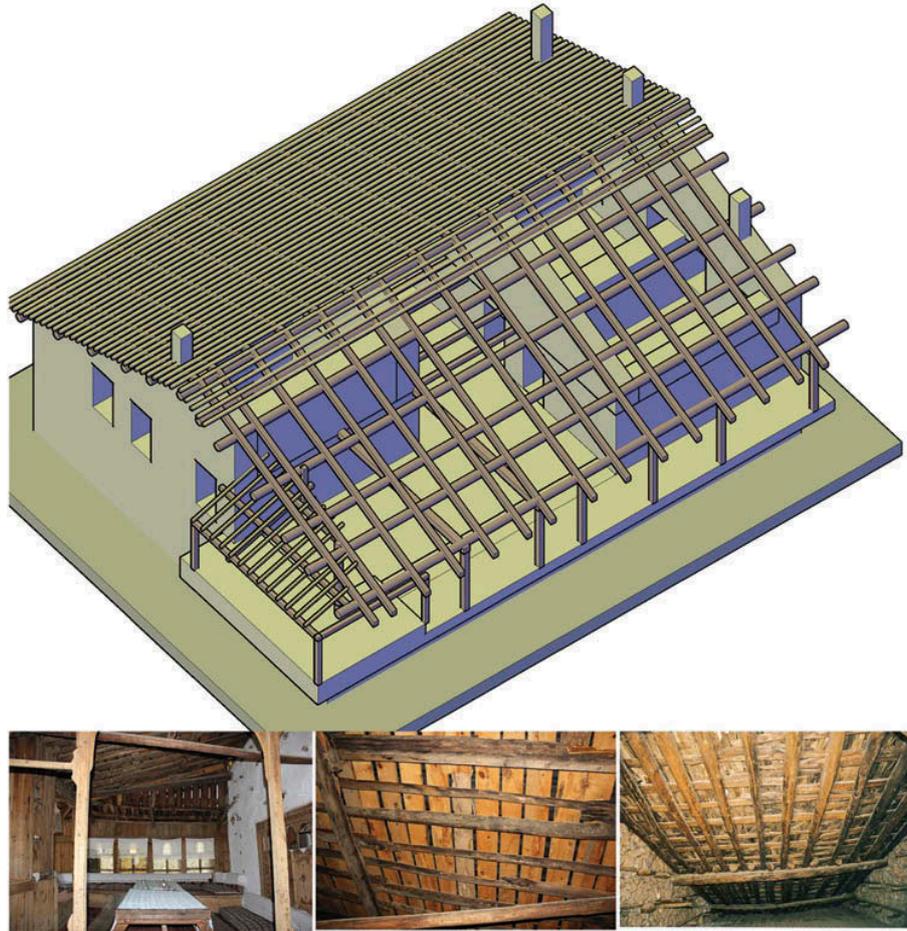


Figure 10. A 3D model and photographs of the roofing system of the Ömer Duruk dwelling in the Bucakalan village.

semi-enclosed projection and window and were formed by boards 2–3 cm thick and 15–20 cm wide. The shutters were fastened to horizontal wood backing with iron nails. Opening and closing the shutters from the interior is accomplished with metal fasteners.

The windows in the rooms were designed so each room would have two, placed to the right and left side of the fireplace, or “başmak” (Figure 13a); however, rooms without an oven and cellars have only one window positioned in the middle of the shorter outside wall, where the oven is located in other rooms. Cellar windows were designed with a single pane, and exhibit the same characteristics as the windows in the semi-closed projections—consisting of the grid and shutters placed on the outer surface of the window opening. The windows of other rooms were designed with double panes, as if they were cupboards. The sections that constitute the surface of the panes is a wooden grid as well.

The grid itself is formed by combinations of very different units that generate a wide variety of geometric

patterns. Because different grids are used in different dwellings, the windows in any given dwelling also function as ornamental elements on the facade. The frame is 15–16 cm thick at the window ledge. An entablature was designed over each window to protect it from weather. The inward-facing sides of the windows have decorated wooden doors that open and close outward, toward the grid. In front of these doors, a short safety rail prevents the doors from opening toward the inside of the rooms. The wall between the elements situated at the inner and outer boundary of the window openings was paneled with 2 cm thick clapboards of various heights and widths; in other words, they block any view of the interior wall construction from inside the window opening.

