UNIVERSITY OF LJUBLJANA
BIOTECHNICAL FACULTY

Ines HRDALO

GREEN SYSTEMS IN THE EVOLUTION OF THE OPEN SPACE OF SELECTED MEDITERRANEAN TOWNS

DOCTORAL DISSERTATION

ZELENI SISTEM V RAZVOJU ODPRTIH POVRŠIN IZBRANIH MEDITERANSKIH OBMORSKIH MEST

DOKTORSKA DISERTACIJA

Ljubljana, 2013

II

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

Doctoral dissertation was made at the Department of Landscape Architecture at Biotechnical Faculty, University of Ljubljana and at the Department of ornamental plants, landscape architecture and historical gardens at Agricultural Faculty, University of Zagreb. On the basis of Stuatute of the University of Ljubljana and by the conclusions of Council of the Biotehnical faculty and conclusion of the 27th session of the Committee for doctoral studies on University in Ljubljana, on a 3th December 2009 is confirmed that candidate fulfils requirements for doctoral diseratation on doctoral Postgraduate study of Biological and Biotechnical sciencies, Landscape Architecture. For a supervisor prof. dr. Ana Kučan was appointed and doc. dr. Breda Mihelič for co-supervisor.

Doktorsko delo je bilo izdelano na Oddelku za krajinsko arhitekturo Biotehniške fakultete, Univerze v Ljubljani in na Oddelku za okrasne rastline, krajinsko arhitekturo in zgodovinskih vrtov Agronomske fakultete, Univerze v Zagrebu.
Na podlagi Statuta Univerze v Ljubljani ter po sklepu Senata Biotehniške fakultete in sklepa 27. seje Komisije za doktorski študij Univerze v Ljubljani z dne 3.12.2009 je bilo potrjeno, da kandidatka izpolnjuje pogoje za opravljanje doktorata znanost na doktorskem Podiplomskem študiju bioloških in biotehniških znanosti s področja krajinske arhitekture. Za mentorja je bil imenovana prof. dr. Ana Kučan, za somentorja pa doc. dr. Breda Mihelič.

Commission for assessment and defense/Komisija za oceno in zagovor:

President/Predsednik:

Member/Član:

Member/Član:

Member/Član:

Date of defense/Datum zagovora:

Dissertation is a result of my own research work./Disertacija je rezultat lastnega raziskovalnega dela.

Ines Hrdalo

III

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

KEY WORD DOCUMENTATION

AB   The thesis is based on the assumption that open spaces of historical towns can be linked to the green system of the contemporary urban area in a social, structural and ecological sense. Four Mediterranean towns have been chosen for the research on the Croatian coast with a comparable historical development. Therefore historical maps were examined and digitalised for the purpose of the comparative analyses. The data were compared with new ortophoto maps in order to define links between open spaces of a historic town and the green system of a contemporary one. The results show that during the historic development of urban centres open spaces had a very important role in the formation of the urban fabric. This was very obvious in the roman period when a forum had a function of the urban nucleus where most of the public activities took place. In that period inhabitants spent their free time in the surrounding landscape. This scheme of the urban form was kept until the nineteenth century when researched town opened to the landscape. Park, as a new form of urban open space was a kind of a certain substitute for the surrounding landscape which became more distant for everyday usage. Twentieth century brought a further diversification of the open public spaces. Results showed that during the historical development open public spaces were always situated on the most valuable areas inside the urban parameter, but during twentieth century they started to appear as a „leftovers" in the development process. Therefore the morphology of the green systems is mostly influenced by the natural background (relief, water features, coastal line). So open spaces of the historical town, as well as a green system of the contemporary town, have an effect on the urban structure. At the same time historical square appears to be the core from which other types of the public open spaces have been developed thus making elements of the green system. Urban open spaces have always been an active element of the urban sustainability, but its ecological function changed from the anthropocentric (in the historical town) to the ecocentrical (in the contemporary urban area).

IV

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

KLJUČNA DOKUMENTACIJSKA INFORMACIJA

AI   Disertacija je izšla iz hipoteze, da je možno odprte prostore zgodovinskega mesta v
      socialnem, strukturnem in ekološkem pogledu povezati z zelenim sistemom
      sodobnega mesta. Raziskava temelji na štirih izbranih mediteranskih mestih na
      hrvaški obali s primerljivim zgodovinskim razvojem. Za potrebe primerjalnih
      analiz so bili izbrani in digitalizirani njihovi zgodovinski zemljevidi. Zbrani
      podatki so se nato primerjali z novejšim ortofotom z namenom opredelitve povezav
      med odprtimi prostori zgodovinskega mesta in zelenim sistemom sodobnega mesta.
      Rezultati so pokazali, da so imeli med zgodovinskim razvojem urbanih središč
      odprti prostori zelo pomembno vlogo v razvoju urbane strukture. To je bilo najbolj
      očitno v rimskem obdobju, ko je imel forum funkcijo mestnega jedra, kjer se je
      odvijalo skoraj celotno javno življenje v mestu. Takrat je bila okoliška krajina
      prostor za vsakodnevno uporabo prebivalcev. Takšna shema je ohranjena skoraj do
      19. stoletja, ko se je mesto začelo odpirati proti okoliški krajini. Takrat je park kot
      nova oblika odprtih mestnih površin postal nadomestek za okoliško krajino, ki je
      postala preoddaljena za vsakodnevno uporabo. 20. stoletje je prineslo nadaljnjo
      diverzifikacijo odprtih javnih prostorov. Rezultati raziskave so pokazali, da so se
      med zgodovinskim razvojem odprti javni prostori vedno nahajali na najbolj
      dragocenih mestnih območjih, v 20. stoletju pa postajajo vse pogosteje zgolj,
      površine, ki so v procesu gradnje ostale nepozidane. Morfologija zelenih sistemov
      je ponavadi posledica naravnih značilnosti območja (strm teren, vodni pojavi,
      obalne linije). Na urbano strukturo so vplivali tako odprti prostori zgodovinskega
      mesta kot tudi zeleni sistem sodobnega mesta. Hkrati zgodovinski trg predstavlja
      jedro, iz katerega so se razvile ostale oblike javnih odprtih površin, ki so postale
      elementi zelenega sistema. Mestni odprti prostori so bili vedno aktivni dejavnik
      vzdržnega razvoja mest, vendar se je njihova ekološka vloga spremenila iz
      antropocentrične (zgodovinsko mesto) v ekocentrično (sodobno mesto).

V

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

TABLE OF CONTENTS

VI

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

VII

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

VIII

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

IX

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

LIST OF TABLES

XI

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
 Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

LIST OF FIGURES

XII

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XIII

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XIV

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XV

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XVI

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XVIII

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XIX

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

XX

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, 2013

ABBREVIATIONS AND SYMBOLS

CIAM - The Congrès internationaux d'architecture moderne (International Congresses of Modern Architecture)

GUP – General Urbanistic Plan

UNICED - United Nations Conference on Environment and Development

KURI - Construction, Utilitarian, Rational, International

Eng. – english translation of the names

Ed. – editor

Cent. –century

GLOSSARY

Landscape – Term landscape has different definitions and meanings. Ogrin (Ogrin cited in Butula, 2004.) has defined term through its physical and social meaning. In this work term landscape is considered as a social and spatial chategory

Urban landscape – Term urban landscape can be interpreted as a synonym for urban open spaces, viewing them as urban green or non-green open spaces (Gazvoda, 1998.). Built and open urban spaces are two categories that are equal constructive elements of a city. However, in this work emphasis will be primarily on the open spaces.

Urban texture – Term urban texture is primarly based on the character of the urban morphology. Therefore it consists of built and open elements, making regular or iregular patterns of urban texture.

Open space (historical town) – Main open space in historical town is considered to be a main square/squares. In the ninetheen century beside a square, a park became an important urban form of open space.

Open space (contemporary town) – Open spaces in contemporary town have been specialised for different kind of activities. Therefore there are squares, parks, sporting and recreational zones, children's playgrounds, cemeteries, walkways, residential greenery, coastal zones, protective zones, etc. (Ogrin, 2007.). These spaces are consideded to be elements of the urban green system.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

1

1   INTRODUCTORY CHAPTER

A town is an entity comprising of two equally valuable, built and open parts. In the past, their relationship was clearly defined, and since open public areas were places centred on urban life, their existence was unavoidable. With the expansion of the historical town and its widening onto surrounding spaces through the process of urbanisation, there appeared problems evident in the built and open public town areas. Since inside the town there appeared significantly fragmented urban landscape, numerous problems developed as a result of unsystematic considerations concerning them and their meaning for the town. The term green system represents a newer way of viewing open areas, a kind of sub-system of the town characterised by a preconcerted layout of open public areas with certain social, structural and ecological roles.

The social role of open town spaces was inherited from the historical town, hence it was a topic of consideration by theoreticians and planner during almost all historical periods of its development. Throughout history, thinkers dealt not only with the social, but also at the same time, the structural role of open public areas. The ecological role is a new subject of research, appearing as a reaction to the expansion of towns, their merger and an increasingly greater jeopardy to ecological systems. As natural landscape disappears around towns, the problem of establishing an ecological link between certain habitats occurs, hence the focus is all the more placed on urban landscape as a possible surrogate of this role. Subsequently, research into a green urban system gains momentum as well as part of the green infrastructure of the whole region. During this time, an increasing emphasis is placed on the importance of logical linking particular green town areas into a single sustainable system. What is important in this process is to not lose sight of man, who is the most dominant inhabitant of urban space. Though we live in times of virtual networks and some new social dimensions, the need for human contact has not disappeared, whereas open town spaces have always been spaces where this has happened (Ward Thomson, 2002).

The one-time roles and functions, which it has today should be re-examined, in order to envisage what is could become in the future. The appearance of landscape urbanism perhaps heralds what may become of the town in the future, since it is one of the possible ways out from ecological problems. However, the green system cannot be viewed solely as ecological problem, but as a town subsystem which is its, not only quantitative but also qualitative space in the function of man. Therefore, as an inseparable part of the green system, there are some categories of non-green urban landscape which perhaps are not significant in ecological terms, but have a significant social role in a town. They are linked to the open spaces in the historical town that rarely had green elements, but presented very significant urban areas, hence on account of their historical and traditional significance they cannot be neglected. It is these features of open spaces belonging to the old town that hide much information that might help in defining characteristics of a town's green system, which once again can become a defining element in urban structure. Subsequently, as the green system can have a significant role in a experiencing the town, it can be a factor contributing to its identity. Today, there is increasing attention afforded to the beauty of urban spaces, which is perhaps related to an increasingly growing conscience of the quality of living, and for the development of tourism as one of the most important global economic

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

2

industries. Subsequently, the urban space of a contemporary town, open town spaces should actually have gain greater importance, when considering that they always had an important role in creating a picture of a town by defining its urban fabric, while at the same time presenting the centre of social life. Furthermore, they today acquire a significant ecological role.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

3

1.1   THE PROBLEMS AND SUBJECTS OF THE RESEARCH

Research work will examine the existence of differences and similarities of systems of green areas in towns, which have appeared in various natural and social conditions, and their links to open spaces in a historical town, when considering the wider aspect of researching roles and importance of urban and open spaces, i.e. an urban landscape, through relationships and legitimacy between the built open town spaces in the historical and contemporary conceptual forms. Researching problems requires a holistic historical overview of the relationship between town and open spaces with the town, including the urban landscape of hinterland, accompanied by the presumption that this relationship has developed in parallel with the changes which have been created by the onset of various forms of urban fabric (e.g. development of the town centre in a dispersed urban space), that is, accompanying the rise of other forms of urban structure.

This problem as a subject of research has been acquired from the fact that the relationship between the built up part of the town and its open spaces, as well as the relationship between the open town areas and the landscape hinterland, remain uninvestigated. This relationship supports much information important for understanding green urban systems, and reasons and manner of linking existing elements of open town spaces with the landscape hinterland, and the understanding of possible transformations of village into town, usable as useful measures in urban planning. Research will focus on the historical development of the urban matrix, with an emphasis on the allocation, scope, form and function of open spaces. Particular attention is given to the period of the nineteenth and twentieth century in which the nuclear town fell apart, and the manner and reasons for towns expanding into the hinterland.

The problem is defined within a wider paradigm of urban planning, where the term urban equally valuable includes landscape, which is not only an equally value structural element but is viewed as one of the urbanisation factors. It follows that we can identify and precisely the functional and structural relationship between built up and landscape components of a town which contribute to a more systematic and serious approach in investigating the town as a whole. On the basis of such a defined subject of research, the work is found to be between an area of urban and landscape planning in the widest possible means. This knowledge can assist urban planners to treat open areas more systematically and holistically as equivalent elements of the urban morphological basis of a town, which has structural, social and ecological importance, and a historical value.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4

1.2   GOALS

The goal is to determine, using analyses, a detailed structure and functional relationships of open town areas belonging to a historical town and green spaces within a newer urban fabric (more or less related), including the actual relationship of the town towards the spatial context in which it develops. Accordingly, special account of the occurrence and development of a systematic importance of open town areas, and their ecological importance will be conducted. The research involves towns that have development phases of construction that are comparable. This will allow the systematic features of green areas to be determined, in comparison to a system of open town spaces depending on the paradigms, i.e. theoretical starting points for planning, geomorphologic models of towns and their urban growth, including the dominating functions of researched examples and same types of urban centres.

On the basis of knowledge gained from research, an applicable recommendation is forms for preserving the relationship towards open spaces within a town, and the relationship towards a surrounding space, as a way of forming a sustainable green system of the current and future town (using the example of researched towns).

1.3   HYPOTHESES

1   There is a link between a historical distribution of open spaces and elements of a green system in newer town sections.

2   Different natural and social factors affect the fact that towns develop different typologies, causing the occurrence of different systems of open spaces, which are evident through function, structural features and ecological aspects.

3   Development of a green system, which we primarily comprehend as an integral part of a contemporary town, can be investigated through the development of open areas in a historical town, whose roles in regards to usage, in this or another way links to elements of a later occurring green system.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

5

1.4   DEFINING BASIC TERMS

Terms used in this work can have various definitions and interpretations. Therefore, they should be defined in more detail to gain a better understanding.

Town/City

Though urban spaces take up only 20% of the earth's surface, half of the whole population lives in towns or cities (United Nations, 2001, cit. by Weng 2007). It is predicted that in Europe, by 2015, almost 80% of the population will live in urban settlements (United Nations 2001, cit. by Tzoulas 2007). Therefore, it is evident that the world, and especially the European population, will become increasingly concentrated in towns, which will surely lead to numerous problems and challenges. The expansion of cities and increasing city population presents a challenge in creating harmony within the urban structure, i.e. a relationship between built and urban open areas, or in other words, the city and its surroundings.

There are numerous definitions of a city that have been developed according to various criteria - such as the number of inhabitants[1], density, appearance of the settlement and the legal status[2] (Marinović - Uzelac, 2001). However, Kostof (1995) says that city space has no link to its absolute size not the absolute number of its inhabitants, but the most important factor is population density. Taking into account that larger numbers of inhabitants per square metre most likely means also more dense fabric, this tells us an important parameter in defining the urbanicity of a settlement is its morphology.

An important feature of city morphology is that it is continually changing; hence some authors compare a city to living organism that is in a continual process of change (Kostof, 1995; Mumford, 1988; Mihelič, 2010). Mihelič (2010) adds that the city - a living organism, represents a certain dynamic system on whose characteristics, besides those social, are often influenced by natural factors, climate, the geographical relief and geomorphology. Indeed, it is this city dynamicity that has brought about its transformations through history and changes in the relationship between constructed and unconstructed parts of the urban space. Nonetheless, though the city is an accelerator of change, it is also a keeper of tradition (Lopez, 1967). The value of traditional goods creates an awareness only after a period of its negation and degradation. This particularly comes to mind with the development of the industrial city, when culturalistic theories in urbanistic formation were created and after the functionalistic phase in urbanism, when a post-modernistic planning concept was developed. Accordingly, the thoughts of Moughtin and Shirely (2005) are exceptionally notable emphasising that inheritance must not be lost in any restructuring of urbanistic planning and design. In this sense, the one-time relationship between urban open areas and the possibility of its preservation becomes important for the

---

[1] The criteria for a city can be the number of inhabitants which is different in various countries (Denmark - a minimum of 250 inhabitants, Japan 30,000).
[2] It was especially significant during the Middle Ages, because a city was a determined space regulated by municipal rights.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

6

city. Equally so, the relationship towards the surrounding landscape can be important due to information that can be utilised for directing further expansion of city space.

City development has generated certain structural forms of historical urban centres. In this way, various historical forms have been created which in common represent the city nucleus, and its fundamental trait is the central open town space in terms of the square. Accordingly, the square, i.e. open space, was a determinant of urban fabric. With the decay of the city nucleus, a new type of city is created, which extends into the surrounding landscape, and it is this that leads to the development of the contemporary city. Cedric Price's comparison of the city with an egg (Eckardt, 2008) is interesting, since it shows what has happened with the shape of the city and its open areas, but the observation of the city in this case is introverted. This research will draw attention also to the surrounding landscape, i.e. the environment in which the city or 'egg' is situated, i.e. their relationship.

Figure 1. Presentation of urban development, Cedric price (Eckardt, 2008:39)
Slika 1. Prikaz razvoja mesta, Cedric price (Eckardt, 2008:39)

Moughtin and Shirley (2005) state that city space can be developed in line with two strategies, meaning that city development is based on a public transport system (new urbanistic movement) or on ecological components of space (ecosystem movement). The ecological component of space in recent times has become an important city factor, emphasising urban landscape as an essential city element. The authors add that its role in urban form can be such that it forms various city spaces in a unifying manner, and hence has the potential to become a dominant element of urban composition, i.e. the creation of identity for urban space (Moughtin, 2003; Moughtin and Shirley, 2005). When taking into account that the historical cities have been developed around a central core, which was the urban open area - the square, this kind of concept of city is something that existed previously, but has occurred out of anthropocentric and ecological requirements.

Urban landscapes are increasingly emphasised when observing urban settlements as self-sustaining systems, but they are then most often understood as green town areas due to their ecological roles. Self-sustaining development is linked to the action plan of the Local Agenda 21, which has been accepted in over than 150 countries at the United Nations Conference on Environment and Development (UNICED), held in Rio de Janeiro in 1992, and topically linked to the development of more green urban environments. The conclusions brought about also speak of creating and protecting green areas (Roelofs, 1996). Moughtin and Shirely (2005) call the self-sustaining city a bio-city, pointing out the importance of its harmony with the surrounding region. This kind of city is in synergy with the natural environment and becomes an active part of a larger ecosystem as its vital

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

7

element. The idea of a self-sustainable city with a system of urban open areas is treated by many authors; hence, it is possible to foresee that this kind of city will become a new type of a contemporary urban model.

Waldheim (2006) spoke of the landscape urbanism who considered it important that the landscape becomes a replacement for architecture's historical role since it has the role of a fundamental building block in urban design. This emphasises the usability of landscape (referring to green areas) as a medium in contemporary urbanism, where it is closer to what the urban open space (most often without greenery) was for the historical city.
In regards to the research topic in this work, the concept of city has been researched with an emphasis on its urban open areas.

Open urban spaces

Open spaces within a city structure are unconstructed urban areas that can have various functions, representing a synonym for the urban landscape. In a city, they can function as squares, parks, sporting and recreational zones, children's playgrounds, cemeteries, walkways, residential greenery, coastal zones, protective zones, etc. (Ogrin, 2007). The most important space in a historical city possessing a nucleus form was the central open space of the square, which in its structural and social role represented the city centre. Other urban open areas with or without green elements accompanied it. [3] Today, often there appears an identification of green urban areas with urban open spaces, without the understanding that there are urban open areas without greenery. This has been concluded by Pereković (2011) who has investigated the general urbanistic plan of the City of Zagreb and the City of Velika Gorica, where the term urban open spaces are identified with green areas or city greenery. Here it is evident that this leads to omitting urban open spaces that do not have (or have very little) green elements within their areas, since such areas (squares, streets) are often considered architectural spaces. Urban open spaces cannot be considered only green areas because today there are even tiled parks[4] without or only with minor green elements (Whiston Spirn, 1985). Gazvoda (1998) says however, that urban landscapes can be interpreted as synonyms for urban open spaces, viewing them as urban green or non-green open spaces. He emphasises that one should keep in mind the occurrence of situations seeking different interpretations of the definition (stating the differences between geographers, architects and landscape architects in comprehending urban space). He subsequently notes that Krier speaks of the "concept of open spaces" referring to all types of spaces between the buildings in cities or in other locations. In that way, Gazvoda (1998) stated that this approach emphasises architecture. If architecture or structures in space are given an advantage, some important relationships and roles of open urban open areas, i.e. urban landscapes, can be predicted.

At the same time, this degrades those open spaces of a city that generated and defined the development of city fabric, since the town originally developed around them, any they often remained in the same place during later urban development (town centres - squares,

---

[3]Treated in more detail in Chapter 3.
[4] Parks are perceived as green city areas.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

8

water features…). For that reason, they often represent one of the rare constants of internal urban fabric, since it is the built structures that changes during development, so open spaces are not defined by the unconstructed periphery, but they define the constructed surrounding fabric. Based on what has been said, one should always keep in mind that these two categories are equal constructive elements of a city. However, since the work primarily covers open urban spaces, the emphasis will be them. Open spaces will be at times viewed as a separate layer of urban fabric, assuming the opposite stance of Krier. [5] It is necessary to emphasis in such situations, the fact that a city is a holistic system will be kept in mind, i.e. a complex spatial formation of constructed and unconstructed spaces.

Open urban areas may also be private spaces in a city (which considering their ecological role, numerous authors have included in their investigations), but they will not be taken into consideration in this work, except those that have in a later periods changes their status becoming open to the public or for the case when they emphatically define urbanism. *Open public city spaces* are exceptionally important for city life. In the past, they had a vital role in urban space in terms of their social, political, commercial and religious functions, and also as an important city structural element. Today, their role has somewhat changed, hence rarely functioning as a political space (Chidister, 1988). Urban open public spaces are primarily places for spending free time, for entertainment and rest. At times, they serve for official city activities, often representing a source of identity of the urban space and community, where the uniqueness of a particular city is reflected, and through a materialised collected remembrance forms a sense of belonging (Miškić Domislić, 2012). While in the historical city they were the central city point, with the development of the city of urban open area, they most often become spaces, which are not appropriate for construction, hence Steiner (2011) calls them 'leftovers'.

Today, they are segregated into public and semi-public urban areas. The difference lies in the rules of behaviour, i.e. in limitations. It was Ward Thompson who mentioned that Marc Augé said that in semi-public spaces, such as some commercial streets, there appears greater control, while at the same time, users who are not included in purposeful consumer behaviour even experience an imposed sense of guilt (Augé M., 1995 cit. by Ward Thompson, 2002). As opposed to semi-public spaces, there still exists a category of open areas that offer freedom in user behaviour, hence Ward Thompson (2002) points out the park, whereas Turner (1996) states that sea foreshores are spaces where users can most free.
Taking into consideration that this work covers systems that make up urban open public spaces, it is necessary to define the term system.

---

[5] Referred to by Gazvoda (1998).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

9

System

The area of research into complex systems is founded on universal principles that can be used in various disciplines (Yaneer Bar-yam, 2003).
A system represents a group of elements making up an integral unit in terms of which certain functions are executed. It is actually a group of structures united by rules of mutual interaction. It represents a formal scheme allowing some elements or phenomena to become ordered (Garača, 2008).

Garača (2008) notes that components are particular parts of a system that can be two-sided. If a certain component is not fragmented into simpler parts, it is called an element. If a certain component is fragmented into its components, it is then called a sub-system (Garača, 2008). Here it is evident that the city can be viewed as a system, whereas the green system represents its sub-system with its own elements.

Important for the structure of a system, besides its elements, are also its mutual relationships that may be established directly or using third-party elements, while Garača (2008) states that, amongst other things, they can be material or informational. Consequently, all elements of a green system need not be structurally connected, since even Orgin (2007) notes that connections are established where necessary.

Garača (2008) says that a system is in a particular relationship with the environment. In order to view a city as a system, it is necessary to take into account the natural characteristics of the space, since it is actually this factor that can determine it. So Kostof (1995) himself says that when topography is irregular, so too is the system.

Green system

The term green system is defined by a number of authors. Doležal (1991) in graduate thesis[6] says that a green system is comprised of logical and thought out allocated green areas in content and functional inter-dependency. Added to this is also his characteristics, in regards to the function and size of the space, orderly allocated green areas that are physically mutually linked where necessary.

Ogrin (1994) however, defines the green system as a connection of all green urban areas in a recognisable whole. Here he is referring to the physically connectedness between particular parts of green areas and the programme-functional connectedness in terms of satisfying various user requirements. Subsequently, a green system represents the respective relations between the requirements of citizens for greenery in space and its spatial allocation. Speaking of elements within a green system for a contemporary city, Ogrin (2007) also speaks of squares, parks, tree-rows, greenery around residential buildings, forests, abandoned agricultural lands, swamp regions, coasts, the city's water systems, cemeteries, and so on.

Kučan (2001) says that a green system on a planning level is a particular urban open space comprising of more or less related different categories of city greenery. At the the city

---

[6] The mentor of the graduate thesis is Prof. D. Ogrin

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

10

level as structural and functional units, system relations are possible, thought out and therefore necessary, while they can be structural, functional or most often a combination of one and the other (Kučan, 2001).

Aničić (1995) when treating a green system says that it is comprised of different units, which are fundamental units in a definite and mutual relationship. This relationship can be functional and structural in nature.

Evidently, all the point out structural characteristics, emphasising connections and relationships between particular elements of the system, hence it is actually this component that is its important feature. Even tough when defining a green system the importance of its green elements is emphasised, this work, besides these also addresses the elements that are not essentially 'green', primarily referring to squares as elements from which numerous functions of green city spaces had developed.

There are some authors who use a different terminology. For instance, Catherine Ward Thompson (2002) who speaks of urban open areas using the term 'open space patterns' and 'open space networks'. These terms can represent a green urban system, if referring to mutual relationships and systematic relations between elements. The Israeli researchers Maruani and Amit Cohen (2007), nonetheless, use the term open space system. The term is perhaps more accurate (if referring to city spaces) since it omits the word 'green' and does not emphasise green elements within the system. However, in regards to the common existing terminology, this work uses the more common term 'green urban system'.

Terms - green network, ecological network, green infrastructure, place emphasis on an ecological role of urban open spaces of the city and region, and when considering that a majority of authors treat only green spaces, they most often are not equivalent to the term green urban system. [7]

What is important for a green system is its social, structural (urban-morphological) and ecological role, which is to be treated in more detail in Chapter 3.3.

---

[7] This will be treated more in Chapter 4.3.2.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

11

2   REVIEW OF THE PUBLICATIONS

(AN OVERVIEW OF THE DEVELOPMENT OF CITIES AND THEIR OPEN AREAS THROUGH HISTORICAL PERIODS, ALONG WITH A SUMMARY OF THE FOUNDING OF THEORIES AND CONCEPTS OF A GREEN URBAN SYSTEM)

This chapter will present, by presenting the development of urban space,[8] development of open areas, and their role in theoretical urbanistic models on the basis of articles by various authors who have investigated this issue in terms of a wider research of the whole city. By referring to social and economic conditions in developing urban spaces, an insight will be gained into information which have conditioned changes, but which could be significant for observing influences in changes to today's urban situations. The last part of the chapter treats green systems as a new way of organising urban open areas.

2.1 DEVELOPMENT OF THE CITY WITH ITS OPEN SPACES THROUGH HISTORICAL PERIODS

2.1.1   Development of the Greek city

Kostof (1995) says that the first Greek cities were founded to unite a number of villages, hence their irregular form because they assumed a structure from settlements from which they were founded. The city form is often defined by irregular topographic base, most often occurring on steep slopes that served as a natural defence of the terrain. The frequently developed close to the sea, but were usually separated from the sea by a zone of landmass. The origin of a city importantly had to be close to a source of water. The holy space of a previous village became of focal point of the city which was transferred onto the city areal (Zucker, 1973). This space in the seventh century B.C. evolved into an acropolis, which was a spiritual centre of every city and a feature of any bigger settlement (Mumford, 1988).

Greek cities up to 4th century B.C. were dominated mainly by rural criteria characterised by more model dimensions. This was a period when spatial components were far from grandiose and monumental criteria. Poverty at that time was not a shame, and ignorance was not a sign of inferiority. The first cities appeared on Crete, and later began to develop in other parts of Antique Greece, expanding across the islands and coast of the Mediterranean Basin and Black Sea. At first, cities were organised as monarchies, but from 650 B.C., aristocracies were overthrown and replaced by popular leaders in a large number of polieis. Aristotle himself associated cities on hilltops with monarchies and oligarchies, while those in the lowlands with democracy. Rejecting the pretension of absolute authority, city leaders did not pretend to be greater than other people. This spirit will continue until Alexander of Macedonia who renewed the divine cult of the king. A Hellenic city, which was the Greek polis up to the time of Alexander the Great, was reduced to a human

---

[8] The presentation of development commences with a Greek city in which the square is conceived as a free open space of the city which is the basis for further development of open city areas (even though open spaces are encountered also in older settlements).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

12

dimension without the senseless pretensions of exalted rulers. This was a period that actually shows how the importance of a city is measured by its achievements in the area of culture, the arts and political through, and not by the number of its inhabitants (Mumford, 1988). Taking into account that Greek did not have a strong organisation of space, there is not strong control over it; hence, a loose organisation form develops. For these reasons, a less regulated relationship between constructed and unconstructed urban spaces developed, hence the city is characterised by an irregular form. Equally so, this process is reflected also on the central urban open space, the agora.

This type of relationship towards urban space is linked also to social norms, since they are less formal and rigid in the hierarchical division of people. This leads to the development of independence and autonomy of citizens who participate in the political life of a polis through a model of direct democracy. Greek cities were not rich, people had time on their hands, but were not focused on accumulating material goods. They spent time on intellectual discussions, love and aesthetical pleasures. Citizens were schooled to become educated, to rise intellectually, and not for the purpose of specialised work (they deemed work not to be noble). They did not divulge themselves in overeating and becoming intoxicated and did not seek excessive luxury and comfort. They lived a sporting and tempered life, and carried out all their duties under a clear sky. Hence, the affluence of a citizen was measured by the richness of enjoyment and experience. Since the citizens had agricultural lands in areas surrounding the city, cities were very tied to their hinterland areas. Every day, citizens strolled the village and natural surrounding space or were involved in recreation such as rowing on the rivers (where they satisfied their needs for green spaces). The city and village represented unity, and not an antagonism (Mumford, 1988). This is evident that the relationship between village and city was formally segregated, but they functionally intertwine and complement each other.

Mumford (1988) says that from the seventh century, Greek cities developed in two directions: spontaneously, irregularly organically on the Greek landmass and islands with a dominant spirit of the acropolis or strictly systematic in Ionia where the dominant spirit was agora. These two city elements pose the most important spatial factor for a polis. In this sense, the acropolis symbolised spirituality, whereas agora secularism.

Zucker (1973) links the original position of the acropolis to the long-ago fortresses which served seeking shelter from attacks. As a holy place, it was a space in which temples were built, monuments and places of kings in earlier periods of Greek civilisation. These spatial elements were at first established without order and such remained until the Hellenic period commencing with Alexander the Great, when they became systematised. At first, the acropolis was surrounded by walls and located most often on heights, which separated it from the settlement below. When the whole city was surrounded, it lost is defensive function. At first, it often served as a place for gatherings, when the city still had not formed agora, i.e. city square. With the appearance of the agora, the city gained two of its most important urban elements representing the main roles of the Greek polis - the acropolis and the agora (Zucker, 1973).

Reconstruction of the archaic agora was carried out by Zucker on the example of the polis Thera, since those in other cities most often experienced numerous alternations (Zucker, 1973). During the archaic period, it was amorphous. The agora was like a new city element, linked to the process of the development of democracy (Mumford, 1988).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

13

Mumford (1988) when mentioning it cites that Homer in Iliad called it a place for "citizens meeting", but was used for political gatherings and legislative assemblies because common decisions in the spirit of direct democracy was made on it (Zucker, 1973). Mumford (1988) says that at first, competitions amongst potters, horse breeders, singers and military unit took place. Wrestling competitions took place on it, including other games because the city did not have a sporting hall or *gymnasium.*

The first performances took place on the agora, because in the beginning the city did not have a theatre, and was used for holding dances (Mumford, 1988; Sitte, 1967). Gradually, it also acquired a commercial role, which increased in 7th century B.C. with the appearance of coins and shops in time became its main role (Zucker, 1973; Mumford, 1988). As a place of meeting, chatting, exchanging news and opinions, it was the main social space of the city shared by citizens, peasants and slaves (Gallion and Eisner, 1963). However, it was nonetheless an area reserved for men, even though a smaller section existed for homemakers. Numerous city functions took place on the agora, hence besides the social role of the city it also assumed a legal, ruling, administrative, court, commercial and religious function, and became a centre of cultural happenings (Mumford, 1988; Čurković, 1985). For Greece, the agora was not so important in terms of its formal features. In a structural sense, it was most important for the whole city because it was a place where the urban fabric opened up, thus creating the most important city point, i.e. a central core of the urban centre. The power of the agora lay in its ideals, not in the design. The fact that it was less regulated by design, allowed it to be a more flexible and multifunctional space.

