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Research paper

TIMBER VERNACULAR HERITAGE IN DANGER - FROM THE BORDERLINE OF BULGARIA AND SERBIA

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Abstract

The built heritage of the rural areas of the Balkans is characterized by decades of neglect, which developed as a consequence of the abandonment of rural areas, strong urbanization of cities, emigration of residents, and low birth rates. Most of the built heritage fund consists of residential and auxiliary buildings dating from the 19th and 20th centuries, in timber construction with infill made of wicker, mud, and straw. These buildings were built with one or two above-ground floors, with or without verandas, using traditional building principles and natural materials. Today, most buildings are abandoned, their roofs partially or completely collapsed, and parts of the structure and façade damaged. Further deterioration of these buildings increases the risk of complete collapse, jeopardising the record of the development of vernacular architecture in these areas. This paper examines the vernacular timber heritage of the border zone between Bulgaria and Serbia in the rural area of the Stara Planina ('Old Mountain') National Park region. The research is based on a comparative analysis of houses from Bulgaria, in the villages of Stakevtsi and Chuprene, and from Serbia, in the villages of Senokos and Boljev Dol, considering several indicators according to which they can be evaluated as significant examples of vernacular built heritage. Selected examples at risk of decay will be compared from the perspective of the functional plan layout, methods of construction, façade design and decoration.

Key words: Built heritage, Vernacular architecture, Endangered timber heritage, Bulgaria, Serbia

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1. INTRODUCTION

Since the mid-20th century, rural areas of the Balkans have faced numerous challenges. These challenges, initially caused by the rapid industrialisation of urban areas and a decline in agricultural activities [1], has led to an ongoing pattern of rural-to-urban migration. Unlike many developed European countries currently experiencing a trend of rural resettlement, many such regions in the Balkans remain marginalised [2].

The depopulation of villages results in an erosion of their ambience, ecological integrity and built heritage, and has particularly affected villages in mountainous and border rural areas due to high outward immigration and low birth rates [3]. Bulgarian census data indicate that areas most vulnerable to this process lie in the northwestern part of the country along the border with Serbia [4], whilst Serbia's most underdeveloped rural areas are found in its southeastern region [5]. The Bulgaria-Serbia border region includes part of the Old Mountain National Park, where preserved 19th-20th century vernacular architecture, built with local materials and traditional techniques [6] now faces abandonment and decay – posing a serious threat of permanent loss to the identity of the Balkan Mountain region and its authentic architecture.

This research reports the presents results from the project "Vernacular housing compounds along the borderline of Bulgaria and Serbia in the Western Balkan mountain - documenting endangered wooden buildings and related oral stories“ (part of Oxford Brooks University’s Endangered Wooden Architecture Programme). Our team used conventional hand-measuring building surveys in combination combined with 3d scanning, drones, and photographic recordings. Construction details were hand sketched on site with plans, sections, elevations and 3D animations created using CAD. Interviews with residents discussed house occupancy, building rituals, and construction traditions. Houses were selected for surveying based on minimal alteration, specific typologies, notable architectural details and access granted by the owner. The selection criteria for recorded houses were based on the minimal transformation of the building forms, particular house typologies, interesting architectural details and access granted by the owners.

This paper examines heritage at risk by comparing timber vernacular architecture in villages on both sides of the Bulgaria- Serbian border, north and south of the western Balkan Mountain. The primary research, conducted in the villages of Chuprene and Stakevtsi in Bulgaria, and Boljev Dol, Kamenica and Senokos in Serbia, analyses house location, layout, construction, facade design and decoration. Place names are transliterated from Cyrillic to Latin as per standard conventions of each country.

Approximately 20 houses were observed in each location, but only a limited number of housing compounds were studied in greater depth. Surveyed buildings include: Chuprene – 3 houses and 2 barns; Stakevtsi – 4 houses and 1 barn; Boljev Dol – 2 barns; Kamenica – 1 barn and 2 mills; Senokos – 3 houses and 1 barn.

