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AND URBAN TYPOLOGY  
(1868-1918)

SPECIAL CASES: ZAGREB AND RIJEKA

PRELIMINARY COMMUNICATION  
UDC 711.6(497.5 RIJEKA, ZAGREB)"1868/1918"

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I URBANA TIPOLOGIJA U RAZDOBLJU  
OD 1868. DO 1918. GODINE

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FIG. 1 FIUME, PORT IN 1908  
SL. 1. FIUME (RIJEKA), LUKA 1908.

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# URBAN TISSUE TYPOLOGY AND URBAN TYPOLOGY (1868-1918) SPECIAL CASES: ZAGREB AND RIJEKA

## TIPOLOGIJA GRADSKOGA TKIVA I URBANA TIPOLOGIJA U RAZDOBLJU OD 1868. DO 1918. GODINE POSEBNI SLUČAJEVI: ZAGREB I RIJEKA

AUSTRIA-HUNGARY  
SPECIAL CASES  
URBAN FORMS  
URBAN TISSUE  
URBAN TYPOLOGY

AUSTRO-UGARSKA  
POSEBNI SLUČAJEVI  
URBANE FORME  
URBANO TKIVO  
URBANA TIPOLOGIJA

In the last third of the 19<sup>th</sup> century urban modernisation processes took place in Austria-Hungary. The urban evolution took new direction and created similar urban forms: the urban tissue types were studied in case of more than seventy towns and enabled the taxonomy of the urban types. Among the low number of special urban types found, two are situated in Croatia. The study is about to discuss and define the unique type of Zagreb and Rijeka.

Tijekom zadnje trećine 19. stoljeća u Austro-Ugarskoj je došlo do modernizacije urbanih središta. Razvoj gradova krenuo je novim smjerom pa su se razvile slične urbane forme: na temelju analize više od 70 gradova, izvedena je tipologija urbanog tkiva s pripadajućom taksonomskom organizacijom. Od malog broja specifičnih urbanih tipova, dva se nalaze u Hrvatskoj. Ovaj rad istražuje gradove Zagreb i Rijeku kao jedinstvene primjere.

## INTRODUCTION

### UVOD

*"Towns have a life history. Their development together with the cultural history of the region in which they lie, is written deeply into the outline and fabric of their built-up areas."*<sup>1</sup>

The urban tissue typology itself has complex manner in the field of urban morphology and in urban typology as well. The cohesion in the urban tissue and urban typology is evident, but it has to be explained, since the juxtaposition of various urban forms does not essentially create coherent urban tissue patterns that could be the base of urban tissue typology. The aim of the taxonomic designation of Austro-Hungarian towns and urban tissues is intended to describe and evaluate the city building activity of the era, since its recognition and processing was not already made. Establishment of a taxonomy of towns itself is significant because the typology is dealing with the Lands of the Crown of Saint Stephen as a whole, thus there is a possibility to bring it into use and evaluate the results of the urban development and urban evolution by an integrated morphological approach.

The aim is to create urban typology that covers the selected research territory. Being conscious about the nature of the city's heterogeneous tissue, that hardly allow the creation of a unified system, which accurately determines the city as an entity, thus makes possible to create a typological system that can define a settlement and group towns by matrix of variables in the territory. Decision was made to incorporate the study with analyses of urban tissues and their correlation, due to contradict the statement and prove that via functional circumscription of urban

tissues, the classification of heterogeneous urban fabric/typological system could be formed.

The one of the most productive and intense eras of town building and modernization of the study area<sup>2</sup> is represented in the period between 1867-1918. Generalized view about city development is not sufficient in the towns of the former Lands of the Crown of Saint Stephen, since between 1867 and 1918 the Austro-Hungarian towns went through specific urban evolution, partially following the Western trends of city-development. Comparison of the Austro-Hungarian cities<sup>3</sup> shows the system of structural changes established in wider context: particularities of the complex system of cities in the Hungarian Kingdom can be defined more appropriately by examining and comparing of selected cities in the Austrian Empire. Economic and historical changes followed the agreement/compromise (1867), as a result of this and the upcoming industrial revolution<sup>4</sup>, a progressive urban development started and it was determined by new urban pattern, urban fabric, urban types and different city construction. New directions in the evolution of the urban fabric of the Hungarian Kingdom and some parts of the Austrian Empire were influenced by the economic changes and distinct functions within the settlements and by landscape features in minor level. The purpose of the study of the taxonomy is to systemize the new urban tissue types, whose development was influenced by the progressive urbanization, and by further organization and combination of these types define a new urban typology of the cities.<sup>5</sup>

The detailed urban tissue analyses indicate high variability of clustered urban tissue and urban types, but there are special cases standing out by their unique features (simple tissue, geo- and urban morphological character, urban tissue combinations, urban planning principals). Out of the more than seventy cities two towns, as special cases in urban typology are going to be analysed in the current paper, outlining their character in the selected timeframe. The former Free City of Fiume / *separatum sacrae regni coronae adnexum corpus*<sup>6</sup> (Rijeka, Croatia) and Agram/Zagreb (Zagreb, Croatia), the capital of the former Kingdom of Croatia-Slavonia are distinct urban types in the typological matrix of the former Austria-Hungary.

### INTEGRATED METHOD OF URBAN MORPHOLOGY

#### INTEGRIRANA METODA URBANE MORFOLOGIJE

The meaning of 'morphology' can be identified as a percept of the nature of the urban

forms as it is, is most significantly the discipline of the study of morphological properties in an urbanized territory.<sup>7</sup>

The examination of progressive urbanization of intensively growing cities in the selected territory requires a new type of typology method, that is partially based on the (typo)<sup>8</sup> morphological analysis of M.R.G. Conzen (English school, 1960) and approaches of G.F. Caniggia (Italian school). The method can not adopt fully either the Conzenian approach of urban morphology or the Canniggian way of seeing the cities. Caniggia considered the development of the cities as a dynamic model, which responds to the changes in society and is perceived as a three-dimensional projection. In case of the study of the selected cities where the examination outlines a specified period of time there are some anomalies, since not all of the forms and elements of the past can be evaluated and seen nowadays. The development of the city and its typology can be examined as a static model primarily in two-dimensions, because of limited availability of sufficient data.

A contemporary theory of the Italian morphological school was based on Koster's (2001) hypothesis, that the city is the physical manifestation of the cultural development. Finding evidence for this theory, he views the maps as a period of cultural and historical imprint and as in terms of the reconstruction of the elements. According to a theory of Karl Kropf (1996), investigation of the physical factors is the most efficient way to determine the city's character, since physical aspects are the most obvious in terms of observation, but it is known that without historical, social and economic impacts, not possible to talk about the actual urban development.

The integrated and developed morphological research<sup>9</sup> combines the basic urban elements (simple tissue, plots, series of plots, buildings, open and green spaces) and their inner relationships due to establish urban tissue typology and more complex form, the city typology. Plot analysis gives an idea about the evolution of the plot and its shape, it is correlating with streets (simple tissue) that should be analysed according to plot and street form relations and building lines, since each street has its unique character and structure. Study of the streets has multiplied effect and result, also in the urban tissue typology, but in the townscape analyses as well.

The identified and outlined urban tissues refer to the 'urban block' (urban block in our case not only a single block/area surrounded by streets, but territory, that consists of some block elements and in this was established a continuous special existence) and its ele-

ments (buildings, streets, plots and their relationships). Within a block the relationship between plots and road ought to be studied, and how the individual homogeneous areas relate to the neighbouring areas. Taking these and previous analyses into account the urban tissue typology can be understood. The city street grid of historical towns refers to the direction of development; thus we can determine the evolution of towns in a selected territory as well. As it has been seen, the built environment is an important indicator in determining the urban tissue. Buildings are placed on the lowest rank with regard to the hierarchy of urban forms and formations<sup>10</sup>, since they are less constant compared to the road network and the city structure. However, the development of the road network has strong influence on buildings, and on the image of the city itself.

The city layout (map) displays the urban complex, general forms in macro-scale, metamorphosis of plot forms, size and form and references, period of formation and terrain characteristics. The framework is constituted by the outlines of the buildings, being the elements that create the city's image (facades, building height, style), while empty plots and public areas are included as well. The functional use is temporal, thus focusing on the structural elements created as samples of urban tissue. The city structure is formed by spontaneous or planned organization of urban elements. In our case, the typo-morphology is the result of a special composition, which tends to explore the connections (on the level of streets, blocks, plots, buildings, green space) between internal and external units.

**Glossary** – Urban forms are group of elements that create different urban tissues and the structure of the town itself, these are streets/roads, plots, plot series, buildings, urban blocks (plot series and buildings together), open spaces and greenery. Simple tissue or street tissue is a combination of all urban elements [Caniggia] or plan unit [Conzen]. The urban tissue or urban fabric is the ensemble of urban forms and its typology is a taxonomic classification of urban form characteristics and their inner relations found in urban places (selected towns), the urban tissue type is a certain arrangement of urban elements. The urban typology is a taxonomic classification of town types according to urban tissues types, urban tissue combinations and relationships between urban tissues and green spaces, railway lines, thus the urban type (city/town type) certain combination and relationship of urban tissue types. The urban or building pattern is "the arrangement of existing buildings, i.e. their block-plans in a built-up area viewed as a separate

1 CONZEN, 1960: 6

2 The study area is the territory of Austria-Hungary: Cisleithania and Transleithania. Transleithania referred to the Austro-Hungarian Empire beyond Leitha (Lajta) river, yet was an unofficial term for the Lands of the Crown of Saint Stephen, it consisted of the Kingdom of Hungary (including the former Principality of Transylvania, Voivodeship of Serbia and Banat of Temeschwar), the self-governed Kingdom of Croatia-Slavonia (1868), and the free port or free city of Fiume (Rijeka, Croatia). Cisleithania refers the Habsburg lands.

