HISTORICAL REVIEW OF THE INTERDEPENDENCE OF SETTLEMENTS AND URBAN AND RURAL BLOCKS

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Ljiljana Vukajlov
University of Novi Sad, Faculty of Technical Sciences
Department of Architecture and Urbanism, Serbia
E-mail: ljiljavukajlov@sbb.rs

Abstract. Due to the emergence of a new way of shaping settlement space, process when the basic characteristics of the traditionally formed blocks are lost, an idea about searching the role of the urban and rural block in forming the structure and the identity of a settlement is initiated. The basic aim of the research is to prove that the block has always been an integral part, and sometimes even inseparable part of a settlement structure, its recognizable element and a significant place of neighboring, and that due to this it is important to preserve its values in future interventions in settlements. In order to understand the cause for the disappearance of the traditional block, its characteristics have been researched in the settlements from the past and the interdependence between the forms of settlements and the blocks has been established.

Key words: Settlements, urban block, rural block, interdependence, morphology

1. INTRODUCTION

Block existed in most of the settlements built in different historical periods on all continents. It had special significance in the ancient world, because it represented a module in planning and organizing settlements, also in the Renaissance, when it was an inseparable part of towns. During all historical periods block represented also the community of the people who were mutually connected within the block, in different ways (in terms of religion, race, class). During the 20th century, one of whose characteristics are broken connections with the past in all areas of life and negation of tradition, there was a change of attitude towards forming and shaping space, and at the same time towards the basic elements of the settlement structure. Because of that, the basic characteristics of the

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block were changed. Its disappearance was observed as well. At the end of the 20th century blocks in older parts of settlements were radically reconstructed, due to this the identity of these areas was changed. The physical transformations of a block also caused new social conditions and contacts among people. Neighboring units started to disappear, and people became more and more alienated from each other.

Block is "an area of inhabited territory, determined for building, or already built, limited by streets, square, park, river bank, etc." [1] or some other areas. Most commonly it is a group of buildings, houses, or a combination of both, and there are cases that the whole block is one house (unit block) [2]. It has been proven that the history of mankind is connected to the appearance and development of settlements, and therefore data on settlements can be traced back to the appearance of the first organized human communities. By researching settlements from the earliest times, until nowadays, the development of the rural and urban block can be followed as well. Block as an element of settlement structure existed in all periods, ancient times, Middle Ages, and modern age. Some of its characteristics which have survived during several thousands of years, remained even nowadays, and are of great importance for determining not only the significance of block for forming the structure and identity of settlements, but also for the future interventions within blocks and settlements.

2. REVIEW OF FORMING OF BLOCK THROUGH SHAPES SIGNIFICANT FOR THE HISTORY OF SETTLEMENTS

The first habitats where people satisfied only their basic existential needs are forerunners of rural settlements [3]. The rural settlements were formed on naturally suitable locations with favorable climatic conditions, near water and fertile soil, or on natural elevations, even on inaccessible and hidden places far away from roads. Smaller settlements were formed of only few buildings, freely located and grouped in space. In prehistoric settlements Glastonbury in England (Fig. 1) or Skara Brae in Scotland (Fig. 2) blocks did not even exist.

![Fig. 1. Glastonbury in England, settlement from the stone age without blocks](image1)

![Fig. 2. The plan of the prehistoric village of Skara Brae without blocks](image2)
Block regularity of the structure existed as early as in the prehistoric period.\(^2\) The structural regularity of the settlements on wooden piles above marshland was the consequence of the structural system of platforms on which those settlements were created, as well as a consequence of efficiency in using its surface area (Fig. 3) \(^4\). Nowadays, there are also similar settlements on wooden piles, such as Zanvie, a village in Benin in Africa (Fig. 4). The concentration and efficiency of using land have always been the basic characteristics of village settlements.

Urban settlements were formed later that rural ones, as a consequence of religious needs, appearance of handicrafts, surplus of products and the need for exchange of goods. That is why they were most frequently formed in places of special spiritual energy, near roads, at their intersections, at the river banks or sea shores. Chatal Hüyük (Çatal Hüyük) is a settlement considered to be the first town (Fig. 5).\(^3\) It was formed 6,500 BC in today's Turkey, soon after the appearance of agriculture. Most probably there were 6,000 inhabitants. It is the best example of a settlement in which people exchanged fruits from the surrounding area for goods from other areas \(^5\). The houses were built of bricks and earth, and were placed next to each other. There were no doors, but the entrance was through an opening on the roof, because it was safer that way (Fig. 6). Through those only openings smoke went out. There were no walls surrounding the settlement. Since the buildings were positioned next to each other, flat roofs were used as streets. Inside the buildings the walls were painted, and people slept on platforms. The dead were buried inside the buildings as well.