Being such an urban component, it was a precursor of the urban park, square, marketplace, campus and shopping centre (French, 1973). It therefore represents also the conception of elements that comprise the green urban system of today. Ordinarily, the agora, if topographical conditions allowed, like a focal point of the city was located in the very centre, hence we can conclude that it defined city urbanism, representing a constant point around which the constructed urban fabric changes and develops. This is contributed by the fact that the agora in port cities alongside the port was the most important part of a city, hence it was located as close as possible to the port, such as for instance in Delos, Rodos and Alexandria. It was the port and agora that defined the constructed space since it determined the development of constructed urban fabric around them.
In time, it also acquired some of the spatial elements such as the *stoa* (portico) and *portico* (colonnade). but located in the space without particular spatial conceptions and coordination (Zucker, 1973).

In the archaic period, Athens became a leading Greek polis with 200,000 inhabitants, while other poleis had between 30,000 and 40,000 inhabitants. In them, besides the main agora, particular specialised agoras also start to develop for selling certain products. So we have the agoras for pottery products, and the separation of squares for selling fish from those selling meat. Shops and kiosks for traders and artisans were located around the main agora (Zucker, 1973).
In the Greek polis, trade was handled by villagers and foreigners (*meteki*) who did not have the same rights as citizens, that is, they did not possess the right to vote in legislative

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

14

procedures and in making decisions, and furthermore, could not own property. [9] Aristotle recommended that the political agora be segregated from the commercial agora in order to exclude non-citizens as passer-bys (Mumford, 1988). This happened in Athena at the end of the 5th century B.C., when commercial trading developed to such an extent that it squeezed out the political function. Political activities were relocated to a special building (*bouleterion*) or onto an individual stoa, i.e. portico (Zucker, 1973). This led to the first differentiation of the central urban open space.

Figure 2. Atena with agora (Zabel ..., 2012)
Slika 2. Atena z agoro (Zabel ..., 2012)

The direct form of democracy in the Greek city functioned while the city was small, but when it grew to be too big, problems arose. As Greece had limited territory with arable land, there appeared a problem of establishing new cities because the existing ones were too big. This led to the creation of colonies of limited size, and important thinkers of the time ponder on the ideal size of a city. Speaking of the ideal city and its dimensions, Plato ascertained that for him, the ideal number of citizens was equivalent to the area to which the human voice extended or it is the number of people that can be accepted by a consecrated location for a solemnity (Mumford, 1988). The importance of a city size, and the agora, was also noted by his pupil Aristotle. Colonies themselves were characterised by a regular raster, which were devised by Hippodamus of Miletus in about 500 B.C.

He created the so called Hippodamus system and used it to establish the theoretical principles that influenced the development planning towns, but also agoras. When he devised the plans for Pirey (446 B.C.), Thurii (445 B.C.) and Rodos (408 B.C.), we acted on the principle of forming cities, which received a rectangular shape in the form of a network, hence the actual central square also had a rectangular shape. The position of the city and street directions were probably influenced by Hypocrat who at the end of the 5th and start of the 4th century B.C., spoke of the importance of street position with respect to the sun, wind and water sources in his theories. Since the old city was quite dirty and had narrow streets, this was at first only applied to the colonies. This principle was gradually accepted by the old cities, and for hygienic purposes they receive extensive parks with walkways for physical and spiritual rest (Mumford, 1988). This tells us that the natural characteristics of a space acted on the structural features of a city due to people's needs; hence some Greek cities also had green elements within the urban fabric.

Though Plato and Aristotle spoke of the agora, it was only with Pausanius (2nd century

---

[9] In Ion, the exception exists because citizens could be involved in trade (Mumford, 1988).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

15

B.C.) that we get detailed information of this spatial element. In his work title *Description of Greece*, he talks of various old agoras and those from the post-Hippodamus and Hellenic periods. He points out formal differences between the old non-rectangular agoras and the new rectangular ones surrounded by colonnades (Kostof, 1995). This tells us that Hippodamus' theory influenced on its shape, which at the start of the Hellenic period, i.e. the establishment of a new social order with the arrival of Alexander the Macedonian, became all the more noticeable. This led to an increasing tendency to construct a rectangular agora whenever possible, even though the location itself in the centre of the city remained the same.

A change in its shape from an irregular archaic to regular Hellenic shape gradually led also to changes in its character - from being a totally opened space it became a closed spatial urban element (Zucker, 1973). So it happens that on one side it is defined by the stoa - portico for protecting pedestrians and traders from the sun, whereas on the other side there is a wall for notices, wall murals, records of victories, conquering, city laws (Mumford, 1988). The agora in time became full, and public buildings (peristyle) are situated in it, while later, under the influence of the Roman forum, sculptures, altars, shrines and small temples. Along the periphery, the stoa also receives a trading role, so the portico area is used for selling various products and other activities (Mumford, 1988).

Figure 3. Agora in Assos, layout (Zucker, 1977:6)
Slika 3. Agora v Assosu, tloris (Zucker, 1977:6)
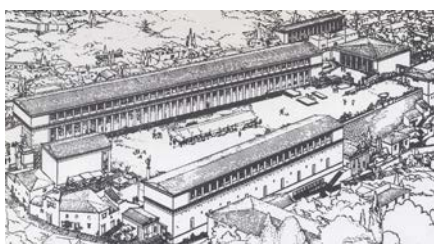
Figure 4. Agora in Assos (Zucker, 1977:6)
Slika 4. Agora v Assosu (Zucker, 1977:6)

The Hellenic city, which developed with the arrival of Alexander the Great in the 4th century B.C., became cleaner and richer, but citizens became an increasingly less active class of the population, and increasingly more part of society that only undertakes particular jobs. This is contradictory to that of a Hellenic city, which is a city of culture and free people. During the time of Alexander the Great, knowledge is gathered and qualified which serves as a replacement for action, which was not an instrument of life. Streets

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

16

become longer and wider, building bigger, while oppression and pressure by property owners encompassed increasingly wider regions (Mumford, 1988).

In the 3rd century B.C., cities became places of trade and political pressure, merciless power and affluence. They were marked by the development of museums, libraries, science, and featured monumentalism (Mumford, 1988).

With the expansion of colonies in the 3rd century B.C., the form of city was regular, in the shape of a grid which created regular rectangular blocks with equally wide streets and a regular agora. This city form was practical because the land could be easily divided up (Zucker, 1973). Nonetheless, form is not deemed to be the absolute concept, but a by-product of development. Interest in the Hellenic period was not directed to an aesthetical counterpoint in articulation of space, given that space for them did not exist in an aesthetical sense. Their interest still remained on the mass of volumes and mutual relationships created in unison. So we have it that Greek spatial planning was a mixture of abstract and geometrically controlled volumes in given local conditions. Consciously creating space is an ability that will be developed by the Romans (Zucker, 1973).

As the most fruitful period of Athens was that between Solon and Pericles (6 and 5 century B.C.), when people still held importance for monuments, we can conclude that the greatest importance for a Greek polis was its spirit embodied in the citizens. This could be achieved while the city was neither too small nor too big, neither too rich nor too poor, utilising urban institutions that were able to unify people in thought and action, at the most important city area, the agora.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

17

2.1.2   Development of the Roman city

Roman cities were definitely founded under the influence of Greeks' artistic vocabulary, though with completely new values (Zucker, 1973). The actual process of founding the city, considered a religious rite, was adopted from the Etruscans.[10] The *auguri*, i.e. priests, having determined the city centre, and the direction of the *carda* and *decumana* and the urban perimeter, provide the urban space with concept (Mumford, 1988; Suić, 2003). According to Roman tradition, the city was created in harmony with the cosmic order (Mumford, 1988).

Though the Hellenic city had a rectangular layout, it was different from the Roman city. The Roman urban space, compare to that of the Greek, had an exactly determined position and directions of the main communication routes. *Cardo* led in the direction north-south, whereas *decumanus* ran in the direction east-west. Whereas forum was created at the location of its intersection, the Greek agora did not represent an intersection of streets because they only correlate to it (Mumford, 1988; Zucker, 1973). As reliquii were buried at the forum in a religious rite, it units the Greek agora and the acropolis, i.e. the secular and spiritual part of the city (Mumford, 1988). The axial concept of the square and structures comprises of inseparable integral elements in a Roman urban settlement. When considering that it gravitates towards symmetry, what is essential is the difference of construction elements around the agora in the Hellenic polis (Zucker, 1973). Construction of the Roman city began with a wall around it, while in the Greek city, the wall subsequently added (Mumford, 1988). Roman urban space most often has a square pattern that is clearly and sharply separated from the surrounding landscape, while the Greek urban perimeter has a less pronounced transition towards the environment. However, the centre of life of a Greek polis, the agora, corresponds to the Roman forum (Zucker, 1973). This is clearly evident in that the Roman forum is an urban guideline of space because it determines the urban fabric of the city. However, apart from it, the relationship of open space and constructed space of Roman urban space is an important division of the urban fabric utilising secondary streets which create a regular rectangular blocks of residential flats, *insulae* (Mumford, 1988; Kostof, 1995). So cities receive more or less the same planned, with an equal ratio of constructed and open spaces (Mumford, 1968). The Roman conquest of Greek poleis, meant that they too acquired more regular layouts.

Regularity of city schemes, i.e. internal order, is revealed through the relationship of open and constructed spaces, becoming a measure of the value of an urban settlement (Suić, 2003). The Roman architect, Higen, spoke of an ideal city surface area with an optimum of 800 m x 500 m, because he considered larger dimensions could not be easily defended due

---

[10]   The process starts with prophecy where they were convinced in the benevolence of the gods (Mumford, 1998). The rites were carried out by *auguri* (priests) by determining the city centre, which would be the starting point of the coordinate system for receiving prophecy from the heavens, with the earthly city originating based on the example of the ideal heavenly cities. The priest turns towards the east, extends his hands and in that way designates the direction *cardo*. The zone of the future city before him is *pars antica*, the zone behind him is *pars portico*. Perpendicular to *cardo* is *decumans*. Left from *decumans* is *pars sinistra*, and right is *pars dextrata*. After that, the size of the city is determined, designated by the priest using a plough (Suić, 2003). The unconstructed part along the city walls *pomerium* remains empty for religious purposes (Mumford, 1998).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

18

to ambiguity of signals between sentries. The majority of Roman urban spaces were derived from these frameworks. All new cities were planned for around 50,000 inhabitants, which was considered the limit for appropriate growth. Rome itself relocate people so that it might not be over-crowded, hence cities were created through Italy, Europe, Minor Asia and North Africa. The cities were the centre of the Roman Empire's great power, which was based on a military system, centralised administration and authority (Zucker, 1973). With the creation of new urban settlements, Europe gradually became urbanised. For new cities it was characteristic to maintain a balance with the surrounding rural area, whereas Mumford (1988) mentions that their greatest value was in preserving the culture of the polis. This is probably reflected in the environmental values of the city and its relation to the hinterland. As in the previous period, Citizens probably often staying in a nearby area, as too Suić (2003) notes that they were very attached to the rural area and accordingly participated in village celebrations of the cult. During the Roman period, it is evident that the actual urban space was structurally linked to the surrounding area because of its divisions expand further onto the landscape, hence agricultural land is divided by centurisation into regular rectangular plots, especially characteristic of Italian valleys, Dalmatia and Africa.

Through these surrounding landscapes, roads pass that link settlements (Mumford, 1988). The life of a Roman city, so too as a Greek city, mostly occurred on the streets and squares. The relationship between private, i.e. individual and public, i.e. social sphere of life was firmly balanced. Suić says that the Roman city lived like a complete organism (Suić, 2003). However, this primarily refers to the smaller Roman cities, since Rome as it grew, created abnormal living conditions in the city, especially when relocation of inhabitants into new city areas ceased. Gladiator games, introduced at the time of the Republic in 264 B.C. debased human dignity.

The urban centre of a Roman city was the forum. When describing its origin, Zucker (1973) discusses three possible sources of influence. The first influence were the settlements the Terramar civilisation. Having studied Terramare Castellazzo, Zucker acknowledges that the village had a grid layout of the streets that intersect at right angles. Their intersecting reminds of the intersection of *cardo* and *decumanus*. At the centre of the settlement was an emptiness consecrated with sacrificial rites of animals from some unknown ritual. Zucker says that this emptiness represents the nucleus of the later forum. Another important influence on the Roman forum came from Etruscan settlement created from a quadrilateral grid scheme. Religious laws determined the internal structure and its regularity. The Etruscan city had the main streets *cardo* and *decumanus*, and those secondary ones. The main streets, at the intersection location, had an open space along with a location of the temple. This could be the precursor of the Roman forum. This kind of settlement Marzobotto back in the 6 century B.C. had two main axes, *cardo* and *decumanus*, at whose intersection was found a smaller square open space.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

19
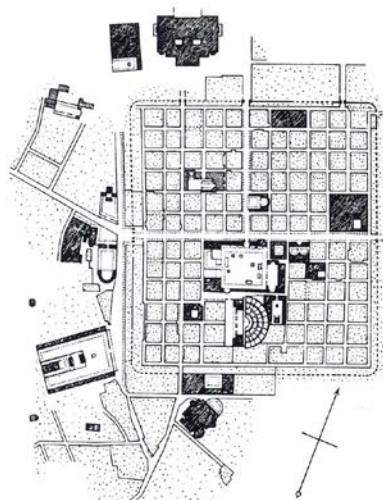
Figure 5. City of Timgad with forumom (Zucker, 1977:10)
Slika 5. Mesto Timgad s forumom (Zucker, 1977:10)

A third important influence probably came from the spatial plan of a Roman *castrum*, *castra sativa*, which is governed by a military needs of invading armies, and in the centre is an open space (Zucker, 1973).

The Roman forum in the city plays an important role in city life, as it is a multifunctional urban space. As the Capitolium was located alongside it, inhabitants met on it for the purpose conducting official cult rituals, so here gatherings were organised and harangue held. Furthermore, it is the centre of public and political life of the city and serves as the administrative centre. Therefore, the curia was established alongside it the council of Decurions met and basilicas, which during bad weather assumed the role of a forum They serve as a public-commercial space, a public promenade, century assembly, a courthouse or as a place where the town magistrate addressed the nation. At the forum, city life unfolded from morning to night in the many amenities and functions. Besides shops, here different manifestations are held and gladiatorial games in cities that do not have an amphitheatre.

Therefore, this is the part of the city that serves in entertaining its inhabitants, providing various games and recreation. The forum is a space that attracts truants, but also business people since on it the city's economic life takes place. A lot of the rural inhabitants from the city surroundings also come to visit it. Due to its role in the city, the forum was located in the best quality urban space alongside which the best quality architectural structures were built (Suić, 2003). It represented the social centre of the city, just like the Greek agora, but Vitruvius notes that between them there is however an essential difference. As before the emergence of the amphitheatre at the end of the 2nd century B.C. gladiator fights were organised for the forums, over the porticoes were balconies from where the games were watched (Zucker, 1973). Sitte (1967) mentions that the forum acquired spatial relationships, which were more characteristic for the theatre. The square, as a spatial city unit, acquire strongly emphasised vertical edges and its area became very closed with vertical plans aided by a series of colonnades used to direct the views (Zucker, 1973).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

20

When comparing the forum and agora, Mumford (1988) observes that there is a stronger concentration of different activities at the forum, and also a higher degree of formal order. Along the periphery were public buildings, because even Vitruvius remarks that the forum should be a treasure, prison and council hall. On a single forum, there would be thousands of busts and statues arranged along the walls, so that the middle remained empty (Sitte, 1967; Zucker, 1973). Vitruvius determined the ideal size for forums where its width is equal to two-thirds the length. It was most often rectangular in shape, but was sometimes adapted to local conditions. (Zucker, 1973).

Though Vitruvius mentions the particular differences between the agora and forum, he does not mention the already notes differences that are visible from their roles in defining a relationship between the construction and open space of the whole urban fabric. In the Greek city, the agora was the only such element, while in the Roman city, this role was assumed by the streets. They subsequently acquired an important role in defining the pattern, i.e. the concept of the Roman city.

Figure 6. Forum Romanum, Roman Square (Zucker, 1977:7)
Slika 6. Forum Romanum, rimski trg (Zucker, 1977:7)

The most important Roman Empire forum was in Rome. It originated during the unification of the tribes from which the city developed, because the symbol of alliance was the establishment of a common square, the forum (Mumford, 1988; Lavedan, 1959). The temple was one of the most important elements of the square, because the commercial peace, necessary for the exchange of goods, had to be preserved. Thus, the space devoted to trade was consecrated, and the Roman Forum was not an ordinary square. According to this concept, it was one complex unit, which included shrines and temples, the courtroom and council hall, and a wide free space surrounded by colonnades. Therefore, it is the Roman square that best account of the way the forum united the Greek agora and the acropolis (i.e. the religious and secular aspects of life). Open space was used by speakers who addressed the crowds and on which religious ceremonies and trading took place. During bad weather, large halls and basilicas assumed many of the forum functions. The simplicity of the forum allowed its multipurpose use. In Rome, there were eighteen forums or public squares and eight *campus* or public land covered with grass for recreational purposes (ball games, or driving carousels, etc.).

The city had thirty parks and gardens, which in later periods possessed a public character (Zucker, 1973). So too Cesar, in his last testament, left his gardens to the people. Unfortunately, public green spaces did not exist in the most impoverished parts of the city where they were most necessary (Mumford, 1988). Here it is evident that the city of Rome had a complex concept of open urban areas.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

21

Mumford (1988) notes that Rome, once growing out, began its degenerative process (in the 2nd century BC, it already had approximately 400,000 inhabitants). Workers lived in inhumane conditions, were paying high rent, and brutally treated at work. At the same time, all the inhabitants of Rome felt exalted because they were Romans, and the downplayed other provincial towns and villages. The sought escape from a poor reality in leisure, which at that time took on brutal proportions, where a large part of the day was spent watching the death and mutilation in the arena (from 246 B.C. to 404 B.C.), while spending the rest of their time in the bathes. They live near open pits on the edge of town, which were filled with garbage, corpses thrown out of the arena, and faeces. Romans violated the value of human life, evident in excessive hedonism, decadence and excesses (Mumford, 1988).

Nonetheless, Roman cities contributed to the development of architecture, because they developed a sense for the form of an open area, its artistic meaning and proportions. They were different from the Greeks in that they, compared to the Romans, developed organic urbanism for which the most important was his relationship towards man (Zucker, 1973). Also, the introduction of an exactly determined relationship between open and constructed urban areas, influence their development process.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

22

2.1.3   Development of the Medieval city

The Medieval period is most often dated by historians as a period lasting from the fall of the Western Roman Empire 476 A.D. to the the fifteenth century. But, as urban development stagnated since the fifth century, Zucker (1973) notes that the Middle Ages in urbanism began only in the ninth century, and Kostof (1995) links it to the start of mature Gothic style in the twelfth century. However, some authors point out that several cities in Italy and Dalmatia maintain a continuity of its city functions, and that they had no interruption of urban life (Lopez, 1967; Fine, 1991; Laurentiu, 1975).

Back in the time of Roman authority, the Barbarians intrusion occurs who capture certain regions of the empire which nonetheless affects economic development of the region. At the end of the fourth century (392 A.D.), Rome accepted Christianity as its official and only religion. Though life in Rome had previously began to change, Christianity brought about increasingly intensive changes in the life of Roman citizens, especially during the first century. In 404 A.D., gladiator games were forbidden and the spatial elements of the city, which were used in everyday life, lost their role, hence the terme and arenas are abandoned, while the basilicas became churches. In Rome, as in other cities, citizens were unable to defend themselves against invasions by Barbarians. Roads which previously provided safety and affluence now facilitated access to attacking hordes. As there were no goods for trading or workforce, the city became a hostage which, on account of its riches, attracted attackers, so the inhabitants fled to the hills. Urban life almost completely disappeared, and the Roman forum lost its role in the city, because the main gathering place became capitolium which was easier to defend, so the city authorities of Rome moved into the area. The period was marked by stagnation, hence many called it the *Dark Ages*. This process affected Rome, and other cities of the Roman Empire. As the changes in the cities are such that they regressed, the only positive process of the early Middle Ages is in the new laws, habits and customs, present outside of the old cities (Mumford, 1988).

Mumford (1988) says that the monastic orders assumed the first initiative for changes in space. They became a new type of community by congregating people for a common Christian life on earth consecrated solely to God, hence their new throne is the heavenly city. Zucker (1973) also spokes of an imaginary concept of city, a "Heavenly Jerusalem" which was developed during the centuries, and is the only city conceived as a unit, with symbolic meaning stemming from the Middle Ages, visible through the presentations of murals and miniatures. In that unstable period, the monastery established an internal order and new values, which rest on minimal material needs for life.[11] It becomes the core assuming the link with the one-time values of a city, hence Greek medicine is used, traditions of Roman agriculture, and the Latin language is used. Here, peace and order primarily prevailed, tranquillity and an obsession with work and prayer. This way of life was achievable in the first centuries of the Middle Ages, during the time of general poverty. It is from these cores of communal life that the city is later developed (Mumford,

---

[11] The Church in the 13th century began acquiring material wealth and distanced itself from this kind of concept. In the 16th century, it completely distanced itself from the moral principles of the early Middle Ages, introducing the indulgences.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

23

1988). Zucker (1973) mentions this type of urban space as a characteristic phenomenon in France, Germany and England, from the ninth to the eleventh century.

Around feudal castles people also settle, who for security and a small piece of land became vassals and serfs. These settlements were attractive because the constructed defensive walls were safe, as were the settlements around the cemetery, representing the core of the development of new cities (Mumford, 1988).

Urban structures from the Roman period were often abandoned, but those cities that hadn't lost their whole population were most often reduced the scope which they encompassed with walls. Some survived within particular units of the Roman city space, such as Nimes who lived in the space of the Roman arena. These cities mostly ceased to operate as production and commercial centres; hence the continuity of their urban life was questionable (Mumford, 1988; Zucker, 1973). Only some of them continued to function as city centres, which includes particular Dalmatian cities in Croatia (Lopez, 1967; Fine, 1991; Laurentin, 1975). With their further development, some adhered to a Roman division of space, whereas other adopted a Roman raster and the relationships of open and closed areas in a city become lost, such as happened using the example of Paris (Zucker, 1973).

Mumford (1988) says that the mentioned cores from which the city grew, received their urban form usually in the eleventh century. The walls around the new or old settlements were important for the medieval city's functioning. The defensive wall was fortified by an external fortification, canal or river that transformed the city into an island (Mumford, 1988; Kostof, 1991). The city could be more easily defended and was a safer place. Security created the basis for the development and establishment of trade relations, and trade fairs became an integral part of life. In time, it created a new class of people who were engaged in trade and crafts. They firstly settled under the original city wall, forming the core of the suburbs, and when subsequently merged with the city and suburbs and surrounding wall, to become an integral part of the urban organism. Merchants and artisans thus became free citizens possessing full rights. Expansion of the city leads to changes within the urban fabric, and most of the village centre was moved from the traps or monastery and the square begins to dominate the city. This path of development of the cities was commonly defined the actual urban fabric, its regular or irregular character. Cities built on Roman foundations usually retained a tetragonal system of subdivision and block construction, and were modified by construction of the citadel or modified monasteries and other buildings that created more or less irregularity. The cities that developed from one or more villages situated around the monastery or feudal castle, usually adapted to the topographic base, so a typical unplanned medieval town characterised by organic growth was established (Mumford, 1988).
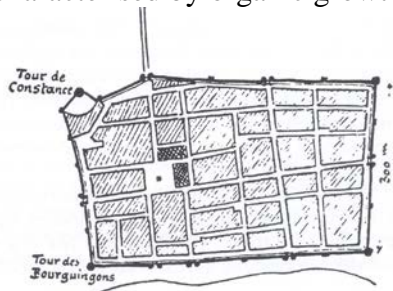
Figure 7. Planned medieval city with central square, Aigues-Mortes (Zucker, 1977:72)
Slika 7. Načrtovano srednjeveško mesto z osrednjim trgom, Aigues-Mortes (Zucker, 1977:72)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

24

A particular type of settlement are planned cities from the Middle Ages that originated in the period from the twelfth to fourteenth century with stabilisation of the situation and development of trade and transport. These include Bastide, Villes neuves in France (Figure 7), in certain locations in England and Wales, and fortified cities in Germany in the area east of the Elba River (Morris, 1994; Zucker, 1973). What they have in common is a rectangular grid structure of urban space which opens up at the square. Most often, they had one or a maximum of two squares within the city (Zucker, 1973). Zucker (1973) notes that Villes neuves were often built without defensive walls, but the central church was fortified, whereas the Bastide was always crowned with fortifications. In France, new cities were often built in a space between castes belonging to feudal lords and in areas with offensive armies so that they were often on hilltops. In Germany, these structures appear due to colonisation of Slavic nations for the needs of the Crusades under the leadership of the Knights of the Teutonic Order (Zucker, 1973).

Zucker (1973) distinguishes a particular category of cities founded at commercial points, i.e. route intersections, along rivers, in ports or harbours.

As the city from the eleventh, and especially from the thirteenth century, began to develop urban institutions from the previous periods of urbanism, they began to dominate the city, reducing the power and influence of the monastery and traps. The period between the eleventh and thirteenth century was a time when cities sought autonomy from feudal lords, abbeys or diocese from which they were founded. They would most often receive a certain self of self-governance, and sometimes even full autonomy. The number of autonomous cities, *communitas* grew.[12] However, some cities did not succeed in becoming autonomous from their feudal landlords, abbeys and dioceses because they refused to relinquish levies, this resulting in rebellions. An increasing number of people lived in cities and subsequently the number of urban settlements grew. A free city was a source of affluence, but its self-confidence and autonomy posed a threat to the whole feudal establishment. At first, the social classes in the city were relatively equal and the population was homogeneous. No social class was that strong so as to impose its authority, and amongst them existed equilibrium. At the same time, the value of manual labour rose because the slave class vanished (Mumford, 1988). This kind of city was the precursor of modern democracy (Giedion, 1965). At the same time, this was the period of the Crusade campaigns and mission often travelled and become familiar with other inhabited regions, extending people's horizons. In the developed Middle Ages, educational institutions were opened, including universities (*universitas*) which assumed the role of inheritors of knowledge and culture from the Church. Knowledge and creativity grew, and the city experienced a cultural awakening (Mumford, 1988).

Nonetheless, throughout the time of a medieval town, its characteristic constituents were the church and square. Although the town hall was essential city later on, the church had an important social and spatial role for the city. It functioned as a hospital, orphanage, school, home for the elderly, and later a home for foundlings. It played an important role in the daily life of inhabitants. The urban segment always had a prominent place in the city and

---

[12] Around 1200, west of the River Elbe there were around 250 towns, to the east only ten or so. Around 1400, west of the Elbe this had increased to 1,500. In 1500, there were already 15 cities that had inhabitants numbering over 10,000 (Zucker, 1973).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

25

its architecture and dimensions dominated the urban space (Mumford, 1988). Often, in an irregular urban fabric it was the only structure originating according to order, as it was always facing east. Usually the surrounding buildings grew with it, linking it to the urban fabric (Sitte, 1967; Zucker, 1973). As it drew a large number of people on a daily basis, in front of it was an open space where fairs were regularly held.[13] The Church itself and the square (parvis) in front of it, had a crucial importance for the city. This provides evident proof that within the urban fabric a specific relationship develops with respect to the constructed and open urban areas to which a dominant structure was established in front of which the city's urban fabric opened up. This changes the relationship between the open and built city areas, because the actual medieval square, through very important for city space, was determined by the position of the most important structure - the church. It continues to represent an important point in the city in which the urban fabric opens up, and its position dependent on the mentioned structure. This was the way a church and square became the city centre in a medieval city. This happened regardless of the formal traits of a medieval urban settlement, being a feature of regular and irregular cities.

From the above, the fact is that the church and square were spaces connected in terms of functionality, hence the numerous activities from the church were transferred to the external space of the square[14], hence these two spaces were linked to one another. They functioned as a social home, a stage, a forum for the learned church fathers who competed in rhetoric and learning. Sitte (1967) says that on the medieval square, part of the city's public life unfolded, and subsequently retaining part of its one-time importance because its role partially originated from the function of the Greek agora and Roman forum. Public solemnities were held on it, including exhibitions, expounding of laws, and also the conducting of state actions. Taking into account there numerous roles, a number of squares are established in the cities, ordinarily two or three. This results in the segregation of the secular squares from the church squares, the parvises (Sitte, 1967).

This led to the differentiation of urban open space. Besides parvis, Sitte (1967) mentions squares functioning as marketplaces and function halls of prince residences. While the town hall is almost always on the market, the squares in front of the residence of the ruling accommodated lodges for the city sentry or guards, which was a raised area for proclaiming laws and public notices. Medieval squares were particularly tied to the structure with which they come into being (in earlier periods it was the church, later the city hall), thus defining the relationship between the constructed and urban open space, because together they create the city centre (or a number of them). The square was usually irregular in shape, but in planned cities it had a regular form. It could possess a wide or tall form. The parvises were elongated because of tall churches, while the squares in front of the city hall were wider since the city hall was a wider structure. The square was usually spontaneously proportional to the dominant structure (Sitte, 1967). This shows that the square adapted to the structure, while in the previous period the square defined the surrounding constructed space. Thus, its role in relation to constructed and open areas

---

[13] Zucker (1973) says that the exception were cathedrals in German cities which rarely had square in front of the structures. They were characterised by a smaller vacant space where the square would otherwise be located. Such examples are the cathedrals in Strasbourg, Ulm, Freiburg im Breisagu.

[14] Though this occurred partially also in Antique cities, in the Middle Ages it was particularly emphasised.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
     Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

26

changed. In later periods of the Middle ages, executions, burn pyres and knight tournaments were held on squares. As the medieval city became an intimate space with fewer inhabitants, the square was an area used for gatherings, socialising and daily sojourning. Besides the squares, open spaces of the narrow medieval streets offered the possibility of their intensive use during winter, creating microclimate conditions allowing trade, sojourning and socialising to take place on them, in the open or under the arcades (Mumford, 1988). At the same time, users were given various routes between two pints, creating a complex visual unity of small city spaces (Moughtin and Shirley, 2005).

Given that houses in a medieval city did not provide great comfort and privacy, the external spaces of the city itself were intensively utilised, including the surrounding area which provided greater privacy and intimacy. Mumford (1988) mentions that in the city quarters, citizens had their own orchards and vineyards, and livestock on the municipal pastures. Wild-game were hunted in the forests and fishing took place in the tributaries and rivers (Mumford, 1988; Whiston Spirn, 1985).

Throughout most of the day, people would live outside their houses, meaning that there existed various forms of recreation,[15] and also places for socialising amongst medieval citizens of a city. Mumford (1988) notes that free spaces within the city itself on which people spent recreation time, were the precursors of the first public parks, but inhabitants also used surrounding area for everyday activities. The actual wall, as in Antique times, was used as an open walkway, especially during the summer period (Mumford, 1988). This showed that the medieval town differentiated open spaces. The medieval miniatures and popular prayer books, at that time intensively used in Western Europe, showed daily activities of undertaken by people, often presenting them in the fields and natural landscapes around the city, strolling, lying on grass, engaged in recreational activities or preparing a picnic (Figures 8 and 9) (Shepherd, 2002). So too Mumford (1988) concluded that the early medieval city lived healthier then than in the later centuries when its expansion increasingly filled its internal space. This often led to the disappearance of urban open areas within the urban fabric, the city became congested, and it also distanced itself from the surrounding landscape due to its greater dimensions. Consequently, expansion of the urban space destroyed the medieval city (Mumford, 1988). When taking into consideration that the average size of a city and 1.0 x 0.5 km, and when the dimensions from the square to its edge reached 1.0 km, the concept of a city characteristic of the Middle Ages was distorted (Kostof, 1995). Here it is evident that the concept of a medieval city depended on open spaces, because it was typical for a city that the city inhabitants had access to the surrounding landscape and had the opportunity of spending time in open areas of the urban space on a daily basis.