4.6.3. Closets/cupboards

All the spaces located on the living floors of the dwellings in the Bucakalan village feature closets and cupboards of different sizes that varied in design from

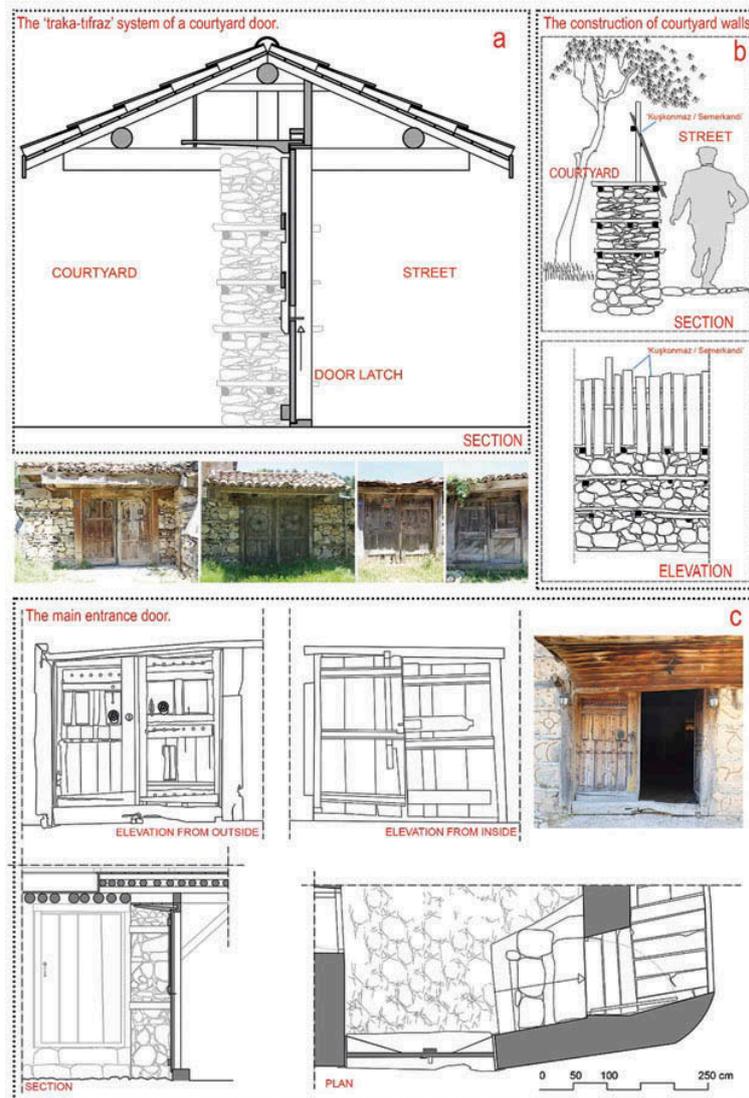


Figure 11. A measured drawing of the “traka—tifraz” system (a), construction of courtyard walls (b), and examples of courtyard doors and an example of a main door (c) in the Bucakalan village.

open, to semi-enclosed, or fully closed, and were intended for different functions. These can be divided into two groups: closets (“yüklük”), one each in the rooms designed for fundamental families, and single small cupboards (Figure 14 a, b, c).

The closets (“yüklük”) are designed on the short wall and extend from the doorway to cover the entire wall (Figure 14a, b). Although the number of modules a closet contains depends on the size of the wall, it always functions as the main closet for bedding/quilts and has an ablution niche (“gusülhane”), niches for lamps or other small things (“lambalık”), and a sideboard (“musandırâ”). The “gusülhane” is always located as far as possible from the door, at one end of the closet,

and may be expanded towards the wall as well as being designed in a quadratic or rectangular shape. Its minimum dimensions allowed for one person to bathe while sitting. These dimensions vary between 70 cm and 110 cm in width, and 200 cm or more in height. The base of the “gusülhane” is generally elevated from the floor by timber girders and poles, and sheathed with 2–3 cm thick and 15–20 cm wide wooden clapboards. In some cases, the surface of these boards have been observed to be plastered, using a type of plaster known locally as “aktoprak siva”. The walls of the “gusülhane” are generally covered with clapboards as well. Entry is provided by a single-paneled door. There is no lighting or running water in the bathing cubicle. When water is