3 During the entire research process more than 70 cities were studied. The cities (Zagreb, Rijeka, Osijek) of the present-day Croatia (former Kingdom of Croatia-Slavonia) were analysed within the framework of CEEPUS – Central European Exchange Program for University Studies at the University of Zagreb Faculty of Architecture in 2016 (mentor: prof.dr.sc. Bojana Bojanic Obad Scitaroci). Final works have been done within the framework of Nemzeti Tehetség Program – Nemzeti Fiaatal Tehetségeiért Ösztöndíj [NTP-NFTÓ-16-0859].

4 The industrial revolution in the Kingdom of Hungary occurred with delay, the country could join only to the second wave of industrial revolution (1871-1914), however it partly worked off its disadvantage until the First World War.

5 The list of the case study cities takes into account the group of those cities that lost their right to be municipal towns through the XX. Article of 1876 [See in: 1868. évi XXX. törvények a Magyarországon, s Horvát-, Szlavon és Dalmátországok közt fenforgott közjogi kérdések kiegyenlítése iránt létrejött egyezmény beczikkelyezéséről] and also those that were allowed to keep their rights, the research cannot ignore those cities that lost their status as royal free towns. More than 70 cities were chosen according to their legal status, that was an indicator of their pre-compromise development. Territorial coverage was taken into account as well. Legal status together with rights and duties as part of it, beside natural development forces, were indicators of the direction of urban evolution. Most of the 70 towns were free (royal, mine, port) towns in a certain period of time. The cities of the studied period reflect the territorial diversity of geographical and hydrographic characteristics, and through these cities the historical inclination that prevented them from establishing a unified and distinctive urban structure and townscape typical in its unified nature for the former Transleithan territories can be shown.

6 1868. évi XXX. törvények a Magyarországon, s Horvát-, Szlavon és Dalmátországok közt fenforgott közjogi kérdések kiegyenlítése iránt létrejött egyezmény beczikkelyezéséről

7 It deals with urban spatial structure, the distinctive character of urbanized areas, and analysis of the development processes that studies the physical character of the urban fabric at different levels of the urban structure. The methodological background was created by examination of urban morphological studies that raised new research issues. When typological/morphological analysis is concerned, then generally demographics, geographic location, building height, and special historical structures dominate.

8 In the case of the current research the idea and practice of the typo-morphology is based on both schools (English-Italian), basically to give an attention to the changes of the urbanized territory, how physical form metamorphosed over time and to how different cities could be compared to each other due to define the urban tissue types and types of the former cities in the Hungarian Kingdom and the former Austrian Empire.

9 LOVRA, 2016: 805-814

10 Based on the Conzenian hierarchy with changes, due to adapt to requirements of the integrated method. [LOVRA, 2015: 238-244]

element complex of the town plan”<sup>11</sup> and morphogenesis or urban evolution pattern (urban development pattern) is creation of physical forms (patterns) viewed as a developmental or evolutionary process<sup>12</sup>, thus the urban pattern is the ”way how different functions and elements of the settlement form are distributed and mixed together spatially”.<sup>13</sup>

**Levels (steps) of the urban tissue analysis** – The steps of urban tissue analyses, according to the urban morphology and the integrated method starts with (1.) the street network determination, followed by (2.) the analyses of plots and buildings (shapes, relations between plots – buildings and to the street network), (3.) plot series (shapes, relation to street network) and additional spaces (open spaces, green spaces adapted to the blocks), the urban tissue (urban pattern) is completed by the (4.) green and open spaces.

1. The street network/system refers to the structural changes of the time period. Identification of the urban network schemas (simple tissue) is important in terms of the further studies and urban tissue determination. The simple tissue is determined by examination of those areas in different cities on maps and plans that went through structural changes in the research period.

2. Analysis of plots and buildings: the nature of relations of plots and buildings to each other, their relations to the street front (shape of plots, construction, buildings with/without internal courtyard, development in unbroken rows, floor plan of the buildings, etc.)

3. Plot series (blocks): shapes, relationship between the blocks and street network, open spaces and green areas (green areas are going to have high importance in the urban typology)

4. Green spaces in the city (parks, alleys): location, conditions

5. The urban tissue catalogue is based on the determination of similar pattern clusters that can be found in the cities. The determination of the urban tissue is based on the previous points 1 through 4.

Parks and green spaces, their location within the city, as well as the relationship to the various types of urban fabric is significant in terms of determination and definition of urban types/urban typology. Before the determination of urban typology green areas within the city borders shall be categorised as 1. Parks within the city, 2. Green areas at the edge of the cities (recreational areas, integrated construction areas), 3. Alleys within the city. The location of the green areas impact on the urban tissue typology as well as in addition to the urban typology.<sup>14</sup>

## PRINCIPLES OF CITY PLANNING IN THE PERIOD BETWEEN 1867-1918

### PRINCIPI URBANISTIČKOG PLANIRANJA U RAZDOBLJU IZMEĐU 1867. I 1918.

The study of urban tissue types and simple tissues (street networks) of the selected towns showed some recurrent principles of city planning, that can be directly linked to the leading, but at some point contradictory with town building ideas and practices of the period. Camillo Sitte's *Der Städtebau nach seinen künstlerischen Grundsätzen* (Vienna, 1889) established a new approach in planning of squares and placement of monuments to define a unity between modern and artistic methods through the formation of public space. Sitte was concerned about the modern town planning principles, like the use of grid layouts for streets, yet he accepted the *raison d'être* of modern city planning methods if these are developed with aesthetic values, artistic methods in mind (not just treated as technical problem), in order to avoid the monotony of blocks and to emphasize the importance of creation the right proportions, organization of public spaces and greater or smaller number of winding and irregular streets and picturesque view along these streets (these streets must be the result of topography – contour forming).

His principle could be witnessed in those cities where were lack of free open spaces for

<sup>11</sup> CONZEN, 1969: 123

<sup>12</sup> According to the ISUF Glossary [WHITEHAND, 1981: 1-24].

<sup>13</sup> LYNCH, 1981: 265

<sup>14</sup> Establishment of the urban typology has to take into account the location of railroad systems in the city, as well as the position of the town centre. The relationships according to the urban tissues: 1. Urban tissue type and the centre, 2. Urban tissue type and the green areas, 3. Urban tissue type and the main roads/railway, 4. Urban tissue type and the river/lake (sea). The combination of urban tissue types, relations and dominance of certain urban tissues determinates the city type.

<sup>15</sup> According to B. Metzger-Šober, who analysed the regulation plan of Paolo Grassi. The urban tissue analyses of Rijeka (then Fiume) based on the cadastral map from 1910 proved the probable existence of Sitte's influence in the upper parts of the city and in the old city, since Sitte was aware that the regulation of the old part/city has its limitations, if the urban heritage should be preserved but in the same time also the old part should be interconnecting into the modern city structure.

<sup>16</sup> BOHL-LEJEUNE, 2009: 251

<sup>17</sup> The differences between the pre and post planning period can be followed by the map CS 3.

<sup>18</sup> CS 2

<sup>19</sup> The aim of the current study is not to go in details of the town planning regulations and explain their influence, but to highlight those characteristics important in case of urban tissue typology and urban typology, the milestones of urban evolution. For detailed explanation about the town planning regulations see in article KAHLE, 2004 and in other publications like BLAU, RUPNIK, 2007 and KNEŽEVIĆ, 1996.

planning, mostly in case of the towns developed on the slopes of highland. Sitte's principles of picturesque harmonic and well organized asymmetry were opposed by Otto Wagner and were followed by Paolo Grassi in his regulation plan of Fiume.<sup>15</sup> In then contemporary urban planning Sitte highlighted three simple tissue systems: the gridiron system, the radial system, and the triangular system. Otto Wagner opposed the planning ideas of Sitte, he rejected the architectural and urban language of the past and 'believed' in new forms created according to their functions. Wagner in his plan of *Die Großstadt* defined the urban blocks as new functional forms which were units of aggregation, the parallel radial and perpendicularly intersecting streets and squares created by 'removed blocks' acted as open spaces. For Wagner the "ideal metropolitan neighborhood consisted of uniform residential blocks interspersed with monumental public buildings arranged along a central axis of green spaces".<sup>16</sup> The modern urban planning principles (orthogonal street network, compact, closed urban block with patio/inner courtyard, centrally arranged green spaces, parks) can be seen in case of Fiume and Zagreb (Lower Town). Hermann Josef Stübben established the practical principles of city planning in his manual, *Der Städtebau* (first edition 1890). These principles are increased by the most emerging problems of the cities in the period of modernization: traffic, building, health. According to Stübben, the radial streets are the most important in the design of city plan to establish the street network (simple tissue). The concentric circles around the central point of the city are the ring streets with different hierarchy. The radial and ring streets perpendicularly intersect each other (the plot series/districts between the main streets have trapezoidal or approximately rectangular form). The shape of the blocks is usually rectangular, trapezoidal or triangular (especially along diagonal streets).