---

[15] were games with a ball, sprinting, and target practice using a bow and arrow. Besides the squares, they also gathered in inns (Mumford, 1988).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

27
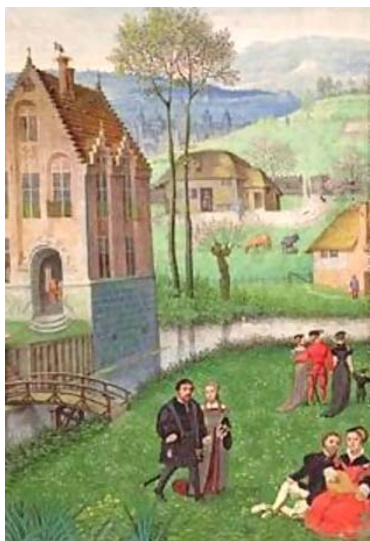
Figure 8. Presentation of usage of
hinterland for a medieval city on a
miniature (Bening ..2011)
Slika 8. Prikaz uporabe zaledja
srednjeveškega mesta na miniaturah
(Bening ..., 2011)

Figure 9. Presentation of usage of space around
 medieval city on a miniature (Bening ..., 2011)
Slika 9. Prikaz uporabe prostora okoli
srednjeveškega mesta na miniaturah
(Bening ..., 2011)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

28

2.1.4 Development of the Renaissance Town

The Renaissance was a period in the history of art that lasts from the fifteenth to the seventeenth century. This period starts after the Black Death in the 14th century wiped out between a third and half of Europe's population, which probably had an impact on the changes that followed (Mumford, 1988). This new period brought about the biggest turning point in the Western Europe's culture, manifested in the material and spiritual world. The fact that focus was placed on man, many changes in opinions regarding the city and its region occurred. Urban settlements of the late Middle Ages are appear as a too dense and disorderly construction with low standards of living, and therefore these situations oppose theoretical reflection and aesthetic perceptions of urban space, based on the perception of the city as a whole with a planned spatial organisation. Aesthetics is based on the purity of structures possessing proper forms that were contrary to the picturesque medieval town of irregularity (Zucker, 1973). Nonetheless, the idea of what a city was differed from the real urban settlement during the Renaissance. The former cities still remain in a medieval framework of urban space, because the whole urban space was not treated holistically as was the model[16] (Giedion, 1965). Having said that, a Renaissance construction during the sixteenth century was based on medieval urban elements that are manifested in the old plan detailing streets and walls. The originators of construction were medieval guild organisations and guilds that functioned according to the medieval principles. The urge to create straight streets and continuous rows of buildings with uniform fronts occur only in some parts of urban surroundings (Mumford, 1988). In fact, the Renaissance city according to Mumford (1988) does not exist, there are only patches of the Renaissance order, openings and purification of medieval urban structure where it became untenable. Milić (2002) remarks that the Renaissance did not do much for urban planning in terms of actual accomplishments, but the idea of creating a city laid the groundwork for the development of urban areas in the Age of Enlightenment. Renaissance did not achieve a complete transformation of cities, but with a strong interest in space it encouraged the development of vision (Giedion, 1965). The most important achievements of the Renaissance is thus reflected in individual structures.[17]

From the fifteenth century, literature on the principles of town planning appeared initiating conscious planning of city spaces, holistically developed only during the Baroque period. At that time, much interest appears for aesthetics and rational ideas are developed which are transformed into spatial concepts. Once integrating structure and function, spatial relationships are consciously created which become dominant in town planning, while plans for urban settlements are composed as compositions. Often, the importance of Vitruvius is emphasised, though he didn't leave any precise information on planning and creating city schemes (Zucker, 1973). Zucker (1973) and Milić (2002) note that Renaissance theoreticians were influenced by Antique ideas, but their contribution was certainly original. They were inspired by absolute measures and a regularity derived from Antique times, adopting them from Hippodamus, Plato (*Utopia Atlantisa*) and from

---

[16] Besides exceptions.

[17] For example, the Church of St. Peter in Rome, Palladium Villas, the Rotondo in Vicenza.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

29

Aristotle's ideas presented in *Politika.* However, Antique ideas nonetheless had a direct impact on Renaissance, because new plans of models were based on radial and concentric patterns, creating a star-like concept (Zucker, 1973; Milić, 2002; Giedion, 1965).

The idea of a city was created as a planned and organised spatial compositional unit with emphasised squares and a harmonised rhythm of main streets (Maksimović, 1976). The first Renaissance theoretician was Alberti, who in his tenth book *De Re Aedificatoria*, written in 1450, spoke of his ideal city. He pointed out the importance of a city's topography and location and its relationship towards the landscape, including the traffic and economic components important for developing a city plan. When reflecting on streets, he notes that it is important that they be narrow because those using wide streets are always exposed to the sun, and mentions also the important of street orientation for ventilation purposes (Zucker, 1973; Kostof, 1995; Giedion, 1965). The definitive plastic pattern was achieved by other authors who were influenced by his advanced ideas, hence the subsequent proposal to have central buildings and creation of central square with radial streets that stem from it (Giedion, 1965). It is important to emphasise that the square is a central city element that defined urban space. A city is conceptualised by establishing a relationship between the central open surface and the surrounding constructed fabric, divided into lines generated from the mentioned central open space.

The Renaissance ideal city Sforzinda, designed by Antonio Filarete in the years between 1460 and 1464, partially relies on Albertius' ideas, with a noticeable influence from Plato's *Utopia*. Sforzinda has a regular octagonal plan, a star-like shape. Eight streets protruded in a radial manner from the city centre, the central square, where the main structures were located, the cathedral and Palazzo Ducale, which are only part of the periphery edge of open space. In this way, the square, i.e. open central urban area, assumed the dominant role in forming urban fabric by defining the relationship of constructed and urban open spaces. This scheme was very influential, hence its concept later influenced ideal and actual achievements. This concept is evident in the cities of Palma and Grammichele in Italy, Karlovac in Croatia and Nove Zmaky in Slovakia, and also later is recognisable in the plan of Washington and Le Corbusier's Ville Radieuse (Zucker, 1973; Milić, 2006).

After Sforzinda, the model was developed by Francesco di Giorgio Martini who showed that the units on the plan were subordinate to the spatial order of the unit. The fundamental pattern was in the shape of an octagon, creating the form of the city's periphery and the central square. From here, the streets extended in a radial manner which the author compared with an artery in a body. In this sense, the square, i.e. the central open urban area, can be understood as the city's heart. This scheme coincides with the square pattern creating a series of secondary squares. Similarly, Fra Gicondo in about 1500 created a model with a circular central square on which the main palace was situated. The city model by Leonardo di Vinci was different from others because he had not particular interest in squares. Treating only some of the city segments (e.g. traffic) where he created a visionary idea of separating pedestrian from road communication contributed in some other aspects to the development of open urban areas.

In addition, Leonardo di Vinci treated hydrological solutions for water flows and was the first to make an effort in regional planning (Giedion, 1965). Pietro Cataneo was a theoretician whose models of cities were constructed on polygonal form of urban fabric, embraced by a star-like fortification system. Conscious of limitations in spatial

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

30

implementation, it was said that polygonal schemes could be implemented only on flat terrain. The final important model was Citta Ideale from Vasari il Giovanea who used a quadrant scheme for a central square accompanied by a central building from which eight streets extended in a radial fashion. He combines a grid scheme where radial streets intersected with communication routes from the grid (Zucker, 1973). Giedion (1965) says that the final Renaissance theoretician was Scamozzi who published his *Architettura Universale* in 1615. The author is Palmanova, hence his plan became an actual city in the east of Italy. In countries other than Italy, Renaissance theoreticians appeared only in the last thirty years of the sixteenth century.[18] Subsequently, star-like plans were typical in publications at the end of the sixteenth century when books on fortification systems became frequently published. The ideas of Catanea and Scamozzi became an inspiration for numerous authors, so they were often repeated later (Zucker, 1973).

An inspection of the model shows that the square and streets as open urban spaces, had a very important role in the concept of urban schemes, defining the structure of urban models. Efforts were made to implement this principle in real cities. This central open urban space became a major determinant of urban fabric.

The actual city of the sixteenth century increasingly became the definitive symbol of social and administrative order (Zucker, 1973). Kostof (1995) mentions that the goal of urban design during the Renaissance was to create visual order, freed of tension in space. Control and perfect stability in design perhaps testifies of a more peaceful social system in the Renaissance period, which is contrary to the medieval period (Kostof, 1995). Therefore, it is no coincidence that all utopian models were developed with a high level of order, but under the influence of theological, sociological and psychological discoveries (Zucker, 1973). The concept of the star represented a scheme based on the centrality of the square and the central structure, the symmetry of the urban fabric, which is evident in the accounts of numerous authors such as Bramante, Leonardo da Vinci, etc. In this way, a focal point with symbolic significance was created in the city centre, but this urban scheme fixed the city into a rigid formal structure (Giedion, 1965). Inflexibility is evident in the rough urban periphery (French, 1973).

The role of external spaces in the Renaissance period is witnessed by the place of the first real attempt at manipulating space and testing Renaissance models and patterns, since this primarily happened in the gardens created by Bramante, Raphael and Giulio Romano, who had the same principles, as were the later city plans (Zucker, 1973). Gardens represent an important spatial segment, but most often were not part of the urban fabric since they were outside of the city (French, 1973). The establishment of Renaissance cities were linked to the creation of a small number of urban centres with defensive roles. The structure is justified by the defensive function of the space because the wide fortified walls were incorporated into the star form, providing a stronger defence that was necessary for the innovative use of gunpowder (Zucker, 1973.; Giedion, 1965).

This led to the founding of the cities of Karlovac (1579), Nove Zamky (1581) and Palmanova (1593) (Milić, 2006; Krajnik, 2007, Zucker, 1973). What was characteristic of all the cities was the use of the star-like layout, with the city core being the central square.

---

[18] The most influential Renaissance theoretician outside of Italy were De Cerceau and Perret with their models of cities (Zucker, 1973).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

31

This led to the central open urban space defining urbanism, and besides forming a dominant core, its form generated streets which share the constructed urban fabric (Karlovac, Nove Zamky orthogonally, Palmanova radially). This defined the relationship between open and constructed urban spaces where the open spaces are defining city-creating elements. In regards to Karlovac, the position of the main streets in the form of a cross is tied to the symbol of Christianity because the city was established on account of the Turkish threat. Consequently, open urban spaces also had a symbolic role linked to the reason behind a city's founding.
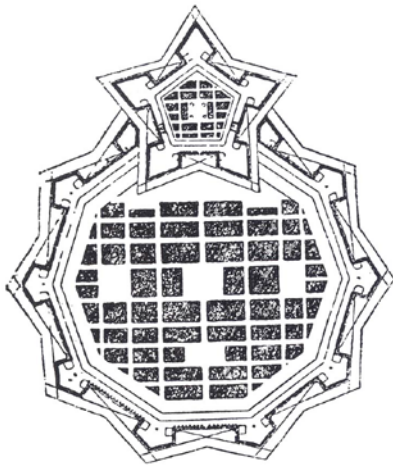
Figure 10. Pietro Cataneo, ideal city, 1507
(Zucker, 1977:105)
Slika 10. Pietro Cataneo, idealno mesto, 1507
(Zucker, 1977:105)
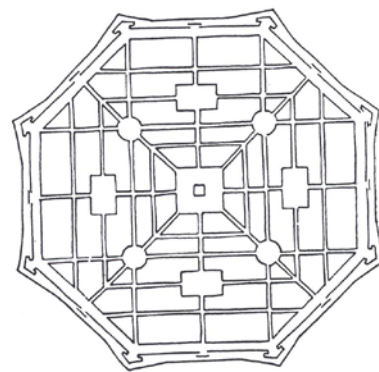
Figure 11. Vasari di Giovane, ideal city, 1598
(Zucker, 1977:105)
Slika 11. Vasari di Giovane, idealno mesto, 1598
(Zucker, 1977:105)

Figure 12. Palamnova, 1593
(Zucker, 1977:105)
Slika 12. Palmanova, 1593
(Zucker, 1977:105)
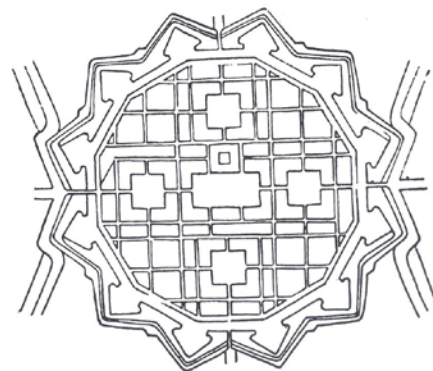
Figure 13. Vicenzo Scamozzi, ideal city, 1615
(Zucker, 1977:105)
Slika 13. Vicenzo Scamozzi, idealno mesto, 1615
(Zucker, 1977:105)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

32

It has already been mentioned that the centre of the city in the Renaissance period was its core, the city square. As social life during the Renaissance unravelled out in the open, the old spirit of Mediterranean tradition which existed in Antique open spaces remained (Zucker, 1973; Sitte, 1967; Maksimović, 1976). So it happens that the square continued to be a social and cultural stage of the city which was intensively used (Ćurković, 1985; Sitte, 1967). The inherited medieval squares often possessing smaller dimensions with a surviving architectural framework, were gradually reconstructed, extended and acquired a regular shape influenced by the study of Greek agoras and Roman forums (Maksimović, 1976). Sitte (1967) mentions that the open spaces of a city, especially those in front of a church of palace, were enlarged in order to find perspective, based on the examples of those in ideal cities. In this period, this was only a hint of the tendency to create open spaces with large dimensions which were to be developed only in the coming period (Sitte, 1967).On account of emphasis being placed on the whole in the Renaissance ideas of a city, to which other elements in space become subordinate, the square assumed the central role, i.e. the town core. This is a common feature of all Renaissances cities. The actual role of a dominant building on the square, the church or another structure, was reduced since it no longer dominates the city but endeavours to fit it in at the periphery of the square. The purpose of this is to create a harmony of spatial accents. The frequent use of the arcade as a connecting element, unifies the façade which encompasses the square, giving the square periphery a uniform rhythm. The use of monuments and fountains in space, in accordance with the suggestions by Vitruvius, Albertius and Paladius, represents the core of the square, which draws visitors to itself (Zucker, 1973). However, a large part of the square is vacant space and it continues to cater for trade, allowing gatherings by town citizens and the holding of public manifestations and entertainment events (Maksimović, 1976).

There appear differences between squares founded in the Renaissance, during the fifteenth and sixteenth centuries, and those, which developed in the medieval open spaces. The differences lie in size, proportions and architectural periphery, though all are an attempt in establishing defined spatial boundaries as the basic characteristics of a Renaissance square. Important Renaissance square appear in Italy like the ones we can point such as SS. Anunziata in Firenze and St. Marks Square in Venice. Some medieval squares upon reconstruction become highly organised Renesance spaces, such as the Piazza della Signoria in Firenze and Piazza di SS. Giovani e Paolo in Venice. They acquire a very important role in the cities, defining the relationship between open and constructed areas. This is evident also in the medieval urban fabric where squares represent the introduction of regular open areas that are often superimposed on organic urban fabric.

Compared to other open areas of the city, the streets were one of the most intensively used spaces. They show that Renaissance authors were not yet aware of space in all its urban segments. Thus, they are composed of rows of different structures possessing non-uniform volumes (Zucker, 1973). While stressing perspective, they do not realise the importance of the role of individual blocks in the view (Zucker, 1995). The development of perspective views with uniform blocks will come only in the future, during the Baroque period.

Besides the urban open areas, people often use spaces outside of the city wall because the urban settlement has a close relationship with the surrounding area, which it inherited from past ages. Thomas Moore in his *Utopia* speaks about the integration of city and surrounding area (Whiston Spirn 1985). Whiston Spirn (1985) also states that, at that time,

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

33

the city of Cologne had already had some tree-lined paths around the city. Speaking about life in the city, Alberti highlights and pleasure of retreating from the city to a place where a person can do what they like. Furthermore, he mentions sunny architectural elements built near urban areas, but are located in areas with pleasant views, natural landscapes, forests, meadows, open fields and along rivers and lakes used for swimming (Mumford, 1988). In this way, he describes the city suburbs for which Mumford (1988) says serve for withdrawing from the city crowds. This tells us that the surrounding area was used by the city for taking walks, recreational use and that citizens during the fifteenth and sixteenth centuries often utilised it.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

34

2.1.5   The development of the Baroque city

Baroque was a period, which according to historical periods, commences after the death of Michelangelo in 1564 and last until the middle of the eighteenth century, but the boundary between High Renaissance and Baroque in urbanism is somewhat fluid. The fundamentals of Baroque in the formation of city spaces was established by Michelangelo, who in the High Renaissance period introduced more dramatic emphasised parts of the entity. At the same time, the possible transition from High Renaissance to Baroque could be considered establishment of the Vitruvian Academy in Rome in 1542. With it, the Classicism approach developed, whose development was encouraged by the works of Palladia in the sixteenth century. Accordingly, Baroque united these rather different tendencies (Zucker, 1973).

Due to the fact that in urbanism more time is need to develop mature shapes of the historical period than in other arts, the proper Baroque city plan was drawn up only at the end of the seventeenth century. During the sixteenth century, a process of developing the Baroque city by through the development of squares began in Rome (Zucker, 1973). As architects in the previous periods already perfected the shaping of structures, now there interest was directed towards external space (Bacon, 1976). This process began during the pontificate of Pope Sixtus V (1521-1590) and lasted until the time of Pope Alexander VII (1665-1667), accompanied by a tendency for Rome to become the core place for developing a powerful anti-reformation centre. The period gathered numerous creators of Baroque[19] (of whom Bernini was the most prominent) who were under the influence of Michelangelo's Campidoglio where is evident the beginning of the Baroque conception of space based on spatial movement.

This concept in Baroque will be developed into a dynamic spatial movement with a present acceleration that surprisingly halts. The halted movement becomes the basic motif in Baroque composition. This spatial concept is evident on the Roman squares Piazza di San Pietro, Piazza Navona, Piazza di Spagna, in an open space in front of the Church of Santa Maria della Pace and on the square in front of the Trevi fountain. Here occurs a close collaboration between architects from various professions who work with space, arriving at frequent common interventions. As Bernini's squares have the role of a city stage, there is clear evidence of influence of the profession of a stage designer on them. This role of a square in a city existed even before, but in Baroque the function was carefully planned out (Zucker, 1973). This resulted in open city acquiring a more important role in forming the relationship between constructed and unconstructed.

At the same time, the works of Palladia and influence of the Vitruvian Academy, Classicism developed. In Italy, Classicism achievements are visible in particular structures, more so than in city plans. These two styles appear autonomously from one another or are mixed.[20] The most evident difference is in the fact that Baroque spatial solutions emphasise three-dimensionality, whereas Classicism is closer to a two-dimensional view of a spatial entity (Zucker, 1973).

---

[19] Renowned Roman Baroque architects who exerted an impact on Baroque planning were Bernini, Rainaldi, Brromini, Corton (Zucker, 1973).
[20] The intermingling of Baroque and Classicism is evident on the squares in front of the castles Stupingi near Rome, Villa Manin near Udina, Caserta near Naples.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

35
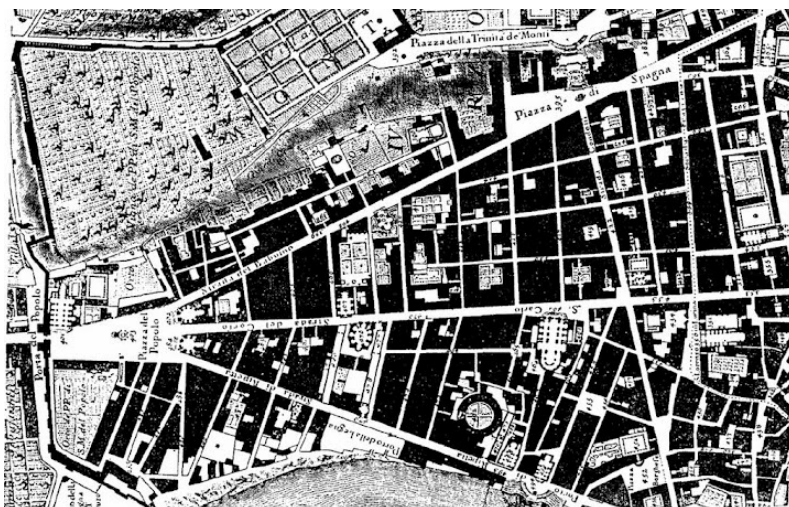
Figure 14. Piazza del Popolo and surrounding area (Rome), 1748 (Zucker, 1977:55)
Slika 14. Piazza del Popolo in okolica (Rim), 1748 (Zucker, 1977:55)

Influences from Italian Renaissance leads to its development in France.[21] Nevertheless, French Baroque acquires proportions unknown in Italy (Bacon, 1976.). The transition from Renaissance to Baroque is characterized by the creation of a disciplined and rational attitude towards space, which was manifested in the strict forms and monumentalism (Zucker, 1973; Mumford, 1988). This attitude stemmed from political and economic changes that occurred due to centralisation of power in the entire country to the king. Plans reflect the social and political situation, and are often merciless towards the existing space, thereby negating the historical layers, topography and other spatial values. As the municipal and regal powers were constantly competing, such relationships appear also between the cities. It was a period characteristic for the creation of a small number of centres of power, which rapidly grew and developed at the expense of other cities. The time of free cities, rich in cultural life disappeared.

Cities that are served for defence purposes, were determined by a complex defence systems, that replaced the former suburb, orchards and gardens. Fortifications are wide due to the use for gunpowder, hence separating city residents from the surrounding area, whereas the surrounding landscapes become easily accessible only to wealthier residents who have horses. Under pressure from landowners, the population of the surrounding area moved to the city, where it becomes even more congested, and losing its open areas. In such cities, military barracks and military training grounds become the dominant urban elements (Mumford, 1988). A change in the relationship between classes occurs given that higher classes become increasingly cruel towards the lower classes. A majority of the population lives under constant threat and forced discipline.

By establishing law, order and uniformity, the understanding of space changes with it, and the city is organised as society. Thus, the axis becomes dominant space symbolising the power of rulers, and usually dividing space into symmetrical sections to introduce order. Accordingly, Baroque spatial organisation in France was based on the axis, representing an

---

[21] The Italian influence was probably contributed by Catherine de' Medici.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

36

academic classicist Baroque movement, reflected in the size and opulence of the Baroque classicist elements. The axes in Baroque spatial plans become boulevards lined with trees or enlarged radial avenues, formed by spreading circular, semicircular and polygonal patterns, which can be intersected with other networks found in the urban fabric.

The actual radial avenues spread beyond the edges of the city, to infinity.[22] This shows that avenue, a new form of urban open space, becomes a defining element of Baroque urbanism, creating a complex relationship between the constructed urban fabric and open urban areas.

Figure 15. Versailles Avenue, end of 17th century (Zucker, 1977:60)
Slika 15. Avenije Versaillesa, konec 17. stoletja (Zucker, 1977:60)

Figure 16. Plan of Versailles, end of 17th century (Zucker, 1977:60)
Slika 16. Načrt Versaillesa, konec 17. stoletja (Zucker, 1977:60)

The importance of open areas is testified also by the fact that these stylistic features developed originally into French garden spaces (Zucker, 1973; Giedion, 1965). The best indicator of this role of gardens is Versailles. There, Le Notre developed three axes, which extended from the castle through the garden and onto the city space, thereby achieving a large perspective expansion as the main motif possessing a symbolic significance. Le Notre later developed Jardin des Tuileries, so that from it, the axis extends towards the glorious arch of victory. The axis lines become the fundamental backbone of developing Paris' urban fabric [23] (Zucker, 1973).

For that reason, gardens become the fundamental model of Baroque universum that reflects a tendency of infinity (Giedion, 1965), hence the development of the French spatial concept begins based on a free-flowing continuum, revealed perspective extensions of open view (Zucker, 1973; Giedion, 1965). Together, the sense of spatial unity is not lost, and space acquires a time component, thereby liberating itself since it moves and becomes three-dimensional. This movement of space is evident in spatial elements and in the repetition of its spatial relationships. Spatial elements are the directions of a coming street, the position of a monument and fountain, differences in height, the flow of building lines and volume of surrounding structures. Movement intensifies with illusions of expanding

---

[22] The width of the avenue was conditioned by the need for an army, and regularity due to the appearance of transport means, horse-drawn cats, which easily and quickly move along straight communication routes (Mumford, 1988).

[23] After Boyce and Delorme, they were done by Le Notre, who had acquired much experience in the gardens of Vaux le Vicomte and Versailles, where the axis was used as a fundamental instrument of the spatial concept (Zucker, 1973).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

37

the depth of space by using tricks borrowed from scenographers (Zucker, 1973). Later development uses the often altered view which challenges particular visual surprises or as Zucker (1973) notes, visual shocks. Accordingly, the fundamental characteristic of a Baroque city is dramatisation of suggestion of movement, achieved through open urban areas. Three-dimensional peripheries are created using regular design based on geometric formation in the form of a square, rectangular or circle. These forms are most evident in forming city squares. Through the square pass axes which run deep perspective views without deviations, because its regularity symbolises centralism of government and absolutism.

The Baroque squares, which appeared in the seventeenth century, during the reign of Louis XIII and Louis XIV, are characterised by mathematical regularity of layout, complete or almost complete continuity of the peripheral facades with emphatically repeated façade types, creating an accent in space most often in the form of a monument to the ruler with an exceptional symmetricity. Examples of such squares are Place des Vosges, Place Victoires and Place Vendome in Paris (Zucker, 1973). Maksimovnić (1976) says that the Baroque square even then lost its role as a social urban space, given that it was often planned as a space over which a view of a particular structure opened up. It also lost its internal space, and often served as a military checkpoint. The square became increasingly integrated into axial compositions, and subsequently lost the quality of a primarily stimulative space.Furthermore, as it ceased to be a closed spatial entity, it loses its unity, which attributed it the property of an autonomous spatial element (Zucker, 1973; Maksimović, 1976). This led to the spatial concept of a square in the eighteenth century to be based on its opening, creating a monumental long view (Zucker, 1973; Gallion and Eisner, 1963). Accordingly, it quite really became segregated from the Renaissance square which is previously defined by buildings. The Baroque square in turn lost its intimacy, so typical for the Renaissance square and often became a monumental and grandiose space in which flowed thoroughfares (Place de la Concorde, Place Royale Bordeaux). Some squares have an crucial role as a central city place for important events, and on them festivals, celebrations, royal weddings, guillotines, etc. were held.
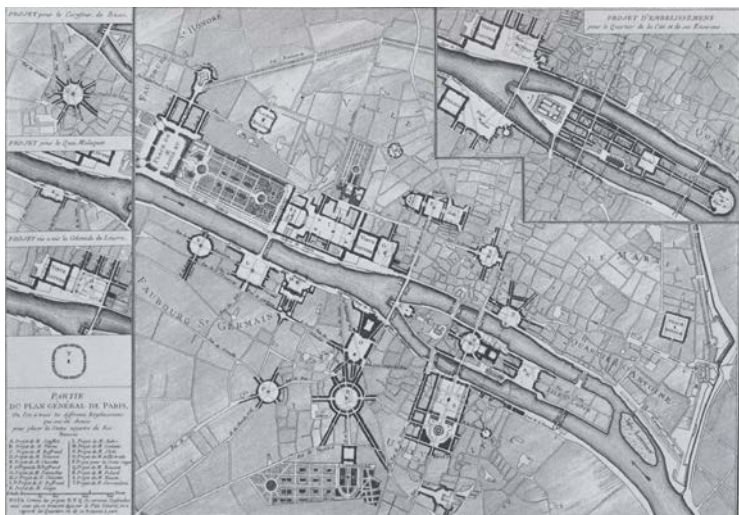
Figure 17. Plan of Paris 1765, (Ruler Louis XV) (Zucker, 1977:65)
Slika 17. Načrt Pariza 1765 (vladar Luj XV) (Zucker, 1977:65)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

38

Therefore, the Baroque city introduced some new elements into the city space, such as avenues and Baroque squares. Given that these elements are open urban spaces, which define urbanism, we could say that open areas have become the most significant element in forming the urban fabric. It allows one to define the relationship towards constructed urban fabric. Besides the mentioned open areas, also appearing in the Baroque period are parking for hunting, and also castle parks which in the subsequent historical periods became public urban spaces, assuming some of the roles that open landscapes surrounding previous historical city had acquired (Zucker, 1973; French, 1973). When taking into account that surrounding landscape outside of the city becomes less accessible, in the eighteenth century there is a need for introducing such elements into the city that will replace them.

In the second half of the eighteenth century, the city begins to develop under the influence of Classicist principles according to which Palladio's concept prevails, a concept that is evident in the discipline and regularity, not to mention the three-dimensional expansion of space. So, in comparison to Baroque which builds climax through space, Classicism gradually accumulates the visual impressions without sudden surprises. Simplicity becomes an ideal that occurred under the influence of Antique, which with the development of archaeology at that time is intensively investigated.[24] Once again, cities with grid schemes are valued.

However, this is a period when the square loses its importance, thereby distancing itself from the concept of an Antique city. In the Classicism period, greater importance is given to streets while the square ceases to be the place of trade because this role was assumed by street trading. A linear perspective of road routes becomes most important when planning a city. The square itself is open, but it is still the centre from which space begins to move. If often loses its social role in the city and becomes solely a monumental thoroughfare node, as for example Place de L'Etole, and accordingly its role in urban life is completely negated. Inspired by the French concept of a city, L'Enfant made a plan for washing where priority was given to thoroughfares, putting a secondary emphasis on other city functions (Mumford, 1988).

Figure 18. Place de l`Étoile
(Zucker, 1977:72)
Slika 18. Place de l`Étoile
(Zucker, 1977:72)
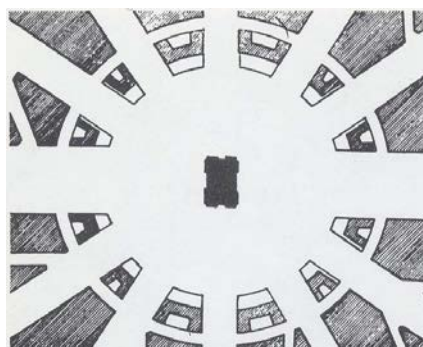
Figure 19. Areal view of Place de l`Étoile
(Zucker, 1977:72)
Slika 19. Aeroposnetek Place de l`Étoile
(Zucker, 1977:72)

---

[24] This is a period when numerous old Greek cities were excavated, of which the most complete plan was preserved in Pompeii (Zucker, 1973).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

39

During the eighteenth century, a different way of looking at and planning urban settlements was developed in England. Since England did not follow French ideas, it experienced a medieval and Gothic rebirth. A typical product of the eighteenth century is the English square, which in time became greener under the influence of the English landscaping style. It represents a residential space fenced off for users of surrounding residential blocks. It was intended for recreation, walks or just spending time in the park. As the eighteenth century was a time when on account of segregation there appeared exceptional divisions amongst the social classes, these kinds of squares were for the more affluent city quarters, whereas Giedion says that they were locked for control purposes. This manner of forming space will develop very important city spaces at the beginning of the nineteenth century, creating a particular type of urbanism, visible today in the city of Bath (Giedion, 1965).

Baroque city planning is based upon a heritage of previous centuries, and with the a gradual development it reached its mature form. Embodied in the Italian and French examples, it expressed a dominant idea and the philosophy of political and social system in which it was born. In Rome, it represented the revival of papal power shown through dramatisation and grandiose architectural spectacles for the purpose of inducing emotion. In France, city planning was governed by reason and classical traditions that embodied the dominant power of rulers (Zucker, 1973).

Given that in planning an important role in city space were open avenues, squares and castle gardens, they are the elements that dominate the urban space. They assume the role of defining the constructed urban fabric. Versailles was the first attempt to relocate a large residential block and administrative in a natural setting outside of a city (Giedion, 1965; Zucker, 1973). Although population relocations occurred outside of existing urban agglomerations even before, this principle is perhaps the basis for the later utopian models and attempts to create new settlements based on flight from the city, which having expanded, lost open urban areas and it link to the surrounding landscape.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

40

2.1.6   Development of the city in the nineteenth century

The industrial revolution initiated new production processes, which affected all segments of society, creating prerequisites for the creation of a new social order. In Great Britain, exploitation of raw materials from colonies causes a concentration of material resources, creating the basis for investments in numerous production innovations ((Mumford, 1988; Choay, 1978). Capitalism develops and leads to the creation of a new dynamic force comprising of traders, bankers, landowners and industrialists (Mumford, 1988). This also leads to many changes in city spaces obvious even at the start of the twentieth century in London, and from the nineteen-thirties in France and Germany (Choay,1978). The development of railway transport leads to the interlinking of cities, and also urban centres with mines. Despite the industrial development, there appears the need for a work force to migrate to city. Accordingly, the number of inhabitants in industrially development counties rapidly increases and the existing cities expand or new ones are created. The accumulation of people causes cities to become dirty and overpopulated, while older residential structures serve primarily the large number of new inhabitants.

It happens that, a residential structure in which there once lived one family is used for renting out to a large number of new urban inhabitants. At the same time, old parts of the city are razed, regardless of their value, in order for new structures to be built in the same location, larger buildings (Mumford, 1988). A large part of the valuable parts of the old city areas of London with characteristic shops, were demolished for the construction of high-rise buildings for residential purposes (Mumford, 1995). Private projects had only one goal - short-term profit, leading to a reduction in the quality of housing, especially in the neighbourhoods where workers lived. Housing opportunities continue to deteriorate and gradually affecting the entire city. Workers spend almost the whole day in a mine or industrial plants, and do not have much free time.[25] They live in residential neighbourhoods without water, sun and fresh air, and in exceptionally poor living conditions in terms of hygiene. As the city is supplied with constant inflow of new workforce that arrives from the countryside, wages are reduced, and the abolition of guilds means that workers remain completely unprotected (Mumford, 1988). Mumford (1988) says such living conditions could only be acceptable due to hunger, meaning people lived in great poverty.

Most of the cities in the nineteenth century still had old defensive walls, and their demolition implied the start of uncontrolled expansion of the city agglomeration that lost its one-time concept of a specifically limited entity (Mumford, 1988; Choay, 1978). New parts of the city were constructed without taking into consideration spatial values and no thought is given to sunlight, winds and topography. No thought is given to social values of open spaces, which in the old parts of the settlement disappear, while not plans are made for them in the new parts (Mumford, 1988). Supek (1987) says that capitalism and industry destroyed the centuries-old order of cities replacing it with chaos. This state mostly marks the city in the first half of the twentieth-century. Fundamental elements of a city become the factory, railway line and most often the mine, and as water is the main energy source,

---

[25] In the twentieth century, the workforce despite men was also made up of women and children from the age of five (Mumford, 1988).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

41

factory plants are located next to it (Mumford, 1988). Specialised city quarters gradually develop in the city, leading to industrial zones being set up in the suburbs (Choay, 1978).

