Abstract. Our traditional architecture, to which the House of Pastrovici belongs, as one of the examples of popular house building in the coastal area, is characterized by the functionality and suitability to human needs. The builders of this, in its essence a simple architecture, took care of every detail, proportion and measure, adapting to the environment and the available material.

The analysis of the interior and exterior space, and its division in segments, as well as the analysis of the spatial serial elements and proportional relations, endeavours to discover the ways and conditions under which this, in essence, endemic architecture was created. The messages it emits, the element of a sloped lean-to roof, simple basis of the house in rows in the functional sense, and grouping of the rows by creating the streets in the spatial sense, we find the elements of modernity and universality of the contemporary house. We may recognize the elements of such architecture in other architectures, even on other continents, even at the great names of the 20th century architecture, which enables us to consider it universal.

Key words: Pastrovici, House of Pastrovici, stone, lean-to roof, rows, universality, functionality, traditionality.

1. INTRODUCTION

The House of Pastrovici as a form of individual habitation is treated only fragmentarily in the professional and scientific studies. These studies do not unify all the results of the influences of the historical, sociological and climatic conditions at the onset of such form and architecture – and its universality and applicability in modern architecture.

The goal is to clarify the circumstances of creation and survival of this type of architecture, so that the same principles on which the original House of Pastrovici was created could be used in the reconstruction and revitalization design procedure, as well as in the new design on the basis of the existing architecture, rural areas or individual buildings.

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It is to be expected to obtain more precisely defined circumstances under which this type of architecture was created and that such principles can be used in the practice prior to making the professional documentation and scientific studies for reconstruction and revitalization as well as new design, respecting the principles of universality of this type of traditional architecture.

2. GEOGRAPHIC POSITION

Fig 1. Geographic regions on the territory of Montenegro
I - Coastal area: a – Boka Kotor Bay, b – seaside between Budva and Bar, c – erosion area near Bar, d – karst and fluvial area, e – field of Ulcinj
II – Montenegrin karst
III – High mountains
IV – The Stari Vlah heights

Fig. 2. The Pastrovici region

The Pastrovici area is situated in the coastal part of contemporary Montenegro, in its central part, presented in figure 1 as stretch I b – seaside between Budva and Bar. The Pastrovici are within the municipality of Budva from Przno (Milocer, Sveti Stefan) till the boundary with the municipality of Bar on the southeast. In the north they border Pastrovska mountain (Fig. 2).

3. NOTION OF HOUSE OF PASTROVICI AND TYPOLOGICAL AFFILIATION

In the pre-Slavic period, and it may be concluded by the toponyms and excavated material, this area was populated by the Illyrians and Romans. The Slavs are mentioned for the first time in "Ljetopis Popa Dukljana" (The annals of the Duklean Priest") at the end of 8th and the beginning of 9th century AD. A larger part of the settlement in the area
of contemporary Pastrovici was established till the end of 14th century, mainly on the land of the of the Illyrian and Roman settlements.

Nowadays, on the basis of the present state of affairs, three basic types of settlements can be singled out and those are:

- Budva and Petrovac as towns
- Sveti Stefan as a village settlement with a special status (strategic, defensive and governmental)
- Village settlements, coastal and mountainous (over 300 above sea level)

The best preserved original architecture of this area is located in the mountainous village settlement that will be the subject of a detailed analysis because they possess all the significant characteristics of this, in essence, simple and specific architecture. In other settlements in the area, the architecture was significantly affected by the foreign element (Venetians, Austrians etc) as well as the proximity of the sea that conditioned certain activities which on their side conditioned the adaptation of architecture to the new purposes.

The original architecture is, as rule, a very simple house with the ground floor and two storeys, the top one being the loft. The roof is a lean-to roof, following the contours of the terrain, and the house is placed with its front side turned to downward slope. The rear side of the house (as a rule, turned to the hinterland – continent) is a wall without or with very little openings, used as defense from the bura (wind) blowing from this direction.

All the houses (homes) are integrated into an uninterrupted row with a common ridge.