2. HISTORICAL DEVELOPMENT OF VERNACULAR ARCHITECTURE IN THE BALKAN MOUNTAIN REGION

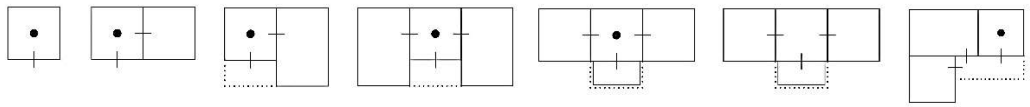
Earlly 19th-century sources describe local vernacular architecture as timber-framed with wattle and daub and thatched roofs. While semi-dug-in “*uzem*” houses were once common,

they had vanished by the century's end, leaving above-ground "*nazem*" houses as more common [7,8].

By the late 19th century (1880s–1890s), above-ground timber-framed houses were common across the Balkan Mountain region. Primarily single- but occasionally two-storey structures, the houses were referred to as "*izha/iža*" or "*kyshta*" [7], with early examples typically consisting of one or two rooms (Fig. 1a); a layout representing the simplest and oldest form of the local house typology. The main room, known also as "*izha/iža*" is where the hearth was located and served multiple functions: cooking, eating, daytime activities and sleeping. The earliest form of the hearth was located centrally in this room, with only a hole in the roof to vent the smoke; later hearths were constructed with a chimney and relocated towards the corners of the bedroom [8,9]. The roof of the house was always constructed as a four-sided hipped roof [6] and a second room, initially a store or pantry, became a bedroom ("*soba*") over time as families grew (Fig. 1b).

By the early 20th century single-room houses were no longer popular [8]. One- or two-storey houses with more complex plans gradually emerged; some, located in sloped areas, incorporated underground rooms for economic purposes like barns or cellars. These rooms occupied only a part of the building, and in all of the cases observed were never built beneath the room with the hearth. Porches/verandas ("*odvodi/trem*") were added along the long or short side of the house, usually on the sunlit facade where also the main entrance is located (Fig. 1c). In some two-story houses a projecting veranda, known in Serbia as a "*doksat*" [10] (Fig. 1e), would be integrated below the main roof and supported by wooden columns on its open sides [11].

As families became larger and wealthier the layouts of their homes evolved according to their needs; bedrooms became deeper at the expense of the porch, which gradually shortened, moved to a corner or was incorporated into the volume of the house (Fig. 1d). The need for additional rooms often resulted in dividing the *soba* or the "*izha/iža"*, whilst in Serbia, houses with an L-shaped plan emerged as the latest stage in the development of housing in the Balkan Mountain region (Fig. 1f) [10].



a) b) c) d) e) f)

Figure 1. Development of the houses- from the left a) one-room ("izha/iža") house; b) two-rooms house; c) house with porch; d) house with more rooms and integrated porch; e) two-story house with "doksat"; f) L shape house (sources: [10], [12], [13])

The spaces around the houses contained many structures related to the daily life and livelihood of the residents. This included two-storey barns with animals kept at ground level and hay stored above [12], separate structures known as "*preshiv*" used for storing grain and other crops, and additional structures designed to shelter different animals.

Buildings were constructed by local, often self-taught craftsmen, with communal participation by all villagers. Materials were locally sourced and easily obtainable and selected on the basis of experience accumulated empirically over a long span.

In the second half of the 20th century, villages – especially in the Bulgarian part of the region – experienced significant growth and change [13]. Contemporary urban planning and development introduced a new type of two-story residential building which, along with public

buildings like schools, cultural centers and post offices, later became abandoned. Shifts in local population demographics saw older houses modernised, often to resemble townhouses, while many more were demolished or reconstructed [11].

3. CASE STUDY OF VILLAGES IN BALKAN MOUNTAIN REGION

The location of the region and villages selected as case studies for the research is shown in Figure 2. The villages were analysed from three perspectives: 1) general features related to geography, demography, and economy; 2) location, siting, plan layout and form of the houses; and 3) construction, facade design and decoration of the houses.