Most of the focus during town planning is given to transport which starts to accelerate. The importance of transport is shown in the linear city model, composed by Soria y Mata in 1882, where the whole urban fabric develops from the aspect of transport communication (Mumford, 1988).

Figure 20. "Coketown " - cotton transit facility with workers quarters recorded during a non-working day (no smoke or dust) (Mumford, 1988:39)
Slika 20. "Mesto premoga" – predilnica bombaža v delavski četrti, posneto na nedelovni dan (brez dima in prahu) (Mumford, 1988:39)

Characteristic for the twentieth century is the creation of a new type of urban settlement, which Dickens called "coketown". Mumford (1988) adds that to a smaller or larger extent, each urban centre in the Western World had prototype traits of a coketown. Since Moravinski (1988) also talks of the inhumane conditions that workers in Central European cities lived in, we can conclude that a great percentage of Europe was trapped in this phenomenon.

Thus, industrialization created the most impoverished urban complexes in history and the destruction of the urban fabric between 1820 and 1900 in large cities generated unrest. Apart from the devastation of urban areas, mining activity had also degraded the landscape outside of the city (Mumford, 1988). Mumford (1988) noted that those cities lagging in development were luck to sidestep this phase of development. As a result of this situation, reaction towards cities develops, which is perhaps the most valuable urbanistic product of the nineteenth-century. Theories are developed and visions created of ideal cities that propose different ways of improving city life. Reflections on the city led to strong changes in urban planning, and these will be dealt with in detail in the next chapter.

These reactions helped in transforming industry itself, including its great contribution to the development of feelings towards valuing cultural heritage (Mumford, 1988; Graburn cit. by Crysler, 2003). In England in the mid 19th century, a planned picturesque movement began that moves towards the beauty of village spaces, whereas in other parts of Europe the glorification of ambient in old towns (Kostof, 1995). Romanticism, a movement conceived already in the eighteenth century, encouraged the tendency of moving out of the industrial city. Richer inhabitants would move into the city suburbs,

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

42

which are characterised by structures dispersed across a large park. This process was especially present in American cities (Chicago, Baltimore, New Jersey) in the period between 1850 and 1920. Suburbs were most often separated from the city by a green zone, leading to an increasing disintegration of the urban fabric, which loses its cohesive force, resulting in the city parts becoming dispersed (Mumford, 1988; Whiston Spirn, 1985). This essentially changes the relationship between open and constructed urban areas, because increasing the quantity of open space leads to reducing the feeling of urbanity. In such conditions, green spaces become those elements that define an urbanism of suburbs.

Pastel's finding of microscopic organisms starts to change the relationship towards hygiene, which was especially evident towards the end of the nineteenth century. Streets begin to be cleaned, sanitary standard is introduced, sewage systems are built, with parks and playgrounds also appearing. Attention is given to culture, leading to libraries and museums being opened (Mumford, 1988).

One of the crucial contributions of the nineteenth-century city is the creation of the city park, which occurs as a reaction to abnormal living conditions. It is created out of the need to improve living conditions in cities, and considering that it was a public urban space, it was open also for workers to whom it was especially important for leisure. In places, they appeared also from existing private gardens, and in other places it was established as a new urban structure. So it was that in London in 1812, John Nash, upon request by the kind, planned a public city park called Marylebone[26] in the area of Bloomsbury, which was to be set up in the nineteen-twenties. A residential zone was constructed around the park for the richer city inhabitants, hence the actual park led to increasing the value of land owned by the crown (Buxton and Goodman, 2002; Hitchock, 1978). While Mumford (1988) states that during the expansion of the city, London swallowed gardens, parks and playgrounds outside of the medieval walls. Giedion's (1965) conclusion that the park is perhaps the greatest contribution by the palace to urban life is probably true.

During his stay in London, Napoleon III became familiar with the new public urban space - the park, and upon his return, he implemented it in the new plan of Paris. As the vastness and irregularities of urbanism heavily favoured reducing the security of the area, it was impossible to control riots. Thus, Napoleon sought a solution to creating safer and cleaner urban spaces (Maksimović, 1976.). On his initiative, the Haussmann plan was formed in 1853, which created a system of wide boulevards through the Paris slums. They connected the old squares, and in places created a new open area (Gallion and Eisner, 1963). Along the boulevards, a residential zone for richer citizens was built, and often they were referred to as streets with no end in sight (Mumford, 1988; Kostof, 1995). He used this concept to complement earlier avenues penetrated during the Baroque period and possessing uniform facades of buildings (Kostof, 1995). Nonetheless, the problem of unhygienic poorer parts of the city continued to exist.

The new plan sacrificed some irregular parts of medieval Paris, so the Latin quarter evolved, and also part of the garden from the Luxemburg Palace due to the construction of the Saint Michael Boulevard (Mumford, 1988; Kostof, 1995). Haussmann also intrigued in the city the surrounding municipalities, i.e. suburbs, which became acquired equal rights as a part of the urban fabric, divided up into twenty districts (Čurković, 1985). The districts

---

[26] Later, this park will become known as Regents Park.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
 Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

43

were organised around the parish church, monuments or preserved residential squares for the purpose of creating a unique city organism with a system of circular character (Kostof, 1995). The city during its reconstruction gained a number of new parks, Buttes Chaumont, Montsouris, Monceau, and a single boulevard linked the Forest Bois de Boulogne and Boise de Vincennes to function as the city's lungs. These two forest areas were integrated into the city as spaces for recreation, walkways or just staying in nature ((Mumford, 1988; Kostof, 1995; Čurković, 1985).
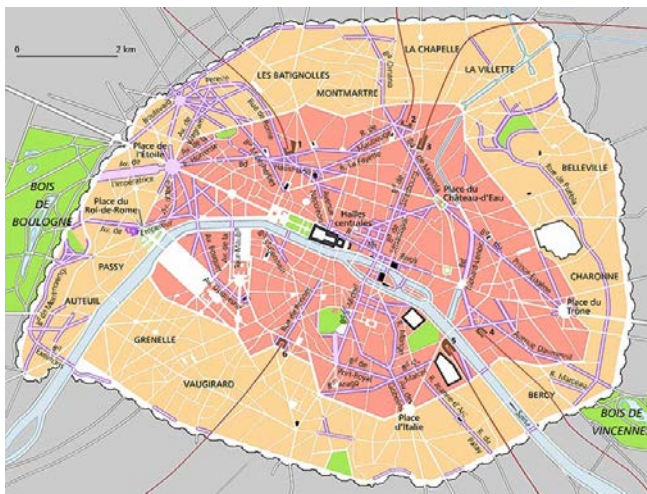
Figure 21. Presentation of Haussmann's plan of Paris with green areas (Encyclopedie ..., 2012)
Slika 21. Prikaz Haussmannovega načrta Pariza z zelenimi površinami (Encyclopedie ..., 2012)

At the location of the defence walls, Haussmann planned a green zone 250 metres wide which would encompass the city and adjacently linked the two forests (Bois de Boulogne and Bois de Vincennes), but this was never achieved (Giedion, 1965). The new plan for Paris had great importance, because it drawn up as a social and aesthetical space, but primarily for the upper class (Kostof, 1995). Despite this, parks were set up not only for rich inhabitants, but also for the workers. The reconstruction led to Paris becoming a metropolis of the industrial age (Giedion, 1965).

At the initiative of Franz Joseph I, a transformation of Vienna was undertaken. Demolition of the city walls in 1857 created a wide-open space of the Vienna Ring. In 1889, Wagner composed a plan for Vienna, paying special attention to this ring. There he envisaged buildings for different purposes, so very quickly the parliament building were built, including universities, theatres, art and natural history museums (Giedion, 1965; Čurković 1985). They are dispersedly located in park greenery that stretches to form a ring around the old town onto which a circular avenue Ringstrasse lined with four rows of trees is connected. Existing green spaces are complemented by new open urban spaces, which utilise the Danube shoulder (Maksimović, 1976).

The concept of creating park surfaces at the location of previous walls will be used by numerous cities in the nineteenth century (Kostof, 1995). As he wanted to create healthier living conditions for inhabitants, his plan was long-term development of the city, which was accordingly set up into twenty-two districts. The urban space was conceived from concentric streets in the shape of a rings linked by radial thoroughfare routes (Blau, 1999;

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

44

Moravanski, 1998). The fabric within the district zone was formal in characters with the shape of a grid based on closed, five-storey blocks, hence it is actually more static than Haussmann's plan for Paris (Giedion, 1965; Moravanski, 1998). The block plan of the city will be developed in numerous cities of the Austro-Hungarian Empire, hence the internal yard becomes another green urban space.

Numerous cities, which following Paris, were reconstructed in the second half of the nineteenth century, often use boulevards that intersected existing urban fabric. In this way, axes penetrated through the urban space of Firenze and Barcelona, but such plans became the basis also for some new cities in America (Washington) (Maksimović, 1976; Hitchock, 1978). However, in comparison to the Baroque axes, the development of the boulevard in the nineteenth century was dictated by private capital that distorted the holistic perspective views, since owners of property demolished at will and constructed buildings regardless of the wider picture (Maksimović, 1976). With them, the tendency of a Baroque linked to the negation of the social importance of the square continues, hence its role is assumed by streets. However, some of its functions will be taken by the new urban element - the park. It originates from the one-time palace gardens, which were transformed into green public areas of the city that prevented the city centres from suffocating.

Figure 22. Plan for expanding Barcelona 1859 (Ildefonso Cedra) (Choay, 1969:61)
Slika 22. Načrt razširitve Barcelone leta 1859 (Ildefonso Cedra) (Choay, 1969:61)

Parks often appear in places of the one-time walls, thereby creating a border between the old and new part of the city (Kostof, 1995). New urban parks open to the public also appear and become the basis for creating a movement to promote the park's importance, Besides having the function of a one-time squares, the new urban element assumes some of the roles of an open landscape surrounding cites from a previous historical period, and is best seen in England where it was led by Joseph Parker. The movement to increase city greenery and parks also leads to the introduction of some new categories of open spaces, such as children's and sporting playgrounds (Maksimović, 1976). The tendency to create parks during the nineteenth century was present also in America, where they are planned to take place within the scope of the city entities. The most significant example is Central Park in New York, which appeared from F.I. Olmstead's project. Later, in America the movement also appears, the Park Movement, which will promote the creation of parks within city surroundings (Maksimović, 1976).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

45

The origin of parks, as a new type of open urban spaces, strongly influenced the development of the relationship between open and constructed areas. Their relationship became more complex and tiered, conceived by the creation of various contact zones. By introducing green elements into the city, a larger contrast within the urban structure due to the relationship between constructed fabric and urban park space is created. In the urban area, a spatial concept is created that ties the constructed and open areas into a cause and effect correlation.

The very end of the nineteenth century brought about many improvements in the lives of workers, and in the Austro-Hungarian Monarchy the concept of communal living programs appear which represents for social policy great progress in social relations[27] (Moravanski, 1998). In the last decade of the nineteenth century, the formal city planning tool is developed - the regulation plan. It originally appeared in Germany during the last decades of the nineteenth century, with the development of the concept of zoning urban space. It allows the complete treatment of an urban area, extracting it in layers, so the city is analysed through the elements of streets, residential blocks, public spaces and green zones. This concept was extended to Austria, so in 1892/93, a tender for a General Regulation Plan of Vienna was drawn up which the first award was won by Wagner (Maksimović, 1976.). This led to the creation of preconditions for the development of spatial planning of cities in the twentieth century.

2.1.7   The development of the city in the twentieth and twenty-first centuries

Towns from the very beginning of the twentieth century still rested on institutional forms of production (industrial) businesses. Institutions of large city become factories and museums, whereas size becomes the most important parameter of value, without any deeper meaning. Accordingly, the imperative was to have the largest museum, university, bank and so on (Mumford, 1988). Mumford (1988) say that the city of the twenty-first century assumed an ill urban centre of the nineteenth century, and heals only its symptoms, preserving the nauseous conditions that caused the ill state. This direction of development allowed the city separate even more from its original ancestors, hence the fundamental basis of the urban centre in the nineteenth century was manufacturing, thereby reducing the importance of all other activities that contribute to the development of human character. The development of intermediary means of communication led to centralisation of administration, which allowed it to manage from a distance (Mumford, 1988). Consequently, an increasingly advanced intermediary manner of communication amongst the city population develops, especially present at the start of the twenty-first century, with the Internet. Direct human contact is increasingly being lost, a form of contact that once mostly took place out in the open.

The city in the first half of the twentieth century was marked by uncontrolled expansion, with the urban population wiping out its core structure and dispersing it across the landscape (Whiston Spirn, 1985). The loss of importance of the city centres led to the function of a one-time agora, forum or cathedral square losing meaning. The contrast

---

[27] At the end of the century, the Franz Joseph foundation for Public Housing and Charity Institution was founded, as the first communal housing programme (Moravanski, 1998).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

46

boundary between city and surrounding landscape, disappearing back in the nineteenth century, created during the twentieth century certain problems, on account of the unbridled expansion of urban fabric linking urban settlements. In the nineteen-thirties, when there were twenty-seven cities with over one million inhabitants, and only later in the middle of the century, the number increased dramatically. This led to a complete change in relationships between the city and the surrounding area, given that the cities were once part of the islets on a sea of agricultural lands, while today in the developed parts of the world, it is the opposite (Mumford, 1988). In an equal manner, the relationship between constructed and open areas within the urban texture changes equally, since the role of one-time surrounding spaces outside of urban areas acquire open areas within a city.

To be able to direct the development of urban areas, tools were devised that Germany and the Habsburg Monarchy used at the end of the nineteenth century. In these areas of Europe, planned urban settlements rise, which were characterised by block construction (Blau and Platzer, 1999). Town planning based on the analytic process starts to develop in Amsterdam in 1900. Having established a commission for a nice - "Judgement", the new and existing urban areas are visually enhanced. An important person in the development of Amsterdam's new areas was Henrik Petrus Berlage, who in 1915 made a comprehensive residential plan for the city's southern section. The main features of the space were the construction of residential blocks with uniformed street facades and parkways. A green zone system was devised for recreation areas and playgrounds, derived from study analyses of residents' requirements. These city plans did not originate under the influence of theories and models, but are the product of a rational analytical process (Giedion, 1965; Kostof, 1991).

Figure 23. Plan for Amsterdam Sud, H.P. Berlage (Bock and Rosem, 2001:137)
Slika 23. Načrt za Amsterdam Sud, H.P. Berlage (Bock and Rosem, 2001:137)

Nonetheless, Choay says the theories and models of cites from the nineteenth century were very important, leading to the development of three schools which were dealing with the city development which affected the appearance of nineteenth-century urban space. This results in progressive, culturalistic and anti-urban visions of development of urban environments, whose models of ideal cities are described in Chapter 3.2., but here more will be said of their application (Choay, 1969, 1978).
By the nineteen-sixties the most prevalent was the progressive approach, which primarily determined the appearance of urban environments in Europe, and in other parts of the world. This school of thought had since 1933 being based on the CIAM doctrine, the

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

47

Athens Charter, which set the foundation for developing functionalistic settlements through four basic functions - housing, work, movement and recreation. This approach emphasised the importance of external open spaces in the lives of people, hence structures themselves are built as vertical monolithic collective housing, with the construction extending primarily in height, leaving the large green areas to function as urban parks. Subsequently, the "city in the park" concept was developed (Kostof, 1991). This created an altogether new relationship between open and constructed areas within the urban fabric, given that the green spaces provided a very important role. Functionalists thought also of a way to utilise open areas, hence they are given various roles. Spaces were established for sport, recreation, sunbathing, playgrounds, cinemas out in the open, and the cities accommodate plantation areas (Giedion, 1965). This stems from the premise that all inhabitants must have access to sun, air, not to mention urban open green areas. The initiator Le Corbusier using his models strongly influences the development of the functionalistic city. [28] As they had negated the natural and cultural determinants of space using a regular grid, uniform models of settlements were built throughout the world. [29]

They were implemented in the form of urban spaces occurring through the expansion of cities and the rebuilding of areas of cities devastated during World War II, because of the need for renewal of the housing stock (Kostof, 1995). However, as the structures in the form of blocks were cut off from the landscape, the surrounding area did not assume its intended role. Architects have gathered in buildings, and less attention was devoted open areas, which were subsequently designed without being tied to the overall design. Consequently, this high architecture did not free open areas, but instead amputated them. These problems were most prevalent in Chandigarh where huge distances between objects were created (Bacon, 1976; Giedion, 1965). Open areas in functionalist settlements are characterised by an over-simplification, deprived of satisfying the emotional needs of people.

The culturalistic model of a city held significance as in practice it supported the protection of cultural heritage from destruction (Choay, 1969, 1978). Sitte's book titled *Der Städtebau nach seinen künstlerischen Grundsätzen,* treats the importance of historical squares, and raises an awareness of the importance of urban open areas. It influenced the strengthening of conservational opinions, which in turn contributed to the preservation of other historical urban spaces. At the end of the nineteenth century, Howard began to talk of the idea of a garden city, encouraging the creation of these urban settlements at the start of the twentieth century. [30] This kind of city was supposed to initiate the development of new civilisations, founded on work within the community, and their basis being a zonal division of spaces with respect to functions. [31] Zoning caused a stricter division of constructed and open urban spaces, establishing a relationship conceived on segregating zones. Howard's city was supposed to have wiped out the differences between city and village, but within urbanistic planning of space, which has a clear boundary for growth (Mumford, 1988; Howard, 1965). The relationship towards a surrounding space of a city is such that it is

---

[28] A more detailed description is found in Chapter 5.

[29] After Europe, Kostof (1995) and Choay (spoke of its expansion to the region of America and Asia (Kostof, 1991; Choay, 1978).

[30] Presentation and description of a diagram of the Garden City is found in Chapter 5.

[31] Division of space developed rings (housing, tertiary activties, industry, agriculture and sections for recreation) described in detail in Chapter 5.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
     Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

48

easily accessible; hence, the natural and agricultural landscape is reached by passing through the green zone, which protects urban areas from mutually connecting. In the very interior of the city, a great importance is given to parks as public urban spaces for daily use. The central park, instead of the square, is often criticised because it negated the vital importance of the core, i.e. the square of historical cities (Kostof, 1991). This shows what importance in the city the park gained as an urban element originating in the nineteenth century (as it changed the social role of the square in the Garden city). This kind of housing model will be promoted through the Garden City Movement.[32] The first garden city Letchworth was founded in 1903, and following that in 1919 construction commenced with Welwyn which literally implements Howard's idea, resulting in the development of an industrial section of the city (Hitchcock, 1978).

These two garden cities alleviated London whose centre was other congested. They will greatly influence the city development through the idea of creating once again the desire for its integration and development of the concept of satellite cities (Mumford, 1988). It was Sir Anthony Montague Barlow, who proposed decentralisation of industry based on garden cities as a remedy for London's congestion. In 1946, this led to the establishment of the New Cities Act, which envisaged the construction of rings of new urban spaces around London, including garden cities in other parts of England (Gallion and Eisner, 1963; Mandelker, 1962). New cities are separated by green zones, which prohibit any construction and protected by the Town and Country Planning Act dating back to 1944.
The green zone could be achieved as a park area as had been proposed by Abercrombie for the London region (Howard, 1965). Great Britain got fifteen new cities, but they were more like dormitories rather than the self-sustainable communities they were presented to be, as Howard had devised. New cities are built in Sweden, the Netherlands, Italy, France, Germany, Finland, Hungary, the USSR, with some of them established in America (Gallion and Eisner, 1963; Mumford, 1988; Blau, 1999). This idea also influenced Henry Wright, a member of the Commission for Residential Construction and Regional Planning for the State of New York in North America. A plan was brought about for a new urban zone, which was to border at the zone along the Hudson River and Mohawka Valley, right up to the foreshore of Lake Erie. The idea was based on the renewal of the old centres abandoned on account of centralisation.

These new communities were supposed to be limited in size to rich agricultural lands and linked by highways. Instead, this development led to the creation of a new problem - unbalanced regions. Clarens Stein came up with the idea of bringing together regional urban centres into a new political and cultural organisation. What was once achieved through dense construction could now be achieved through strong organisation. This led to the concept of the etherised city, composed of several urban centres, which together with the surrounding village areas makes up a grid-like regional complex that functions as a single entity (Mumford, 1988). The outcome is a completely new relationship between the city and the surrounding landscape. Furthermore, the concept of urbanity as it had once existed changes, because the relationship between open and constructed city areas also experience change.

---

[32] In Vienna in 1926, the International Congress Association of Housing and Urbanism was organised by the International Garden Cities and Town Planning Association. Despite the conclusions according to which block constructions should be avoided, the practice continues even after the congress (Moravanski, 1998).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

49

An anti-urban model of city development appears in America and led by Frank Loyd Wright who had limited opportunities for implementation, hence it appeared in the form of a small number of suburbs in American cities[33] (Choay, 1969). When considering that structure fully adapt to the natural circumstances of space in which they occur, he raised an awareness of the importance of landscape features which should not be negated, hence he probably had an impact on the developmental tendencies that appeared in the second half of the twentieth century.

As a reaction to the most prevalent principle of the urban settlement development - functionalism, in the second half of the twentieth century a post-modernistic approach towards cities developed. For him, Turner (1996) notes it as a period when the city got its self-confidence back. Jenks (1985) says that postmodernism appeared with the defeat of modernistic elitism. Postmodernism allowed the enjoyment of tradition and language in local culture with expressive semantics and symbolism, hence the architectural language develops in various ways and in various directions (Jenks, 1985).

Besides the vertical structures of functionalism, garden cities, new British urban cores, green zones around the settlements, the twentieth century was a significant phenomenon of an increasingly complex division of open public areas within the city (Gallion and Eisner, 1963). As mentioned earlier, the functionalistic settlement testifies to functions of external spaces such as recreation, golf, sunbathing... Though these open spaces, in practice, are represented by simple forms, mostly in the form of an undefined lawn surface, thinking about how they work has led to their classification in a later period. Howard's garden city has a park area in the centre of a settlement, while the concentric rings of greenery provide a scheme of possible reflection on a system of urban open spaces. Wright's anti-urban city, however, highlights the importance of landscape and the need to adapt to his character. Subsequently, all these schools of thought show that open green areas become important for a city in the twentieth century, and it has only in this present period become an area rich in vegetation (Turner, 1996).

Urban open spaces begin to be viewed as an integral part of the urban space and thought of as a conceptualised system in the nineteen-sixties (Cooper Marcus and Francis, 1988). It defines a new relationship towards the unconstructed part of the urban entity. In the second half of the nineteenth century, a better understanding is gained of the importance of the distribution of particular specialised open areas for the needs of citizens. Hence, recommendations are drawn up for the allocation of children's playgrounds, and the distance should not be more than 500. This imposes its uniform allocation to urban areas for easy access by all (Moughtin and Shirley, 2005; Mumford, 1988). Open areas of the city act to create an urban-morphological character, hence the spatial identity elements become essential. Consequently, planning a city, conceived in the past, during the twentieth and twenty-first centuries has become the most important tool in directing its development. Exceptionally important is understanding urban open areas not only as being equal, but as a potentially defining area of urban space. It follows that urbanism in the twenty-first century gravitates towards sustainability, for which the urban landscape is an important element. As a product of such reflection, there appears another new direction in landscape urbanism[34] (Steiner, 2011).

---

[33] A more detailed description of the model is to be found in Chapter 5.
[34] See Chapter 3.3.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

50

Table 1. Development of open urban areas throughout history
Preglednica 1. Razvoj odprtih mestnih površin skozi zgodovino

PERIOD	MAIN OPEN PUBLIC AREAS	FUNCTIONS OF OPEN PUBLIC AREAS	STRUCTURE OF OPEN PUBLIC AREAS	RELATIONSHIP BETWEEN OPEN AND CONSTRUCTED URBAN AREAS	RELATIONSHIP BETWEEN THE CITY AND ITS SURROUNDINGS
Greece	agora (main city square)	-social -legal -ruling -administrative -trade -religious -cultural	amorphic	- no determined structure -agora (core) is the only determinant of the urban fabric in which the city opens up	-close -related (on a daily basis)
	streets	-passage			
Rome	forum (main city square)	-social -legal -ruling -administrative -trading -religious -cultural	-regular quadrant forms -in the middle of the settlement at the intersection of the main streets	-structurally determined -open areas (forum and streets) determine the urban fabric	-close -related (on a daily basis)
	streets	-passage -trading	-regular		
Middle Ages	square (parvis) (early and late Middle Ages)	-religion -social -legal -ruling -administrative -cultural	-organic -regular (planned)	-open surfaces depending on dominant structure - together with dominant structure determining the urban fabric	-close -related (on a daily basis)
	markets (late Middle Ages)	-trade -social -legal -ruling -administrative -cultural -performances			

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

51

Continuuation of table 1.

PERIOD	MAIN OPEN PUBLIC AREAS	FUNCTIONS OF OPEN PUBLIC AREAS	STRUCTURE OF OPEN PUBLIC AREAS	RELATIONSHIP BETWEEN OPEN AND CONSTRUCTED URBAN AREAS	RELATIONSHIP BETWEEN THE CITY AND ITS SURROUNDINGS
Renaissance	square	-trade -social -legal -ruling -administrative -cultural -performances -military	-regular (planned)	-structurally determined - open areas (square and streets) terminate the urban fabric	-less close
	street	-passage			
Baroque	avenue, boulevard, street	-trade -social	- regular (planned)	- structurally determined - open areas (avenues, boulevards, streets, smaller squares and parks) determine the urban fabric	- distant
	square	-transport route node -presentation -performances -military role -less important social role			
	park	-social -recreation -spending time in greenery			
Nineteenth century	boulevards	-trade -social	-planned (regular of organic form)	-together defining urban fabric	- distant
	park	-social -recreation - spending time in greenery			
	square (mostly old)	-social			

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

52

Continuation of table 1.

PERIOD	MAIN OPEN PUBLIC AREAS	FUNCTIONS OF OPEN PUBLIC AREAS	STRUCTURE OF OPEN PUBLIC AREAS	RELATIONSHIP BETWEEN OPEN AND CONSTRUCTED URBAN AREAS	RELATIONSHIP BETWEEN THE CITY AND ITS SURROUNDINGS
Twentieth century	park	-social -recreational -residing in greenery -children's game	-planned (regular or organic form)	-together defining the urban fabric	-distant
	square	-social -trade - performances (less often) -cultural (less often)			
	children's playground	- children's game			
	sporting and recreational areas	-sport -recreation			
	walkway	-social -walks -recreation			
	foreshore zone	-social -recreation - children's game			
	protective greenery	-protection			
	cemetery	-stays			

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

53

2.2 IMPORTANT THEORIES AND MODELS FOR CITY DEVELOPMENT FROM THE NINETEENTH AND TWENTIETH CENTURY

2.2.1 Urban conditions that contributed to the creation of urbanistic theories

Though this period is treated in the chapter on city development, in this section the origin of urbanistic theory will be treated, hence it becomes necessary to emphasise which social and economic situations led to their development.

The industrial revolution and the creation of an industrial city has already been discussed, but it is necessary to emphasise what sparked a reaction to the occurring changes. A sudden and rapid development of industry increased the urban area and the number of inhabitants due to migration from rural areas (Choay, 1978; Giedion, 1965). Industry creates new forms of work organisations, which is reflected in the city's structure and the creation of a new lifestyle for city residents, not to mention their social behaviour (Blau and Platzer, 1999; Mumford, 1988). A new social order is created. Parts of the city start to specialise, hence business districts are created which cluster around the stock market, a higher city classes are often zoned into peripheral areas of the city, but also working class city quarters appear (or new towns) accompanied by very poor living conditions.

Mumford (1988) mentions the creation of a "new type of city which is ugly, overpopulated, not adapt to living requirements, but solely a mythical fight for survival". Consequently, the creation of repulsion towards oversized cities occurs, repulsion towards a denaturalised world, and nostalgia appears for that once ago relationship with nature. At the same time, a belief in progress and almighty technology develops. The creation of an intellectual climate means that for the first time the city becomes the subject of criticism, and becomes an interesting phenomenon for investigation. To that effect, Mumford (1988) says that the most important contribution to the industrial city was the actual reaction towards such as city.

2.2.2 Developing criticism of the city

The city becomes an object of investigation from various aspects and various thoughts appear. Choay (1978) categories them into those that investigate cities by describing them (statistics and sociology), and those who polemicise about the city in their investigations. These two opinions view development as a pathological process with expressive humanitarian feelings. Their representatives were Fourier, Owen, Carlyle, Proudhon, Arnold, Engels and Ruskin. Increasingly, there is talk of inhumane conditions and low standards of living in worker housing. This included the unhygienic state of the city, and the long time it took to travel from the place of work to where someone lives. Segregation is also touched upon, including the issue of the absence of aesthetical criteria in construction and the absence of public parks in working neighbourhoods. When taking into account all of this, it becomes evident that the real issue is the absent green areas close to the city's inhabitants, who always had a need for such spaces.

Their polemics base their concepts on the philosophical thoughts of the late eighteenth and early nineteenth century, especially from J.J. Rousseau, A. Smith and G.W.F. Hegel. Even at the beginning of the nineteenth century, Owen, Fourier and Carlyle were talking about

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

54

industry, industrialism, democracy, class conflicts, profit, exploitation of workers and alienation in the work process. However, Engels first realised that the disappearance of one social order marked the creation of another, and that is precisely the reason for the rise of new social problems, the new spatial organisation of the city, the industrial revolution and capitalism. Other critics fail to recognise the change, most commenting on anarchy. Therefore, this is the inception of the concept of disorder, often extending through to the twentieth century (Arnold, Fourier, Gropius, Mumford, etc.) (Choay, 1978).

Given that disorder develops a need for creating order, opinions abound on the past and the future. Accordingly, Choay divides pre-urbanistic models into nostalgic, i.e. culturalistic and progressive projections of a city. The actual city was replaced at that phase with the idea of a city, whereas the existing urban order qualified as disorder, desires opposition from ideal orders and models (Choay, 1978).

2.2.3   Models of a city in this pre-urbanistic phase (by Choay)

While the **progressive model** is based on rationalism, teachings and technology which should lead us to the solution for problems between man and the world, and man and other people (Owen, Fourier, Richardson, Cabet and Proudhon), the **culturalistic model** does not start from the individual, but instead from the city itself and the organic units of city and its inhabitants (Choay, 1978).

The important basis of the progressive model of city, especially treated by the French utopian socialist Considerant is the rational analysis that should make possible the determining of a single type of order, which can applied to any group of people, at any given time, in any given location. This order, expressed as a city model, often has certain traits, which will continue to develop even in its later phases of development. An important phenomenon within city space is its division into functions, leading to spaces for housing, work, culture and leisure. (Choay, 1978). The appearance of functional classification becomes the foundation for later zoning of city space.

Owen in these cities, segregates housing from industry and agriculture, while Richardson besides segregating work from housing, also segregates city quarters with public buildings, hospitals and laundry facilities (Choay, 1969).

An important characteristic of a city is the formation of zones for leisure purposes which are most often found on green spaces. The space in a city model is open, penetrated with empty areas and greenery. This is evident in the example of Richardson's Hygeia or City of Health (Figure 25) from 1875, where greenery creates spaces used for leisure time. The importance of green surfaces for society was noted also by other social critics. So it is that Proudhon thinks France should be transformed into a garden with small forests, Goden says that the air, light and water must be accessible to everyone in equal measure (Choay, 1978). Open spaces and greenery in models (which become spaces specially zone for leisure), result in the loss of urban character previously present in a traditional city (since spaces for sojourning are no longer tied to traditional squares). Choay (1969) when speaking of new plans without borders as city once were, in essence, confirms that the city is losing its character as nucleus, since it is increasingly becoming more open to the surrounding landscape.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

55

She therefore concludes that the city disintegrates in a particular manner aided by the open areas, hence the difference between city and countryside landscape is reduced.

Here it is evident that greenery is interpreted as an element that is missing in the industrial urban space, and the importance of spending time in nature, which becomes too distant from urban centres.

Choay (1969) says that in terms of form, models are more prone to be exposed to geometrical regular lines, because geometry is considered to be beautiful.

An trait of a city is the attitude towards housing. Many representatives of the progressivist model advocated a unique, i.e. a standard model of housing equal for all residents. Cabet developed this idea to the extreme by creating a prototype of housing for the model city of Icaria, where each type of housing (even furniture inside residences) was standardised. Richardson in his Hygeia model also uses standardised housing without decorations (Choay, 1969; Giedion, 1965). As the models were made with an unlimited number of standard units, in their formative role they reflect the tendency to eradicate social inequality. The already mentioned progressivist models created in pre-urban period, Fourier's Phalanstery or Social Palace, Richardson's Hygeia of City of Health and Cabet's Icaria, were important for later development of theories and models.