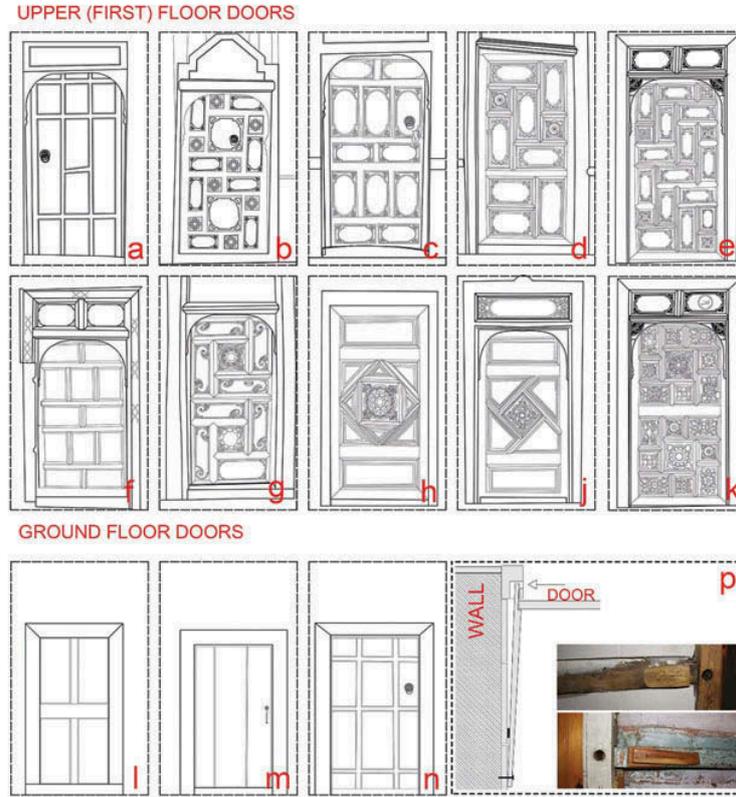


Figure 12. The typology of the second floor doors (a,b,c,d,e,f,g,h,j,k), ground floor doors (l,m,n), and the “traka-tıfraz” system used on interior doors (p) in the Bucakalan village.

needed, it is heated in the fireplace (“başmak”) and carried over. Dirty water runs to the dirt floor of the barn via a drain at the bottom of the cupboard toward the barn.

The second section, placed next to the “güsülhane”, is a wide, double-winged “yükçük” elevated approximately 40–50 cm above the floor. The bedding and quilts belonging to the family are stored in the upper part of this section. The beds, which are made up at night after having been removed from this closet, are stripped in the morning and stored during the day. Wooden poles and girders tied together were used to elevate the cupboard above the floor. The top of this construction was covered with 2–3 cm thick and 15–20 cm wide fine-hewn timbers that exhibit the same characteristics as the timbers used in sheathing. A special cover providing access to the lower part of the cupboard was built into this section, which constitutes the base of the cupboard. This lower section can be accessed only by opening the cover, and it is here that the family keeps their valuable objects. In some cases, access has been observed to be controlled with a lock.

The niches (“lambalık”) were designed to hold the oil lamps used as lighting elements and other small

objects, and are always present on one or both sides of the closet. A “lambalık” section is composed of three consecutive niches without any door or lid. There is an ornamented “yaşmak” board in front of the shelves in this section, which is from 20–50 cm deep.

The top of the closet is named “musandıra” and is generally used for drying fruit or storing objects. There are pitched-faced timber girders of 10–12 cm in diameter between the closet and the “musandıra”, at the level of the door frame. These timber girders stretch from wall to wall. In some cases, they have been observed to be reinforced with timber poles inside the cupboard to increase their load-bearing capacity. The tops and bottoms of the girders are covered with 2–3 cm thick clapboards fastened to the girders with nails to form shelves. The sideboard section, which reaches to the ceiling, has no cover. A safety rail was placed at cupboard level to prevent objects from falling into the room. This timber safety rail was of carved wood similar to the entire closet and varies in height between 10 and 80 cm. The carving shows elements with various details.