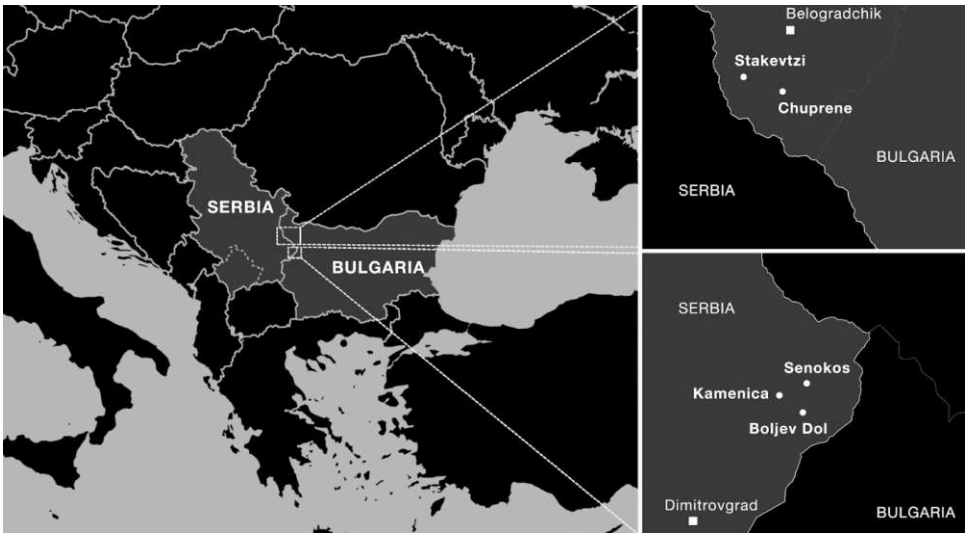


Figure 2. Map of subject area, source: S. Brooks using Google map

3.1. GENERAL FEATURES OF THE VILLAGES

The villages studied in both regions share numerous characteristics typical of this border region, reflecting common cultural traditions and crafts shaped by centuries of life in a rugged yet resource-rich environment.

On the Bulgarian side, the villages are situated on the northern mountain slopes, while the Serbian villages lie on the southern slopes. Although both Chuprene and Stakevtsi are part of the Vidin district, Stakevtsi falls within Belogradchik municipality whilst Chuprene serves as a municipal centre within the same district. Both villages are situated in a river valley.

The villages of Boljev Dol, Kamenica, and Senokos are situated in the Pirot District and are part of the Dimitrovgrad municipality. These three compact villages are among the 37 located in the Balkan Mountain region of Serbia. Boljev Dol is a typical mountain village, Kamenica is situated in a river valley and Senokos is a river-mountain village.

In Serbia each of the surveyed villages cover similar land areas, while Stakevtsi is nearly twice their size, and Chuprene around four times larger. This discrepancy can in part be attributed to the faster rate of depopulation of Boljev Dol, Kamenica, and Senokos (Fig. 3) and the status of Chuprene as a municipality center.

Villages developed near favorable conditions - along the courses of local rivers, in valleys surrounded by protective mountains and dense forests, with agriculture, livestock breeding and forestry [12] historically forming the backbone of local economies. The physical structure of all examined villages formed spontaneously along irregular street networks shaped by the mountainous terrain and natural features.

Villages were subdivided into local neighborhoods "*mahali*", (traditionally formed by extended families and known by family names) or after geographical features, many of which have been preserved to this day. Public spaces centered around gathering points - wells, fountains, churches, votive stones and pubs, with some evolving into squares.

Since the mid-20th century, the villages on both sides of the border have experienced major depopulation, as younger generations migrate to larger towns and cities, leaving behind an aging rural population. With scarce new development and widespread neglect of older structures, the villages face shared challenges – limited financial support, job opportunities and public services. Chuprene, as a municipal center, has managed to retain more residents, sustaining a slightly younger and more active community.