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\(^2\) Although the prehistoric "block" does not fit into the definition of contemporary blocks, great similarities are noted between their basic characteristics.

\(^3\) The Chatal Hüyük settlement was discovered by James Mellaart in 1958, and in 1961. its excavation started.
Some rural settlements eventually developed into urban settlements such as Ur. Town settlements often were very specific and unique in various aspects, that is why it is more difficult to compare them than village settlements. However, by considering settlements from different perspectives, taking into consideration the historical moment of their creation, process of development, the cause of their decline and disappearance, as well as their people needs, it is possible to understand their relevance and the characteristics of all of their elements.4

3. MORPHOLOGICAL DEPENDENCE OF SETTLEMENTS AND BLOCKS

By systematization of settlements according to the shape of the base of the settlements and blocks (Table 1) great diversity was noted, and a simple division, not only of the settlements but also of the blocks, in two basic categories, regular and irregular was made. The shape of the base of the settlement is the consequence of many factors, and in this paper the significance of physical shape of a block, one of the most important element of the settlement structure, is specially emphasized.

Regular shapes of settlement bases are always the consequence of regularly organized street networks and shapes of blocks, and irregular shapes of settlements are either consequence of irregular shapes of blocks or they are conditioned by natural specific characteristics (moved relief, presence of curved water surface, bigger terrain incline and the similar).

4 Professor at the Faculty of Architecture in Belgrade, architect Jovan Nešković, in his lectures in subject Architecture of the Past, emphasized that “if we observe buildings as objects we see nothing. We should observe people and their needs. The plans are not only drawings, there is life coming out of them.”
### Table 1. Systematization of the analyzed settlements according to the shape of settlements and blocks

<table>
<thead>
<tr>
<th>Settlement</th>
<th>Regularity of the settlement base</th>
<th>Shape of the settlement base</th>
<th>Regularity of block base</th>
<th>Shape of block base</th>
<th>Block base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babylon</td>
<td>regular</td>
<td>rectangular</td>
<td>regular</td>
<td>trapezoidal</td>
<td></td>
</tr>
<tr>
<td>Korsabad</td>
<td>regular</td>
<td>square</td>
<td>regular</td>
<td>square</td>
<td></td>
</tr>
<tr>
<td>Workers near Akhetaton</td>
<td>regular</td>
<td>square</td>
<td>regular</td>
<td>very longated</td>
<td>rectangular</td>
</tr>
<tr>
<td>Kahun</td>
<td>regular</td>
<td>rectangular</td>
<td>regular</td>
<td>rectangular</td>
<td></td>
</tr>
<tr>
<td>Timgad</td>
<td>regular</td>
<td>square</td>
<td>regular</td>
<td>square</td>
<td></td>
</tr>
<tr>
<td>Mompazje</td>
<td>regular</td>
<td>rectangular</td>
<td>regular</td>
<td>rectangular</td>
<td></td>
</tr>
<tr>
<td>Elblong</td>
<td>regular</td>
<td>rectangular</td>
<td>regular</td>
<td>elongated</td>
<td>rectangular</td>
</tr>
<tr>
<td>Palmanova</td>
<td>regular</td>
<td>star-like, nonagonal</td>
<td>regular</td>
<td>polygonal</td>
<td></td>
</tr>
<tr>
<td>Brasilia</td>
<td>regular</td>
<td>bent, stripe-like</td>
<td>regular</td>
<td>bent, rectangular</td>
<td></td>
</tr>
<tr>
<td>Milet</td>
<td>irregular</td>
<td>dissected</td>
<td>regular</td>
<td>rectangular, almost square</td>
<td></td>
</tr>
<tr>
<td>Athens</td>
<td>irregular</td>
<td>heart-shaped</td>
<td>irregular</td>
<td>pentagonal</td>
<td></td>
</tr>
<tr>
<td>Priene</td>
<td>irregular</td>
<td>fan-shaped</td>
<td>regular</td>
<td>rectangular</td>
<td></td>
</tr>
<tr>
<td>San Gimignano</td>
<td>irregular</td>
<td>finger-like</td>
<td>irregular</td>
<td>pentagonal</td>
<td></td>
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<tr>
<td>Carcassonne</td>
<td>irregular</td>
<td>elliptical</td>
<td>irregular</td>
<td>semicircular</td>
<td></td>
</tr>
<tr>
<td>Avignon</td>
<td>irregular</td>
<td>elliptical</td>
<td>irregular</td>
<td>complex</td>
<td></td>
</tr>
<tr>
<td>Orvietto</td>
<td>irregular</td>
<td>elliptical</td>
<td>irregular</td>
<td>pentagonal</td>
<td></td>
</tr>
<tr>
<td>Dubrovnik</td>
<td>irregular</td>
<td>rectangular</td>
<td>regular</td>
<td>rectangular</td>
<td></td>
</tr>
<tr>
<td>Manchester</td>
<td>irregular</td>
<td>rectangular</td>
<td>regular</td>
<td>very elongated</td>
<td>rectangular</td>
</tr>
<tr>
<td>a part of New York</td>
<td>irregular</td>
<td>dissected</td>
<td>regular</td>
<td>rectangular</td>
<td></td>
</tr>
<tr>
<td>Redbarn</td>
<td>irregular</td>
<td>dissected</td>
<td>irregular</td>
<td>amorphous</td>
<td></td>
</tr>
<tr>
<td>Welwyn</td>
<td>irregular</td>
<td>dissected</td>
<td>irregular</td>
<td>amorphous</td>
<td></td>
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</tbody>
</table>
Regularity of the shapes of the settlements' base and blocks is a consequence of the way the settlements were created. Those settlements that were formed as complete in a very short period, were most frequently built from the outer borders, walls towards the centre, in which process blocks of regular shapes were most commonly formed, and the settlements which were continually formed, during a longer period of time, were spreading from the center towards the outskirts of the settlements, and the blocks were most frequently of irregular shape. There are settlements which were formed within regularly positioned walls, and the blocks are of regular shapes. There are also settlements which were created by multiplication of regularly shaped blocks; therefore the regular bases of the settlements were formed. Thus, it can be concluded that the regularity of blocks was the consequence of the settlement organization, but also the regularity of blocks influenced the regularity of the shape of the settlements' bases. The square block shape (Fig. 8) is noted in Roman military fortifications, castra, whose bases are of regular shapes, such as in Timgad in Africa (Fig. 7) or in Korsabad (Table 1). All of the blocks are of the same shape and size.