The House of Pastrovici belongs to the coastal type Boka Kotorska bay house. Apart from the relation with it, it also demonstrates the influences from the houses of the hinterland, the continental part.

"The notion of the house in this area comprises an architectural unity that can be separate or connected with the other so that they form an uninterrupted common row with the same ridge. There can be multiple homes in the house, consisting separate household. When the brothers part, usually a new fireplace is made in the house, and thus the new home is formed. There are more homes than houses in each village".

This type of the house has a rectangular basis. It is formed in the shape of an inclined shelter leaning on the rock, which in essence is an interim form, from a primitive shelter to the house we find nowadays in the majority of the settlements in this area.

As a consequence of the influence of the specific natural and social conditions, the house developed gradually, first by building the wall facing the down gradient of the ter-
rain and then this wall would be further built to rise above the terrain level. With the influences coming across the Adriatic sea, especially from Venice (with which the dynamic commercial activities were established in 16th century), the house firstly developed a storey, obtained in fact by building over the basic structure of the ground floor (now becoming the cellar or konoba) and it also obtains a pergola. With later development of the house, there comes another floor, the loft with an inclined lean-to roof, and the cellar (konoba) gets a porch which becomes a terrace with a pergola on the first floor. Such shape of the house is the one seen the most nowadays and which is a dominant one, too.

The volume of the house is relatively small, around 5x6-7 m, so that each floor, in principle, consists of one room. In the cellar there is a konoba (larder), on the ground floor there is a dormitory, while on the top floor (loft) there is a kitchen – "kuzhina with a fireplace".

Fig. 4. Basis of the typical house of Pastrovici:  

In front of the house at the level of the first floor there is a terrace - "teraca" which is often constructed along the entire length of the house, and is built on the stone vaults, paved with the rectangular flagstone pieces. Along the rim, there is a stone bench with a "pizhuo" or "pizhun" back rest that is at the same time the parapet. The terrace is reached by the outer stone staircase.

The house is built of hewn stone, and roof is covered with S-tiles "kanalica". The roof structure and the floors are made of wood. Between the cellar and the upper floors, there are stone vaults paved with flagstones from the upper side. The roof is inclined, lean-to roof (rarely a saddle roof) with no attic and no eaves.

The partition walls are made of reed and wood lathing, and most often they are made after the construction, when the rooms of the house need to be partitioned because of the new needs, or division of the family. The interior staircases are single, steep, and most often made of wood.

The basic volume of the house is clearly defined by the planes of the walls and the roof.

The exterior staircases, terraces, yards and yard walls have a character of appended elements (in compositional sense) and develop independently of the basic volume of the house structure.
4. THE BASIC CHARACTERISTICS OF THE HOUSE OF PASTROVICI

4.1. Rows

The system of dwelling structures – houses is a very compact structure within which the individual objects are physically connected. Usually, the structures are connected with the common walls. The most frequent form of the system is the row.

The row is most often straight or slightly curved, depending on the terrain configuration. In the Pastrovici settlements, there are two basic types of rows and those are:

a) development of the row perpendicular to the contour line (Fig 5)

b) development of the row parallel to the contour line (Fig. 6)

The rows of the houses developed perpendicularly to the contour line are less frequent cases (Rafailovici). The row of the houses perpendicular to the contour line forms a cascaded street with the staircases – kale. Such type of the row occurs more often in the lower, coastal villages and represents an atypical example of row formation (Fig. 7).

The rows developed paralelly to the contour line of the terrain is a dominant way of forming the house row in the Pastrovici, especially in the higher (mountainous) villages which is a logical consequence of the rational usage of the terrain configuration, so that the houses in rows with the common walls could be build, but also to enable the formation of a street (street) (Fig. 8).

The number of the houses in rows ranges between 4 and 8 and very rarely there are 10 houses. The houses in rows are most frequently of the same heights and same cross-section contours, so that they are covered by a single roof plane with a common ridge. The structures of such a row of houses were not constructed at the same time, but were built (appended) during a prolonged time period, depending on the needs and capacities, but...
the builders always respected and adhered to the spontaneously adopted regulation line and building principles.