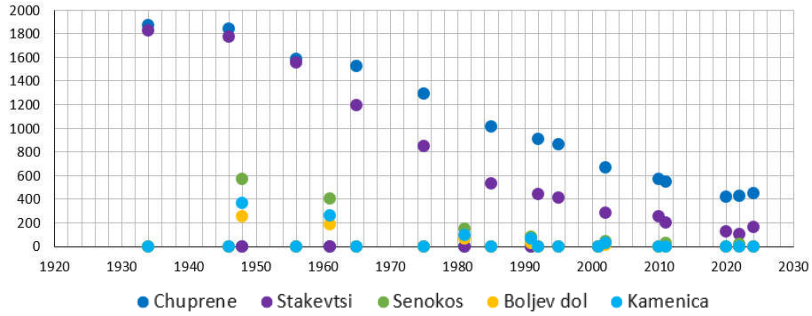


Figure 3. The distribution of people in villages-from 1940s to 2020s, sources [14-17]

3.2. POSITION, PLAN LAYOUT AND FORM OF THE HOUSES

In all the villages, available sunlight and the topography of the terrain play a significant role in determining the orientation and layout of both the houses and their positioning on site.

The most important factor is maximising southern exposure, which is why the principal, and usually longer, façade of the house (where the porch and most windows are located) tended to be oriented to the south. In some cases, depending on the slope and layout of the terrain, the orientation shifts slightly to the east or west, but north-facing aspects are routinely avoided as they offers less light and a greater exposure to cold winds and heat loss [10]. There are also some differences in house position and orientation in relation to access and main roads; in this case, houses often face the street with their longer, principal façades, reflecting their more public character or importance.

In contrast, houses situated along smaller paths or local roads often face inward toward their own sites with a shorter façade oriented toward the street – an arrangement which may reflect a more private and inward-facing way of life.

Most houses in Boljev Dol face roads with their short sides; in Senokos, as the buildings are situated mainly on the eastern and southern slopes, access to the main road is obtained both from the house's shorter or longer façade. In Kamenica, Stakevtsi and Chuprene, there are preserved houses along the main road with their principal façades facing the main road to reflect their prominent positioning. Both Stakevtsi and Chuprene also exhibit houses which face the street with their shorter side, in these instances a layout dictated by the terrain.

Topography further shapes house siting; depending on the terrain configuration, there are noticeable variations in how buildings relate to slopes. Some houses are aligned with their longer side parallel to the slope, following its natural contour, while others are perpendicular to the slope to take advantage of the semi-underground space formed on the downhill side.

With regard to the floor plans of the observed examples, most houses have a relatively simple layout consisting of two or three bedrooms surrounding the room with the hearth. The most common houses in the villages on both sides of the border are usually compact rectangular structures, with a single above-ground floor with or without a porch (Fig. 4a) [8,18]. Nevertheless, many houses, particularly on the Serbian side, have T- or L-shaped floor plans, reflecting adaptations to the terrain, functional needs or later extensions, with almost all having an underground level. In all surveyed villages, there are also examples of houses with two above-ground floors, some of which also feature an underground level located beneath a portion of the house.

In Boljev Dol there is a preserved one-room house representing the earliest stage of development in this region, while in Senokos and Kamenica, as well as in Chuprene and Stakevtsi, there are a few examples of small two-room houses (Fig. 4b). These houses always adhere to a rectangular compact plan with a small entrance porch and workshop or cellar in the basement.