## URBAN TISSUE TYPES AND URBAN TYPE OF RIJEKA AND ZAGREB

### TIPOLOGIJA URBANOG TKIVA I SLUČAJEVI RIJEKE I ZAGREBA

#### Agram (Zagreb, CRO) between 1868 and 1918

– The urban tissue and urban typology is taking into account the entire urban structure, but highlighting the importance of the studied morphological period that can be distinguished in case of Zagreb. The different morphological periods can be divided and show the linear development character (west-east direction). The medieval double core (Gradec and Kaptol) was unified in the mid of 19<sup>th</sup> century and since then the evolution of the city

took new and modern direction. Before the first regulation plan was established (1864/1865) the morphogenesis of the city was organic (spontaneous) along the access roads (Ilica, Frankopanska, Petrinjska, Vlaska) and around Harmica.<sup>17</sup> The map of Zagreb from 1864<sup>18</sup> served as base of the first regulation plan<sup>19</sup> (1865<sup>20</sup>) and shows the pre-regulation structure of the city. The structure of the Upper Town (Gradec and Kaptol) remained untouched, kept its medieval character, since the new city centre (Lower Town with the "Lenuci Horseshoe") was situated outside the walls of the settlement. The pre-regulation simple tissue structure of Lower Town lacked any geometrical order, since even the line of the main street (Ilica) between the hill and the plain was adjusted to the slopes, but the other streets on the plain had irregular order as well. The two town planning documents and regulation plans (1865, 1887/1888<sup>21</sup>) established the orthogonal gridiron system of the Lower Town. The regular network of new (and regulated old<sup>22</sup>) streets, series of squares and green areas, the new city centre itself was divided into block strips with integral green belt. Since in 1880 Zagreb was hit by earthquake which caused great damage in the built environment and the Lower Town before the planning was mostly nothing else but empty fields. Urban planning works resulted in regular, orthogonal grid of streets, squares, parks and system of large city blocks. The upper mentioned Lenuci Horseshoe is an "U" or horseshoe-shaped system of eight connected park/garden squares (Gartenplätze by Stübben<sup>23</sup>) with two axes (north-south and west-east). Even the idea of Milan Lenuci was firstly presented in 1881/1882, but the green-belt structure, incorporated with the rectangular grid plan was adopted to the regulation plan of Zagreb (1882) as a significant urban ensemble of the Lower Town. The integrity of the rectangular grid system with the green-belt as well gives the unique character to the city, since in other cities that kind of linear<sup>24</sup> and radical urban evolution was lacking.

#### Fiume (Rijeka, CRO) between 1867 and 1918

– The urban structure and townscape of Rijeka has been changed significantly, but its medieval core, built on roman layers remained and integrated into the further developments as a complex, but still almost untouched ensemble. The urban structure of the city in the research period consists of different morphological periods/layers (18<sup>th</sup> century: southward to the medieval core the orthogonal urban matrix; from the mid of the 19<sup>th</sup> century the planned filling of the coast acted as base of the further investment with intention of the planned neighbourhood Novi grad, as well as the Boulevard that created a link between the medieval-renaissance nu-

20 CS 3

21 CS 4

22 Old streets were widened and adapted to serve effectively the more intense traffic.

23 STÜBBEN, 1890: 161-170

24 The morphological periods can be easily divided by linear lines: 1<sup>st</sup> morphological period is the Upper Town, 2<sup>nd</sup> is the Lower Town till the railway lines.

25 Reference: CS 6. The first railway line was established in 1873 (Budapest-Fiume).

26 The office designed the Croatian National Theatre (1894-1895) as well in Zagreb and other cities in Austria-Hungary.

27 Pfaff designed the main railway station in Zagreb (1892) as well as numerous other railway stations in the cities of the former Hungarian Kingdom.

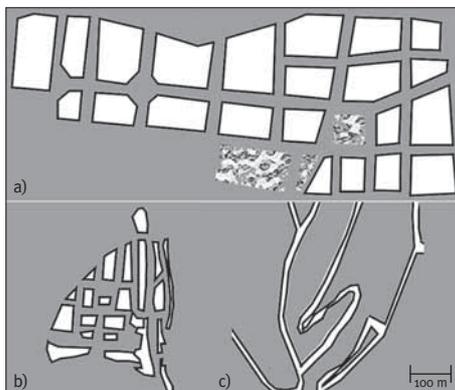


FIG. 2 ZAGREB, THEATRE (MARŠALA TITA) SQUARE WITH THE CROATIAN NATIONAL THEATRE IN 1908

SL. 2. ZAGREB, KAZALIŠTE, TRG MARŠALA TITA S HRVATSKIM NARODNIM KAZALIŠTEM 1908.

FIG. 3 ZAGREB, SIMPLE TISSUE – STREET NETWORK SHOWS THE DYNAMICS OF THE OPEN SPACES AND GREEN SPACES

SL. 3. ZAGREB, JEDNOSTAVNO TKIVO – MREŽA ULICA POKAZUJE DINAMIKU OTVORENIH PROSTORA I ZELENIH POVRŠINA



cleus with new developments). The progressive townscape and infrastructural development of Fiume has become national affair in the studied period, due to city's strategic role. After 1872 the improvements of the port and the railway construction were continuous<sup>25</sup>, the conscious and purposeful interventions brought new urban development path: at the beginning of the 20<sup>th</sup> century at the site of the previously narrow winding alleys, wide and regular streets with lines of mansions were built. Even the perception of the city is more likely to Trieste (IT) (comparison has been made to achieve the upper mentioned wider context), but the new-built structure and architecture mostly followed the plans of the state architects. The designers of the Rijeka's modern public buildings were mainly architect and engineers from Budapest and Vienna: Atelier Fellner&Helmer: Croatian National (City) Theatre (1883-1885)<sup>26</sup>, Ferenc Pfaff: main railway station (1890/1891)<sup>27</sup>, Ala-

jos Hauszmann: Governor's Palace (1893-1897).<sup>28</sup> At the end of the 19<sup>th</sup> century the new Brajdica neighborhood was built, and free-standing villas and the residential houses surrounded by greenery were erected in the central areas. In 1898 a decision was made about preparation of urban regulatory plan, which was preceded by land survey of the city. In 1904/1905<sup>29</sup> the regulation plan was accepted, the leading engineer was Paolo Grassi. In this period the construction was related with demolition of the built environment, Grassi at the same time destroyed the abandoned buildings and eliminated the existing smaller squares. The urban development and city building of the period was characterized by the compact closed blocks in the centre and villas and spacious gardens on the slopes.<sup>30</sup>

**Analyses and specifics (simple tissue, urban tissue)** – The cities, Rijeka and Zagreb in the period between 1867 (1868) and 1918 have undergone intense urban development and architectural (townscape) transformation (Fig. 1 and 2), the increasing population and the number of buildings, as well as the territorial spreading refer to that tendency (Table 1<sup>31</sup>). The urban morphological changes during the first and one of the most intense modernization period of these cities, created unique urban evolution pattern among the studied towns. Zagreb and Rijeka, as well as the other cities were studied based on the principles of the chapter 2. Zagreb shows individual linear evolution and the urban development of Rijeka is combined, in addition to the regular, almost orthogonal simple tissue structure, the street network on the slopes is adapted to the geomorphological character of the area.

Understanding the basic principles of the city planning (building) theories and practices gives a proper base of the urban tissue analyses, since as in the first level of the urban tissue analysis was highlighted, that the identi-

TABLE I STATISTICS OF DEMOGRAPHIC AND TERRITORIAL CHANGES IN ZAGREB AND RIJEKA BETWEEN 1877 AND 1913. DATA FROM 1877 BASED ON THE OFFICIAL MONOGRAPHS OF STATISTICAL RECORDS VALID FOR THE TERRITORY.

TABL. I. STATISTIKA DEMOGRAFSKIH I TERITORIJALNIH PROMJENA U ZAGREBU I RIJEKI IZMEĐU 1877. I 1913. PODACI IZ 1877. TEMELJE SE NA SLUŽBENIM STATISTIČKIM PODACIMA.

City	Year	Legal status	Buildings	Inhabitants	Territory (cadastral yokes*)
Fiume (Rijeka)	1877	Free City and Port	768	13,314	166
Fiume	1892	Autonomous Port City which is part of the Countries of the Hungarian Holy Crown	1,731	29,494	1,333
Fiume	1913	Autonomous Port City which is part of the Countries of the Hungarian Holy Crown	2,511	49,806	3,573
Zágráb/Agram	1877		1,521	19,857	5,680
Zágráb, Zagreb	1892	Hauptstadt/Capital City	2,275	38,742	5,781
Zágráb, Zagreb	1913	City endowed with Municipal Rights and Capital City	3,830	79,038	11,620

\* 1 cadastral yoke = 1.412 acre, also known as bécsi hold (literally translation: Viennese yoke), used as area unit in the research period.