In the wall plane of these almost rigid rows that are most seen in the Pastrovici, the fine grid of the individual houses is discernible only on the back side of the rows – on the walls facing the uphill gradient. The wall of each house has its individuality, which is perceived through the texture determined by the quality of the stone used in construction and the binding medium used.

A very important factor that affects the appearance and the texture of the wall, is the time of the structure construction and the technical means applied as well as the skill of the builder himself, when applying the appropriate techniques and materials.

The final product of the time when the structure was built, applied new technical means and the processing of a higher quality material and the increased building experience, are the finer texture and the bond of the better hewn stone and more harmonized and more proportionate composition.

This individual tone of each structure is balanced with the rigid composition of the row, which although constituting one house, not only does it not annihilate the individuality of the singular parts of the row, but on the contrary emphasizes them.

As opposed to this example of outstanding determination, clarity and geometrical strictness of the row, there are rows of much more dynamic character, with lively house fronts, different ridge heights, as well as different depth and width of the house yards. In such rows, the houses are connected with their longer side, and the saddle roof may be seen, thus further intensifying the diversity and the dynamism of the row. Such form of the row was established under the influence of other building cultures (Venetians, Austrians, and Italians) and mostly in the coastal villages (Przno), so it cannot be considered as an autochthonous representative of the Pastrovici villages.

The free composition is an interesting, even though not a dominant example.

4.2 Inclined lean-to roof

The main formal characteristic and a recognizable element of the Pastrovska hose architecture is a lean-to roof that is parallel to the gradient of the terrain. The reasons of onset and lasting of such shape of the roof lie in the archetype, but also in the relation to some functional and structural reasons. There are suppositions that the basic reason for the existence of such roof planes that are positioned parallel to the terrain gradient (apart from adjusting it to the contour line) lies in the fact that a builder sought to protect the structure from the influence of the bura, by trying not to present it as an additional barrier to the wind flow but rather channeling the wind down the slope (Fig. 10).

Another reason for this shape of the roof lies in the way of drainage. The roof drainage takes place along the entire length of the cornice and possesses no gutters, so in this case the lean-to roof represents the most rational solution, because in the case of the saddle roof, the rain water would affect the rear side of the house, resulting in the humidity appearing in the cellar walls. Even if there are houses with the saddle-roof (which is a rare case), such type of the house is located in the flat ground, most often in the coastal villages.

The next important reason of the emergence of this roof type is that the lean-to roof has simpler structure (Fig. 11) and requires less timber, which is a sparse and limited resource in this area, rarely used, and when it is inevitable, then it is used in a most rational way.
Also, one of the factors which influenced the application of such roof type is the fact that due to the limitation of such roof structure, it brings about a decreased depth of the house, resulting in easier illumination of the rooms, if the relatively small openings on the façade are taken into account.

The next factor in the choice of the lean-to roof is a relatively easy construction of the roof structure that is supported by the front and rear façade walls, and in the middle supported with a beam, which is by far simpler for construction than the saddle roof structures.

Finally, one of the reasons for application of this roof type is in the archetype that was applied, adjusted and modified during a long stretch of time.

There are departures from this basic concept as in the example of Srzentice (Fig. 12) where the certain structures are positioned at an angle of 90 degrees in respect to the gradient and the wind directions.

Those are rare examples originating in a different concept of adaptation to the terrain and to the previously mentioned protection from the enemy.

The roof inclination angle ranges between 22-30 degrees and forms quite a high jump between the front and rear wall (Fig. 13). The attic space does not exist, so the space below the roof belongs the the upper floor – kitchen.
4.3. Organization of the living quarters

It is supposed that this house type developed from the primitive shelter with a rectangular basis, shaped in the form of the oblique shelter leant on the rock. With its simple form, it represents a sort of the transitional form from the primitive shelter to the residential house, which is present nowadays in the majority of settlements. Due to the specific natural influences, the house develops in vertical direction to the present form with the cellar and two storeys.