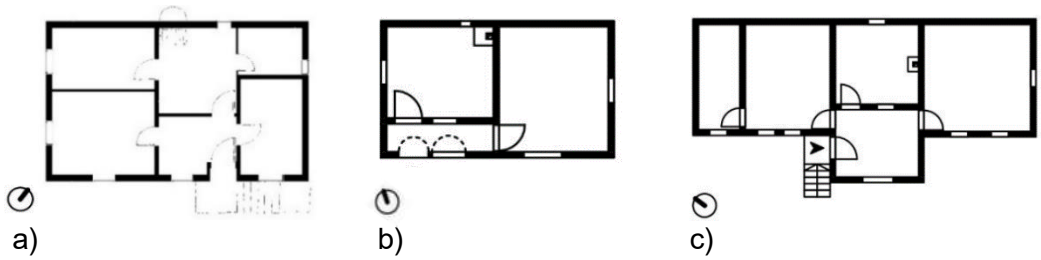


Figure 4. Ground-floor plans of the houses with single above-ground level: a) rectangular house with semi underground level in Stakevtsi b) two-room house in Senokos; c) T-shape house in Senokos, sources: A. Karapandzheva and B. Rančev

The T-shaped plan observed in these villages emerged as a consequence of introducing a closed entrance part - porch in the middle of the original rectangular plan [18]. Most houses with this plan geometry are a single storey building with an entrance positioned laterally on the protruding part of the T-shape. In this case the internal corridor provides access to the main room, a storage room and usually two bedrooms (Fig. 4c).

In summary, the orientation and layout of the houses results from a combination of factors: the size of the household, its economic means, and the materials at their disposal, in turn dictated by available sunlight, natural terrain, and necessary access, all combining to influence the form and structure of the built environment.

3.3. CONSTRUCTION, FAÇADE DESIGN AND DETAILS OF HOUSES

The rural vernacular architecture of the Western Balkan Mountain region represents a unique blend of environmental adaptation, local craftsmanship, and authentic socio-cultural expression (Fig. 5). Construction techniques reflect locally sourced materials, primarily stone, timber and clay, and buildings typically comprise a stone foundation and a timber-frame superstructure. The foundation and basement levels were built with locally sourced stone,

often constructed using dry masonry techniques or with clay mortar, relying on the weight and arrangement of the stones to ensure stability and durability.

Figure 5. Examples of houses: first row- Bulgarian villages, second row- Serbian villages, sources: authors

Upper walls of the houses were usually built using a timber frame infilled with wattle and daub, straw-reinforced clay plaster, cob, or occasionally adobe bricks [10], and finished with a final layer of lime-washed clay plaster resulting in the characteristic white façades of residential buildings (Fig. 6). Wooden structural elements in the timber frame are joined using traditional carpentry techniques with precisely crafted joinery connections and a minimal application of additional binding elements, a method which ensures durability, structural flexibility, and ease of replacement for individual components [19].

aS aB bS bB cS cB dS dB

Figure 6. Comparation of construction, details and finishes: S- Serbian villages, B- Bulgarian villages, sources: authors

Roofs are generally hipped or multi-pitched, made from wooden elements, and designed to shed heavy snow and rain efficiently. Stone roofing is a notable and expressive element of the architecture in the area of Senokos, resulting from the availability of specific local stone that can be easily split into slabs (Fig. 7). Originally, roofs were covered with stone tiles approximately 3-5 cm thick, laid in overlapping rows to cover the joints between lower layers [10]. The ridge and roof crest are also covered with stone and secured with clay mortar, but in some cases covered with clay roof tiles. Meanwhile, in the area of Stakevtsi, clay tile cover prevails, reflecting a different local material; a difference also reflected in the underlying design of the roof structure.

Stone coverings also have a characteristic roof and eaves design of horizontal beams supporting wooden rafters to achieve a gentler roof pitch. By contrast, clay tiled roofs typically lack such horizontal members, resulting in a different frame configuration.

Although wood plays a vital structural and decorative role, in residential settings it remains mostly concealed beneath plaster, contributing subtly to the architectural character. Conversely, in barns and granaries wood is a dominant visual element, with the timber-frame structure faced in planks to create a rhythmic visual pattern on the façade. When plaster is used for ancillary buildings such as barns and livestock shelters, (particularly in the Serbian villages) the earthy texture and color of the clay is retained without whitewash alongside the exposed timber framing resulting in a more rustic appearance [20]. Meanwhile, in Bulgarian

villages, these structures are typically faced sparsely positioned wooden planks to allow for greater natural air circulation.