Fig. 7. Square shape of the base in Timgad in Africa from 100 AD
(Figure 8, satellite picture from)

Fig. 8. Square shape of residential block in Timgad (2008, satellite picture)

Within the Workers settlement (Fig. 9), of a square base, which was built near Akhetaton (Akhetaton around 1350 BC, today Tel el Amarn), elongated rectangular blocks were formed only for staff builders' residential (Fig. 10).

Rectangular shape of settlements and blocks existed also in Babylon (2,500 BC.), Khun (2,500 BC), Mom Pazje (Figures 11 and 12), Elblong (1237), Brasilia (1960) (Figures 27 and 28) and Manchester (79). The specific characteristics of Mom Pazje that the rectangular block (Fig. 12), whose shape originated in the shape and size of the building lot, was used as a module in forming of the settlement (Fig. 11). Trapezoidal, hexagon or "L" (Fig. 14) shapes of blocks are the consequence of forming regular star-like, nonagonal shape of the base of Palmanova and characteristic shaped defense system (1593) (Fig. 13). The specific shapes of blocks in Palmanova were necessary elements for forming streets and squares, and at the same time inseparable part of the town completeness.
Irregular shape of the settlement has not always been the consequence of block irregularity, but also it depended on the specific natural surroundings. Thus, for example, Milet (479 BC)
(Fig. 15), which is organized with the regular blocks (Fig. 16), has irregular shape of the base due to jagged shore. The similar examples are also Priene (300 BC), Dubrovnik (7th century) (Figures 17 and 18) and New York (1625) (Figures 19 and 20).

Fig. 15 Irregular shape of the base in Milet from the 5th century BC

Fig. 16. Rectangular shape of the block base in Milet (satellite picture from 2008)

Fig. 17 Irregular shape of the base in Dubrovnik from the 7th century

Fig. 18 Rectangular shapes of blocks in Dubrovnik (satellite picture from 2008)

Fig. 19 Irregular shape of the base of a part of New York, Manhattan in the 17th century

Fig. 20 Rectangular shapes of blocks in New York (satellite picture, 2008)
Although the natural conditions greatly influenced the location of settlements and its design, the influence of rulers must not be neglected. Already, several rulers in Babylon continuously built and edit a city on the banks of the Euphrates. Nebuchadnezzar had built Ishtarian gate, rebuilt the Etamenan temple and built Semiramis’ hanging gardens (one of the Seven Wonders of the World) [6].