The basic dimensions of the house is relatively small 5 x 6-7 m, so that each floor consists of one room.

The cellar (Fig. 14) has a function of a basement floor and in earlier times it was used for the livestock and storage of products, while nowadays the livestock is placed in the facilities built in the yard, while the konoba is used solely for the storage of products.

The ground floor is used as the living quarters, but also has functions as dormitory or resting premises, and once was an integral space, while nowadays it is partitioned into several small rooms.

In the loft (Fig. 16) or on the first floor, there is a kitchen – "kuzhina", which is in fact, a previous ground floor with a fireplace, which by addition of new floors beneath and not above it, became a loft, i.e. a first floor room.

An extraordinary and functionally inappropriate location of the kitchen was conditioned by the primitive solution for the removal of fire smoke – directly through the roof. By locating the kitchen on the top floor, the cooling of the kitchen on the top level was more efficient in the summer months, because of the favourable air flow, so the heating up of the rooms on the first floors was avoided. The first floor is accessed directly through the terrace space, and the connection between the first floor and loft (second floor) is effected through the steep wooden staircase. The yard and konoba space is connected to the first floor by the exterior stone staircase. In front of the first floor there is terrace that usually runs along the length of the house, and is erected on the stone vaults and paved with rectangular flagstone tiles. On the rime there is a stone bench with the pizhuo - pizhun back that at the same time represents a parapet (Fig. 17).
The basic volume of the house is clearly expressed and defined by the roof and wall planes. The exterior staircases, terraces and yard walls are, in the compositional sense, the additional elements and develop outside the basic volume plane (Fig. 18).

Fig. 17. Connection of konoba to the terrace  Fig. 18. Relations of the basic volume and additional elements

4.4. Composition manner and proportions

The composition manner is one of the significant elements of design. In the popular civil engineering, the composition has the character of the experience taken from the predecessors, and the inherited tradition.

If we look into the history of the architecture, the composition we meet in our popular civil engineering, and in the House of Pastrovici, has the foundation in the proportional relations going back to the ancient times.

The popular builder uses the available tools and devices for mensuration and scaling "the stick and the rope", and with those primitive means, he develops the proportional relations of the lot, structure basis and the façade. In the first phase of the proportional relations development, the house space is 1:1 in respect to the yard space, where side A= 1 (Fig. 20).

The relation of the yard as private property and the street as public property with the relation between the street and the yard is 1/4: ¾ is very important (Fig. 19).

If we assume that the open space of the yard (that is the space over the covered part of the yard as well as the space of the semipublic communication of the terrace) have the relation of 2/3:1/3, then, according to the previous analysis (for figure 19) we have the relations of the semipublic space, the non-covered part of the yard and the street 1/3:2/3:1/3 (Fig. 21).
However, let us return to the basis of the house, to any of the storeys, because it there where the essence of the proportional relations lies, and from where later everything evolves and becomes the logical continuation.

So if it is determined that the ratio of the rectangular sides of the House of Pastrovici is $5 \times 7$ m, there may arise a question of how the ratio was invented. The old builders, as we already said, using the primitive implements – the stick and the rope, performed the mensuration in the following manner (Fig. 22).

Firstly, the stick would be fixed in a point, e.g. A, and from this point the lateral side $a$ would be measured and transferred on the side of the row at the right angle. With the aid of the diagonals, the correct square $ABCD$ with the right angles would be established. Then, an $AC' = dI$ diagonal would be placed down on side of the row, so the side $AC' = dI = b$ would be obtained, which corresponds to the other side of the house rectangle. If we assume that $a = 5m$, $b = AC' = dI = \sqrt{a^2 + a^2}$, that is $\sqrt{5^2 + 5^2}$, this is approximately equal to 7.

This proportional relation was applied in all the remaining elements, as well as on the façade (Fig. 23).

In such a manner, the harmonized proportional relations would be attained, with all the elements acting in harmony with one another, and with the environment.