The part of the cupboard next to the door functions to form a short hallway called “sekialtı-pabuçluk” and

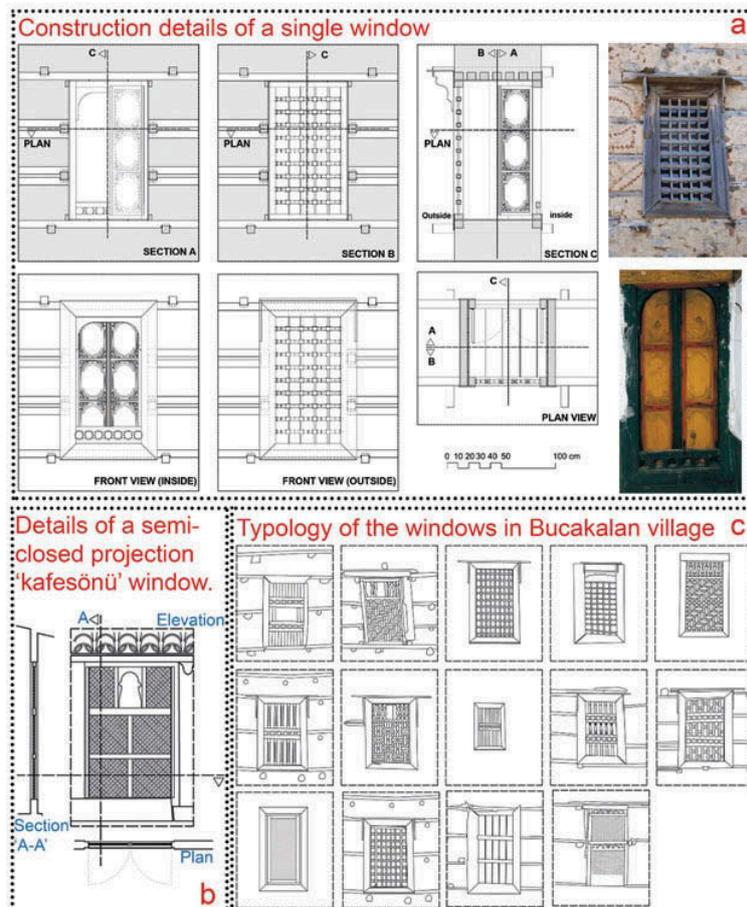


Figure 13. Construction details of a single window: (a) details of a semi-closed projection (“kafesönü”) window (b), and typology of the windows (c) in the Bucakalan village.

defines the entrance of the room. This section is occasionally designed to be somewhat lower than the elevation of the room. The section that ends at the level of the cupboard doors is finished with lampstands on one side and an arch defined by a bent wooden pole on the other. The lower surfaces of the timber girders that separate the sideboard section of the cupboard from the lower section are decorated with the same techniques used on the ceiling.

The single small cupboards in the dwellings could be designed with covers, without covers, or a combination (one part with a door or lid, and one part without). These appear in every section of the dwelling, wherever they are needed. The depth of these cupboards varies depending on the wall thickness, and the dimensions vary depending on personal preferences (Figure 14c).

4.6.4. The fireplace—“başmak”

Fireplaces, or “başmak”, are located in all the rooms on the living floors of the dwellings in the Bucakalan

village except in the cellar and sofa of some dwellings (Figure 14d). When present, the fireplace in the sofa is situated on the wall across from the “kafesönü”. The fireplaces (“başmak”) in other rooms are situated on an outside wall between the two windows. The section at the lower part of the “başmak” where the fire is lit is called an ash-pan, or “küllük”. The inner surface of the “küllük” is thickly plastered (4–5 cm) with “aktoprak sıva”. Clapboards continue below the plaster and connect to the main floorboards. The “küllük” was designed as a square or rectangle and extended into the room for approximately 70–110 cm. Its width can vary from 100–130 cm—the same as the width of the fireplace. The point where the “küllük” connects to the room floorboards was delimited by a wooden or natural stone plaque of max. 10 cm in height to prevent the scattering of ashes.