Typically, wood is adorned with simple carvings, especially on columns, the ends of rafters and beams; occasionally, doors and windows are more elaborately carved. Another decorative element commonly found on house façades is on the columns supporting the arches of the porch, which are often decorated with specific carvings [20].

aS aB bS bB cS cB

Figure 7. Comparation of roof construction, roof covering and façade design from left to right: S- Serbian villages, B- Bulgarian villages, sources: authors

4. COMPARATIVE ANALYSIS - RESULTS AND DISCUSSION

Table 1 summarises the comparative analysis of the Bulgarian and Serbian villages studied, covering general features, siting, plan layout, house forms, construction and decoration. Residents numbers are based on current census data. The number of floors includes the basement. While villages on both sides share notable similarities regarding house position, layout and form, differences appear in construction and façade detailing.

Table 1. Comparative analysis of villages in Bulgaria and Serbia

Attributes		Bulgaria		Serbia		
		Stakevtsi	**Chuprene**	**Boljev D.**	**Kamenica**	**Senokos**
General	residents no.	105	427	1	8	19
	listed houses	2	4	0	0	0
	major economy-past/present	agriculture, livestock, forestry/ none	agriculture, livestock, forestry/ livestock	livestock / none	livestock / none	livestock / farming, cow herding
	church/state	yes/active	yes/active	yes/active	yes/ruined	yes/active
	school/state	yes/empty	yes/active	yes/empty	yes/ruined	yes/ruined
	library/state	yes/active	yes/active	no	no	no
	interventions	yes	yes	yes	yes	yes
Position, layout, form	access to road (mostly)	both	both	from the short side	from the long side	both
	position related to slope	long & short side follows the slope	long & short side follows the slope	long & short side follows the slope	long & short side follows the slope	long & short side follows the slope
	main façade orientation	S, SE, SW	S, SE, SW	S, SE, SW	S, SE, SW	S, SE, SW
	house plan geometry	□, square, T shape	□, square, T shape	□, T & L shape	□, T shape, L shape	□, T shape, L shape
	no. of floors	1-3	1-3	1-3	1-3	1-3

	min. rooms	2-3	2	1	2	2
Construction	type	stone foundation & timber frame	stone foundation & timber frame	stone foundation & timber frame	stone foundations & timber frame	stone foundations & timber frame
	wall infill	wattle and daub, SR clay plast. or bricks	wattle and daub, SR clay plaster or bricks	SR clay plaster	SR clay plaster,	wattle, SR clay plaster or bricks
	façade finishing	LW clay plaster, clay plaster	LW clay plaster, clay plaster & wood	LW clay plaster, clay plast., & wood	LW clay plaster, clay plaster & wood	LW clay plaster, clay plaster & wood
	roof form	hipped or multi-pitched	hipped or multi-pitched	hipped or multi-pitched	hipped or multi-pitched	hipped or multi-pitched
	roof rafters order	fan-like manner	fan-like manner	fan-like manner	parallel	parallel
	roof covering	clay tile	clay tile	clay tile	stone slabs or clay tile	stone slabs or clay tile
	window sashes no.	double & triple	double & triple	double & triple	double & triple	double & triple
	flooring type	earthen	earthen	earthen	earthen	earthen, stone tile
	ceiling type	LW clay plaster/ wooden planks	LW clay plaster/ wooden planks	LW clay plaster	LW clay plaster	LW clay plaster
Decoration	degree	scarce	scarce	scarce	scarce	scarce
	roof elements	carved rafters	carved rafters	carved fascia board & rafters	carved fascia board & rafters	carved fascia board & rafters
	façade features	coloring, arches, columns' carving	coloring, arches, columns' carving	coloring, arches, columns' carving	coloring, arches, columns' carving	coloring, arches, columns' carving
	windows & doors	decorative framing	decorative framing	decorative framing & carving	decorative framing & carving	decorative framing & carving
Legend: LW-lime-washed; □ rectangular plan; SR- straw-reinforced; S-south; SE-south-east; SW- south-west						

A broader discussion of similarities and differences can be found in Table 2.