Figure 24. Presentation of Fourier's Phalanstery (Choay, 1969:82)
Slika 24. Prikaz Fourierovega Falansterija (Choay, 1969:82)
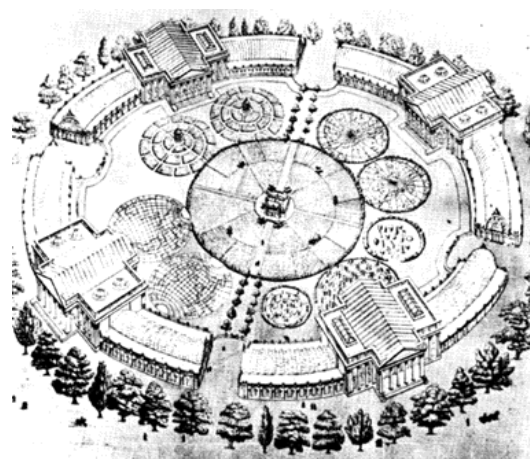
Figure 25. Presentation of Richardson's Hygeia (Richardson, 2010:15)
Slika 25. Prikaz Richardsonove Hygeia-e (Richardson, 2010:15)

Fourier's Phalanstery or Social Palace (see Figure 24) is a residential unit for two thousand people. The tendency by Fourier was to replace industry with agricultural activities to which great importance is attributed in his models for the housing concept. Evident is the desire for returning to the one-time close relationship between city and landscape. A similar approach occurs also in Cabet's Icaria, which in his model agriculture also appears as the most important industrial branch. The model presents units for common housing for up to two thousand people. Richardson's Hygeia or City of Health (see Figure 25) is a hygienic city where the most important criterion of formation was related to the hygienic behaviour of the urban settlement. The width of streets and height of buildings provide the

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

56

city with sunlight, and clear views with an absence of noise create a healthy space, with greenery playing an important role in the lives of the inhabitants (Choay, 1978).

While the progressivist city rejects the historical heritage, because it believes more in the laws of natural geometry, simplicity and rationality, **the culturalistic model**, founded after the progressivist model, is based on historical investigations and archaeology, developed at the end of the eighteenth century as a reaction to the negation of heritage, which is devastated. The culturalistic model of the pre-urbanistic period is based more on essays than on models, which criticise previous achievements of industrial civilisation, comparing them to achievements from history (Choay, 1978). Perhaps Hegel's endeavours were the first influence, which will later act on other followers of such opinion. He points out the perfect cultural entity of the city from Antique Greek times, emphasising its formal characteristics.

Reviewing the then industrial city, J. Michelet and J. Burckhardt, and somewhat later N.D. Fustel de Coulanges, carry out his comparison with the urban space from the Middle Ages, Renaissance and Old Roman times (Choay, 1969). During the twentieth century, the worst mutations of city occurred in England. Consequently, there appeared strong resistance to the novelty, evident in the nostalgic writings of the English authors J. Ruskin and W. Morris. In France, the great writer, V. Hugo, in this writings lamented after the pictures of cities from the past, but did not project them into the future. The importance of Gothic architecture and its rebirth were written by E. Viollet le Duc and A.W.N. Pugin.

So in response to industrial civilisation, a culturalistic model of the city appears, in a descriptive form, which importantly must have clearly defined peripheral boundaries, implying a clear relationship to the surrounding landscape. Holders of such opinion stress that cities should be small and concentrated accompanied by all of its imperfections and individuality, similar to cities from the past. For them, the concept of progress is equivalent to the concept of culture. This kind of city is a cultural phenomenon, limited in size, and should be a contrast to the surrounding countryside. The city from the culturalistic model is different from the progressivist one, on account of the exceptionally urban environment. In the field of architecture, there is no standardisation, no prototypes, because for them every building is different and individual. Just as the political agenda of the idea of community and collective spirit creates democratic forms, while on the economic front it is reflected by anti-industrialism, Choay says that the culturalistic model from the pre-urban period has remained within an historicism framework (Choay, 1978).

Most advocates were unable to remain strictly within one of these two models. A problem appears because they all viewed the city as a model, not considering it a changing process (Mihelič, 2010), or a problem, hence they are often removed from creating time (Choay, 1978). In this way, only a small number of achievements of the utopian socialists existed in the pre-urbanistic period. At the start of the nineteenth century, Owen's model appeared in New Lanark (see Figgure 26) in Scotland, and in 1825 New Harmony in Indiana (USA). Cabet's colony model of Icaria in the USA was formed in the middle of the same century (firstly in Texas in 1848, then later in Iowa in 1849). In 1859, Fourier's Phalanstery was created in Guise. In time, the model failed because they weren't linked in any way with economic reality (Choay, 1978).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

57
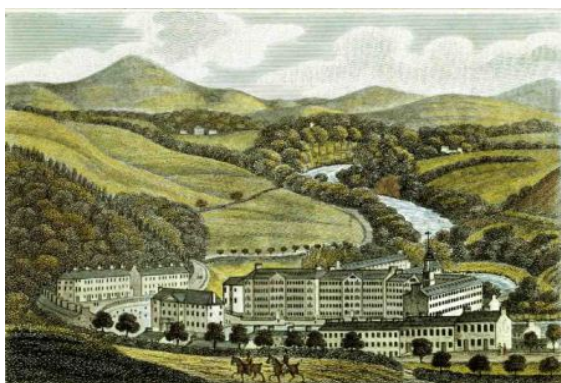
Figure 26. R. Owen, New Lanark (Owen and Claeys, 1991:1)
Slika 26. R. Owen, New Lanark (Owen and Claeys, 1991:1)
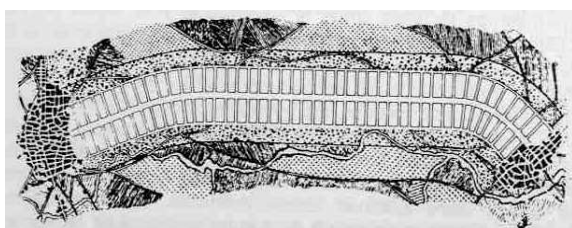
Figure 27. A. Soria y Mata, linear grad (Choay, 1969:84)
Slika 27. A. Soria y Mata, linearno mesto (Choay, 1969:84)

Towards the end of the nineteenth century, the progressivist model entered a new phase accompanied by a new theoretical expoundings. Arturo Soria y Mata subsequently, inspired by the establishment of one of the first tramway lines in Madrid, created a linear city in 1882 (see Figure 27), primarily based on transport. This model recommended the mixing of various city functions due to the limitations posed by an elongated urban space. Such a city offered unlimited expansion, and easy access to the countryside, but it degraded the true urban atmosphere. A possible implementation was in the ring zones around the existing cities, or in the shape of a completely new city in a non-urbanised region (Choay, 1978). [35] This model shows that each inhabitant can approach the surrounding space since the distance from any position within the city such that the surrounding landscape is equally accessible.

―――――――――――――――

[35] Nikolay Milutin later developed the model as a zone linking two city cores. On a linear zone along a thoroughfare, there is housing, industry and a green zone. This shortens the distance and length of travelling, while the rural population has better access to cultural and health facilities (Blau and Platzer, 1999).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

58

2.2.4   Other criticisms of the twentieth-century city

With the creation of numerous models of utopian cities, Marx, and especially Engels published critiques of modern industrial cities, but not suggesting a solution in the form of models. For them, the city of the future was part of the order, linked to the emergence of a classless society, which cannot be imposed without establishing a revolutionary government. Revolutionary activity should create a socialistically, and then communistically planned space. They deliberately reject the security and certainty of one particular model, deeming that workers can move into the existing homes of the bourgeois class. Nevertheless, even for them, the thought exists concerning the relationship between village and city, reminiscent of the utopians Owen and Fourie, but more related to the equalisation of economic, cultural and demographic disparities of the two spatial entities. Following their exhortations, the renunciation of models is a rare thing (Choay, 1969).

During that time, nostalgia towards nature appears in the USA. This leads to the creation of an anti-urban movement. However, it failed to provide any single model that would offer something new or different. The movement was started by Thomason Jefferson, and was continued by R. Waldo Emerson, H. D. Thoreau, H. James, and finally finishing with Louis Sullivan. All of them criticised the city from various aspects (Choay, 1978). The movement can be linked also with establishment of the Park Movement,[36] of which Trancik (1986) speaks of and which had influenced the creation of green system in a city.

2.2.5   Models of the city in an urbanistic phase

According to Choay (1969), following the pre-urbanistic phase, the initial phase of urbanism appears which compared to the previous period becomes the work of specialised experts. Urbanism becomes depoliticised and a practical task. As a discipline, urbanism originated in 1890.
Models continue to have a common starting point with respect to the unacceptable state of current cities, and in various ways, they arrive at a similar result - a model of the city (Choay, 1969, 1978).

2.2.5.1   The progressivist model of a city

In the urbanistic phase, the task of researching the city is undertaken at the same time in the Netherlands (Oud, Rietveld, Van Eestern), Germany (Gropius, Mies van de Rohe), Russia (constructionists Malević, Tatlin), France (purists Ozenfan, Le Corbusier), Belgium (Bourgeois Victor), and in the central European region (the KURI group) (Choay, 1978; Blau and Platzer, 1999; Trancik, 1986). Hitchcock says that these people represent the second generation of modernists (Hitchcock, 1978).
Development of these views was highly influenced by the German School Bauhaus, founded in 1919, upon the initiative of Gropius who united design schools and schools of applied arts to create a place where the arts, industry and technology could be treated using architecture as a medium (Giedion, 1965; Trancik, 1986). This school had an important

---

[36] The movement started with the help of F.L. Olmstead, who endeavoured to create public parks, boulevards and promenades in American urban spaces (Trancik, 1986).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

59

contribution to the further influence in the USA, because upon its closing, these advocates emigrated to America (Hitchcock, 1978).

Since 1928, the progressivist model started to widen its influence to the international movement called the CIAM Group. In 1933, CIAM proposes the Athens Charter doctrine with a content adopted from numerous works treated the topic of moderna. The interest by urbanists expanded from the economic and social structure to the technical and aesthetical. Followers of this model had gathered around Modrian, Van Doesburg, around the initiator De Stijl (who greatly influenced Bauhaus) and around Malevič, Tatlin, i.e. the Soviet entourage who during the later development were linked to a revolutionary ideology. All these groups proposed a new relationship towards the subject founded on a strict and rational beauty. This is also evident in the Athens Charter, which deems human needs through four functions that become the basis of the ideal type of a human settlement - housing, work, movement, and nurturing the body and spirit. Following the manner in which the importance of hygiene in the urban environment was understood, structures are dispersed creating a system based on individual elements that are autonomous entities exposed to full sunlight and greenery (Choay, 1978). Construction is mainly directly vertically, leading to the construction of vertical units, whereas large green areas in the environment were to play the role of a large urban park, giving the green space a systematic character (Ogrin, 1985). Accordingly, green spaces formally begin to be viewed as an integral part of urban space. Details concerning architecture and the external space are rejected, laying bare the visual picture, and as function becomes primary, they are called functionalists. Housing is a fundamental principle of the charter, and as the primary urban function develops into two types, low houses (single-family or multi-family structures) and colossal collective housing structures, which are more suitable for a society based on modernist ideals (Choay, 1978). For decades, functionalists were the main catalysts of urban practices in the world, providing a strong influence on the visual outcome of a city in the twentieth century.

The first model of a progressivist city that unites the fundamental ideas of human settlements is Le Cité Industrielle (see Figure 28) by Tony Garnier, and appeared in the period between 1901 and 1904 in France. Some consider this model to be the basis of modern urbanism, because it strongly influenced the work of functionalists, especially Le Corbusier (Pawlowski, 1967).
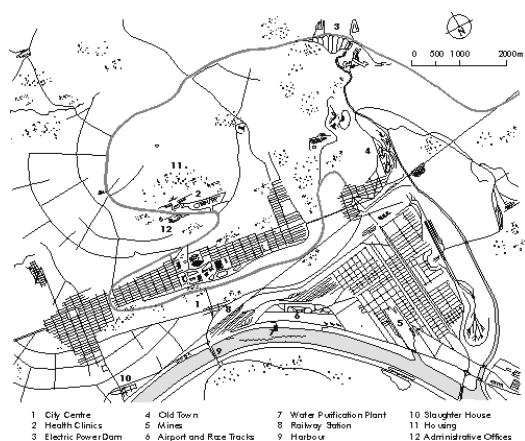
Figure 28. T. Garnierov Le Cité Industrielle (Choay, 1969:86)
Slika 28. T. Garnierov Le Cité Industrielle (Choay, 1969:86)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

60

The actual model of the city is based on the spatial segregation of the functions covering housing, work, movement, health and recreation, most often by using green zones (Blau and Platzer, 1999; Choay, 1978). Green zones in this model are mutually linked, making a system of public spaces, hence Orgin deems that it is one of the fundamentals of a green system in a contemporary city (Orgin, 2007). Housing is made up of standardised structure on housing plots that are imbued with greenery. In the middle of the housing zone are categorised public amenities. An important feature of the actual model is that is represents a socialist city without walls, private ownership, churches, while the whole unconstructed space is a public park areas (Wiebenson, 1969). Given that Garnier thought that the future of urban spaces was the industrial city, his model has such a character with adopted fundamental principles of mass production and industrial efficiency (Blau and Platzer, 1999). With a maximum population of 35,000 inhabitants, it was designed for real spaces around Paris (Giedion, 1965; Choay, 1978). The model was partially accepted in reality with Lyon serving as an example (Giedion, 1965).

Figure 29. Le Corbusier, Villa Contemporaine (Milić, 1985:55)
Slika 29. Le Corbusier, Villa Contemporaine (Milić, 1985:55)

The remaining models originated in Germany, France and in Russia (Choay, 1978). Nonetheless, special attention should be given to the model of the city Villa Contemporaine (see Figure 29) devised by Le Corbusier in 1922. It envisages the first functionalistic city for accommodating three million people. The town consisted of six-storey high-rise buildings primarily catering for office space, and located in the central park. This would establish a special connection towards the green areas, as an equal city-creating spatial element. Around them are a series of residential building intended providing luxurious housing and housing units for industrial workers. This type of segregation was the subject of criticism later, especially by representatives of the KURI group[37] (Blau and Platzer, 1999). Le Corbusier predicted the complete separation of

---

[37] KURI is the abbreviation for Construction, Utilitarian, Rational, International, and represents a group of functionalists in Central Europe. In 1925, Farkas Molnar designed a KURI city which was a reaction to the criticism from Le Corbusier's Villa Contemporaine. Since Le Corbusier's model was in essence a segregation of the population, he deemed this model to be capitalistic in nature, and undertakes a KURI model of the city. It consists of equal models, small cities accompanied by extensive functional segregation of space. The module is a square-like grid 2 kilometres in length on each side. At the intersection of

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

61

functions as the most rational form of spatial organisation occupied by a large population. In the centre there is a major transportation hub. He combined traffic at multiple levels, which was not directly linked to buildings. He called this city called the Vertical Garden City, because his basic plan was create population concentrations in high-rise buildings in order to liberate outdoor green space in which the city would have sunlight and air. Although his model was considered shocking, he has caused major changes in the way cities and its open spaces are perceived. Given that he had a major influence on the formation of urban structures between the two world wars, he marked the end of the traditional urban form (Choay, 1978).

In 1935 Le Corbusier created the model L`unité d`habitation (Cite Radieuse) (see Figure 30), created for the first time in Marseille, and later in other cities (Nantes, Berlin, etc.). Having adopted Fourier's concept of the Phalanstry, it becomes a living space for 1,500 to 2,000 people. A problem arose because the same housing model was used in various geographic regions, pushing construction without respecting existing topography and without taking into consideration cultural tradition and local values. So it happened that Le Corbusier devised almost identical schemes for Rio de Janeiro as for those in Algeria. This kind of principle is a total separation of previous principles in construction, which in strict Roman rules abided by the existing natural, and often traditional values of space. Given that all functions were located in a single residential unit, this model degraded the urban atmosphere (Choay, 1978). However, it also instigated a new approach to urbanism - a total opening to the surrounding landscape.[38]

Figure 30. Le Corbusier, L`unité d`habitation (Kampen …, 2010)
Slika 30. Le Corbusier, L`unité d`habitation (Kampen …, 2010)

The progressivist model is characterised by the need to negate historical space, that is, the cultural context, often occurring fact is the destruction of old town sections, in turn constructing new settlements. This becomes a normal way of spatial planning of functionalism, we choose therefore called an international style (because it is equally applied everywhere) (Blau and Platzer, 1999; Trancik, 1986). This often negated the deeper sense of human existence in a wider dimension of urban life (Giedion, 1965).

thoroughfare intersections there are squares containing public amenities. In the space of the module there are parks, sporting and cultural facilities, schools and health centres (Blau and Platzer, 1999).
[38] The issues of open spaces within the model, following application, will be treated in Chapter 3.3.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

62

2.2.5.2   The culturalistic model of a city

The culturalistic model of a city has acquired its urbanistic form in Germany and Austria in the 1980s and 1990s, even before the occurrence of the word urbanism. The ideological principles were inherited from a previous phase, and were based on the unity of the urban agglomeration, and cultural concept of a city, which is more important than the material (Choay, 1978).

Choay (1967.) considers that one of the most important founders is Camillo Sitte, an Austrian urbanist, whose book *Der Städtebau nach seinen künstlerischen Grundsätzen* had an important influence in Germany, Austria and Great Britain.
The main features of the Sitte's spatial model are containment, diversity, asymmetry, irregularity and various connecting elements (Choay, 1969; Sitte, 1967). In studying historic towns from the Baroque period (because he thinks that from that period the city loses its value), in his book, using analysis he comes to the conclusion that the most acceptable way of human development of the modern city is the principle of organic growth peculiar for medieval urban space (Giedion, 1965). In his publication, he deals with open squares, their sizes, their need for closure, optimal access communications, accommodation of sculpture, and the relationship with surrounding buildings i.e. volumes. He emphasises the importance of shortened i.e. limited vistas within cities, because he believes that the endless vistas are unpleasant and freestanding structures are undesirable (Sitte, 1967; Giedion, 1965). He deals with the importance of the natural qualities of spaces including winds, insulation. Guided only by the qualities of the old historic core he ignores the importance of green space in the city, and although in the last chapter of his book he deals with it as an important element in the psyche of people, but does not use it to articulate structure (Choay, 1969, 1978; Sitte, 1967).

Sitte gave the proposal to modernize the Vienna Ring, but, as says Giedion, his solutions where only superficial reforms (Giedion, 1965). He was the first to instigate abstract planning of a city, which was related to work on a drawing board. Having emphasized their omissions, he points out a significant spatial dimension, a behavioural space. The problem is that Sitte exclusively treated the aesthetical character of space and is therefore monosemantic. By ignoring the complexity of a city, he analyses smaller spatial complexes based on the level of daily activities undertaken by pedestrians, and consequently could be used only for smaller areas of city extensions and suburbs (Choay, 1969). His approach was used by Karl Henrici on the expansion plan for Dessau and Munchen, and he also influenced the work of Theodore Fischer, Theodor Goecke, Otto Lasne and Friedrich Puetzer. At the start of the twentieth century he becomes influential in Great Britain through Patrick Geddes and Sir Raymond Unwin. In the French speaking region, he is mostly ignored. Sitte's great contribution is the preservation of old cities (Grand Palace, Brussels) (Choay, 1969).

Regarding the issue of greenery, Howard had a different opinion than Sitte, on account of it being an integral part of this Garden City plan. He was encouraged in creating this model due to political and social issues, as opposed to Unwin and Sitte (Choay, 1978; Howard, 1965). The essence of his model, i.e. city plan, was that the community should control the value of property, and the actual inhabitants work for its well-being. Profit from the actual city should be used for the benefit of the community of people living in it (Giedion,1965). This concept of settlement, where the development of civilisation was based on serving the

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

63

community is considered by Mumford (1988) to be a turning point in comprehending a town economy and authority. Howard uses agricultural green zones to limit the city's dimensions, i.e. prevent the splicing of urban spaces (Choay, 1978). This zone will become the basis for the green system of some cities in the future. A Garden City should be an asylum for those fleeing from the big city in which the big problem is alienation. This is a similar manner of developing a city as it was in long-ago Greek practice, the colonisation of groups of people who were prepared to create better conditions for the functioning of a single urban space. Howard wanted to combine the social benefits of a city and healthy life on a village according to the surrounding space, since he considered that the new model would combine these qualities. The village had inadequate economic and social opportunities, whereas the city had inadequate natural section (Choay, 1978; Mumford, 1988). The model itself is limited in area and the number of inhabitants, and it is planned for 32,000 people (Choay, 1978). Howard did not provide the city plan as a basis for development, but a programme offering harmonised organisation and controlled growth in the form of diagrams. He did not commit himself to a certain type of construction or planning method. His contribution is not as important in physical terms, as it is in the idea itself (Mumford, 1988).

The structure of the diagram (Figure 31) is composed of a set of concentric circles (Giedion, 1965). The city is autonomous and has a variety of functions, including the industry and agriculture zones located on the periphery, while tertiary industries exist in the form of large public buildings in the very centre and are located around a central garden (Choay, 1978). Between public functions and the Crystal Palace (sales gallery) is a public park and recreational area. Halfway between the central and peripheral circuit is the circular Grand Avenue, a 128-metre wide road for the green zones and parkways (Giedion, 1965). Howard created an entire system of Garden Cities (Figure 32), located on the perimeter of large circles with a radius of 16 kilometres, in which the centres are mother cities reaching a population of up to 65,000 inhabitants. All of these units are mutually linked by a system of quick electric trains (Choay, 1969). Though the model has characteristics common also to the progressivist city due to the fact that it includes hygienic and zone spaces, Choay (1969) considers it to be culturalistic, because of the strictly limited size and city centre has an exceptional urbanicity to it.
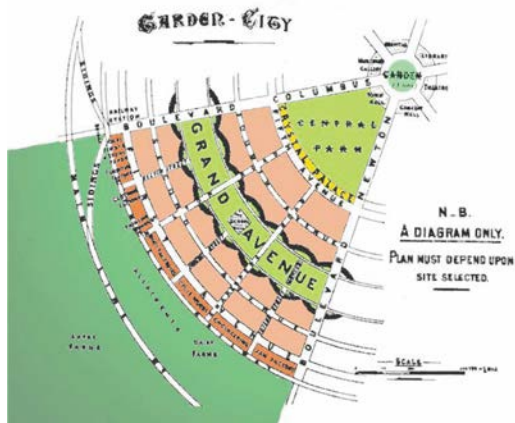
Figure 31. E. Howard, Garden city (Choay, 1969:93)
Slika 31. E. Howard, Garden city (Choay, 1969:93)
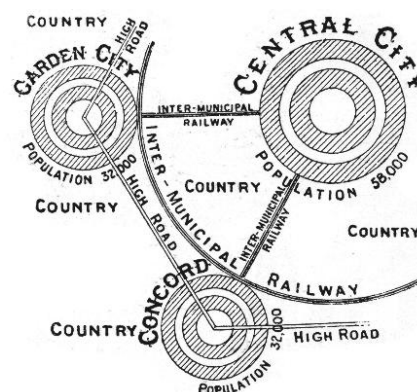
Figure 32. E. Howard's system of Garden Cities (Fishman, 1977:117)
Slika 32. E. Howard, sistem Vrtnih mest (Fishman, 1977:117)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

64

The Garden City accompanied by the concept of green areas, but also accommodating the park in the middle of the settlement, provides green areas a very important position in the city's scheme of things. By creating a system of green zones, he has created one of the most important foundations for developing the idea of a green system in a city.

Progressives have reacted on the culturalist by criticism, because of their strong connection to history, because they believe that the culturalist proposals don't match to that time since they are nostalgic.

2.2.5.3 The anti-urban model

In America, an anti-urban movement appears. It created in the twentieth century a new utopian model not applicable in reality, but which had a strong influence on American sociology and urbanism. It was established by Frank Loyd Wright who called it the Broadacre City (see Figure 33). It was founded in the period between 1931 and 1935. This city was characterised by an apocentric system composed of point-like elements in a transport grid. It eliminated the megalopolis and idea of a city. Given that he considered man should be allowed direct contact with nature, it becomes continual within a city, whereas all the city functions are dispersed and isolated in the form of smaller entities. Housing has an individual character, hence there are not collective housing units, and around the residential structure is land intended for agriculture and leisure activities. He believes that the earth and country have important essential elements of a self-sustainable community (Blau and Platzer, 1999). Work is located within the residential structure or in smaller specialised centres. All the elements of the city are linked to land and air communication networks, because isolation makes sense if it can be overcome at any given moment. The model itself is exceptionally complex, and combines elements from the progressivist and culturalist model. It is simultaneously open in terms of the city plan, and closed because structures are intimate spaces possessing a closed character. Preserving the natural conditions existing on the terrain, it does not negate topography. Hence the architecture is complemented with it and stems from it, for the reason that it is subordinate to nature (Choay, 1978). The model was often criticised, hence Fourier considered that such primitive social forms cannot supplement nor replace city functions which are the basis of our culture (Giedion, 1965). Nonetheless, this model is important, as it encourages adaptation to existing landscape values. This idea will gain importance only in the second half of the twentieth century.

Figure 33. F.L.Wright, Broadacre city (Hall, 2011:47)
Slika 33. F. L. Wright, Broadacre city (Hall, 2011:47)

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

65

2.2.6   Later development phases of models after the Second World War

The most widespread and widely used model is the progressivist model which was imposed in various regimes and obtained various forms (Choay, 1978). As a language of architectural forming, in the early nineteen-thirties it greatly spread throughout Europe (Giedion, 1965). In the former Soviet Union and Germany, it lost the aesthetic dimension, so breaking up connections with the avant-garde, while due to the migration of most representatives of Bauhaus to the United States during the Second World War. It was transferred as a means of the idea of freedom where it inspired the development of suburbia and the reconstruction of most American cities. It subsequently became a means of creating urban spaces in capitalist and communist countries throughout a long period of time (Choay, 1969).

The culturalistic model has maintained a strong influence in the UK for a long time.
The naturalistic model has been only partially implemented in some American suburb.
Within the progressivist model, various variants are created. Even Le Corbusier had the most radical and purest expression, but later his architecture develops some new features. The architecture of Notre Damn Ronschamp shows some new views of the area, allowing him to move away from his original design principles. The German avant-garde Hilberseimer evolved even up to the garden city concept. Given that he criticized Le Corbusier because he failed to reduce the traffic of the city. In his "Highrise city" scheme he avoids traffic by placing work and residence in the same building, one above the other, so everyone lives above their workplaces.
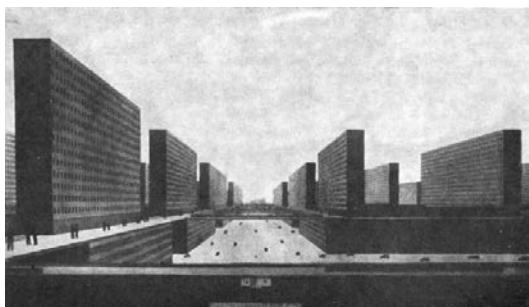
Figure 34. Hilberseimer, Highrise city (Utopian …, 2012)
Slika 34. Hilberseimer, Highrise city (Utopian …, 2012)
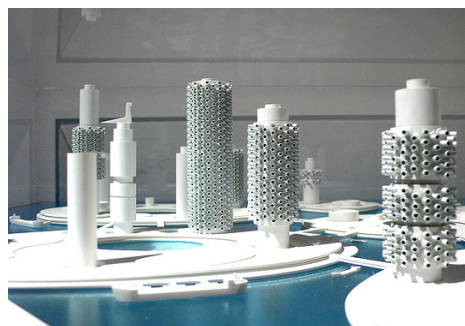
Figure 35. Kikutake, Marine city (Alison, 2007:58)
Slika 35. Kikutake, Marine city (Alison, 2007:58)

Both the progressivist and culturalistic models have some identical features, so sometimes the solutions start to resemble to each other, but also resembling the anti-urban model. Thus, for Howard a very important role in the city was hygiene and area zoning, while at the same time in France garden cities are created like a progressivist models of the city with an emphasised role of vegetation. The functionalist Alvar Alto, at certain stages in his works starts to resemble Wright who represents anti-urbanistic opinions (Choay, 1969). Basic approach changes with the further development of functionalism. A new generation

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

66

of functionalists gathered at the Team 10 Group[39] published their philosophy based on the humanisation of basic settings of their former approach (Trancik, 1986).

In the second half of the 20th century, the idea of futuristic cities was created, which have in common that all of the authors propose a large concentration of people in the buildings. By liberating the earth's surface they occupy underground, sea and air (vertical Maymont cities, the city on lattice J. Fridman presented at X CIAM in Dubrovnik, the Marine City of Kikutake).

One of futuristic cities is an experimental town Arcosanti, created by P. Soleri (Figure 36). Inspired by Wright's approach, it represents a city of 5,000 people, which is envisioned as a model for the city of the future. This city, in which the pedestrian is dominant, is based on minimal environment impact and represents the coherence of architecture and ecology. It is currently under construction in the U.S., in Arizona. It is evident that all the works are trying (at least in the description of the solution) to reduce the impact on natural space, thereby attempting to strengthen environmental protection awareness and landscape protection values.
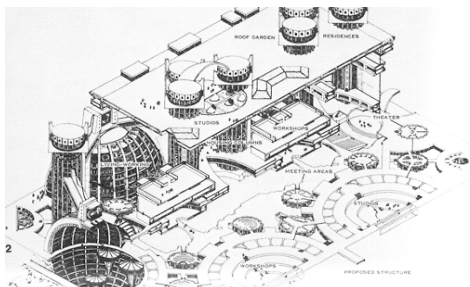
Figure 36. P. Soleri, Arcosanti (Soleri, 1987:76)
Slika 36. P. Soleri, Arcosanti (Soleri, 1987:76)

2.2.7 Criticism of the models

During the formation of the reformist proposals of pre-urbanism and urban models, there was some criticism of the proposed ways of thinking about space. One such criticism is evident in "The Human Settlement as a Time-Space Rooting: Urban Continuity", in the early twentieth century, whose founder was Patrick Geddes, and speaks of the need for a real and complete planning procedure of cities (Choay, 1978). He was influenced by Frederic Le Play, who in his social theories talked about the importance of environment and geography at the existing social structure of the city (Choay, 1969). Elisee Reclus at the time mentioned the importance of the unique personality of each city, noting that the city is a living organism. Supporting their theory, Geddes suggests developing a survey before the planning process, which refers to a set of factors that will affect the project. It becomes a process of sociological recording which has to be linked with the economy, demography, aesthetics, and other disciplines (Choay, 1978). It should be a corrective to the urbanism respecting the complexity of reality (Choay, 1969). He considered that for the city, biological criteria of dynamic equilibrium and organic harmony with the village in the

---

[39] Team 10 was a group active in the period from the nineteen-fifties to the nineteen-eighties.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

67

wider ecological scheme are very important. These parameters are important for functions within the city, growth control and population density is especially important, as is the possibility of establishing new settlements, when the city begins to grow excessively (Mumford, 1988). His thoughts were further deepened by Lewis Mumford in the mid-twentieth century, who was a critic of progressivist planning and its results on the lives of individuals. By criticising traffic, the rigidity of solutions for residential areas and units, he seeks new forms of city organisation. Realising the lessons from the past, he believes that the city with clear boundaries is better than the modern megalopolis. She suggests polynucleism that leads to regionalism. Since he had an important role in the Regional Plan Association of America, he has had an impact on the construction of new U.S. cities (Choay, 1978).

The impact of this criticism has been extremely significant, especially in Anglo-Saxon countries, and soon "urban studies", "sociological survey" as a fundamental part of the planning process was introduced (Choay, 1978). His influence can be seen in developing environmental awareness, which is later seen in understanding the urban green spaces as areas that could be in a function of ecological corridors. Subsequently, he has significantly affected the ecological role of the green city.

Criticism from the standpoint of mental hygiene is connected to the research of Boubi and Freud, who maintained that mental hygiene is not the same as physical. By connecting it with the parts of functionalist concept that denies cultural and individual aspects of human life, and consequently leads to socially degrading concepts, they concluded some important insights. Progressivistss do not take into account on security or freedom or wealth, choice of possibilities, or fun, which are necessary for mental health. So it has been shown that the North End of Boston, with narrow streets is the healthiest part of the city with the lowest crime rate and the lowest rate of infant mortality. Due to their starting point, they emphasise the importance of the heterogeneity of the architectural, functional and demographic structure of the city. Meaningless open areas are considered a source of anxiety, while for the greenery they think it should be formed and limited to special places. These criticisms were led by Jakobs, Reisman and Duhl. They believe that residents are not objects and should be involved in the creation of environments because an environment can affect on the individual with aggressive or a power of integration. The book Life and Death of Great American Cities, in the early nineteen-sixties, has raised awareness of the importance of streets in a city, and therefore the pedestrian street area as an element of a green city. Emil Aillaud dealt with the same issues in France who used this knowledge to raise the importance of paved surfaces and games on the streets, however, neglecting the importance of green system. They have contributed to the development of methodology because they paid attention to the important fact, which has to be kept in mind during city planning (Choay, 1978).

The third criticism emerged in the mid-twentieth century, when studying how awareness of the population perceives the city as a material being. The city planning project should cease to be an object when by means of experimental psychology and questionnaires, inhabitants become the planer's collocutors. The concept of structural city analysis was developed in the U.S., but limited to visual perception. Practical application is found in the reconstruction of Boston by Kevin Lynch. This analysis revealed a mistake of urbanists progressivists who when planning spaces create pictures or works of art without taking into account the function of the number of living threads that connect residents with the city.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

68

Urbanists culturalists might have guessed this improper understanding, but their desires ceased at the aesthetics of space (Choay, 1978). Lynch also contributed to raising awareness about the importance of squares (nodes) in the urban area with his mental maps.

This chapter shows that the rigidity of urbanism was developed due to the fact that the urbanists, using fixed models and functionalism, viewed urban agglomeration as a single standard form. This inflexibility did not allow the creation of customised solutions in existing situations, and made it difficult for the city and its open areas to gain new, yet unknown to us, values and meaning.