A more spacious area was provided by thinning the wall where the fireplace “başmak” was built by



Figure 14. Construction details (a) and examples (b) of closet “yüklük”; the typology of cupboards (c) and measured drawings and examples (d) of a fireplace (“başmak”) in the Bucakalan village.

approximately 20 cm for the width of the “küllük” until the start of the chimney roof. This section constitutes a chimney shaft by narrowing from two sides to the point where the chimney roof begins, reaching measurements of 20 x 20 cm at their narrowest point. The sides of the chimney were thickly plastered with an indentation built toward the interior space which prevent the heat from reaching the beams and piştuvan on the walls.

The hoods of the fireplace “başmak” are formed by 3–4 cm thick wooden siding placed to create an arch. The radius of the arch varies between 60–80 cm. This section continues smoothly until it reaches shelf (“terek”) height, and ends when it reaches the ceiling by being molded into a pyramidal shape. The pyramidal section is generally plastered. While the surfaces of the hoods used in the fireplaces (“başmak”) can be plain, they can also be engraved with floral rosettes.

4.6.5. The ceilings

The ceilings in all dwellings of Bucakalan were mounted on rough-hewn timber girders stretched from wall to wall with nails, using, 20 cm wide and 3–4 cm thick timber boards running the opposite direction of the girders. These are first fastened under the girders, and then 2 cm wide and 1–1.5 cm thick timber lathings are nailed to the junction points of these boards. By nailing shorter lathings in the opposite direction, the lathings form decorative squares of 20 x 20 cm (Figure 15b, c, d). A star-patterned wooden centerpiece with 6 or 8 points is mounted in the middle of most ceilings (Figure 15a). While this centerpiece can be flat, it can also be engraved with plantal or geometric patterns. A few square or square-shaped timber centerpieces were also attached to the ceilings in addition to the star-patterned centerpiece. Circular

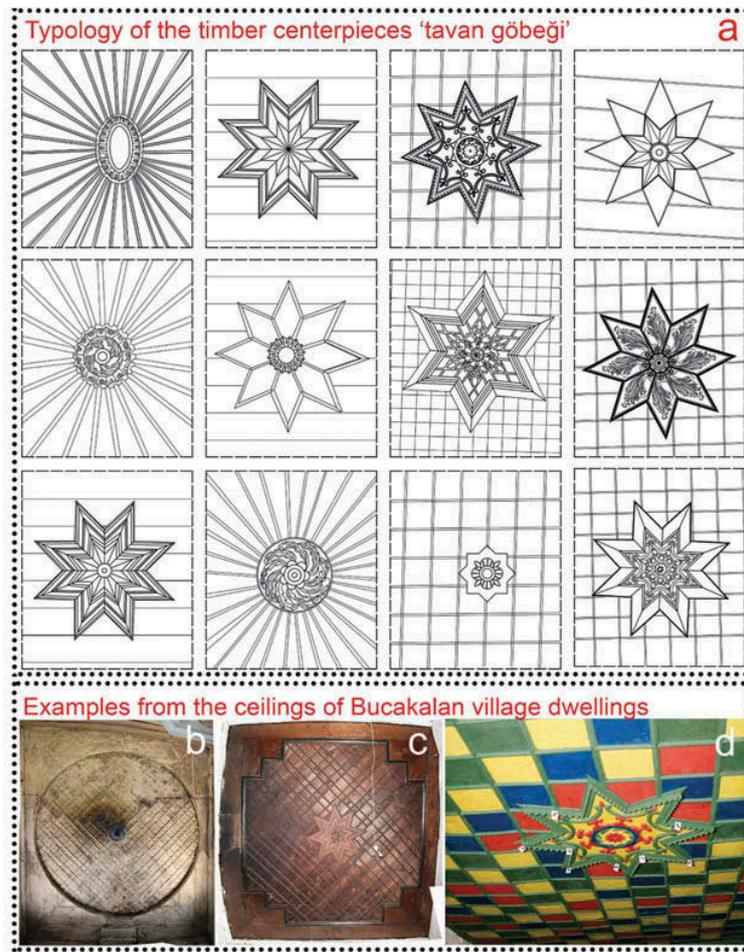


Figure 15. The typology of timber centerpieces (“tavan göbeği”) and examples of ceilings from the Bucakalan Village.

centerpieces were generally applied to similarly round ceilings. The wooden lathings used on ceilings of this type are arranged to look like beams of light emanating from the centerpiece in the middle of the room to the edges. These centerpieces contain remarkable wood workmanship. There is usually a wooden pomegranate, the symbol of abundance and blessing, at their centers.