<sup>28</sup> The list of the buildings is not complete; these examples are just few of the extraordinary buildings in Rijeka from the period.

<sup>29</sup> Final approval in case of the plan came from Budapest in 1909, but when the plan came into force, terrain conditions have changed so much that it had to be changed in many ways, which was done several times until 1917 when it adopted the final general regulatory plan, the so-called Piano rosso. [PALINIĆ, 2011: 53]

<sup>30</sup> CS 5 and 7

<sup>31</sup> Table I is based on official monographs of statistical data valid to the territory of the former Lands of the Crown of Saint Stephen.

<sup>32</sup> It means that in case of urban tissue typology and urban typology all the morphological periods (urban structure and build environment established in a certain development period) are taken into account.

<sup>33</sup> More details about the typology and groups in the author's upcoming publication (2016) *Párhuzamos tipológiai párhuzamok in: régi-új Magyar Építóművészet – Post Scriptum.*

fication of the urban network schemas is important in terms of the further studies and urban tissue determination. Simple tissue – street network of Zagreb (Fig. 3) shows the dynamics of open spaces and green spaces as well, along with the rectangular grid network of the Lower town and the organic, irregular street network of the Upper town, the third type is following the inclinations of the slopes and shows looser and irregular, mostly single or poorly connected paths. In case of Rijeka, the simple tissue determination (Fig. 7) is similar, the city is divided into three simple tissue parts: a) orthogonal grid system (along the port) together with the port, b) irregularly winding paths of the old town, c) irregular loose path-system, that are following the slopes. Rijeka is an interesting, yet unique example, since its location (sea) and function (port) has high impact on the simple tissue and on the urban tissue combinations as well. The function is industrial (having in mind its role in transport and trade) and the railway tracks are located between the sea and the urban core (Fig. 6). The semi-linear layers of morphogenesis can be followed by determined simple tissues and urban tissues, and made the urban development and the town itself a special case. The analyses according to the plots and buildings showed high variety, but in both cases the disposition of the plots and buildings with corresponding geometry and placement is similar: on the slopes mainly irregular plots and free standing buildings (the variations see in Table II and Table III among urban tissue groups: A, B) followed by regular oblong plots and buildings what are creating or an unbroken row of buildings or compact plot-series with or without patios/inner gardens. The mentioned linear urban evolution is denoted by the built environment and the plot-series (urban block) of the cities is shown in the Fig. 4 (Zagreb) and Fig. 6 (Rijeka). Examination of the urban tissues covers the whole territory of build environment<sup>32</sup> of Zagreb (Table II) and Rijeka (Table III), thus it appears unique urban tissue types as well, like in case of the port city, the harbour itself. The urban tissue catalogue of the two cities and the maps show the urban tissue distribution (Zagreb: Fig. 5 and Rijeka: Fig. 8). The samples cover the entire city, in the maps are shown the exact places of the samples, although the whole city was studied and these significant types were found. These pieces (most of the types) are construction elements of other studied urban structures as well, yet their combination is unique. The first determination among the studied cities was based on the urban tissue combinations, their spatial designation, natural features (slopes, river, plain). Two bigger groups can be divided: basic types (outlined and defined tissue, without mix-



FIG. 4 ZAGREB: PLOT SERIES – URBAN BLOCKS  
SL. 4. ZAGREB: PARCELE – URBANI BLOKOVI

ture) and complex or combined types.<sup>33</sup> Zagreb and Rijeka was chosen to be discussed as special types, since among the complex/combined types, their special role is laying in their urban structure and their urban tissue combination. Zagreb's Lower town adopted well the leading urban planning and urban design tendencies by that time, the urban matrix with the open spaces, green spaces (Lenuci's green belt), with urban blocks follows the Stübbenian principles and well divided from the unplanned structure of the Upper town. This clear division is hardly found between the other cities, even the single urban tissue types can be found in other studied towns.

FIG. 5 URBAN TISSUE TYPE DISPERSION IN ZAGREB  
(THE SPOT SHOWS THE NEIGHBORHOODS WHERE THE SAMPLES WERE TAKEN AND THE URBAN TISSUE TYPE)  
SL. 5. DISPERSIJA URBANOG TKIVA U ZAGREBU  
(OZNAKA POKAZUJE ČETVRTI U KOJIMA SU UZETI PRIMJERI KAO I TIP URBANOG TKIVA)

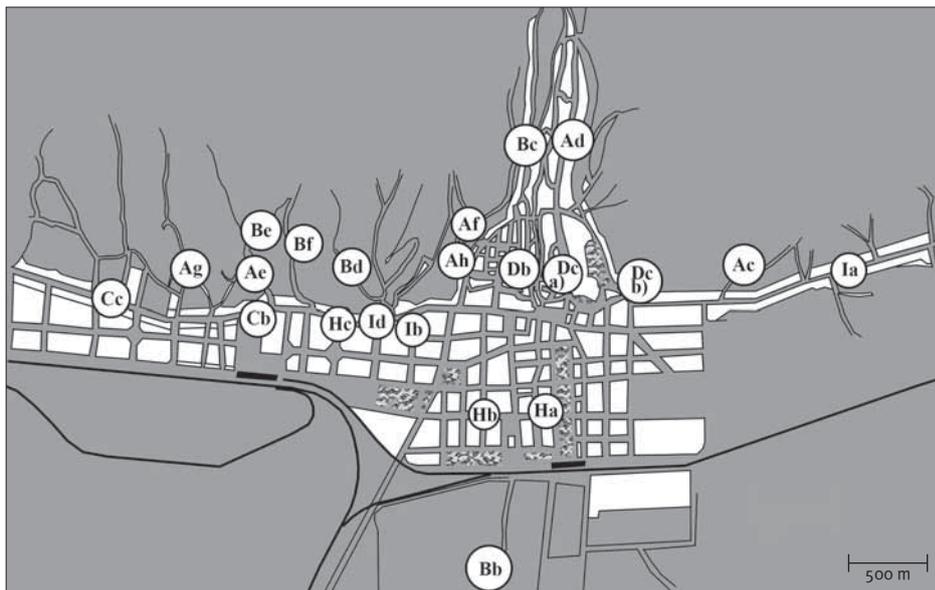
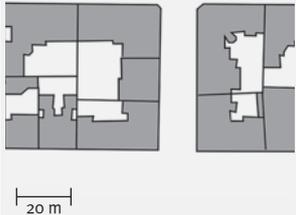
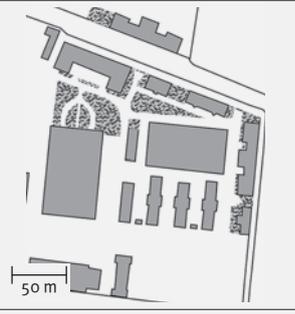
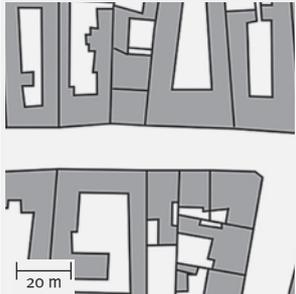
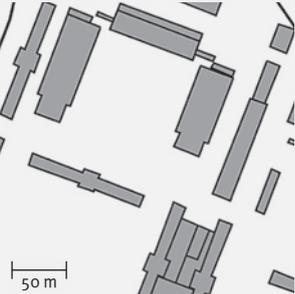
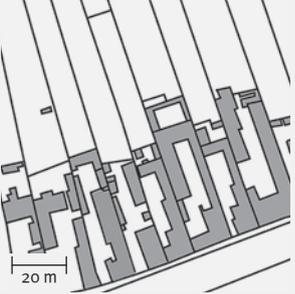


TABLE II URBAN TISSUE TYPES OF ZAGREB. ANALYSES ARE BASED AND REFERENCED ON THE CARTOGRAPHIC SOURCE UNDER NO 1.

TABL. II. TIPOLOGIJA URBANOG TKIVA ZAGREBA. ANALIZE SE TEMELJE NA PODACIMA IZ KARTOGRAFSKOG IZVORA POD BROJEM 1.