One of the most significant factors of forming, organizing and developing town settlements was traffic. The development of traffic caused "reduction" of distances between settlements, thus the settlements became more closely connected, but also it influenced the spreading of existing settlements, thus they became larger and larger (e.g., New York). Some new settlements (e.g. Brasilia) were built over large areas, which could be easily travelled owing to complex and developed traffic systems. Specific shapes and sizes of blocks were formed as the consequence of traffic networks. Irregular shapes of blocks exist in irregularly shaped settlements, and they were formed as the consequence of irregular street networks, for example in Athens (702) (Figures 21 and 22), San Gimignano (12th century), Avignon (12th century) (Figures 23 and 24), Carcassonne (13th century), Orvietto (13th century), Welwyn (1920) (Figures 25 and 26) and Redbarn (1929).

![Fig. 21 Irregular shape of the base of Athens from the 6th century BC](image1)

![Fig. 22 Irregular blocks in Athens (2008, satellite picture)](image2)

![Fig. 23 Irregularity of the base shape of Avignon from the 12th century (2008 satellite picture)](image3)

![Fig. 24 Irregular shape of blocks in Avignon (2008, satellite picture)](image4)
Orthogonal street network in Korsabad, Workers settlement near Akhetaton (Fig. 9), Babylon, Kahun, Mompadier (Fig. 11), Milet (Fig. 15), Priene, Dubrovnik (Fig. 17), Elblong and Brasilia (Fig. 27) caused forming of regular block shapes, most commonly rectangular. This block shape proved to be most suitable not only for spatial organization and block division, but also for forming the settlements' structure. The regular block shapes were most frequently of the same or similar dimensions, regardless of urban disposition within the settlement. Although the blocks often were formed as the consequence of forming street networks, in some settlements they were used as module for forming and planning of settlements as well. Thus there are typical blocks in Milet (Fig. 16), Priene, Elblong and New York (Fig. 20). Trapezoidal, hexagonal or complex block shapes in Palmanova, were formed as the consequence of regularly organized shapes of the settlement base, they were inseparable parts of the town, significant not only for the settlement organization but as well for street and square (Figures 13 and 14).

From the very beginning of settlements, different needs of people caused forming of public and private spaces. The purpose of most blocks in settlements was residential, and only a small number of blocks were used for other purposes. The central blocks, as well as the blocks next to the main street or close to the centre, were specific, more significant than others and stood out from the surrounding residential part, not only for its purpose but for its morphology. Specific blocks or buildings in them represented also significant elements of the settlement identity. However, the most important landmarks in settlements were not the blocks but individual objects. Accentuation of structures in space was used in order to stress the importance of functions, show prestige, owner's wealth or stressing religious domination. Urban settlement structure clearly showed hierarchical organization of society, and caused certain way of living.

Fig. 25 Irregularity of the base shape of Welwyn from 1920  
Fig. 26. Irregular block shape in Welwyn

Segregation of population, which characterized all historical periods, reflected also in the settlement structure. Every special element had its own social purpose. Regular people from lower classes were content with humble accommodation, and luxurious mansions were a privilege of the rulers. The differences between individual objects most clearly could be seen when comparing their sizes and the quality of building materials. Thus, for example, residential buildings in Ur, were not preserved, because they were built of mate-
The fact that residential buildings of the most of ancient town and village settlements were not preserved, confirms that they were built of lower quality materials, and that their owners were poor people.

In the 18th century, when the industrial settlements were formed, parts of the settlements became separated because of the ecological conditions [7]. During the 19th century a specific attitude towards all life spheres was developing, and it was based on the influence of economic rules. Due to that, towns were viewed as products so the town land was used to the utmost. As a consequence of settlement planning based on economy, the surface of settlements grows enormously, blocks were completely built and very tall buildings were built in the central areas [8]. Free surfaces in blocks were more and more used for building. spaces within the blocks became darker and darker and less and less ventilated. Close building led to appearance of blocks with only one building whose dimensions were the same as the dimensions of the block. The central blocks were getting more and more different purposes, so they were more functional than surrounding blocks and residential outskirts. Free settlement development encouraged also "liberation of human personality, individuality and subjectivism, as a basis for human anatomy, independence from all family, national, racial constrains [9]."