2.3   DEVELOPENT OF THE CONCEPT OF A GREEN SYSTEM

Reviewing the development of the city and its history through the open areas (Section 3.1.) has shown that the former functions of the central city square (developed from the Greek agora) and the open landscape around an urban centre, were implemented in a variety of types of open areas of contemporary urban space. The disintegration of the historic centre (the so called. "nucleus shape"), leads to the creation of many different types of open urban areas that are placed in the urban fabric with a more or less systematic organisation. This process is typical for the nineteenth century when the rapid expansion of urban areas outside the existing or ruined city walls occurs. Increasing the surface of urban area leads to the alienation of open landscapes (sometimes located near the city's population), and is characterised by a nostalgia for the former relationship between the urban centre and the surrounding area as mentioned by Whiston Spirn (1985). The medieval city resident had a strong relationship with the surrounding landscape because he resided in it on a daily basis (Whiston Spirn, 1985), whereas in the nineteenth century this relationship is lost. Consequently, green space begins to occur within the city, which David Nicholson Lord (2002) describes as countryside indenting in the city in the form of parks. Whether a park is created as an imitation of ancient landscapes around cities or as French (1973) says by the influence of pre-existing forms of private or semi-private gardens, is ideologically linked to the Greek agora since it represents a social space i.e. a place of meeting, place of residence, socialising in the outdoors. This process has already been discussed in the chapter on the development of the city, but here it is necessary to emphasise that the creation of new open, public urban areas during the nineteenth century, was the beginning of today's green system. Systematicity of open urban spaces is visible in a variety of urban planning and theoretical urban models of that period. So in the mid-nineteenth century in Haussmann's plan for the city of Paris there appeared various public spaces that had a particular arrangement in space. By introducing boulevards with alleys which connect public open areas of the city (new and old), a thought-out system of public open space was created (Kostof, 1995; Giedion, 1965; Mumford, 1988). This led to the appearance of green linear elements that emerged from infrastructure, and which will become an important connection within the green system of the modern city. Converting two forest areas on the edge of the city into the recreational spaces that Haussmann intended to link with a green zone around the urban fabric (250 meters wide), [40] is an idea that will be developed later (Giedion, 1965).

---

[40] The idea of a green belt was not implemented.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

69

Figure 37. Green zones in the Haussmann's plan for Paris (Choay, 1969: 52)
Slika 37. Zelene cone Haussmannovega načta Pariza (Choay, 1969: 52)

This theme of encompassing cities with a green zone may be formally connected to the massive process of demolishing fortifications across Europe, since public parks were often raised in place of them. Given that the fortifications were usually circular, parks or other green spaces often created a green, circular belt that once created the green urban edge, and sometimes the boundary of certain urban areas, such as Wagner's plan of the Vienna Ring (Kostof, 1995; Giedion, 1965; Maksimović, 1976). The purest concept of this kind of thinking is reflected in Howard's model "The Garden City" [41] (Figure 38) whose diagram is most directly tied to the contemporary term of the urban green system (Hall et all, 1973). Creating concentric green belts, which separate certain functions, is a form that will later lead to the idea of green belt acting as a city's edge, and also to the idea of connecting green areas within the urban fabric (Moughtin and Shirley, 2005). Maksimović (1976) says that some theorists further developed his scheme by adding some green elements into the models of cities. So Eugene Henard , by improving green system, also introduced individual park elements in the urban fabric[42] (Maksimović, 1976, French, 1973). This idea can be seen later, so French (1973) calls it the "Swiss cheese system".
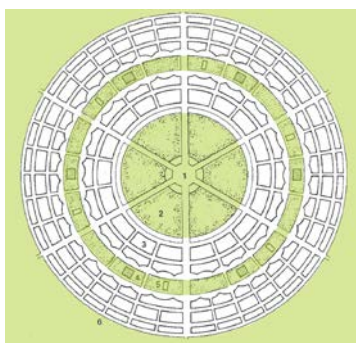
Figure 38. Presentation of the Garden
City scheme (Howard) (Vuković, 2003:18)
Slika 38. Prikaz sheme Vrtnega mesta
(Howard) (Vuković, 2003:18)

Figure 39. Henard, scheme of city with
concentric green zones
(Vuković, 2003:19)
Slika 39. Henard, shema mesta s koncentričnimi
zelenimi pasovi (Vuković, 2003:19)

---

[41] Whiston Spirn connects idea of the Garden City to the utopian city of Thomas Moore from the early 16th century (Winston Spirn).
[42] Haussman used the same idea in the plan of Paris and that existed during the creation of Savannah and Philadelphia.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

70
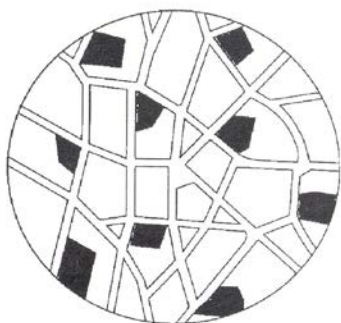
Figure 40. Henard, scheme of city with particular green elements (Vuković, 2003:19)
Slika 40. Henard, shema mesta s posameznimi zelenimi elementi (Vuković, 2003:19)
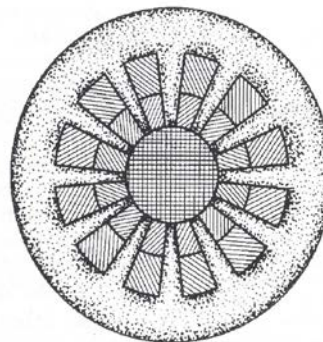
Figure 41. Ebetstadt, Mohring i Peterson, scheme of city with wedges (Vuković, 2003:19)
Slika 41. Ebetstadt, Mohring in Peterson, shema mesta s klini (Vuković, 2003:19)

Improving Henard's scheme, Ebetstadt, Mohring and Peterson in the conceptual design of Berlin in 1908, besides the ring they included the green wedges that were radially penetrating from the periphery to the centre of city. Subsequently, the connection between the extra-urban landscape and the centre of urban space (Maksimović, 1976) was created. Using the principle of wedges, the green system of Copenhagen was developed (Figure 41), defined in 1947 in the form of fingers (the so called Finger Plan) (Turner, 1996; Gallion and Eisner, 1963). A similar principle is evident in the plan of Zagreb, Warsaw, Helsinki, Amsterdam, Freiburg and other cities (Koščak, 2000; Beatley, 1999).

Figure 42. Copenhagen, finger plan (Moughtin and Shirley, 2005:151)
Slika 42. Copenhagen, »finger načrt« (Moughtin and Shirley, 2005:151)

The creation of a system of green open spaces was certainly influenced by the development of cities in America, so French (1973) says that the green squares in the planned network basis of the city of Savannah and Philadelphia[43] were the basis of the American City Park Movement. The movement was led by Olmstead who developed the concept of linking green urban spaces into corridor parks. The best example of such a system is the Emerald Necklace in Boston, formed by connecting parks, meadows, forests and coast in 1892 (French, 1973; Maksimović, 1976).

---

[43] They originated in the eighteenth and nineteenth century under the influence of English green square (French, 1973). Similarly, in the mid-nineteenth century in Ceder's plan of Barcelona, green landscape park elements appeared as part of the city's regular grid plan (Maksimović, 1976).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

71
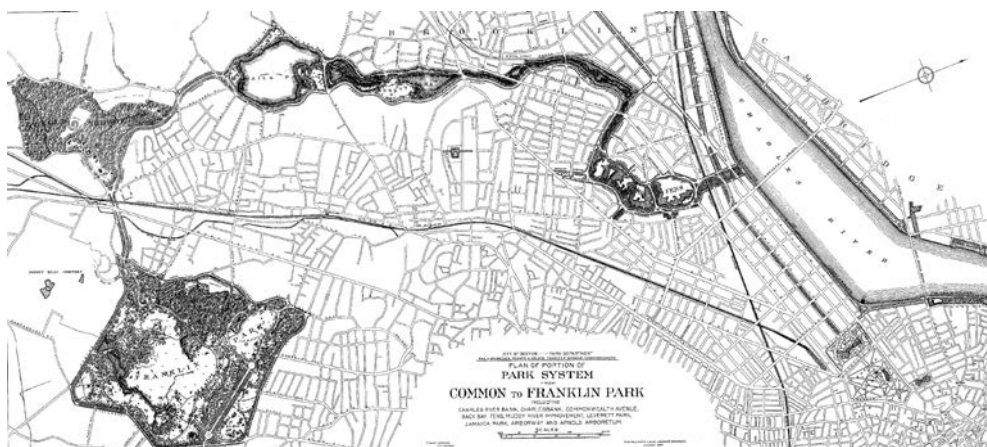
Figure 43. Emerald necklace in Boston, Olmstead (Digital .., 2012)
Slika 43. Emerald necklace v Bostonu, Olmstead (Digital .., 2012)

After Boston, this idea appeared in Philadelphia and Baltimore, and today is an integral part of the green system of Washington, Toronto, Stockholm, London, etc. Corridor parks have contributed to the green system concept because they implemented linear elements, which are natural surfaces with a line character in the urban fabric (coastal zone, river ...) (French, 1973).
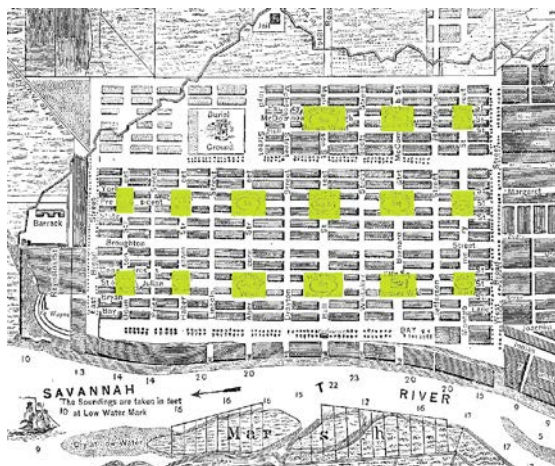
Figure 44. Green squares of the city Savannah in 1818 (Sobel …, 2007)
Slika 44. Prikaz zelenih trgov mesta Savannah, 1818 (Sobel …, 2007)

The conceptualisation of open urban space area was certainly influenced by the idea of the need for the creation of children's playgrounds and sports grounds available to all citizens, assuming equal distribution across their urban fabric (so that the maximum distance does not exceed half a mile from the place of residence). Even distribution implied the creation of a specific system in the dispersing of elements in the urban space. The concept was originally applied in Chicago, where an initiative for creation of playground movement was launched (Maksimović, 1976). This idea was also used by H. P. Berlage in Amsterdam, forming a system of recreation areas and children's play (Giedion, 1965; Kostof, 1991).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

72
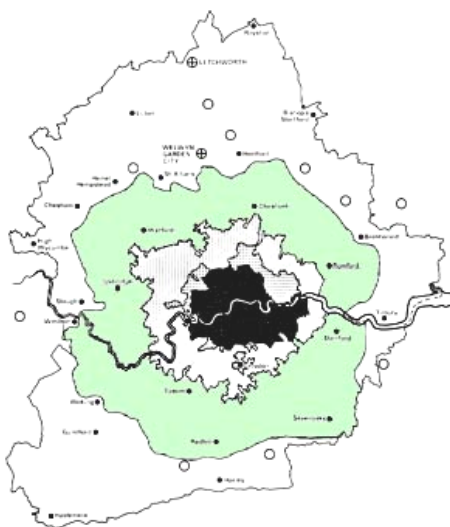
Figure 45. London, green belt (Sdoutz …, 2009)
Slika 45. London, zeleni pas, green belt (Sdoutz …, 2009)

After the Second World War, there occurs the creation of the green belt acting as edges of cities preventing the further spread of wild cities. They can be considered as part of the urban fabric as they are often created in the function of parks and recreation areas, and are often implemented in the UK and other Anglo-Saxon countries (Gallion and Eisner, 1963; Mandelker, 1962).

With the development of the modernist phase in urban planning in the first half of the twentieth century, a new approach to open urban areas was created. The Athens Charter brings a new understanding on the full integration of the green space and free space within the urban system (Ogrin, 1985). Ogrin (1985) links this to the Howard's idea of a garden city, and Sitte's opinion about the need to create green urban spaces, expressed in the last chapter of his book titled *Greenery in a Big City*. Since Choay (1978) classifies those as representatives of the urban culturalistic model, it can be concluded that culturalists inspired the most important doctrine of the progressivist urban model. But apart from the culturalist, highlighting the value of green was probably influenced by Garniere's model Le Citte Industrielle, [44] a system of green spaces.[45] Ogrin (1985) says that although the Athens Charter sought to determine the use of free space on the basis of contemporary typology, open areas do not functioning as a social spaces as they have been imagined. In the attempt to liberate as many green open spaces as possible, following the idea that the structures should be situated in the park, this led to the emergence of large green spaces that due to the pronounced quantitative value dimension had lower qualitative values. Therefore, the contribution to the modernism in the development of the green urban system is most emphasised in the understanding of open green space as a vital part of the urban fabric. May says that in such circumstances, green vegetation is no longer a single event within the city, but takes on a new, larger size, and moves into the net of connected parts and is considered a unique system in city planning (May cit. by Ogrin, 1985). Although the signs of this kind of thinking are visible in the American aspiration to connect parks and in various theories, it was only during the time of modernism they were

---

[44] Chapter 3.2.
[45] He was inspiration to Le Corbusier.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

73

fully achieved. Since modernism was the widely accepted urban model, this system was implemented around the world and thus probably contributed to the definition of green space as a vital part of the city. In addition, to oversimplify the problem was to deny the value of old urban areas, and thus the old town squares[46] and streets as important public open spaces. Since the fact that in the nineteen-sixties, postmodernism occurs as a reaction to modernism, again there is an interest in history, tradition and sustainability (Velibeyoglu, 1999). In line with this and due to works and the influence of Jane Jacobs, Gordon Cullen and Kevin Lynch, the importance of the street and the squares as important open spaces of the city returned. Flo Marcus and Francis (1998) emphasises that Galen Cranz in 1982, by defining the four major periods of development of parks in America, extracted a system of open space as a concept that has been developing since 1965 and combines parks, playgrounds, and urban beaches. This shows that the sense of awareness in the importance of urban paved spaces in the green system of the city was developing, although in the definition of squares elements do not appear (only the plaza, defined by the proportion of green elements as category between park and square). The city in the postmodern period begins to be understood as part of a larger entity, thus increasing awareness of its ecological role on Earth (Hirt, 2005). In developing these preferences, there is a perception of city as a space that has a very important ecological role in a wider context, for which it the sustainability of the urban landscape (open urban areas) is extremely significant. Such principles of thinking may be linked to F.L. Wright and the anti-urban model[47] of the city form the nineteen-thirties. So the green system of city as a concept of sustainable development develops.

Figure 46. Diagram of green system for the city of Sophia,
(Kovachev, 2005 cit. by Dimitraova et al., 2006:16)
Slika 46. Diagram zelenega sistema mesta Sofije
(Kovachev, 2005 cit. po Dimitraova in sod., 2006:16)

---

[46] Denying of squares as social space has already begun in the Baroque period.
[47] Chapter 3.2.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

74

2.3.1 Review of current investigations of the green system

Figure 47. Presentation of green system for Amsterdam (Gieling, cit. by Rombant, 2009:12)
Slika 47. Prikaz sheme zelenega sistema Amsterdama (Gieling, cit. po Rombant, 2009:12)
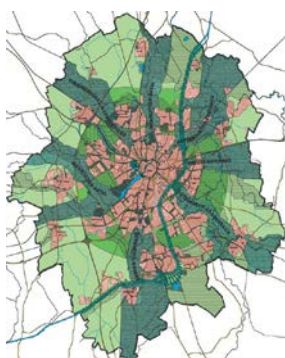
Figure 48. Concept of green system for Munster (Ogrin, 2010:233.)
Slika 48. Koncept zelenega sistema mesta Münster (Ogrin, 2010:233.)

Figure 49. The green plan, Milano, 2007 (Kipar, 2008:46)
Slika 49. Zeleni načrt za Milano, 2007 (Kipar, 2008:46)

Numerous authors have dealt with the study of the green system. Since it has a significant social, structural and ecological role in the urban area, some of them practically dealt with all its functions, and some only covered its individual role in the city. Maruani and Amit Cohen (2007) say that the researches can generally be divided into two approaches: those that address human needs (planners) and those who cover environmental values "environmental quality" (ecologists and conservationists).

During the processing of these topics, it has been established that there is various terminology, which is not completely homogeneous, but applies to most or all surfaces of the green area (includes some additional spatial elements). So in addition to the already mentioned[48] authors who talk about green systems, green infrastructure, greenway network, ecological network; individual elements as green corridors, green wedges, green belts, green fingers, greenways while Mumford (1968) mentions ribbons of green.

Maruani and Amit Cohen (2007) say that the term green paths (greenways model) is characteristic for the last decade of the twentieth century, and it was used by numerous authors (Toccolini, 2004; Conine, 2004; Cawood and Somers Smith 2006; Teng et. al 2011). They note that in recent times, more common terms are the green network (Teng et al 2011th; Mahmoud and El-Sayed, 2011) and green infrastructure (Tzoulas et al., 2007; Sandström, 2002, Vandermeulen, 2011; Mell, 2009; Hostetler, 2011). Similar opinions are held by Hellmund and Somers Smith (2006), who talk about how the original idea of greenways was developed into a network of greenways for which in many European countries often used the term ecological network, while in America more often the term green infrastructure. Tzoulas et al (2007) say that the green infrastructure term represents improving the definition of urban green system since it includes all natural, and artificial networks semi-natural and multifunctional ecological systems within, around and between urban areas. Consequently green infrastructure, besides urban spaces explore non-urban areas, and therefore the term of the city is viewed in the wider context of the region in

---

[48] In the chapter Defining Fundamental Terms

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

75

which it is located. Given that Vandermulen (2011) deals with the social role of green infrastructure, so this term is no longer exclusively linked to the ecological role of green, because it represents a green system in a wider context. However, the above terminology commonly emphasises the ecological role of urban green spaces, hence authors, when recounting urban spaces, which are covered by the investigation, do not take into account the paved urban spaces, which perhaps might not be essentially ecological, but have an important role for the city's population.

Since the ecological role deems that all green urban areas are essential including private spaces, numerous authors in the research list categories include gardens. So Gupta et al (2012) using the term green urban spaces, covers both private and public green urban areas. A similar approach is used by Moughtin and Shirley (2005). Despite their differences, these studies are relevant because their findings may help in understanding the problems in the research topic.

The importance of the role of green space for urban residents as spaces for recreation and relaxation in a busy and stressful life in the city, has been treated by numerous authors, with works most relevant by Kaplan and Kaplan (1989), Gobster and Westphal (2004), Ward Thompson (2002), Tyrvainena and associates (2007). In his study, Ward Thompson (2002) emphasises that open spaces are important because of their public role, so they seldom represent lands on which democracy develops. For their system the term "open space network" is used. In defining social role of a green infrastructure, Vandermulen (2011) says that it is used as a meeting place for recreation, rest, playgrounds, and highlights the fact that these areas reduce stress, positively affect human health, and may be alternative communication routes. The importance of the green system in experiencing a city has been treated by numerous authors, so Tyrväinen et al (2007) and Palmer (2003) explore its role in Helsinki. Moughtin and Shirely (2005) talk about the increasing appreciation of its importance, and emphasise that it can become the dominant element of urban space and consequently form a special model of the city. This approach has representatives in landscape urbanism, [49] which has recently become an increasingly pervasive topic of research (Steiner, 2011). However, such considerations can also be found in the last century. So by quoting F. L. Wright, [50] Ogrin notes that the green system as a measure of the value of the individual authors was reported in the past (Wright cit.by Ogrin, 1985).

The ecological importance of the city and its sustainability is topic of investigation by many authors that occurred due to problems, which arise from the expansion of urban areas (Mell, 2009; Tannier et al., 2011). Although the historic towns were sustainable from an anthropocentric point of view (Gafron, 2008), increasingly reflect on the ecology of a city due to the attention given to other living organisms (Weng, 2006; Nassaeur, 1999; Forman and Godron, 1986; Dramstadt et al., 1996; Jim and Chen, 2003; Tannier et al., 2011). Given that, in many parts of the world urban areas are being connected, so they are

---

[49] The term was first mentioned by Walheim (Steiner, 2011).

[50] FF.L.Wright in an interview published in the book The Future of Architecture, when asked why he thought that Chicago would become the most beautiful city in the world, said: "First of all, because it has an extensive system of parks, the largest in the world." (Ogrin,1985).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

76

dominating the region, causing environmental problems.[51] Consequently, urbanisation is leading to the fragmentation of open spaces whose environmental issues were treated by many authors (Forman, 1995; Antrop cit. by Jun Yu and Nam Ng, 2007; Levin et al., 2006; Tannier et al., 2012th). For the ecological role of urban open spaces, the continuity of green spaces is important in order to create ecological corridors (Gazvoda, 1999; Levin et al., 2006; Tzoulas et al., 2007; Tannier, 2011). These connections can be both wildlife corridors, which may have positive effects on biodiversity, but also serve as a human function[52] (Teng et al., 2011; Moughtin and Shirley, 2005; Carmona et al., 2003; Manlun, 2003; Flotête and Piombini, 2006; Ward Thompson, 2002), so some authors propose a human ecosystem model (Zipper, 2000; Tzoulas, 2007). Authors in various parts of the world and in diverse climatic zones have studied the establishment of corridors. Mahmoud and El-Sayed (2011) have dealt with this using the example of El Sadat City, and Mell (2009) discusses the possibilities of their implementation in British cities. Moughtin and Shirley (2005) emphasise the Leichester city as an example and note that in addition to the corridors the green network should be formed which is essential for ensuring biodiversity and sustainable ecology. In contrast to these studies, Morancho (2003) says the greater importance to man was afforded by a larger number of smaller green spaces than only larger ones, and therefore proposes their combination. Some authors have talked about the possibilities of ecological relationships without creating a continuous corridor, using the system of disconnected corridors and "Stepping Stones" (Dramszad quoted in Rouland and Johnson, 2002; Gazvoda, 1998).
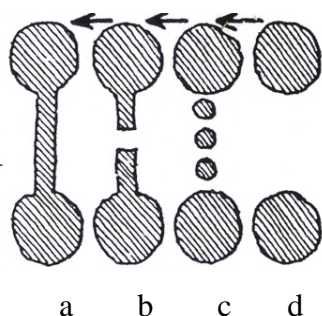
Figure 50. a) Presentation of ecological link between habitats, b) broken link, c) stepping stones, d) non-existing link (Dramstad et al., 1996:37)
Slika 50. a) Prikaz ekološke povezave med habitati, b) uničene povezave, c) stepping stones, d) neobstoj povezav (Dramstad in sod. 1996:37)

Numerous authors point out the importance of establishing a connection of urban green spaces with surrounding landscape and emphasize the importance of urban edge (Bruns and Schmidt, 1997), so frequently researches are dealing with a green belt which is usually present in the cities of Great Britain, formed after World War I (Turner, 1996; Mandelker, 1962; Gallion and Eisner, 1963; Mumford, 1968). Since this is a belt formed of parks and recreational areas and natural and agricultural zones, it is an important part of the green urban system. Therefore, researches of Frankfurt, Berlin, Vienna, Barcelona and Budapest green belt can be distinguished (Lassus, 1998; Kühn, 2003). In recent years, some cities recognize its importance, and on it underlay concept of green systems, such as Oslo, [53]

---

[51] Of which the most important problem is the inability of animal species (wildlife) to move freely (Hellmund, Somers Smith, 2006.).
[52] Kim and Kaplan say that green spaces encourage socialisation (Kim and Kaplan, 2004. cit. by Tzoulas).
[53] Oslo's green plan has a 1km forest area from the city edge and is treated as part of the city green system (Oslo Municipality, 1997).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

77

Guangzou etc. (Oslo Municipality, 1997; Jun Yu and Nam Ng, 2007). Some authors have suggested that there are various modes of managing green belt areas, so some are protected from development (Gallion and Eisner, 1963., Mumford, 1988), while in other cases it represents areas of potential future expansion of the city, despite a completely different philosophy and reasons of the occurrence (Amati and Yokohari 2005, Tang et al., 2006).
The Netherlands has approached this problem in a specific way, by forming the so called "Randstad Green Heart" located in the middle of an urban agglomeration of cities including Amsterdam, The Hague, Rotterdam and Utrecht (Beatley, 1999; Marunai, Amit-Cohen 2007; Mumford, 1968). So Mumford (1968) notes that the entire landscape of Randstad is designed as a park for bike trails, hiking and spending time outdoors. This area functions as a highly valuable ecological area with a strategy of so called habitat networks (Turner, 1996).

Figure 51. Concept of green system for Leipzig(A strategy for urban green space, 2008:44.)
Slika 51. Koncept zelenega sistema Leipziga (A strategy for urban green space, 2008:44)
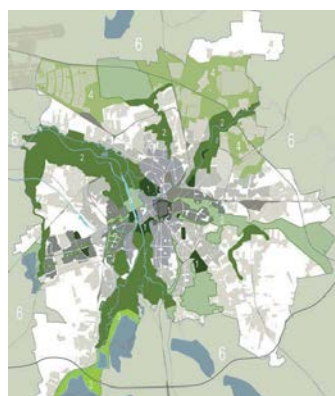
Figure 52. Green system for Leipzig (A strategy for urban green space, 2008:54)
Slika 52. Zeleni sistem Leipziga (A strategy for urban green space, 2008:54)

Since expansion of city leads to numerous changes, it is necessary to take account of development of the green system (Xi Jun and Ng, 2007). Decisions related to urban planning and land use in any urban landscape must take into account environmental, physical and social components of the system (Zipperer et al., 2000.) and work towards the protection of open space (Bengston et al., 2004). It is also necessary to take into account regional characteristics and their conservation, since urban development threatens fragmentation of open agricultural landscape, which causes loss of historic character (Burns and Smidt, 1997). It is also necessary to take into account the importance of traditional cities for the purpose of creation the innovative strategies[54] (Bruns and Schmidt, 1997; Palang et al., 2011).

---

[54] Burns, Smidt (1997) states the example of town Postdam.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

78

To determine the developmental tendencies, many authors have recently studied the structural development of the green system on specific examples. Kühn (2003) studied Berlin, Vienna, Barcelona and Budapest, and Dimitraova and colleagues (2006) were spoken about the structural characteristics of Sofia. Research of Melbourne (Buxton and Goodman, 2002), Hong Kong (Tang et al., 2006) and Ljubljana (Cerar et al., 2002; Ogrin et al., 1994) were also made.

This kind of thinking is developed by Germany in the planning process of city development (Gälzer, 1970) (Figure 51, 52), while some countries have undertaken individual studies. In Slovenia, a group of authors in 1994 developed the study "Green System of Ljubljana" (Ogrin et al., 1994). In Croatia, this issue was dealt by Koščak (using the example of Zagreb in preparing her master thesis) (Koščak, 2000) and several authors in their diploma theses.

Urban matrix and structural characteristics of the entire city (built and open areas) are subject to investigations of numerous authors. Some authors have made research looking these elements of open space as singular dots (Bacon, 1976), some like a more comprehensive elements with less (Milić, 1990, 1995, 2002) or more (Gazvoda, 1993) interest in a system that they make. On the other hand, a numerous authors, exploring its ecological component, handles into the structural features of open urban areas, since it has already been said that the structure (fragmentation, continuity) acts on its ecological potential.

Given the fact that the green system can be the foundation of sustainable development, while simultaneously contributing to the city's identity (Kučan, 2001), it represents a very significant aspect of urban study.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

79

3   WORKING METHODS

- The selection of four town from the coastal area of Croatia representing four different types of towns is conditions using a specific topography,
- Making an inventory and analysis of relationship development for open surfaces and built up structures within investigated towns found in particular historical development phases (on the basis of literature, and digitalised and georeferenced[55] cartographical presentations using various historical periods, newer maps and aerial recordings)
- Linking knowledge-acquired and theoretical starting points in urban theory, which were valid in various historical phases
- Recognition of a structure and element of open space, which in particular towns were preserved throughout a specific historical period, hence they are visible as existing and active elements of a systems of open surfaces, in a contemporary town
- Researching the relationship of a historical town towards spatial determinants in the hinterland for particular (when compared with the same) development phases
- Making an inventory and analysis of the state of open urban spaces in a contemporary urban matrix.

The term analysis implies a structural analysis and an analysis of socially important open spaces, including green areas at determined time (historical) turning points. Analyses of systems of green town areas, in terms of development of open town spaces, will show the importance of finding a systematic town solution, which has been transformed from an anthropocentric founding of the historical town into a system that meets human needs, while also takes into account the vegetative and animal world.

More detailed description of each phase of the work is going to be described in a chapters dealing with the analytical concepts and their results.

---

[55] Digitalisation and georeferencing is conducted for superpositioning purpose in order to gain a comparative analysis of researched cities.

4   RESULTS: RESEARCH OF DEVELOPMENT OF OPEN AREAS OF FOUR MEDITERRANEAN CITIES ON THE CROATIAN COAST

4.1   ANALYTICAL APPROACH

In studying the investigated cities, analyses have been done through stages of historical development. During the analytical process, the urban structure was observed as a complete entity in order to provide a better understanding of the relationship between built and open fabric, including the relationship of the surrounding landscape. As the immediate area of research is open urban spaces, particular attention is given to them, meaning their position, the relationships and patterns created, social significance, and (if any exist), their ecological value. In perceiving them, they were often segregated as a separate layer within the city, while the city itself was viewed as negative; in order to better highlight the urban open areas. Furthermore, a comparison is carried out between the four investigated cities to identify similarities and differences.

4.1.1   Criteria for selecting investigated towns

The basic criteria for selecting the investigated cities were their position on the Adriatic coast, and the historical origin and development of the cities, for the purpose of making better comparisons between them. Therefore, the selected cities were Rijeka, Zadar, Split and Dubrovnik, as all have their roots in Antique times. This provided the opportunity to compare historical periods and establish a causal link to the development open urban space, and the creation a green system of the contemporary city. As the studied cities most often experienced peak of development in different historical periods, this provided the opportunity of making comparisons and finally conclusions.

The variance in geomorphologic basis created various hinterland regions of the urban spaces, hence a comparative analysis gives information essential for understanding the dynamics between city and hinterland region (Rijeka and Dubrovnik along the mountain spaces, Split in a relatively flat space, while Zadar lies on an almost completely flat base). At the same time, the geomorphologic specifics of some examples divide the city space and subsequently hide important information in terms of the city's relationship towards such specifics.

4.1.2   Criteria for selecting areas that entered the analytical process

When composing the analytical works of cities, the analyses included those spatial elements that have a public character and are important for the whole city. At times, attention was directed also to certain private properties, which had in later periods become public places, and also those that define urbanism of a particular city section, possessing a potential to become spaces of public importance for the future. The criteria for creating specific analyses were described in the chapters describing the mentioned analyses.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.1.3   The operational procedure

The operational procedure consisted of an overview of accessible archived material, cartographic presentations (maps) of cities through the studied historical periods,[1] and associated literature. This procedure is important in order to emphasise that the maps are digitised in software supported by Auto Cad, where they are also georeferenced so that they might be superimposed with all other historical layers aimed at making comparisons.

For the analysis of the present state of the investigated cities, a comparison was carried out using digitised maps utilising aerial and satellite imagery for acquiring a better interpretation. For this purpose, some of the information is verified in the General Urban Plan (GUP) of the cities, and additional checks have been undertaken in consultation with local experts. When treating each city, data was verified on site.

4.2   AN ANALYSIS OF DEVELOPMENT OF THE INVESTIGATED CITIES THROUGH HISTORY

4.2.1   The Roman Times

4.2.1.1   The social and economic situation

The Roman authorities on the Croatian coast in the first century established a number of cities and applying the status of colony and the municipality to them. The centre of the province of Illyricum (later the province of Dalmatia) was Salona.[2] Some of the investigated urban centres in this period became cities, which in the first century B.C., a pre-Roman settlement grows to become Jadera, the centre of the Roman municipality[3] (Suić, 2003). In the same century, Illyrian settlements become urbanised and develop into Tarsatica possessing the status of municipal autonomy (Blečić, 2001). Recent research has shown that during Antique times, Dubrovnik was also probably a settlement[4] (Peković, 1998; Žile, 1997). Given that there is not enough evidence about the type of settlement and its spatial organisation including date of origin, we cannot say for sure what the position of it was during the ancient period. Unlike the other cities investigated, during this period Split was the palace of Roman Emperor Aurelius Valerius Diocletian, which was built in the period between the 295 and 305 B.C.

The investigated cities were not the centre of the province, but were instead smaller urban centres. During whole period of its existence, Jadera was a small Roman town of about 10,000 inhabitants, an important seaport, both heavily tied to its agricultural land on

---

[1] At time, the boundaries of these maps were reduced, i.e. limited, hence some maps do not show the suburban areas.

[2] Suić states that Salona had 50,000 - 60,000 inhabitants (Suić, 2003).

[3] Jadera was the Roman name for the city of Zadar, which later acquired the status of a Roman colony.

[4] Recently, archaeological findings have been uncovered proving that trade took place at today's location of Dubrovnik - coins from the second and third century B.C. were discovered including tombstones (Žile, 1997). As prior to the discovering of the rudder, stone rows were used for rowing, natural sandy coves were needed as ports. One such port could have been Dubrovnik (Suić, 2003; Peković, 1998; Žile, 1997).

account of its important industries being viticulture, olive-growing, grain production, animal husbandry, fishery and shipbuilding (Suić, 2003).