Type	Characteristics	Figure	Type	Characteristics	Figure
[Ha]	Regular street network, grid-like dynamics (oblong grid; gridiron system). The parcels are regular, and divided into two or three sections. In the first section is located the building (residential use), its façade is tightly placed on the street line, unbroken row of buildings. Development method is equivalent in the plot series: similar layout shape (rectangular central core with one or two extending elements, "L" or "U" shape); behind the residential building (multi-dwelling unit) is situated the courtyard and an open (green) area, the so-called "perivoj"*; the communal courtyard garden. The buildings form a closed block, which internal part, closed from the public is a connected network of the communal courtyard gardens.		[Id]	Plots with irregular geometry form complex plot-series. Development in unbroken rows with variable building layouts: "U", "L" and traditional rectangle shape. Outbuildings (in some cases more than 3) are attached to the main building. In all cases a courtyard belongs to the buildings, it is surrounded by buildings located on the same plot. The shape of the plots reflects on the pre-regulation distribution of land, which has not changed. As a result of street system regulations, along the streets the distribution of building layout has changed, while inside the blocks the traditional (pre-regulation) development method remained the same.	
[Hb]	Regular street network, grid-like dynamics (oblong grid; gridiron system). The parcels are regular, and divided into two sections. On the first section is placed the building (rental palaces or mixed use), its façade is tightly placed on the street line, unbroken row of buildings. Development method is equivalent in the plot series: similar layout shape (rectangular central core with one or two extending elements, or "L" shape on the corners); behind the residential building (multi-dwelling unit) is situated the courtyard. The buildings form a closed block, which internal part is a connected network of courtyards.		[Cb]	In a coherent plot series (one bigger plot) number of separated, in most cases public buildings are located. Public gardens, smaller parks may be on the plot as well. The plot is bordered by streets, if it is not stated (drawn) otherwise. The layout (urban tissue) of the city's industrial area and that of a privileged area of public buildings is similar. The features/functions and some special building layouts distinguish the two different types of urban fabric. Public buildings	
[Hc]	The street network is not completely regular: partly adapted to the geomorphological characteristics (modest inclination) of the area. Plots have regular geometry and are divided into two parts. The façade of the building is located on the line of the street edges (development in unbroken rows). The shape of the buildings could be "U", "L", "G" or "O" and the inner courtyard is enclosed by them. The buildings form closed building blocks, but the courts do not form a coherent network.		[Cc]	In a coherent plot series (one bigger plot) number of separated buildings are located. The plot is bordered by streets, if it is not stated (drawn) otherwise. The layout (urban tissue) of the city's industrial area and that of a privileged area of public buildings is similar. The features/functions and some special building layouts distinguish the two different types of urban fabric. Industrial territory	
[Ia]	Rectangular plots with regular geometry, development in unbroken rows. Courtyards are located behind the buildings, that are linked with: a) to the garden, that extends to the lower ranked street parallel to the main street; b) to the garden behind the courtyard. Separated plot with residential buildings faces on the lower ranked street. There are two plots in a line, which connects the streets. The streets are regulated and orderly planned. The lower rank street can be used as service road, because it is bordered by green space predominantly.		[Ac]	Elongated rectangular plots with regular geometry, dynamics of the plot series are rhythmical/regular: width of the plots and the placement of the buildings are almost identical. The property consists of the main building and some additional buildings (outbuildings), that partially surround the inner courtyard. The buildings are adjusted to the line of the street, coherent free space is between the street line and the development in unbroken rows. The unbroken row of building is disrupted by open courtyards. Yards could be divided into two parts depending on the location (front and back yards): the two sections are separated by buildings and fence.	
[Ib]	Gridiron system (regular street network). The shape of the plot is a regular rectangle, the development method dynamics of the adjacent plots are the same: divided into three sections, behind the residential building is a small courtyard, and behind the courtyard is the garden, that fills over 2/3 of the plot. Development in unbroken rows, dimensions of the buildings are the same, except the "L" shape building on the corner, but the development method dynamics is unbroken.		[Ad]	Elongated rectangular plots with regular geometry, dynamics of the plot series are rhythmical/regular: width of the plots and the placement of the buildings are almost identical. The houses consist of a main building and one or more additional buildings (attached). The development method aligned with the street line is disrupted with open courtyards. The yards can be divided into front and back sections: the two sections are separated by buildings and fence. The street in parallel with the front street functions as a border of the yard or garden.	

\* perivoj (Cro.) – communal courtyard garden (in this case)

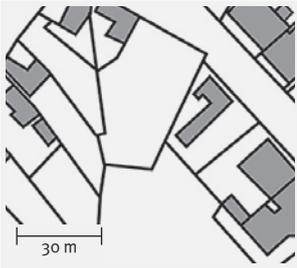
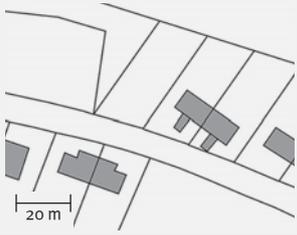
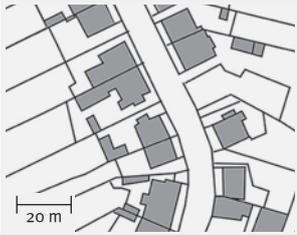
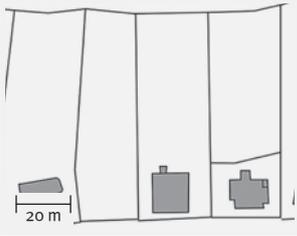
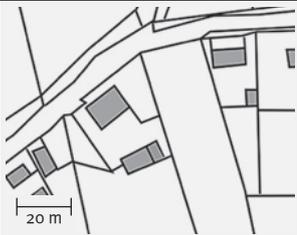
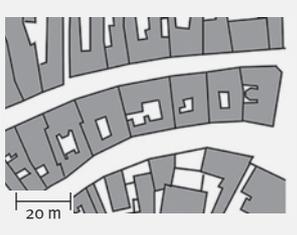
Type	Characteristics	Figure	Type	Characteristics	Figure
[Ae]	The street structure is adapted to the geomorphological character of the region. The street lines and plot shapes show the modest inclination. The urban tissue is composed of two different fabrics: 1. small, freestanding residential buildings located on prolonged rectangular plot. The properties (plots) are divided into three parts: residential building (house), courtyard and gardens (backyard). In addition to the main building some service buildings (outbuildings) are located on the property. 2. rectangular plots with attached houses, without outbuildings.		[Bd]	Regular street network. Geometrical, elongated rectangular plots. The plots are separated into front yard and back yard (garden), inside the courtyard (front yard) are located the house (single family housing) and some additional buildings (outbuildings). The dynamics of development method is characteristically heterogenic, there is not exactly repeating development method's dynamics. Front garden is located in front of the house (main building) from considerable distance of the street line. The buildings are built on one side of the plot border, occasionally attached to the wall of the building place on the adjacent plot. Typical suburban development method/urban pattern.	
[Af]	Irregular street network, in the street widening a triangle shape square is formed. The widening and then separating street surround a building block island. The shape of the plots is not fully regular elongate rectangular (tailored to the geomorphological characteristics of the terrain). The façade of the buildings is aligned to the street line, but the development is not in unbroken rows, because in some cases the court extends till the line of the street. Behind the house is located the yard and garden.		[Be]	Irregular simple tissue (street network), dynamics of the development method is symmetrical (regular) with attached single family houses. The placement of the houses follows the inclination of the terrain and the façades are not in parallel with the street line. For the lot layout (house and yard combination) the district (urban tissue) is for weekend houses.	
[Ag]	Elongated rectangular plots with regular geometry, dynamics of the plot series are rhythmical/regular: width of the plots and the placement of the buildings are almost identical (attached single family housing). The façades are in parallel with the street line, but not aligned with the regulation line (there is a forecourt in front of the main building). The plots are divided into the yard and garden; in some cases, the horizontal stratification of the plots consists of four sections.		[Bf]	Elongated rectangular plots with regular geometry, dynamics of the plot series are rhythmical/regular: width of the plots and the placement of the buildings are almost identical. The free standing main building (single family housing – villas, mansions) is not aligned with the street line. The plots are not always divided into yard and garden (back yard).	
[Ah]	Irregular street network, the line follows the inclinations, geomorphological character of the terrain. The situation of the plots in the urban tissue has two variations: a) The plot is divided into two parts (in the first section is situated the house and yard, closer to the street; the garden is in the back part). b) in the plot are just the house, outbuildings and courtyard. Characteristic that we can get into the house through the courtyard, or the house has "L" shape, but the central part of the house is located in the centre of the plot, small garden wedged between the single family house and the garden.		[Db]	Complex, irregular simple tissue. The line of the streets is broken by rectangular squares. Urban tissue is part of the medieval urban structure, which is shown by the structure of the streets, the plots are rectangular (irregular rectangularity). The size of the plots varies (2-3 or 6 and more create a block). The buildings fill almost the entire plot with patios and courtyards open to the street.	
[Bb]	Irregular street network, the line follows the inclinations, geomorphological character of the terrain: variable plots' geometry. The inner order of the plots is similar to each other: area located behind the living area is completely separated from the front yard, where the free standing main building and the outbuildings are. The plot is divided into three parts, occasionally there are front gardens, the main building is located close to the street line (short distance). Typical suburban development method.		[Dc] a)	The line of the street is defined by the geomorphological features of the area. The shape of the plots also relates to the terrain inclination (irregular rectangle, polygon) and the buildings fill the entire area of the plots. The properties consist of a main building and an outbuilding, that surround the inner courtyard. The buildings are adjusted to the line of the street, coherent free space is between the street line and the development in unbroken rows. Variations: a) double plot series create an irregular geometric block	
[Bc]	Irregular street network (street lines). Shape of the plot has no regular geometry (more irregular): elongated rectangular or oblong. The freestanding buildings are located in the first third of the site in the courtyard. In some cases, next to smaller outbuildings, agricultural buildings are located on the plot.		[Dc] b)	Variations: b) single line plot series form a coherent block, bounded by streets.	



FIG. 6 THE BUILT ENVIRONMENT OF RIJEKA. THE BOLD LINES REPRESENT THE POSITION OF THE RAILWAY LINES, BUT DOES NOT SHOW ALL TRACKS. THE SCHEMATIC DRAWING IS FOLLOWING THE REAL MAP, BUT FOCUSING ON THE CHARACTERISTICS AND IS NOT STRICTLY ACCURATE.