From this one can see that with the aid of primitive implements for mensuration and poor technical means, by following consistently the way of mensuration and proportions, one can produce extraordinary harmonized proportional relations.
Fig. 23. Proportional relation of the façade

When these proportional relations are applied nowadays in design and construction, the results obtained are very good, both in the functional and in aesthetic and formal sense.

In this example the universality of the popular civil engineering, that is the House of Pastrovici as its representative, may be observed.

5. UNIVERSAL IN TRADITIONAL

5.1. Traditional

The tendencies in modern architecture develop in two, conditionally, separate directions. The first one is in the direction of regional architectures across the world, and the other is in the direction of the high-tech hypermodern world architecture.

At first sight, these two directions in modern architecture have nothing in common, because the first one strives to preserve (very often uncritically) the traditional values of the climate and local architecture, while the other prefers and uses the achievements of the modern technology and technical experience in uniforming the architecture in the world. However, if we scratch beneath the surface of the external appearance of both contemporary architectural styles, we may perceive very interesting things. In both directions, at their best representatives, we can recognize the fundamentals of the beginnings of architecture – and that is a house.

Why again - a house? Because in it, we find the beginning of all the elements of architecture and because it is easier to reach an architecture where all the elements will be developed, differently processed and represented.

In short, because it is about an enterprise that can be easily applied to any type of architecture. It is impossible to understand the contemporary experience if we do not now the origins, development directions, causal and functional relations. One should compare both local and foreign experience, seek the conditions from which the houses evolve, be-
cause we cannot have the same measure for all the houses, because the emergence of each house is the result of the struggle with the environment and climate, of the application of materials, and the reflection of different human habits, culture, technology development and social structure.

Also the new achievements throughout the world must be considered. One should incessantly compare, in terms of Goethe's words: "Know the old, examine the new, remove the weaknesses, create new." – which means to explore one's own and someone else's civil engineering heritage, investigate the new one, eliminate the drawbacks of both of them, and then create new values. That is why it is necessary to discover the essence of such architecture through the analysis of certain segments of our civil engineering legacy, in this case - of the House of Pastrovici, in order to recognize the universal architectural elements in it.

Analyzing the House of Pastrovici and the Pastrovici settlements, one may conclude that the basic values of such type of our family house in a row are: function, proportion, suitability to human needs, composition, flexibility, but also the application of the materials, elements texture, handling of details, etc. In fact, the values that the architects aspire to throughout the world nowadays. But, yet, the functional relations and suitability to human needs ought to be placed at the first place.

Why the functional relations and suitability to human needs?

It is because in any healthy epoch the architecture was functional and suitable to human needs, which is especially true for the examples of our architectural heritage, where the House of Pastrovici irrefutably belongs.

5.2. Fitting into the ambient

It is very important for the successfullness of any architecture to fit well into the ambient. Fitting the house into the ambient is accomplished through the application of appropriate materials, but also with the choice of the location and the appropriate spatial pattern.

When building a house in our climate, "the owner of the future house invites the builder, the builder scouts the terrain, environment and measures the basis of the house, taking into account the view from other houses, illumination, insolation and the existing trees and informs the owner about that." The very pattern of the village is a very important element of the Pastrovici houses, but also the house itself within the clan family row. The village, as it is already said and analyzed, is always oriented down slope, so that the approach roads and the fields could be controlled, but also have a visual connection to the sea, "to which everyone is entitled to". With a good pattern of rows and the houses in the row, the negative climate influences are reduced to a minimum, and the traditional manner of connecting, for the common work and defense, in the conditions of mediaeval insecurity, in the contemporary conditions resulted in the more economical usage and better maintenance of the settlement. Such usage of space resulted in its more humane relationship towards the inhabitants, the better knowledge of the inhabitants among themselves, but also better usage of the scarce space and the public spaces with the primary group (i.e. the row), that becomes accessible to all the inhabitants of all the residential units forming the group. The primary group is the spatial frame where the people know each other well, and where they find it easier to realize their individual or common interests. The special quality of the grouped houses in rows is the harmony they form with space that surrounds them, making the unity. "These agglomerations..."
tions are the examples of the inherited long-lasting experience of the popular civil engineering that has, in the spatial shaping, harmonized the environment and uniform residential buildings, and created the perfect harmony of unity.