Tarsatica was, in the beginning of its existence, a traffic and trade centre, but during the Roman rule developed from a civilian to a military centre, and from the third to the fifth century, became a significant location with defensive bulwarks built to defend Italy (Novak, 2009; Matejčić 2000).

4.2.1.2 Structural characteristics of investigated settlements with on overview of the relationship between constructed and open areas

Unlike Tarsatica, the structural characteristics of Jadera are much easier to determine because of the better exploration of space and the preservation of the Roman grid of Zadar peninsula in today's urban structure. Given the fact that the centre of the colony or metropolitan municipality was protected by a city wall, it also surrounded Jadera. The city area itself was divided on the principle of *cardo* and *decumanus*, thus forming a network in which *insulae* (blocks) were situated, measuring some 45x25m (see Figure .53). This will define the relationship between open and constructed urban areas that possessed a regular structure. Since the concept of the city was formed (after the city wall) by the establishment of these main streets, it is evident that the open area of the city was the basis for the formation of constructed urban fabric. Hence, they are an important determinant of the urbanism in Jadera. City functions important for urban life (shown in Figure 55) were the Capitoline with it temple, located in the city centre and thus differing from the typical Roman conception of urban space, since it was displaced to the northern half of the city territory. This situation stemmed from a cultic place and shrines of the pre-Roman period, which suggests Roman adaptation of inherited traditions. It was raised 1.8 metres above the forum and thus dominating the rest of the settlement, which was more or less straight or flat (Suić, 2003.). This meant that the position of the forum was shifted position and was not located at the intersection of the *cardo maximus* and *decumanus maximus*, but instead the main streets just touched it, presenting a clear view of Roman practicality that is particularly evident in the flexible adaptation of its existing spatial realities. Three forums were reached via the *decumanus*, of which the main forum was a direct link to the city gates, while *cardo* linked the square to the *emporium*. [5] As earlier settlements developed alongside the former cult place, the role of the city centre was superseded by the forum Capitoline. Thus, they (along with the city's main streets) important spatial elements that have defined other constructed urban fabric. The forum had a regular shape and pronounced spatial edges, and utilising the dominating matrix of the city, posed a determinant of urban space in a structural and social sense. Its elongation is probably derived from the direction of the natural structure of the peninsula, the basis that has generated other divisions of urban space, which are designed by a clearly defined relationship between the open and constructed urban areas (defined primarily by the forum and the main street). The edge of the forum was a two-storey portico for which Mumford said originated for the purpose of observing numerous events (Mumford, 1988). Around the forum, from the northern and southern sides were basilicas, curia and shrines, while the *tabernae* were located on the northern and eastern side of the square. In addition, besides the main forum, in Jadera there was the emporium - a specialized economic forum

---

[5] *Emporium* je gospodarski trg. *Emporium* is the business square.

83

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

(market), located along the harbour on the northern side of the peninsula. It is thought that the theatre and the baths were the site of the present church of St. Mary, in close proximity to the main urban square. The amphitheatre was outside of the city walls at the site of the Venetian castle (Suić, 1981). The division of urban space in Jadera does not match centuriation because between them there is a certain shift amounting to a few degrees (see Figure 54) (Suić, 2003). A similar shift occurs in the case of the Diocletian's Palace, because its division does not coincide with the surrounding centuriation of the agricultural land. This shows that despite the strong religious beliefs, rigorous Roman division of space nonetheless created shifts due to the adherence to natural specifics of a given space.

Due to the fact the whole area of Tarsatica has not yet been investigated, it is impossible to speak with certainty about its structural characteristics. Matejčić (2000) notes that Tarsatica could not develop properly as only a part of it was situated on flat land. She argues that it deviated from the classical scheme, because there was no possibility for developing an abstract rectangular Roman city with regular *insulae*, hence the urban fabric was determined by the terrain forming a long *insula* on both sides of the main routes directed towards the port. This assumption prescribes that the transport communication line is the embryo of an urban settlement, showing that the open urban space is defined by the constructed fabric. Blečić (2001) and Novak (2009) agree that perhaps the settlement in the beginning had more regular features, as they talk about the regular Roman divisions of space into *insulae* (30x15m or 22.5x15m). Matejčić (2000) and Novak (2009) state that during the third century, the city was fortified by a polygonal fortress with a defensive role on account of invasions barbarian by Barbarians.[6] The shape of the wall certainly originated for adapting to the topographic base, and again moving away from the customs of Roman construction. During this same period, onto the urban fabric the Principium of Alpine claustrum is superimposed as a space intended for military purposes, established according to the canons of military construction, and located in the centre of the settlement. Although studies have shown that at the intersection of the *cardo* and *decumanus* there was a structure afforded privileges in urban planimetry, there is no evidence of the existence of the forum in such a position. Alongside the *decumanus, taberne* were located, and it extended towards the bathes (along the Lešnjak tributary) and the basilica on the east side of town (Novak, 2009). Novak (2009) presumes that here lay and urban forum (see Figure 55). If indeed this is so, then the forum (as in many other Roman examples) was located as close as possible to port situated at Rječina.[7] The port was a façade of old Tarsaticas, which generated the lines of *cardo*, side streets, with contours that are today still visible transversals running through the urban fabric (Matejčić, 1988, 2000). Given that the city space defined by the streets which stem from the port foreshore (an open urban space), it is evident that the constructed space of the urban fabric of Tarsatica defined by open urban elements, creating a strictly definite relationship of architectural volumes and open cells.

Diocletian's Palace was perhaps not so important because during the Roman era it was in privately owned, but given the fact that in the Middle Ages it became a city, its formal and social characteristics will become guidelines for the development of Split. As a palace, it already has the essential elements of an Antique city, including that of a fortified military

---

[6] To je vrijeme pretvaranja Tarsatice u vojno središte (Novak, 2009.) This was the time of transforming Tarsatica into a military centre (Novak, 2009).
[7] Since this position of the forum is very likely, it is used in the analysis of the city space of Tarsatica.

camp (*castrum*) and luxurious villas (*villa*). Thus, in a rigorous manner, through its regular layout it reproduces the idea of the Antique city of Urbs Quadrata. Diocletian's Palace clearly distinguishes an internal hierarchy of urban space in a way palace ordinarily did not possess. Its *decumanus* therefore, flows from east to west, dividing the whole complex into the two larger entities (see Figure 53). Therefore, (as planned constructed city) the spatially dominant square and the religious space[8] are distinguished from other spaces that served as a military space. As the line *cardo* is intersected beneath *decumanus*, the villa model approaches the form of a *castrum*, because in cities it is not intersected, but extends to the perimeter. Given that porticos along the street facades were a feature of urban spaces, the palace was a complex possessing urban character prior to its evolving into a town (Suić, 2003). The above it is evident that in the strict link between constructed and open urban spaces an important role was assumed by streets. On the southern side of the wall this is a wall opened by a criptoportico to provide views of the sea, providing it with the form of a palace. At the meeting point of the *cardo* and *decumanus* there was a peristyle, which provided a passage into the imperial chamber (see Figure 55). Located on the western side were the temples and cult buildings, while on the east side was Diocletian's mausoleum (Marasović, 1997). According to this differentiation of space, it is evident that the peristyle and the main streets possessed more of a higher public character than that embodied by other areas of the palace.

Kečkemet (1994) considers that within the palace were gardens, while Grgurević (2002) thinks that the only green spaces were the green areas of the Split Field, used often for walks by Diocletian and his family. Therefore, even though the Roman town was clearly separated from the surrounding landscape, it was not however dislocated from it, meaning that us Romans used green spaces outside of the urban complexes, staying in the Roman gardens or out in the nearby countryside. This shows that the relationship between the city and its hinterland region was very close and mutually inseparable.

---

[8] At the city, this line distinguishes the area of the forum and captoline.

85

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.1.3 Presentation of the structural characteristics of a Roman settlement

Jadera   Tarsatica   Diocleatian's palace

Figure 53. Main streets of the investigated settlement Jadera (Suić, 1996:375), Tarsatica (Novak, 2009: 193), Diocleatian's palace (Marasović, 1997: 39)
Slika 53. Prikaz glavnih ulic raziskovanih naselij (Suić, 1996:375), Tarsatica (Novak, 2009: 193), Diocleatian's palace (Marasović, 1997: 39)

Jadera   Diocleatian's palace

No data on centuration of the Tarsatica surroundings

Figure 54. Difference between division of city and centuration Jadera (Suić, 1996:363) and Diocleatian's palace (Suić, 1996:363)
Slika 54. Prikaz zamika razdelitve mesta in centuriacije Jadera (Suić, 1996:363) in Dioklecijanova palača (Suić, 1996:363)

Jadera

Tarsatica

Diocleatian's palace

emporij

amfiteatar

kapitolij   forum   teatar
                      terme

forum

terme
bazilika

vestibul
perisil
mauzolej
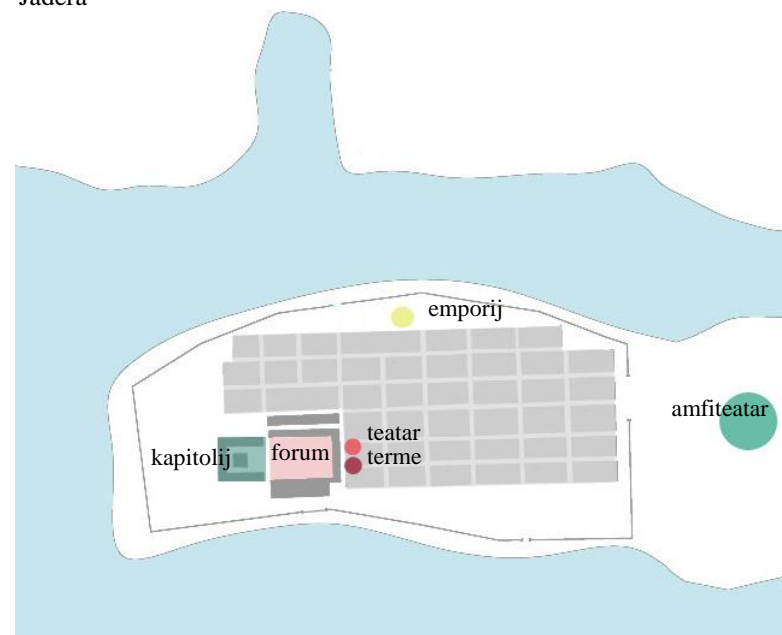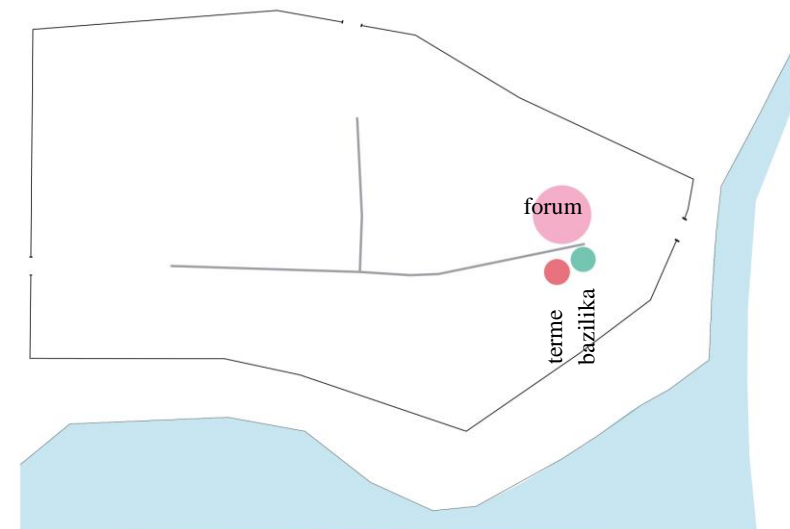
Figure 55. Settlement functions
Slika 55. Prikaz funkcij naselij

Jadera

Tarsatica

Diocleatian's palace
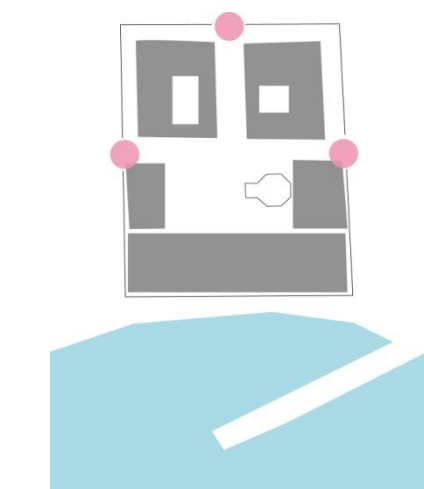
Figure 56. Entries into the settlement
Slika 56. Prikaz vhodov v naselja

Jadera

Tarsatica

Diocleatian's palace
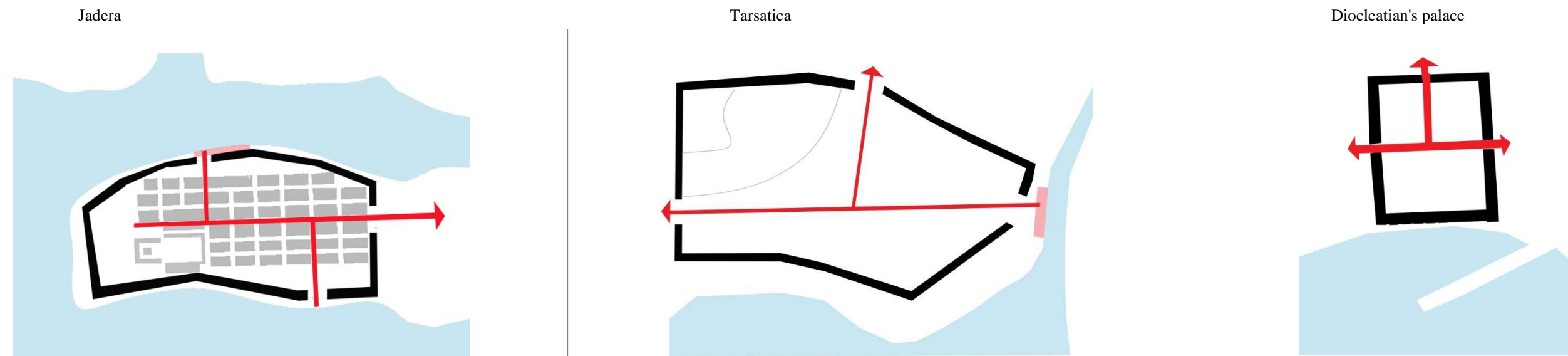
Figure 57. Main communication routes in city
Slika 57. Prikaz glavnih komunikacijskih smeri v mestu

4.2.1.4 Open spaces in settlements

These were the city's streets, forums, the Capitoline area, private courtyards and intervalum. The city's main street (*cardo maximus*, *decumanus maximus*) had stores and workshops (*taberna*) with city life taking place in them on all day. Most important was the town forum, an urban space in which most of the functions took place, urban space that would later possess a green system intrinsic of the contemporary city.

Decumanus in the Jadera linked the forum to the main land entrance leading to the city, and *cardo* with the port. We know for certain that in Tarsatica, the *decumanus* passed through the city centre and ended up in the port, with this line perhaps passing through the forum. (Figure53). The City forum has had numerous roles in the life of a Roman city, and for that reason, it wa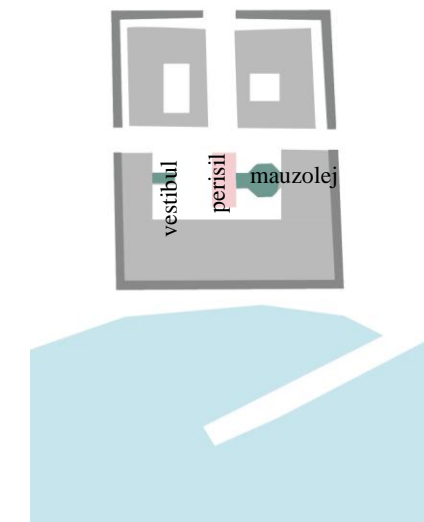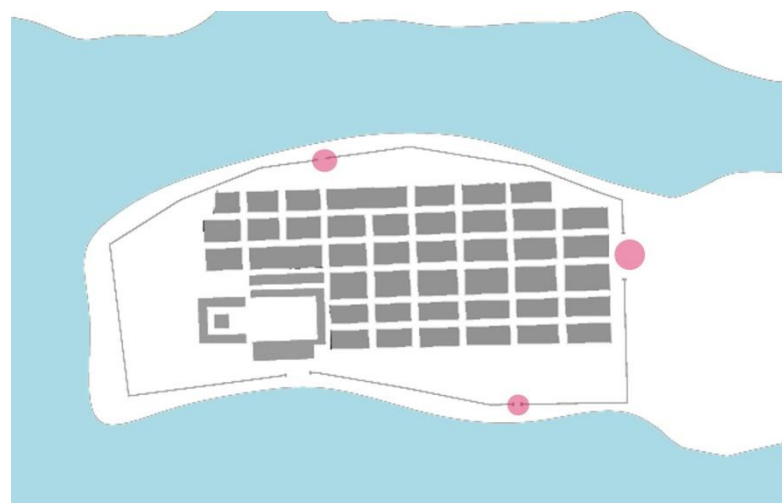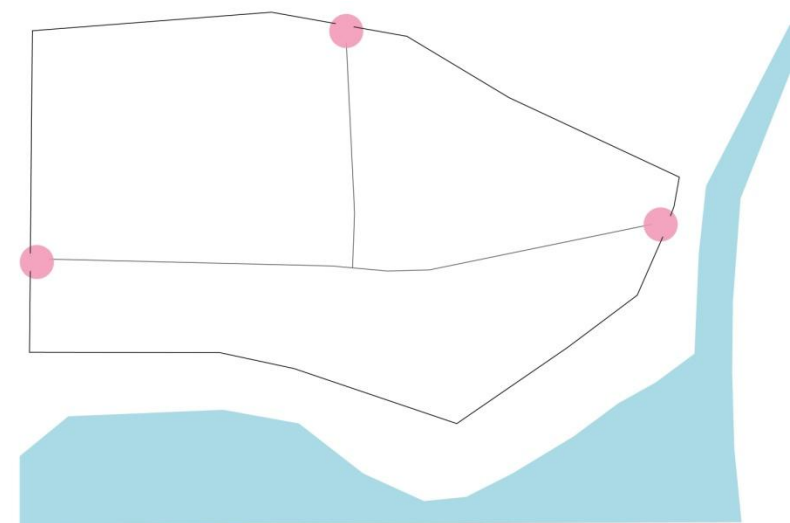s the most important open urban space (Suić, 2003). A less dramatic life took place on other streets, and Mumford notes that the Roman city walls were also used for taking walks during the day (Mumford, 1988). In Jadera, adjacent to the forum was the Capitoline, theatre and baths, while in Tarsatica, adjacent to the forum were probably basilicas and baths. Thus, the functions covering entertainment, events, spiritual and religious ceremonies were united in it, and served (as in other Roman cities), for political and legislative purposes. The investigated examples show that the forum was shifted from its central position in the city (Jadera, Tarsatica), but still represented the most important gravitational point of the city that defined the urbanism, and the relationship between open and constructed urban areas (Figure 58). As in the example of Zadar suggesting that it was tied to a former cult space used by the city's previous inhabitants, we can conclude that the effective role of this open urban space perhaps the most important and oldest point in the settlement. The open space of the square was very significant as the focal point for all types of settlements, and was an integral part of the *castrum* (military barracks). Therefore, this kind of forum was located within the Principium of Tarsatica (military camp). Here, it is evident how important the forum was for the life of every Roman settlement.

All of the squares in Roman cities were sheltered from the wind (strong gusts and southerly winds) by the protection provided from surrounding buildings. For protection against the summer sun, colonnades were probably used. For this reason, we can conclude that they were sustainable areas providing anthropocentric meaning. The edges of investigated Roman complexes complied with the Roman principles, and the boundary of the city or the palace sharply separates them from the surrounding area because of its wall-shape. This clear boundary of the city limits is regular in the case of Jadera and Diocletian's palace, whereas for Tarsatica due to the irregular topographic base, it was also irregular in nature. The phenomenon of irregularity in the Roman era is significant, because the creation of a regular city was a religious ritual, which has its own symbolic significance. Therefore, we can conclude that even in such cases, Romans adapted to the natural circumstances or limitations of space, without altering the natural resources even on account of cultic beliefs. This shows that they did not sacrifice space nor for the sake of retaining a vision of an ideal city. Given that the constructed city wall was used for entertainment in more peaceful times, it had multiple roles for the citizens (it closed the space for defensive purposes, created a residence zone in the city during more peaceful times, and it was also connected to the surrounding space).

4.2.1.5 Presentation and analysis of open spaces in Roman settlements

Jadera

Tarsatica

Diocleatian's palace

Fugure 58. Position of forum in settlement
Slika 58. Položaj foruma v naselju

■ Most intensively used open spaces

■ Intensively used spaces

■ Less intensively used open spaces
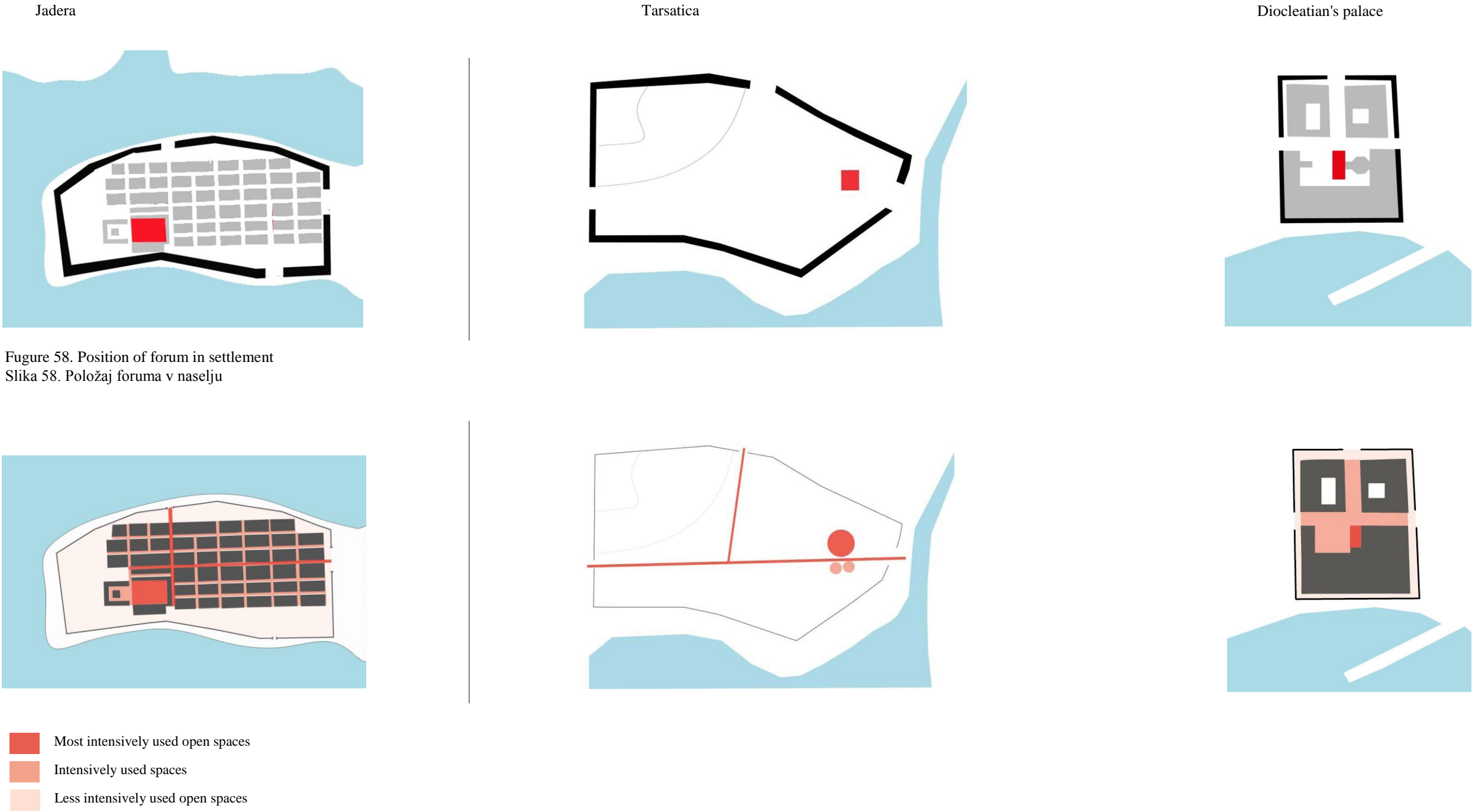
Figure 59. Intensity of use of open public spaces (criteria formed on basis of citations in reserached literature)
Slika 59. Intenziteta uporabe odprtih javnih površin (merila so nastala po navedbah iz uporabljene literature)

4.2.1.6 Relationship of the city towards its hinterland region

It has already been said that the Roman settlement had a strictly defined relationship to the surrounding landscape, because it was separate from the wall (see Figures 60, 61 and 62). However, given that the structure of division of the investigated settlements (Jadera and Diocletian's Palace) and the surrounding agricultural area are tied in some way (though with some delay), they are all structurally related. This connection is evident in the functional sense, because life in the village and outside it is not separate. The surrounding area of the ager or natural landscapes, meant that the city inhabitants often used it for walks. Rural populations often used urban functions, and their routes of their movements were usually centuriation lines, and marked by Roman paths (Suić, 2003). This testifies that the relationship between the surrounding city space and the city centre were close, with the Romans treating the surrounding area with respect (evident in the above mentioned adaption of the forms of Tarsatica to natural topography). This occurred in most Roman cities which were far from licentious Rome.

Figure 60. Relationship with the surrounding landscape, Jadera
Slika 60. Odnos antičnega mesta do zaledja, Jadera
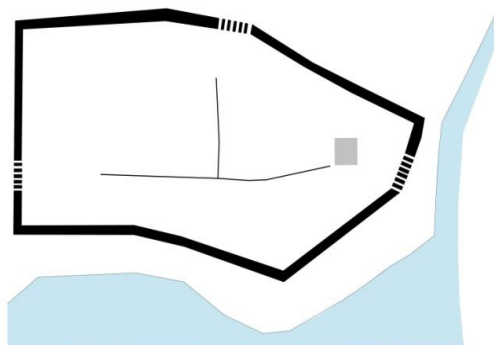
Figure 61. Relationship with the surrounding landscape, Tarsatica
Slika 61. Odnos antičnega mesta do zaledja, Tarsatica
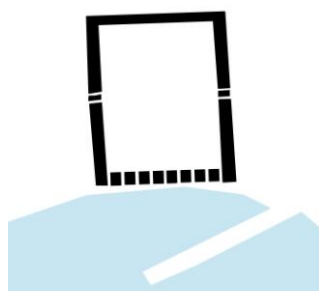
Figure 62. Relationship with the surrounding landscape, Diocletian's palace
Slika 62. Odnos antičnega mesta do zaledja, Dioklecijanova palača

4.2.2   The Middle Ages

4.2.2.1   The social and economic situation

The Middle Ages were characterised by frequent rampaging barbarians, so in this situation, the investigated Roman cities on the Croatian coast were looked at (among other things, these kinds of events cause a stagnation in the economy)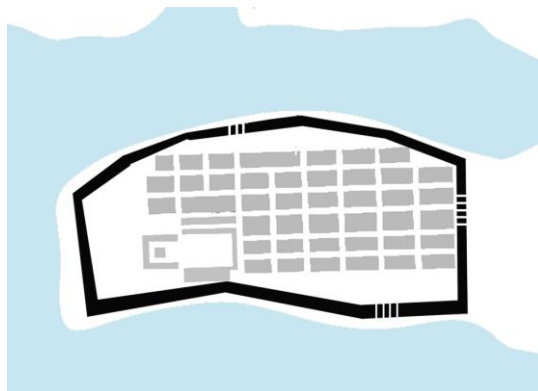. The biggest attacks occurred during the seventh century, when big changes happened in all the investigated settlements. Tarsatica did not survive the Avar-Slavic attacks due to lack of able-bodied people who could defend it.[9] However, some of the Slavs stopped near Tarsatica, and taking advantage of the ruins on the hill above the city, founded the settlement of Trsat[10] (Klen, 1988). Neither did Salona survive the attacks, so a part of the population, with permission from Byzantine authority, settled in Diocletian's palace. In this way, the palace is gradually transformed into a medieval town receiving a Latin name Spalatum (Marasović, 1997; Muljačić, 1958). At the today's location of Dubrovnik, without a doubt a settlement existed before the invasion of Barbarians at Epidaurus, but it is first mentioned as a town in Dalmatia in the 7th century. In it, refugees arrived from devastated Epidaurus (Cavtat), thus transferring with them their urbanity (Suić, 2003). Of the cities studied, Zadar was the only city to resist the attacks of barbarians, and it urban life was never interrupted[11] (Novak, G. 1965), therefore it take over the role of the administrative centre of the Byzantine province of Dalmatia (Novak, M.1965). All the cities investigated in the early Middle Ages were under the Byzantine rule, except Slavic Trsat which in the Middle Ages was hard to conquer because it situated on a hill (only at a later period will become part of Rijeka). Cities on the Adriatic coast under Byzantine rule had greater freedom for development because they were far from central government (Planić Lončarić, 1980). Thus, Zadar, Split and Dubrovnik were free municipalities with special rights granted to them on account of their autonomy (Klaić and Petricioli, 1976; Marasović, 1997). They managed to retain their autonomy under Croatian-Hungarian rule and occasionally under Venetian rule, thereby substantially differing from European cities that received a certain degree of autonomy only in the period from the 11th to the 14th century as mentioned by Zucker (1973) and Mumford (1988).

The composition of the population in Dalmatian cities in the early Middle Ages was of Roman origin, and they were like islands in nearby rural areas inhabited by the Slavs. In time, the animosity between them decreased, and as both depended on each other (Slavs were engaged in animal husbandry and agriculture, the Romans were involved in the crafts and maritime activities), they establish between each other trade links. Furthermore, the conversion of the Slavs to Christianity was the reason for their rapid infiltration of Roman cities (Marasović, 1997; Novak, G. 1965).

In the ninth century, Croatian state was founded near Split. In the year 923, The Croatian Prince Trpimir gained from the Byzantium the right of supreme supervision of Dalmatian

---

[9] It has not been exactly determined when Rijeka was razed. Some authors state that it happened in the fifth century, others are of the opinion that it happened in the seventh century. Other though hold that it may have been razed in a series of attacks (Klen, 1988).

[10] The original name of the settlement was Trsat, which was taken from the Roman name for Rijeka. The abbreviated version became the name Trsat (Klen, 1988).

[11] It was not the only city on the Adriatic coast which represented this phenomenon, since a number of them continued with urban life under the protection of the Byzantine.

towns, including over the investigated urban settlements of Split and Zadar, whereby in the 11th century they came under the sovereignty of the Croatian state (Marasović, 1997). Next, a strong infiltration of the Croatian population from the hinterland areas moved into the cities (Novak G., 1965). The city of Zadar is an example of an extremely rapid mixing of Croats with the Roman population. This was contributed by the fact that Croatian nobility were able retain their titles after relocating, so assimilation was not an obstacle (Klaić and Petricioli, 1976).

Since the Dalmatian cities (Zadar and Split in the Croatian part of the Hungarian Kingdom) from the 12th century receive the status Mediterranean communes, they could exercise a certain freedom, which gave them the opportunity to develop, leading to an era of prosperity. Having received the statutes social and legal issues were stipulated. This is reflected also in the city area, because it develops in accordance with the municipal provisions, which stipulate general medieval principles of planning and urban development (Benyovsky, 1999). Their economic development was based on shipping, trade and agriculture, developing in agricultural areas around cities (Marasović, 1997; Cvitanić, 1985; Novak, G., 1965). Although Venice had earlier conquered Zadar temporarily, Dalmatia (without Dubrovnik) will become part of its dominion not until 1409, which will determine the course of its development (Graovac, 2004).

Dubrovnik is located in a slightly different position from other parts of Dalmatia, since it remained under Byzantium rule until its fall. At the end of the 10th century, it successfully endeavoured for the establishment of an archdiocese, and thereby became ecclesiastically autonomous from Split (Beritić, 1958; Milinović, 1997). As it started to develop trade links within the Byzantine Empire and the rest of Apulia, Sicily and Venice, it developed faster than other parts of the coast (Planić Lončarić, 1980). Dubrovnik therefore, was highly developed in terms of commerce, maritime travel and shipbuilding (Peković, 1998). After the fall of Byzantium Empire in 1205, city came under Venetian rule that lasted until 1358, but had during that time managed to preserve its autonomy, for which it paid a tax (Milinović, 1997). As in the 12th century, Dubrovnik gained the status of a commune, and in 1272 the Statute of Dubrovnik was established, which guided the city's ongoing development. [12] While developing trade and making special arrangements with the Bosnian hinterland, Serbia and many Italian cities, Dubrovnik ensures its traders a privileged position (Ravančić, 2000). An affluent class evolved from the population, the nobility (*nobiles cives*) and a class of commoners (merchants, captains, scribes), while in the surrounding areas lived serfs, i.e. peasants. Since the 13th and 14th century, they purchased surrounding areas, Dubrovnik expanded the territory under its rule. This created the basis for the intensive development of the urban fabric. In 1358, it became part of the Hungarian-Croatian Kingdom, but successful diplomacy enabled to retain its autonomy. Thus, after the death of Louis I in 1380, it gained independence as the independent Republic of Dubrovnik.