SL. 6. IZGRAĐENI OKOLIS RIJEKE. DEBLJIM JE LINIJAMA OZNAČEN SMJEŠTAJ ŽELJEZNIČKIH PRUGA, NO NE I SVE TRAJNICI. SHEMATSKI CRTEŽ SLIJEDI STVARNU KARTU S NAGLASKOM NA KARAKTERISTIČNIM OBILJEŽJIMA I NIJE SASVIM PRECIZAN.

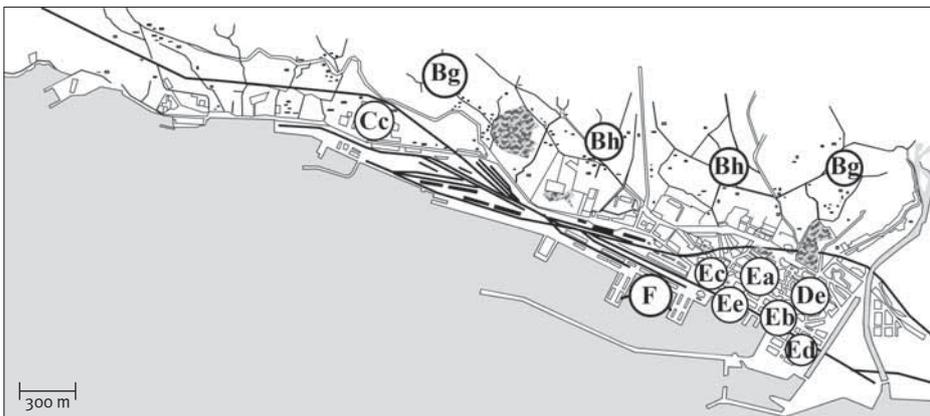


FIG. 7 RIJEKA – TYPES OF ROAD NETWORKS: A) ORTHOGONAL GRIDIRON, B) IRREGULAR MEDIEVAL, C) IRREGULAR TOPOGRAPHICAL

SL. 7. RIJEKA – TIPOVI CESTOVNIH MREŽA: A) ORTOGONALAN, B) SREDNJOVIJEKOVNI NEPRAVILAN, C) NEPRAVILAN TOPOGRAFSKI

FIG. 8 URBAN TISSUE TYPE DISPERSION IN RIJEKA (THE SPOTS SHOW THE NEIGHBORHOODS WHERE THE SAMPLES WERE TAKEN AND THE URBAN TISSUE TYPE).

SL. 8. DISPERZIJA URBANOG TIPA U RIJEKI (OZNAČENE SU CETVRTI U KOJIMA SU UZETI UZORCI KAO I TIP URBANOG TKIVA)



## CONCLUSION

### ZAKLJUČAK

The urban tissue analyses of these two cities are based not only on urban forms, but also point out the urban tissue characteristics on basis of supporting archival documents and historical analysis and indicate the urban type as well. The urban tissue analyses of Zagreb and Rijeka is supplemented with study of urban planning (city building) theories, practices and principles typical in Central Europe and in Austria-Hungary as well. The development and evolution of these two cities in the period between 1868 and 1918 shows a typical, in sense of architecture and urban evolution, yet unique progress in the area of Austria-Hungary. Based on the examination of Zagreb's urban tissues and simple tissue established in the period of Austria-Hungary (Lower Town), the city has linear, territorially (west-east) and temporally exactly distinguishable development directions. The significant simple tissue of Zagreb has gridiron system (square and oblong grid): straight street direction, geometrically very regular rectangular grid of streets with regular compact building blocks. The irregular urban fabric follows the geomorphological characteris-

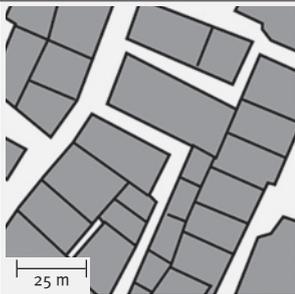
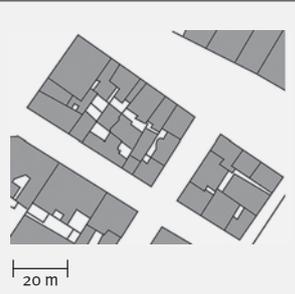
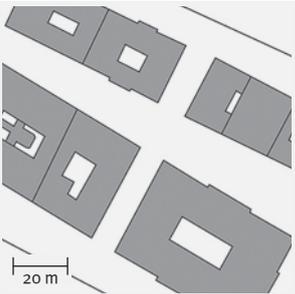
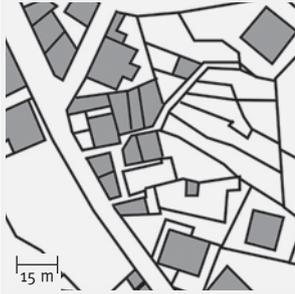
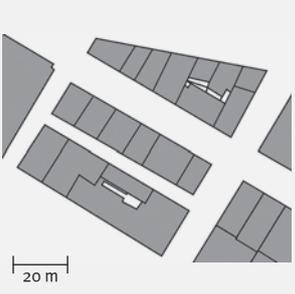
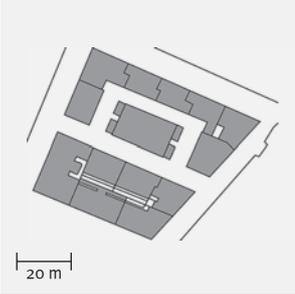
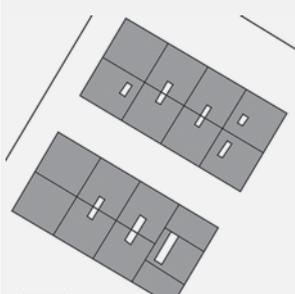
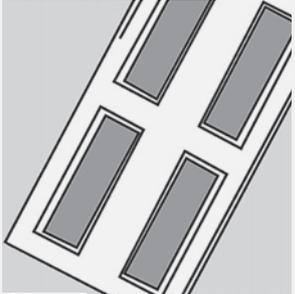
tics of the upper part of the town (slopes), the urban tissue sections show the pre-regulation structure, however, the urban tissue upper and around the Upper town, with summer houses or mansions and irregular streets applied to the inclination of the terrain follows the principles of Sitte's city building (picturesque view). The relationship of green areas (especially the Lenuci's Horseshoe) and urban tissues in the Lower Town refers to the fact that the system of parks (green areas), squares and streets is the result of conscious planning that took into account the trending city planning principles by Camillo Sitte and Josef Stübben. The harmony between the urban tissues, created by orthogonal arrangement urban forms and the urban forms related with the geomorphological structure of the terrain can be observed the best in case of Zagreb and Rijeka.

Rijeka is a unique case not only because it is established on the seafront, but also semi-linear articulation of the areas with different morphological character: line of the railway, industrial areas and other, like regulated downtown areas and slopes with irregular street network and plot series of the city. The significant simple tissue of Rijeka has gridiron system (oblong grid and rectangular plot series) and contour forming system. Sitte's principles prevail on the slopes, however, the stricter, more the result of orthogonal city building principles can be witnessed closer to the port and in the territory of the port.

The study negates the doctrine that each city is unique (Benevolo), establishing rather that each city can be seen as a collage of different urban tissue types, the organization of which creates a specific urban type and image. A "collage nature" of each city allowed to examine the forms of urban areas, and the whole structure has been read as a whole. The research period is a very interesting and complex era of the world history: the study of the cities not only explores the urban types, but also discovers the new urban conditions created within the settlements. It points out the (not just territorial) unity-creating nature of this period, indirectly refers to the appearance of urban forms, and signifies the dominant urban development forces via urban tissue types. The modern image of the city was created and the current built heritage, the inherited city structure represents a valuable inheritance of the contemporary cities and define the cityscape. The modernization processes and development of the cities reached their peak point during the era of Austria-Hungary, the urban and architectural pieces dated back to the dual monarchy represent a significant section of today's urban and architectural heritage of the cities.

TABLE III URBAN TISSUE TYPES OF RIJEKA. ANALYSES ARE BASED AND REFERENCED ON THE CARTOGRAPHIC SOURCE UNDER NO 4.

TABL. III. TIPOLOGIJA URBANOG TKIVA RIJEKE. ANALIZE SE TEMELJE NA PODACIMA IZ KARTOGRAFSKOG IZVORA POD BROJEM 4.