This led to significant ideas regarding block organization and settlement planning, and to reconstruction of already existing parts of settlements. The development of towns in 20th century was greatly influenced by technical and technological achievements in the field of constructive systems, building materials and traffic. By criticizing inherited industrial and capitalistic towns, it is suggested to improve the towns by moving residential areas far from the industrial parts and heavy traffic. By aspiring to improve hygienic and functional conditions of living for people, freestanding buildings surrounded by green areas are built far away from the traffic and where non built areas are safe for children playing. However, spaces within blocks become inseparable part of traffic surface, and in the same time not safe enough. "Opening" of blocks led to block destruction, and to other settlement elements.
Zoning is introduced within the towns, division of town territory according to functions, which are mutually connected by heavy traffic. Due to the development of busy roads neighboring blocks became physically separated and the people living in them as well. Separation of residential areas from working areas caused less contact among neighbors in spaces within the blocks. Gradually this caused alienation among people. It was believed that building new settlements paid off more than reconstructing old ones, thus new garden and satellite settlements were formed. A lot of attention was paid to separation of inner part of residential blocks from outer traffic. For that reason groups of residential buildings such as in Figure 26 were formed [10]. The private life was priority, and public and social life was neglected.

4. CONCLUSION

On the basis on the comparative analysis of the structure and identity of settlements and their blocks from different historical periods, and by observing the ways of their creation, several conclusions were drawn. Although there is a great diversity of the base shapes of the settlements and blocks, settlements and blocks can be divided into two categories: regular and irregular (Table 1). The significant interdependence of the shape of settlement base and blocks within them is noticeable. Regularity of the shape of settlement base is most frequently consequence of the regularity of blocks, but, in some cases, regularity of blocks is conditioned by the organization of the settlements within their geometric borders. Irregular shape of settlements is most frequently consequence of the block irregularity or specific natural surrounding.

It has been noticed and that the shapes of the settlement bases depend on the way of creation and development of the settlement. In some settlements, block had a function of a module. When it was, settlement were forming by multiplying blocks, and later continued with its development, building new blocks. It has been noted that the rectangular shape of the block is the most represented in the settlements and that was always the most efficient for land exploitation. Rectangular block shape came from the result of multiplication plots rectangular shape, and sometimes was the result of organizing orthogonal street network. Block shapes are mostly a consequence of the street network characteristics. Trapezoidal, hexagonal or "L." block shapes usually formed due to the result of a need for squares and streets or as consequence of forming specific shapes of settlement base (eg, ideal cities).

Urban dispositions of blocks in the settlement were extremely important for the organization and implementation of certain functions. It observed that the central blocks are specific and more significant than other blocks. Most of them are non-residential, unlike most of other units whose purpose is residential. Urban structure of settlements has always emphasized hierarchical organization of the society and caused certain way of living. The blocks are allocated of the environmental conditions in the settlement, depending on the location and their purpose. Realizing the difference in the ways of building blocks, it was concluded that the free way of building the formation of environmentally correct area, but less secure. Marginal way construction, on the contrary, creates less favorable environmental conditions, but provides a higher degree of security. Free way to building more and led to block destruction and the alienation among the people.
ISTORIJSKI PREGLED MEĐUUSLOVLJENOSTI NASELJA I URBANIH I RURALNIH BLOKOVA

Ljiljana Vukajlov

Usled pojave novog načina oblikovanja prostora naselja, pri čemu se gube osnovne karakteristike tradicionalno formiranih blokova, pokrenuta je ideja o istraživanju uloge urbanog i ruralnog bloka u formiranju strukture i identiteta naselja. Osnovni cilj istraživanja je da se dokaze da je blok odvojek bio sastavni, ponekad i neodvojivi, deo strukture naselja, njegov prepoznatljiv element i značajno mesto susedstva, pa da je, zbog toga, bitno sačuvati njegove vrednosti i pri budućim intervencijama u naseljima. Da bi se shvatio uzrok pojave nestajanja tradicionalnog bloka, istraživane su njegove karakteristike u naseljima iz prošlosti i utvrđena je međuuslovljenost naselja i blokova.

Ključne reči: Naselja, urbani blokovi, ruralni blokovi, medjuuslovljenost, morfologija