5.3. Comparison to world architecture

The issues brought up in this paper would suggest that this, in its essence endemic architecture has no similarities with other architectures, however, the universality of the principles upon which it emerged and the consistency in the shaping, made it an architecture and a spatial organization that we can meet anywhere in the world. We meet the spatial concept of the house in a row all around us and it represents the most economical way of individual family habitation and at the same time it prevents the alienation the modern man is encouraging through his apartments in the skyscrapers or isolated individual houses.

We can meet the form of the lean-to roof everywhere in the world, so this remarkable element of the House of Pastrovici becomes universal.

The village Miryna for resting and recreation (Fig. 24) in Limnos, Greece, by the architect A.N. Tombazis from Athens is an excellent example of almost the same pattern of a coastal settlement, its composition given in the groups in a row, and even the same element of the lean-to roof and same materials is present. (Fig. 25 and 26).
There is also a residential settlement The See Ranch in California, by the authors Moore, Lyndon, Turnbull, Whitaker, where the same elements of the composition occur, as well as the orientation of the houses to the sea, relations of the wall and the roof planes, as well as the proportional relation that is almost the same to those applied in the Pastrovici settlements and houses (Fig. 27).

Fig. 27. The See Ranch California

Fig. 28. Similarities between the Alto architecture and the House of Pastrovici

Fig. 29. Similarities in application of stone at Wright and the House of Pastrovici

Fig. 30. Usage of window openings at Corbusier and the House of Pastrovici
These and similar examples show how the architecture of the House of Pastrovici contains all the elements of universality and modernity. In it, we can recognize the Alto's material treatment and his building bond (Fig. 28), Wright's ambientality and suitability to human needs (Fig. 29), Mies' functionalism through the phrase "less is more" and Corbusier's stroke (Fig. 30). In one word, we can rightly claim that this, in its essence an autochthonous architecture sends the messages of universality, because it is in its core universal.

6. CONCLUSION

The architecture of the House of Pastrovici by all its characteristics belongs to traditional popular architecture. It represents a type of the Eastern Adriatic coastal house. It may be considered a special type of the southern Adriatic house, by its typological and formal characteristics. This simple and functional architecture, reflected in the House of Pastrovici has the characteristics of universality. It is reflected in the organization of the living quarters, proportional composition of the basis and the facades, as well as in the creation of the "houses in a row", in urban sense.

All these enumerated characteristics that are given in detail in the paper, confirm that a well conceived and shaped space that can fit well in the environment and with the application of local materials represents a supreme art of creation of universal architecture. Only architecture based on functionality and good relations of the proportions may qualify for universal architecture.

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PAŠTROVSKA KUĆA UNIVERZALNO U TRADICIJALNOM
Alesandar Keković

Naša tradicionalna arhitektura, kojoj pripada i Paštrovska kuća, kao jedan od primera narodnog graditeljstva na primorju odličuje se funkcionalnošću i čovekomernošću. Graditelji ove, u suštini jednostavne arhitekture, vodili su računa o svakom detalju, proporciji i meri, prilagodavajući se okruženju i materijalu koji im je bio dostupan.

Analizom unutrašnjeg i spoljašnjeg prostora, te njegovim raščlanjivanjem na segmente, kao i analizom prostornih elemenata niza i proporcijalnih odnosa, pokušalo se doći do načina i uslova pod kojim je nastala ova, u suštini, endemična arhitektura. Poruke koje ona emituje, element kosog jednovodnog krova u oblikovnom smislu, jednostavna osnova kuće u nizu u funkcionalnom smislu i grupisanje nizova stvaranjem ulica u prostornom smislu, nalazimo elemente savremenosti i univerzalnosti savremene kuće. Elemente takve arhitekture prepoznajemo i u drugim sredinama, pa čak i na drugim kontinentima, kao i kod velikana arhitektonske scene XX veka, što nam daje za pravo da je smatramo univerzalnom.