Type	Characteristics	Figure	Type	Characteristics	Figure
[De]	Medieval street structure and plot layout: irregular, narrow and winding streets and alleys, the plots are irregular, sometimes geometric. Crowded arrangement inside the plots without green areas (yards, gardens), the building layouts fill the entire plot. There are no proper open spaces or courtyards, green spaces that could make looser the dense urban fabric.		[Ec]	Regular street network (oblong gridiron system) and regular, but differently dimensioned rectangular plots, where residential building and yard is located. The façades form a closed system; building blocks are bordered with streets that intersect each other in the right angle. In some cases the route towards the inner part of the block and the buildings located there is going through a courtyard of the other plot, in this way the courtyards of two adjacent plots are connected.	
[Bg]	Irregular street network, the streets and irregular shaped plots are adapted to the geomorphological character of the terrain (slopes). The shape of the plots is irregular polygon, the buildings are free standing, in some cases located at the edge of the plot, surrounded by yard. The blocks are separated by service roads (private roads), that have separated cadastral numbers.		[Ed]	Regular street grid (gridiron system), widening of the street takes a function as a gate that leads to the square. The buildings are palaces and public buildings that completely fill the regular rectangular plot on which each of the buildings stand. Inside the buildings are inner courtyards (patios), the dimensions of the buildings are in harmony with the dimensions of the inner courtyards, which are located in the approximate centre of the layout.	
[Bh]	Irregular street network (simple tissue), but the ambition for regularity can be observed. The irregular shaped plots are adapted to the geomorphological character of the terrain (slopes). The intersecting buildings form a square. In the placement of the buildings can be discovered some regularity (placed in straight line, located at the frontline of the street or not so far from the frontline), but there is no order in the development method.		[Ee]	Symmetrical orthogonal street structure, plot shape and dimension follows the street structure imposed opportunities. The buildings fill entirely the plots, one single plot series line form a block. The width of the plots is the same, development is in unbroken rows. The front façade is facing the wider, higher-priority streets, the narrower street behind functions as a service road. The façade of the building on the edge of block is perpendicular to the other façade, it is facing to the street perpendicular to the higher-ranked street.	
[Ea]	Regular street network, polygonal building layouts, that fill the entire plot. The building block is cut through by a vacant plot that can function as a service road. The direction of the façades and the development dynamics of the plots may indicate the former (and actual) function held. The inner area is bordered by buildings around, creating a square-formation, where is located a separate building (Market Square).		[Cc]	In a coherent plot series (one bigger plot) number of separated buildings are located. The plot is bordered by streets, if it is not stated (drawn) otherwise. The layout (urban tissue) of the city's industrial area and that for privileged area of public buildings is similar. The features/functions and some special building layouts distinguish the two different types of urban fabric. Industrial territory	
[Eb]	Symmetrical street structure (orthogonal, gridiron system), the shape and dimension of the plots is regular, symmetrical, almost square shape. The buildings fill the plots' layout completely and double plot series form a block. Plots with same width create development in unbroken rows. The façade of the buildings on the edge of the block is facing perpendicularly to the other façades to the other street. The compactness of the blocks is broken by patios which are connected to the interior courtyards behind the buildings. Buildings located at the edge of the block and do not have patios or the patios are separated, but in some cases these are connected to each other (same inner courtyard dynamics than in case of the parcels in the middle).		[F]	Urban tissue that can be classified as a unique form of industrial area. Cadastral number of halls and cadastral number of the land is different; the buildings fill the plots entirely. The pier is extending toward the sea, halls are positioned symmetrically and correctly on the pier (significant part of the port). Their façade (with opening) turns toward the sea.	

## BIBLIOGRAPHY

## LITERATURA

- BLAU, E.; RUPNIK, I. (2007), *Project Zagreb: Transition as Condition, Strategy, Practice*, Actar, Barcelona / New York
- BOHL, C.C.; LEJEUNE, J.F. [eds.] (2009), *Sitte, Hegemann and the Metropolis: Modern Civic Art and International Exchanges*, Routledge, London / New York
- BOROVSKY, S.; SZIKLAY, J. [eds.] (1900), *Fiume és a magyar-horvát tengerpart*, Magyarország vármegyéi és városai, Budapest
- CANIGGIA, G.; MAFFEI, G.L. (2001), *Architectural composition and building typology: interpreting basic building*, Alinea Editrice, Firenze
- COLLINS, G.R.; CRASEMANN COLLINS, C. (1965), *Camillo Sitte: The Birth of Modern Planning*, Phaidon Press, London
- CONZEN, M.R.G. (1960), *Alnwick, Northumberland: a study in town-plan analysis*, Transactions and Papers (Institute of British Geographers), 27, George Philip, London
- DR. JEKELFALUSSY, J. (1892), *A Magyar Korona Országainak Helységnevtára*, Pesti Könyvnyomda – Részvénytársaság, Budapest [OSZK ST 3826]
- FRIED, I. (2004), *Fiume*, Enciklopédia Kiadó, Budapest
- KAHLE, D. (2004), *Gradevinski propisi grada Zagreba u razdoblju od 1850. do 1918. godine*, „Prostor”, 2 (28): 203-214, Zagreb
- KNEŽEVIĆ, S. (1996), *Zagrebacka zelena potkova*, Zagreb
- KOLLERFFY, M. (1877), *A Magyar Korona Országainak Helységnevtára*, Atheneum R. társ. nyomdája, Budapest [OSZK ST 3826]
- KOSTER, E.A. (2001), *Urban morphology, a taste of a form – oriented approach to the history of urban development*, Groningen University, Groningen
- KROFT, K. (1996), *Urban tissue and the character of towns*, „Urban Design International”, 3 (1): 247-263, Palgrave Macmillan, UK
- LOVRA, É. (2015), *Typology of the Urban Fabric: Evaluation of the Inherited Townscape*, „Cultural Heritage Possibilities for Spatial and Economic Development – Conference Paper”: 238-244, University of Zagreb, Zagreb
- LOVRA, É. (2016), *The „Modern City”: Urban Tissue Typology (Limitations of Caniggian and Conzenian practice and the new typology)*, „Zbornik radova 4. Međunarodne konferencije Savremena dostignuća u gradevinarstvu 2016”: 805-814, Gradevinski fakultet Subotica, Subotica
- MAGYAR SZENT KORONA ORSZÁGAINAK HELYSÉGNÉVTÁRA I. II. (1913), *A Magyar kir. Központi Statisztikai Hivatal*, Budapest [OSZK ST 3826]
- MEGGYESI, T. (1985), *A városépítés útjai és tévútjai*, Műszaki Könyvkiadó, Budapest
- MEGGYESI, T. (2009), *Városépítészeti alaktan*, Terc, Budapest
- METZGER-SÖBER, B. (2012), *Regulacijski plan grada Rijeke Paola Grassija, 1904.*, „Prostor”, 20 (1): 146-157, Zagreb
- PALINIC, N. (2009), *Urbanisticki razvitak Rijeke*, [https://helpdesk.uniri.hr/system/resources/docs/000/006/812/original/URBANISTICKI\\_RAZVITAK\\_RIJEKE\\_slike.pdf?1445010958](https://helpdesk.uniri.hr/system/resources/docs/000/006/812/original/URBANISTICKI_RAZVITAK_RIJEKE_slike.pdf?1445010958) [27.8.2016.]
- ŠKALAMERA, Ž. et al. (1994), *Zagreb na geodetsko-katastarskim zemljovidima i u zemljisnim knjigama*, Gradski zavod za katastar i geodetske poslove, Zagreb
- SITTE, C. (1889, reprint 2001), *Der Städtebau nach seinen künstlerischen Grundsätzen*, Birkhäuser, Basel-Boston-Berlin
- SLUKAN ALTIC, M. (2006), *Morphological and functional change in Zagreb's Lower Town (Donji grad) 1862-1914 based on cadastral sources*, „Prostor”, 31 (1): 2-19, Zagreb
- SLUKAN ALTIC, M. (2012), *Urbano planiranje Zagreba kao dio Evropskog kulturnog kruga*, „Ekonomika i ekohistorija”, 8 (8): 100-107, Zagreb
- STÜBBEN, J. (1890), *Der Städtebau*, A. Kröner: <https://archive.org/details/derstdtebauoost-000g> [17.2.2016.]
- WAGNER, O. (1912), *Development of a Great City*, „The Architectural Record”, 31 (1-6): 486-500, New York
- WHITEHAND, J.W.R. (1981), *Background to the urban morphogenetic tradition and Conzenian ideas: extension and development*, in: WHITEHAND, J.W.R. [ed.], *The urban landscape: historical development and management: papers by M.R.G. Conzen*, London
1876. évi XX. Törvénycikk némely városi törvényhatóságok megszüntetéséről, <http://100oev.hu/index.php?a=3&param=5733> [12.12.2014.]
1868. évi XXX. törvénycikk a Magyarország, s Horvát-, Szlavon és Dalmátországok közt felforgott közbizonyi kérdések kiegyenlítése iránt létrejött egyezmény becikkelyezéséről, <http://100oev.hu/index.php?a=3&param=5352> [15.7.2016.]
- FORTEPAN, <http://fortepan.hu> [27.8.2016.]