Table 2. The similarities and differences overview

Aspects	Similarities	Differences
Demography & economy today	The population has significantly declined in the last decades, resulting in no economy today in villages with few residents.	Serbian villages undergo a faster rate of depopulation. Due to a larger population, today Bulgarian villages are more economically developed.

New construction & interventions	A significant number of buildings have new interventions due to the need for repair or the absence of responsibility for preserving the heritage. Interventions include concrete reinforced construction, new roof covering, and converted porch to a closed entrance part.	New construction is more prevalent in Bulgarian villages as a result from more people living there compared to the Serbian villages.
Plan layout and form of the houses	Most houses have a room with the hearth & 2-3 bedrooms. Plans are usually rectangular or T-shaped, with 1/2 above ground floors. Some houses are designed for siblings: so-called 'twin' houses.	In Serbia, some houses have a prominent L-shape floor plan. In Chuprene a square floor plan was uncommon.
Main construction system and joints	All houses on both sides of the border feature ground and semi-underground floors with stone base masonry of local stone. The upper floors-first and second levels-are typically built with a wooden box-frame structure filled with wattle and daub.	In the Bulgarian villages all walls on the ground floor are made by stone masonry, while in Serbian villages there were examples with just two or three of the ground floor walls constructed by stone and the front façade made of timber box frame & wattle and daub.
Roof construction and covering	On both sides there were roofs covered with clay roof tiles. The roof structures beneath these coverings were similar in form and construction, including similar types of joints.	The predominant roof covering in the Serbian villages was stone tiles, with clay tiles in Bulgaria. The difference in material necessitated a different eaves design. In Bulgaria, the rafters often take a fan-like form in contrast to the Serbian cases.
Floors and ceilings	Ceilings were with wooden boards, covered with clay and whitewashed. All floors were made of rammed earth.	In Bulgarian villages there were examples of ceilings with visible wooden boards. In the Serbian villages, the porch floors were often finished with large stone tiles.
Façade design	The facades are colored and lime washed.	In Serbia there were more houses with arches, while in the Bulgarian cases they were less.
Decorative elements	Decoration is generally scarce in the researched area. Both sides exhibit geometric carvings on the main column supporting the porch and on the rafters. Windows and doors have decorative framing.	In Serbian villages carving can be found on windows and doors and on the fascia board of the roof.

5. CONCLUSION

Similarities and differences between the Bulgarian and Serbian villages are described in Table 2. In terms of demographics and economy, both regions are in a state of decline and depopulation, processes that are more apparent in the Serbian villages. Somewhat younger families employed in agriculture, cattle breeding or tourism are present on both sides.

Influenced by European construction methods and designs, the mid-20th century saw Balkan vernacular house construction practices dating to the Ottoman era supplanted by 'modern' reconstructions. Such houses are more evident in the Bulgarian villages, with many residents of the Serbian villages continuing to live in the houses in which they were born.

In terms of siting, plan layout and construction there are many similarities in both regions; both exhibit examples of twin houses, whilst Serbian villages feature more L-shaped houses.

There are subtle differences in the ground floor surface – built entirely from stone in Bulgaria and partially in Serbia. The roof coverings differ due to available materials – heavy stone slabs with a different supporting timber structure is predominant in Serbia, whilst in Bulgaria a fan-type timber roof structure supports a lighter roof covering of clay tiles.

Interiors are largely similar, with rammed earth floors, lime-washed walls and ceilings with wooden boards. Hearth and fireplace designs show many variations on both sides, and while Serbian houses employed simple decorative arch structures, this feature was less frequently observed in the Bulgarian villages. Carved timber decorations are similar across villages and often employed on posts, beams, capitals, porch balustrades, eaves and fascias. Principal carpenters were responsible for creating these details to a particular variation of their liking which could be used as a sign of recognition.

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