5. Conditions and problems of the buildings today

The authentic settlement texture and the authentic texture of the houses in Bucakalan village have mostly survived to today. However, there are important problems with regard to both the texture and the construction. These are as follows.

- (1) Bucakalan village is the closest settlement to Manavgat-Konya highway and Ömer Duruk Facility on this road. Therefore, the authentic

settlement texture has started to degenerate due to the lodgings built recently on the southwest border of the village. Because the village was declared an urban protected site after the construction of these lodgings, the authentic texture has started to be surrounded with new buildings, and the homogeneity of the texture has started to degenerate (Figure 16a, b).

- (2) Most of the traditional residences inside the village are not used. The residents of Bucakalan village, similar to those from the other forest villages, have been migrating. In addition to the lack of employment opportunities in the village and the surrounding districts, the reasons for this migration include insufficient agricultural areas, insufficient irrigation, and drinking water problems.
- (3) Some of the traditional houses in the village have experiences structural and material deterioration. Especially in the derelict houses, this

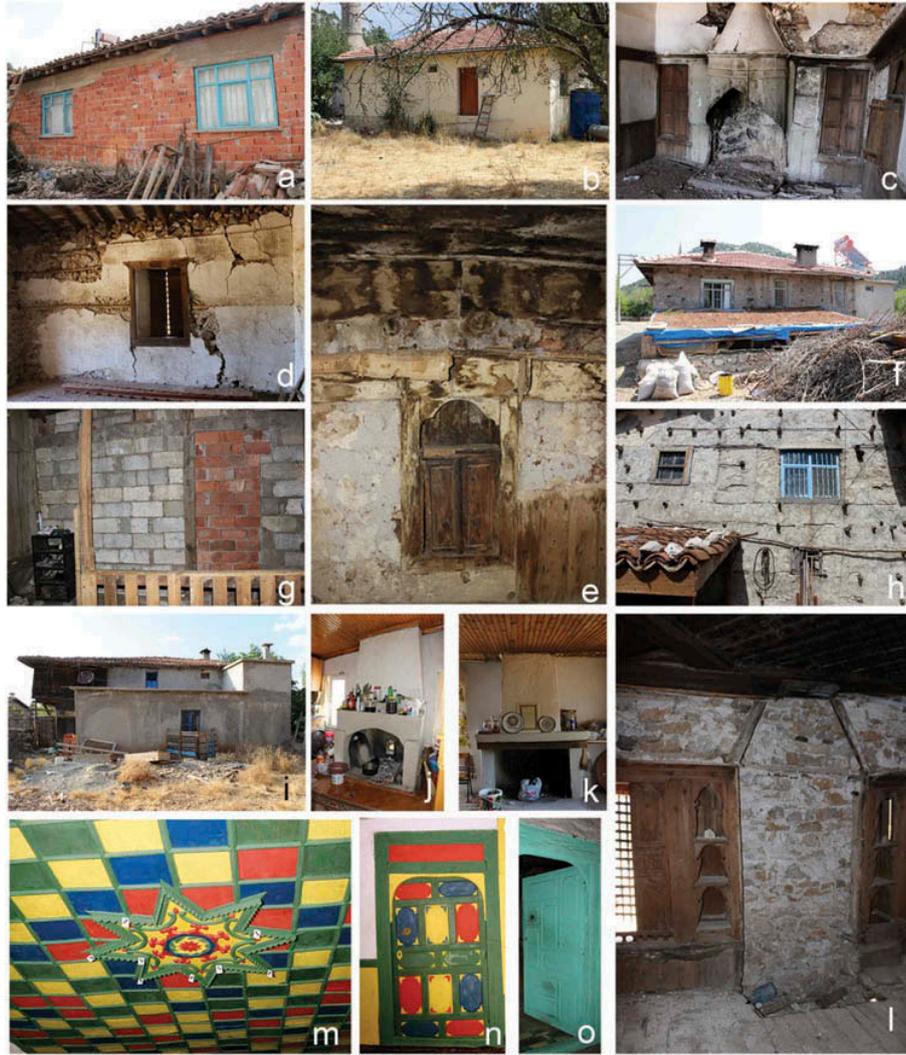


Figure 16. Examples from the problems of the village and the dwellings.