## SOURCES

## IZVORI

## ARCHIVAL SOURCES

## ARHIVSKI IZVORI

- National Archives of Hungary, 2-4 Bécsi kapu Square, Budapest /maps.hungaricana.hu [MOL]
- Muzej grada Zagreba, 20 Opatička Street, Zagreb [MGZ]
- Országos Széchenyi Könyvtár, 4-5-6 Szent György Square, Budapest [OSZK]
- Hrvatski državni arhiv, 21 Marulić Square, Zagreb [HAD]

## CARTOGRAPHIC SOURCES [CS]

## KARTOGRAFSKI IZVORI

- Zagreb – 1913: Nacr Rudina Intravilana slobodnog i kr. glavnog grada Zagreba 1910-1913 [MOL S 76 No 1874/1-100; <http://maps.hungaricana.hu/en/MOLTerkeptar/13771/> /6.5.2016./]; References: HR-HDA-1421-1-9-576 (Zagreb – 1914), HR-HDA-1421-1-9-575 (Gornji Grad: 1858-1892) and HR-HDA-1421-1-9-574 (Donji Grad: 1858-1905)
- Zagreb – 1864: Nacr Zagreba D. Albrechta [MGZ KA, g 1 h 1-1. Detalj karte Zagreba D. Albrechta, 1864; ŠKALAMERA, 1994: 88-89]
- Zagreb – 1865: Regulation Plan [BLAU-RUPNIK 2007: 42-43]
- Zagreb – 1889: Regulatorna osnova [MGZ Inv. No 2945. Regulatorna osnova Zagreba, 1889; ŠKALAMERA 1994: 92]
- Rijeka – 1904: Fiume város kataszteri térképének másolata az 1900. évi mérnöki helyszínelés szerint [MOL S 76 No 340/1-16; <http://maps.hungaricana.hu/en/MOLTerkeptar/12591/> /16.8.2016./]; References: OSZK ST 66 TM 487 and OSZK ST 66 TM 1937 (1898 Fiume)
- Rijeka – 1871: Fiume térképe a pályaudvar és kikötő tervezetével; metsz. M. k. Államnyomda [OSZK ST 66 TM 487]
- Rijeka – 1885/1891: Stadt und Hafen Fiume [OSZK ST 66 TM 246]

## ILLUSTRATION AND TABLE SOURCES

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- TABLE I Dr. JEKELFALUSSY, 1892; KOLLERFFY, 1887; MAGYAR SZENT KORONA ORSZÁGAINAK HELYSÉGNÉVTÁRA, 1913
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## SUMMARY

## SAŽETAK

## TIPOLOGIJA GRADSKOGA TKIVA I URBANA TIPOLOGIJA U RAZDOBLJU OD 1868. DO 1918. GODINE

## POSEBNI SLUČAJEVI: ZAGREB I RIJEKA

Tipologija gradskoga tkiva sama je po sebi doista složena tema unutar polja i urbane morfologije i urbane tipologije. Cilj taksonomskog određenja austro-ugarskih gradova i urbanoga tkiva jest opisati i vrjednovati urbanističku i graditeljsku djelatnost u razdoblju Austro-Ugarske Monarhije (1867.-1918.) jer takvo određivanje tipologije, ali ni obrada podataka – dosad nisu učinjeni. Uobičajeni pristup kod sagledavanja razvoja gradova u ovome slučaju nije dovoljan jer su između 1867. i 1918. godine austro-ugarski gradovi prošli kroz specifičan oblik rasta, tek djelomično prateci zapadne trendove urbanoga razvoja. Ekonomske i povijesne promjene, koje su uslijedile nakon Austro-ugarske nagodbe (1867.) i Hrvatsko-ugarske nagodbe (1868.), također su dio i tada nadolazeće industrijske revolucije, čime je započeo progresivan urbani razvoj određen novim urbanim uzorcima i razlikom u izgradnji grada, gradskoga tkiva, te urbanim tipovima. Istraživanja u vezi sa Zagrebom i Rijekom čine bitnu sastavnicu ove studije u sklopu koje je proučavano više od sedamdeset gradova. Gradovi prikazuju povijesnu inklinaciju koja je sprječavala uspostavu jedinstvene i prepoznatljive urbane strukture tipične za područje Zemlje Krune sv. Stjepana (ugarski dio Monarhije). Detaljnim analizama utvrđen je visok stupanj varijabilnosti urbanoga tkiva i urbanih tipova kod austro-ugarskih gradova. Prva determinacija među ispitivanim gradovima zasnovana je na kombinaciji urbanoga tkiva, njihovih prostornih i prirodnih obilježja (padine, rijeka, ravnica). Po svojim značajkama poput ulične mreže, geomorfoloških i urbanomorfoloških značajki te po kombinacijama različitih urbanih tkiva mogu se razlučiti dvije veće skupine: osnovni tipovi (definirane karakteristike i tkiva, bez primjesa) i kombinirane/složene vrste. Zagreb i Rijeka odabrani su pritom na temelju iscrpnog istraživanja. U korpusu od više od sedamdeset različitih vrsta gradova u tipološkoj matrici, Zagreb i Rijeka ističu se kao kompleksni, ali i posebni slučajevi urbane tipologije i tipologije gradskoga tkiva, ponajprije zbog toga što ih i među kombiniranim tipovima njihove značajke, urbana evolucija, kombinaci-

ja tkiva i morfogeneza čine izdvojenim primjerima koji nisu usporedivi s ostalim gradovima iz istraživana korpusa. U studiji o vrstama urbanih tkiva i uličnih mreža odabranih austro-ugarskih gradova utvrđena su načela gradogradnje koja se ponavljaju, a koja se mogu izravno povezati s vodećim, ali u nekim slučajevima i kontradiktornim idejama te praksom izgradnje grada u tom razdoblju. Rijeka i Zagreb doživjeli su u razdoblju od 1867. (1868.) do 1918. godine intenzivan urbani rast i preobrazbu. Tomu u prilog govori prirast u broju stanovnika i broju građevina, a paralelno s time gradovi su se i teritorijalno proširili. Urbane morfološke promjene tijekom prvog i jednog od najintenzivnijih razdoblja modernizacije tih gradova stvorile su jedinstveni uzorak urbanoga razvoja među proučavanim gradovima. Rijeka je zanimljiv, ali i jedinstven primjer jer njezin položaj (grad na obali mora) i funkcija (lucky grad) imaju velik utjecaj na uličnu mrežu i na kombinacije urbanoga tkiva. Funkcija je industrijska (imajući u vidu njezinu ulogu u prometu i trgovini) i željeznička, pri čemu se pruga nalazi između obale mora (luka) i gradske jezgre. Polulinearni slojevi morfogeneze mogu se slijediti temeljem određenih uličnih mreža i urbanih tkiva, njihove kombinacije te urbanoga razvoja koji grad određuje kao poseban slučaj. Donji grad u Zagrebu usvojio je i vodeće tendencije planiranja i urbanističkoga projektiranja toga doba; u urbanoj matrici s otvorenim prostorima, zelenim površinama (Lenucijeva potkova / niz parkova) i urbanim blokovima slijedi načela Stübgena, pri čemu je odvojenost od neplanirane strukture Gornjega grada definirana. Takvu jasnu, čak i linearnu podjelu jedva da možemo naći među ostalim ispitivanim gradovima, iako se mogu pronaći pojedini tipovi urbanoga tkiva. Dva spomenuta grada u razdoblju od 1868. do 1918. godine pokazuju značajke tipičnoga, a ujedno i jedinstvenoga razvoja i rasta. Na temelju sagledavanja zagrebackoga gradskoga tkiva i ulične mreže uspostavljene u razdoblju Austro-Ugarske (Donji grad), jasno je kako se grad teritorijalno razvija u linearnom smjeru zapad-istok i vremenski

jasno vidljivim pravcima razvoja. Značajna ulična mreža Zagreba ima sustav rešetkastog sustava (trg i duguljaste rešetke): ravan ulični smjer, geometrijski, vrlo redovite pravokutne mreže ulica s redovitim slijedom kompaktnih građevnih blokova. Nepravilno urbano tkivo prati geomorfološke značajke sjevernih predjela grada (na padinama), odjeljci urbanoga tkiva pokazuju strukture koje su nastale prije Regulatornih osnova (1865. i/ili 1889.), a urbano tkivo Gornjega grada i njegove okolice s ljetnikovcima, vilama i nepravilnim ulicama prilagođenim nagibima terena – u skladu je s načelima Sitteove gradogradnje (slikoviti prikaz). Odnos zelenih površina (posebno Lenucijeva potkova) i urbanoga tkiva u Donjem gradu odnosi se na činjenicu da je sustav parkova (zelenih površina), trgova i ulica rezultat svjesnog planiranja koje je uzelo u obzir tada aktualna načela uređenja grada od Camillea Sittea i Josefa Stübgena. Sklad urbanoga tkiva koji je rezultat ortogonalnoga rasporeda i urbanih oblika vezanih za geomorfološke značajke strukture terena može se ponajbolje vidjeti u slučajevima Zagreba i Rijeke. Značajna ulična mreža u Rijeci ima sustav rešetki (duguljasta rešetka – pravokutne serije parcela/urbani blokovi) i sustav koji oblikuje konture. Sitteova načela ovdje prevladavaju na padinama, a načela ortogonalne urbane konstrukcije cjelovitih blokova primijenjena su u blizini luke i na području luke. Slučaj Rijeke pritom je jedinstven zbog linearne artikulacije područja različitih morfoloških značajki: linija željeznice, industrijska područja i druga područja grada (regulirano središnje tkivo, padine s nepravilnom uličnom mrežom i cesticama). Razdoblje na koje se ovo istraživanje osvrće jest zanimljiv i složen dio povijesti, u kojem se gradovi proučavaju na način da jedinstvo stvaranja gradova nije bilo samo teritorijalno nego da se neizravno odnosi i na pojavu urbanih oblika. Procesi modernizacije u to su doba dosegli svoj vrhunac, a urbanistička i arhitektonska djela predstavljaju značajan dio današnjega urbanog i arhitektonskog naslijeđa gradova.

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## BIOGRAPHY

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