deterioration is a serious problem (Figure 16c, d, e). In addition to dereliction, various treatments can cause a loss of authentic characteristics. These treatments include repairing buildings with unsuitable construction materials (Figure 16f, g, h), unqualified spatial and material additions (Figure 16i, j, k, m, n, o) and destroying authentic elements and spaces that are unused (Figure 16l).

- (4) Some of the authentic streets that constitute the texture of the settlement have been protected to today. However, most of the streets are covered with asphalt and are not authentic.
- (5) The garden walls are authentic to Akseki-İbradı basin and were built with wooden screens over dry walls; in this region, they are called “kuşkonmaz” or “semerkandi”. These walls that

have become integrated with the authentic buildings contribute to the urban texture. However, some of the walls were destroyed and were replaced over time with concrete walls using unqualified materials.

6. Conclusion

The dwellings of the Bucakalan village constitute important and unique examples of rural architecture in their arrangement, the relationship between the ground floor and living floor, rooms equipped for fundamental families to live, sofas for social life, and construction elements that contain important elements including detailed wood workmanship and unique construction techniques. However, the villagers are emigrating to nearby provinces

and counties due to such factors as lack of water facilities, the lack of employment opportunities and continual loss of pasture land. The people who continue to live in the village despite this emigration are quite old and cannot maintain the dwellings. Thus, the buildings show a loss of architectural elements, deep structural cracks, or partial decay. Very few masters know the authentic construction techniques and are able to apply this technique. In addition to the difficulty of finding master builders and authentic construction materials, the prohibitive cost of these materials results in the use of nontraditional materials or elements during the repair and implementation of temporary solutions. Moreover, spatial divisions or additions due to the current daily rituals and comfort conditions and the abolition of architectural elements or the transformation or modification of them using nontraditional or unsuitable materials are other practices that degrade the authenticity of the buildings.

To preserve these dwellings, which daily are becoming more run-down—many verging on collapse—it is of the utmost importance to provide the funding required to make repairs, take steps toward ongoing preservation, and thus be able to pass these dwellings along to future generations.

Notes

1. It was registered in its entirety as a “museum village” in 1997 by the Ministry of Culture of Turkey.
2. It was placed on the “UNESCO Natural and Cultural Heritage” list under the name of “Bursa and cumalıkızık: the birth of the ottoman empire” and was registered in its entirety as a “museum village” by the Ministry of Culture of Turkey.
3. The qualitative Mineralogic-Petrographic Analysis report states that the “helik” rubble stones are biomicrite rocks (MTA, 2016). (Main components: Allocems (fossil shells, pellets, and intraclasts) and cement; Fossil Shells: Medium-fine grained, the cavities were filled with micrite and sparite carbonate minerals; Pellets: Fine-grained, spherical-oval shaped micrite formations; Intraclasts: Fine-grained and irregular-shaped micrite formations; Cement: Formed of micrite (cryptocrystalline) carbonate minerals.)
4. The Standard Qualitative Mineral analysis by X-ray diffraction (XRD) states that the external wall plaster includes calcite and some quartz (MTA, 2016).
5. The proportion of hay, mud, and sand was determined to be 33% by the construction master Hüseyin Kurtel.
6. During an oral interview with Bucakalan village mukhtar and construction master Hüseyin Kurtel in 2016, it was found that the ingredients of *aktoprak* plaster were calcareous soil, water, and goat hair when necessary. There were no goat hairs in the samples of the inner wall plaster in the derelict houses in Bucakalan village. Therefore, the Standard Qualitative Mineral analysis by X-ray diffraction (XRD) states that “*aktoprak* plaster”—the internal wall plaster—includes calcite and some calcite (MTA,

2016). However, it was visually observed that there is goat hair inside the *aktoprak* wall plaster in some of the houses for which a permit was not able to be obtained for taking samples.

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