The Rijeka region during the Middle Ages did not share the same fate with the other investigated cities, because it was not until the 12th century that a bulwark and which the feudal castle of the Devonac alongside Tarsatica was to be built. Around it, people seeking protection from the surroundings migrated (similar situations in European medieval cities mentioned by Mumford (1988)), so it was that during the 13th century the feudal 'upper

---

[12] Prelog (1987) says that the Statute of Dubrovnik was the most detailed of all Dalmatian Statutes.

93

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

city of St. Vida' was established, and the common lower town of Rika along the Rječina (Flumen sancti Viti) (Klen, 1988; Margetić, 2007). At the same time, Venice became stronger dominating the Adriatic, hindering the development of trade and transport of goods, hence Rijeka becomes heavily dependent on its limited hinterland space. At that time, Rijeka's chief industries were animal husbandry, poor farming and fishing. Along Rijeka, on the hills overlooking the town, the settlement Trsat is already mentioned. Although the inhabitants of both settlements are Croats, Rijeka is located in an area of the German Empire, whereas Trsat remained part of the Croatian-Hungarian Empire, resulting in demarcation line between them. During later development, these two settlements will unite. In the 14th century, Rijeka becomes part of the possession of the Walsee family, which beings to develop the area (Klen, 1988; Matejčić, 1988).

Throughout these events, it is evident that the investigated cities experienced different developments that determined the characteristics of the urban space, but it is significant that all of them, though for different reasons, had a close relationship with their hinterland regions.

4.2.2.1   Structural characteristics of the investigated settlements with an overview of the relationship between built and open areas

Zadar represents one of the rare world examples of urban space without interruption of urban life, and it was one of the few mainland towns on the Adriatic coast, where barbarian attacks did not destroy its walls, meaning that it remained tied to its ager, which fed it (Klaić and Petricioli, 1976). Split is specific because it developed into a city from a Roman palace and received a new urban population from Salona. This kind of development of the cities did not coincide with the already mentioned divisions in the development of medieval cities, mentioned by other authors Zucker (1973) and Mumford (1988), so Zadar and Split are exceptions. Since Rijeka was destroyed, it experienced an interruption in its urban development, hence its new beginning commenced thanks to the construction of the feudal castle. Its ongoing development is in line with numerous examples of such cities in Europe mentioned by Mumford (1988). In this case, the citadel developed into the once fabric of Tarsatica, and on its surface a new medieval settlement rose. At the same time, another village at the top of the hill above Rijeka was founded, an additional core of urban development (Klen, 1988). Dubrovnik and Split are filled with new inhabitants from Epidaurus, and perhaps it was only in this period that it developed like city because in the 9th century it was called *civitas*,[13] and was mentioned by Porphyrogenitus (*civitas Ragusa*) (Peković, 1998). Through regulation of space, it became a planned medieval urban space, but still differed from the planned European cities that Morris (1994) and Zucker (1973) mention, because they talk about completely new settlements.

Medieval opportunities on the Adriatic coast were also characterised by uncertainty which created a necessity for the existence of city walls, and equally so all the cities investigated had developed fortification systems (see Figures 67, 68, 69 and 70). Around the walls, a moat was excavated filled with seawater, [14] however an exception is the Split defence system, built without a moat. Thanks to the preservation of the ancient fortification systems, Zadar and Split retained their existing inhabitants from the Antique buildings in

---

[13] *Civitas* were medieval cities acting as dioceses centres (Margetić, 2007).
[14] In Zadar, the Venetians constructed the moat Fossa only later in the 15th century (Petricioli, 1959).

its city limits, but also attracted new inhabitants (Milić, 1990). Later, the walls were extended, modified or simply the urban perimeter was extended (Split and Dubrovnik) and subsequently include new parts of the city. Dubrovnik built walls with every enlargement, incorporating the new part of the city into the perimeter of the existing city, gaining its final appearance in the 12th century and thereby encompassing the entire city (Marinović, 1959). Although it was mentioned that all of the cities had a close relationship with the surrounding landscape, the walls represented a clear and sharp demarcation of the surrounding area, although in the late Middle Ages, the construction of suburbs outside the walls meant that the transition to the surrounding landscape became more flexible.

The very structure of the urban fabric is also different, so the fabric of Zadar is less compacted[15] whereas Rijeka has also an unconstructed area within the city walls, that serve as an economic part of the settlement. As Zadar and Rijeka developed within the perimeter of the Antique urban scheme, during the Middle Ages they had enough room for their population. Split and Dubrovnik evolved from smaller nuclei from previous times, so their structure is marked by highly dense urban fabric. Thus, Split after filling its former palace (see Figure 62b), expanded beyond the walls and its suburb *burgos* will completely grow to become urban fabric during the 14th century, when the city becomes enclosed with new city walls (see Figure 62d) (Marasović, 1997; Sirišćević, 1958). Dubrovnik spread on six separate occasions so that the original sexteri in the area of Kaštel, in the area of St. Mary's, joins the sexteri of St. Peter, and in the third round the Pustijerna. After that, sexteri of St. Blaise is planned, which is followed by sexteri Prijeko (Beritić, 1958.; Peković, 1998). This shows that the relationship between the built and open urban areas due to the available areal development of the city. Where there was more space, the relationship is less dynamic to reduce the pressure on the open areas of the city.

Structural characteristics of medieval urban space in investigated cities are usually manifested in an irregular urban fabric, but this irregularity developed most often within a Roman division of space, evident in communication routes. Thus, streets, as forms of open urban spaces helped define urban structure, acting on the forms of constructed urban fabric. So it happens that they (along the squares) work to define the relationships between constructed and unconstructed urban areas, especially in the early Middle Ages, when they were more related to the regular Roman communication routes.

It is characteristic for all cities that development meant the preservation of the main communication routes, inherited from the previous period. In the case of Dubrovnik and Split, it extended into the newly expanded urban fabric of the original suburbs (in Dubrovnik in the first three phases of expansion from the 7th to 10th century, Split on two occasions from the 10th to 14th century) (Marinović, 1959; Beritić, 1958; Grgić, 2004; Muljačić, 1958; Sirišćević, 1958).

Zadar is the best example of preserved Roman orthogonal networks (Klaić and Petricioli, 1976) The urban fabric, and the irregularities were developed within a regular Roman division space and is reflected in the communication routes (see Figure 61b).

Roman division of space is evident in the example of Split, specifically in that part of city accommodating a Roman palace, particularly evident as the main communication routes were preserved if they were accompanied by an Antique aqueducts and sewer lines.

---

[15] Structures also had spacious yards, and decorative and utilitarian gardens, but their number fell as the city developed (Petricioli, 1991).

However, the development of the new city led to the creation of an urban fabric that was a real medieval labyrinth of newer roads (Milić, 1990). Some routes of the new sections of Split in turn are linked to the network of centauration present prior to the existence of the palace. This shows that elements of the surrounding landscape with the expansion of the city were incorporated into its urbanism.

The area of Rijeka City includes part of the visible routes *cardo* and *decumanus*, so this urban fabric has a somewhat more regular structure, while other parts of city possess an irregular organic character. Rijeka City experienced a higher density of construction along the harbour, and beyond that belt a zone was developed for a less densely constructed urban fabric. On the east and west sides of the constructed city there are places where no construction takes place, and which are subsequently used for industrial structures, pasture or arable land. The entire city is dominated by a citadel, utilised for gaining visibility of urban space for control purposes, and this is one of the reasons why the Roman division of space partially survived (according to the Klobučarić's picture) (Fig. 63.).

Milinović (1997) and Beritić (1958) mention that in the case of Dubrovnik, the canons of the Roman castrum in the oldest part of city are evident, leading to the revelation of *decumanus cardo* in the urban fabric (see Figure 64c). Dubrovnik is an exception to the other investigated cities because in the 13th century it developed in a planned manner. A proper plan of Dubrovnik is devised, which is regulated by the Dubrovnik Statutes, [16] meaning that all of the major elements of the town are relocated into the new planned section where new dominant urban communications occur. Thus, a planned fourth sexteria of St. Blaise followed the sexteria of Prijeko. Due to the fact that in 1296 a large part of the old city was burned down, it is reconstructed according to a regular plan. The entire city is an example of planned medieval urbanisation accompanied by considerable control over construction[17] (Marinović, 1959; Beritić 1958). The basic characteristic is the orthogonal communication network with a dense residential grid of blocks (Planić Lončarić, 1980). In the mid 14th century, Dubrovnik segregates a manufacturing zone from the city, which is relocated outside the of city walls, to the area of Pile (Šišić, 2003).

The City of Dubrovnik is an exception, because during Middle Ages, the urban fabric of other cities develop irregularly, typical for irregular urban areas mentioned by Zucker (1973) (with the except of a small part of Zadar, Babe i.e. today's Varoš, where spatial regulation was carried out most likely between the 10th and 13th century and is visible on the maps in the form of a comb) (Petricioli, 1959; Klaić and Petricioli, 1976).

In medieval urban structure there are certain elements that dominate. Consequently, in all the cities investigated, structures appear which are accents in the urban fabric (in the early Middle Ages, churches and feudal citadels, while in the late Middle Ages it was the town halls). Since the main city squares are linked to them, together they define the urban fabric. Thereby, they exert an impact on the relations of open and constructed areas of settlements conceived by the opening the urban fabric in a single (in the early Middle Ages) or two nuclei (in the late Middle Ages).[18]

---

[16] The Dubrovnik Statute was drawn up in 1272. The fifth book of the statute covers geographical, urbanistic and construction issues and regulations. The forty-first chapter presents the first regulation basis of the new section of a city called the *burgos*. A graphical presentation has not been preserved, but the text describes in detail the manner in which the new part of the city is to be developed.

[17] Control and supervision was carried out by the construction commission (Beritić, 1958).

[18] Treated in more detail in the following chapter.

96

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.2.3   Presentation of structural characteristics in the investigated cities in the Middle Ages

Jadera
63a

Medieval Zadar
63b

Remains of the Roman division in medieval Zadar
63c
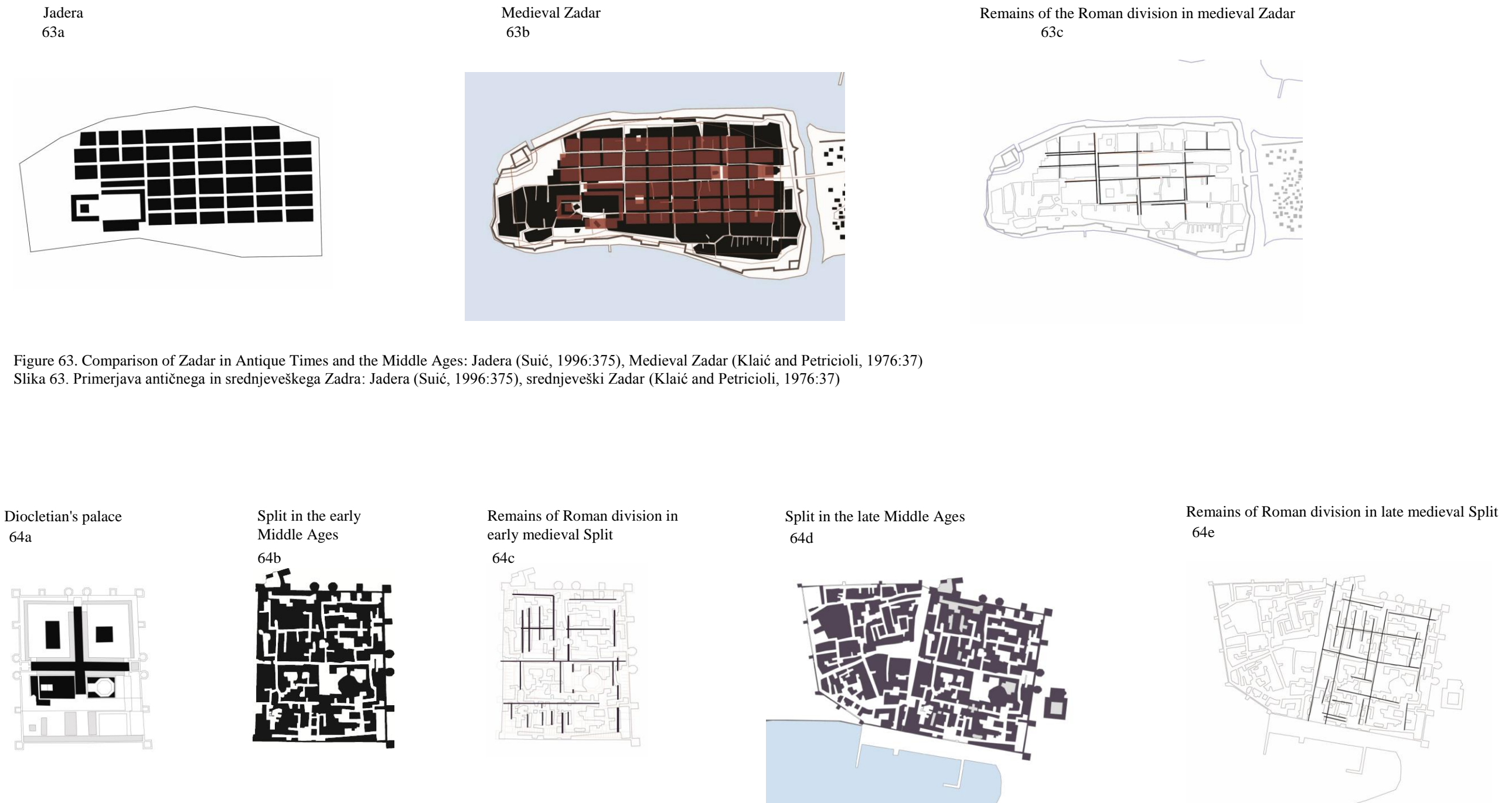
Figure 63. Comparison of Zadar in Antique Times and the Middle Ages: Jadera (Suić, 1996:375), Medieval Zadar (Klaić and Petricioli, 1976:37)
Slika 63. Primerjava antičnega in srednjeveškega Zadra: Jadera (Suić, 1996:375), srednjeveški Zadar (Klaić and Petricioli, 1976:37)

Diocletian's palace
64a

Split in the early
Middle Ages
64b

Remains of Roman division in
early medieval Split
64c

Split in the late Middle Ages
64d

Remains of Roman division in late medieval Split
64e

Figure 64. Comparison of ancient palaces with medieval Split: ancient palace (Marasović, 1997: 39), early medieval town (Marasović, 1997: 48), medieval town (Milić, 1995:421)
Slika 64. Primerjava antične palače s srednjeveškim Splitom: antična palača (Marasović, 1997: 39), zgodnje srednjeveško mesto (Marasović, 1997: 48), srednjeveško mesto (Milić, 1995:421)

97

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Presentation of Rijeka from 1579 (map by Ivan Klobučarić) showin same appearance as in the Middle Ages
65a
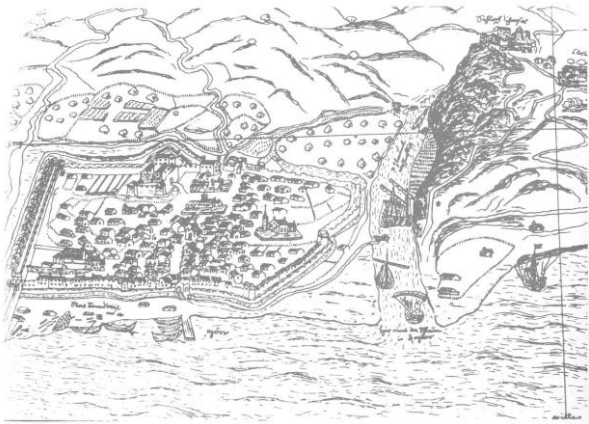
Remains of Roman division of space
65b
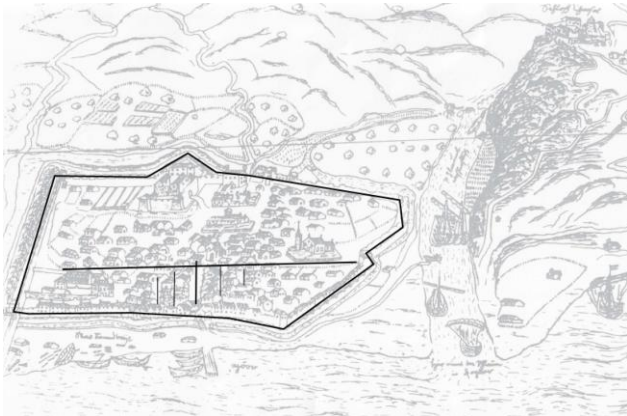
Remains of Roman division of space on a layout
65c
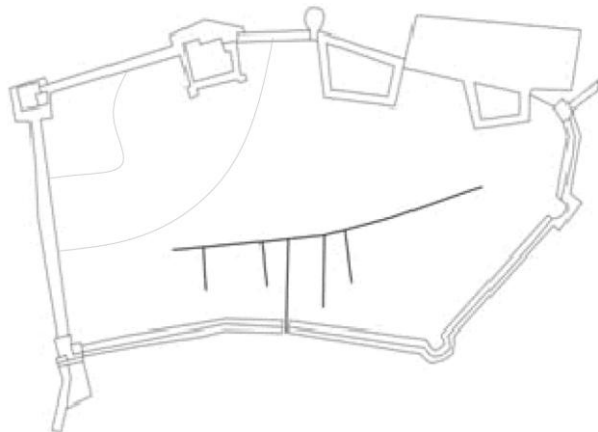
Figure 65. Rijeka and the remains of the lines from Antique Times (Najstariji ..., 2011.)
Slika 65. Prikaz Reke in ostankov linij iz antike (Najstariji ..., 2011.)

Antique settlement in the place of Dubrovnik (according to Beritić, Milinović)
66a

Dubrovnik in the late Middle Ages
66b

Remains of Roman division in the space of late Middle Ages
66c

Figure 66. Medieval Dubrovnik and remains from Antique Times (Beritić, 1958: 77)
Slika 66. Prikaz srednjeveškega Dubrovnika in antičnih ostankov (Beritić, 1958:77)

4.2.2.4 Open spaces

In the early Middle Ages, the former main public and open spaces of Roman origin, representing the main city square were inherited. In the late Middle Ages, the development of trade and the expansion of the city, led to the creation of new squares in the city, segregating the secular open and public areas of the town from those possessing a religious nature (see Figure 65). As in the earlier period, the squares in medieval towns determined the urban space in terms of a structural and social importance. The social importance of medieval squares, has already been mentioned in the chapter on the history city development, and analysing situational layouts of investigated cities has resulted in much collected data on their structure of the urban fabric of a city.

In the early Middle Ages, appearing on the surface of the forum in Jadera is the square of St. Luka (Petricioli, 1959), while from the peristyle of Diocletian's Palace in Split the central Split square is formed. In Rijeka, only with the development of settlements in the late Middle Ages at the location of the Tarsatica forum will a square finally develop. All these squares eventually become *parvisi*, since they originated next to churches. In Split and Zadar, the construction of religious buildings adjacent to the former square occurs quite early, with the conversion of the population to Christianity. Thus, as noted above, these two elements become dominant spatial determinants of the urban territory. So we have that in Zadar in the early Middle Ages on the site of the forum where Antique basilica and number of sacral structures were built (Cathedral of the Holy Trinity.[19] Cathedral of St. Anastasia, the Church of St. Luke) (Petricioli, 1959). In Split, Diocletian's mausoleum became a Christian church, which was subsequently converted into a cathedral, becoming the ecclesiastical centre of the bishops and archbishops of Salona. The ceaserian peristyle becomes the centre for the social, political and spiritual life of citizens (up to the emergence of the new town square) (Milić, 1990). On Klobučarić's picture using Rijeka as an example, it is evident that at the site of the presumed forum in front of the cathedral a square was formed, developing somewhat later than in Zadar and Split. In the late Middle Ages, Rijeka gets another *parvis* on the western side of city, in front of the Church of St. Jerome which developed together with the Augustinian monastery. In all of the three cities investigated, the examples show the same characteristics, thereby distancing themselves from Milić's claims that the sacral structures in Antique cities were often built outside of the location of practicing pagan culture (Milić, 1990). In the investigated cities, there is evidence of continuity in using the same places for religious functions, so it was that the open space continued to be the focal point of the city. However, in subsequent periods, new urban squares are formed which become important gravitational points as it develops alongside the town hall, lodge, and are used for the city's public pronouncements, proclamation of laws, and so on. This phenomenon of differentiating squares is typical for European cities of the late Middle Ages, which Sitte (1967) mentions. Thus, in the 14th century, in Zadar a new main city square, the *Platea magna* (large square) is formed in the eastern part of the city, alongside which the town hall and city lodge is built (Petricioli, 1959). As the communication routes of the one-time *decumanus* were a direct link to the mainland entrance into the city, it became the main gravitational point. In the 13th

---

[19] From the 15 century, Church of St. Donatus

99

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

century,[20] a new square possessing irregular formal characteristics appears in Split, the Plokata of St. Lawrence, located in the new part of the city, and later transformed into the People's Square (Muljačić, 1958; Grgić, 2005). It is associated with the opening of new city gates on the west, and also the closing the northern gates in Diocletian's Palace. It is located on the main communication route in an east-west direction, resulting from the extension of the *decumanus* axis of the palace into the new city. In Rijeka, besides the two *parvis* formed on the route of the former *decumanus* which linked entry points into the city in the Middle Ages, the main city square develops at the intersection of the *decumanus* route and *cardo*. Alongside it the town lodge was located, accommodating numerous city functions (Matejčić, 1988). [21] This square was an important gravitation point, as it was on the communication route that linked the mainland and the maritime entrance into the city. As opposed to them, during its expanding on six occasions, Dubrovnik changed the position of the main sacral structure four times, so it is presumable that it also changed the position of the main square - *parvis*. The original centre of the oldest part of the settlement was the Church of St. Sergius and Bacchus, which probably had a square in front of the building. With the expansion of settlements, a new sexteria of St. Peter was formed, with the centre being the Church of St. Peter which became the city's main church, so one can presume that the main city square was relocated there (Beritić, 1958; Peković, 1998; Marinović, 1959). The third sexteria Pustijerna was constructed in the early Middle Ages, meaning that the main church in the settlement was relocated to its position, because the Church of St. Stephan was being built, which probably imposed conditions on the location of the main town *parvis* (Beritić 1958). By creating a calmer political situation and receiving the status of an archdiocese, Dubrovnik commences with the construction of a cathedral outside the city walls (Beritić, 1958; Peković, 1998). Thus, the centre of city life is transferred, taking into account that within the scope of the then fortified space there is not enough space. In this location, a suburb emerges (in what is today's Gundulić's paddock) will be developed into a fourth sexteria in which period during the 11th century the maritime channels are filled (Marinović, 1959; Beritić, 1958). With the development of other sexteria the cathedral remains in the same place. [22] Between the cathedral, the Kneževev dvor, the town hall, the arsenal and the port gates, the most important city square is located - *platea communis,* which retains this role until the filling of the Placa, i.e. Stradun (Planic Lončarić, 1990). This example demonstrates just how Dubrovnik found itself in a specific situation, keeping in mind the concentration of major secular and sacral sites in the small town area. This created an elongated urban space of a central city square (*platea communis*), which was linked to the cathedral's *parvis* (forming a continuous zone). The *platea communis* following construction of the Church of St. Blaise and Stradun (i.e. the main street) in the 14th century is linked to this space. With the construction of Stradun (Placa), it becomes a new strong gravitational zone in the city, but it linked to existing squares, creating a continuity of open space. In front of the Church of St. Blaise, there is an open market and municipal lodge, so at the end of the Middle Ages it was an intensively used city area, representing the most important gravitational point in the open urban areas

---

[20] In the presentation of Split from the 11th century by Tomislav Marasović, it is evident that at the respective location there had already existed an empty space.

[21] The exact location of the city lodge is not know, but it is presumed that it was to the right of the square (Matejčić, 1988).

[22] With the construction of the Church of St. Blaise in the 14th century, the cult of St. Blaise moved from the cathedral, hence another central structure was constructed, i.e. an important gravitational point with its square.

100

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

(as is evident from the description of Gervais in the 15th century). The city streets were an important space in the urban life of a medieval settlement, and in Dubrovnik at the end of the 13th century, they had high standards of living, due to the earlier implementation of an underground sewage system[23] (Beritić, 1958).

Based on what has been said above, evidently the location of medieval squares was linked to important gravitational points back in Antique times (see Figure 66). Communication routes set in Antique times were the determinants used for positioning also the new city square, which occurs in the later Middle Ages (an exception is Dubrovnik, which with the development of a planned city, distanced itself from the centre of the former settlement). This shows that important route from the previous period were usually preserved as the backbone of the space in the Middle Ages, and therefore generating the origin of new gravitation points, and the relationship between open and constructed areas. Dubrovnik, however, shows an interesting characteristic of open spaces that occur in continuity. While for the other cities, fragmentation is characteristic of open public areas, in Dubrovnik the connecting of squares occurs, and the new square links onto the already existing zone. This form of development in open areas is characteristic of later periods, while it emerged Dubrovnik probably due to the limited areas possessing flat terrain within the city area (because then, the most valuable areas were used as open public areas).

People were, in addition to the mentioned squares, also probably occupied the area next to the city cisterns, as discovered in all of the investigated cities. All of the squares spaces closed with structures that provided protection against strong winds, and again streets leading to the location provided ventilation. This shows that they greatly influenced the relationship towards the constructed urban fabric. The existence of the porticos provided shelter from the sun, thus creating sustainable ecological spaces in an anthropocentric sense. In addition to the streets and squares, medieval walls as was the case in antiquity, were used for walks and stays in the open in more peaceful times.

The cities of the early Middle Ages possessed a very closed character, as it was a period of frequent attacks mostly directed against the inner urban space. The port in the medieval cities was an important urban point, especially in the late Middle Ages, when social and political opportunities were more peaceful. On account of it being a place of receiving goods and information in the city, the city residents often resided in this particular area. In Zadar, Split and Rijeka it remains at the site of the ancient port, but in Dubrovnik during the Middle Ages it changed position, and is relocated to the east side of city.

The Middle Ages was a period when within the city fabric, monastic cloisters were constructed, as is the case in Zadar (Benedictine monastery) and Dubrovnik (Franciscan and Dominican monasteries during the 14th century are incorporated into the city perimeter) (Petricioli, 1991; Ravančić, 2000). Since the Franciscan cloister in Dubrovnik was open to the public Ravančić (2000) says that it as used for rest and reflection by ordinary people, serving as a semi-public green space within the city. There is a possibility that in medieval Split there was a garden or park, because a provision in the statute mentions this spatial element (Cvitanić, 1985). Grgurević (2002) says that it could not have been a real park (especially not of importance for citizens of the whole city) on account of there being no room inside the perimeter of Split. Perhaps this provision referred to smaller gardens in front of the foyers of the houses of nobles (Grgić, 2005).

---

[23] Dubrovnik constructed a sewage system in 1296 (Beritić, 1958).

4.2.2.5 Presentation and analysis of open spaces in investigated cities from the Middle Ages

Zadar   Split   Rijeka

Dubrovnik in the 7th century   Dubrovnik in the 9th century   Dubrovnik in the 11th century   Dubrovnik in the 12th century   Dubrovnik in the 14th century
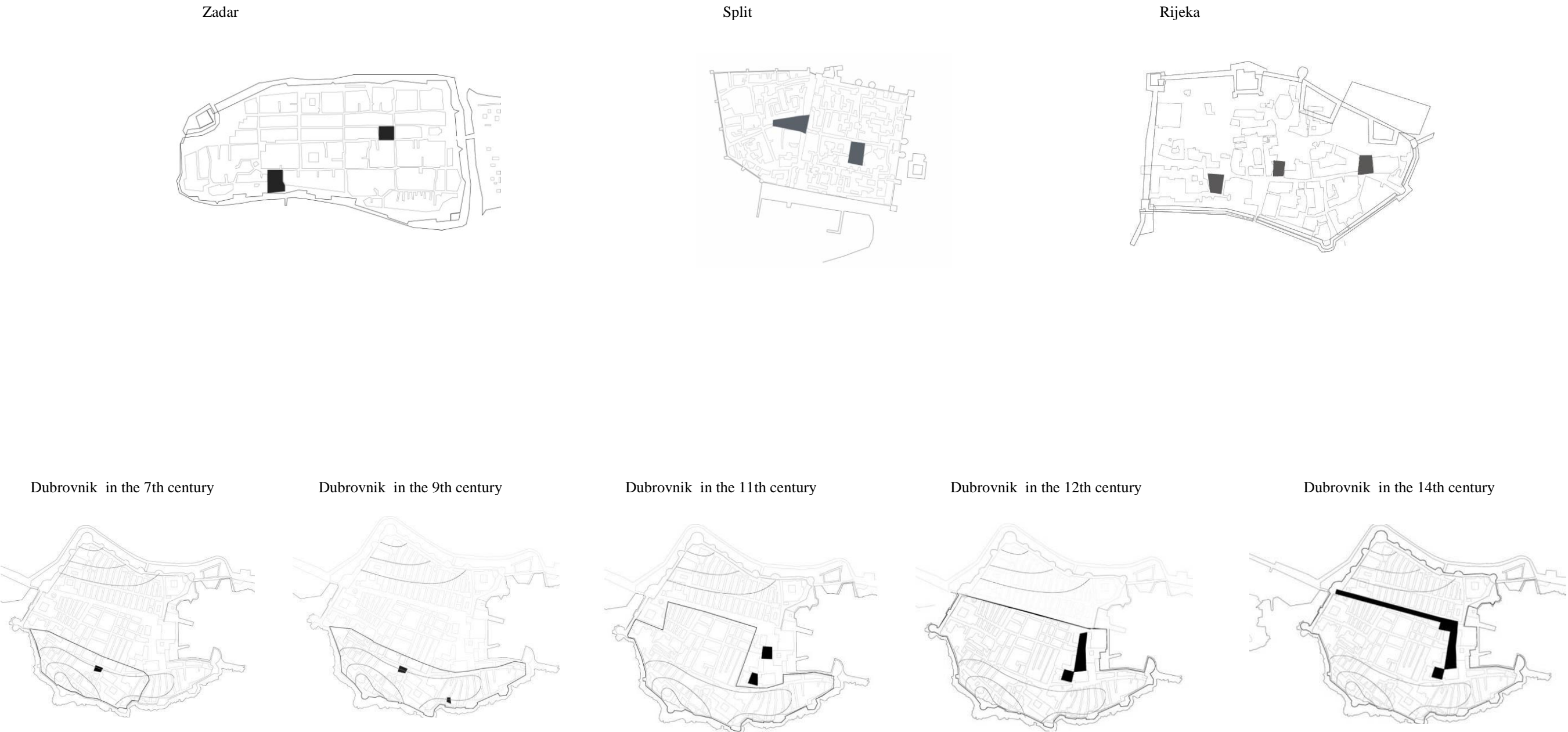
Figure 67. Main city squares in the investigated cities
Slika 67. Prikaz glavnih mestnih trgov raziskovanih mest

Zadar
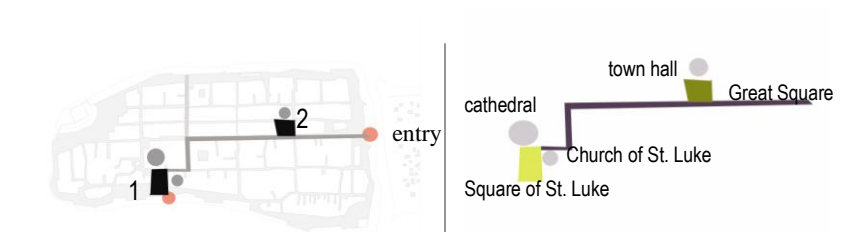
1. ■ religious space
  ■ originated on the ancient square
  ■ symbolic significance
  ■ urbanistic determinant
2. ■ secular square
  ■ utilitarian
  ■ no continuity from before

Split
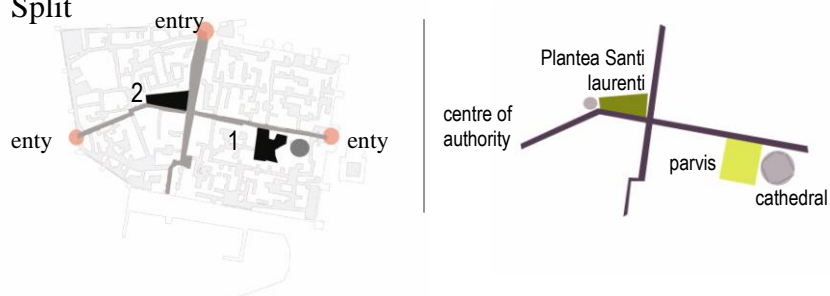
1. ■ religious space
  ■ originated on the ancient square
  ■ symbolic significance
  ■ urbanistic determinant
2. ■ secular square
  ■ utilitarian
  ■ no continuity from before

Rijeka
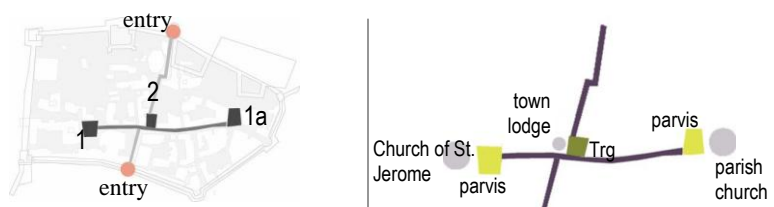
1. ■ religious space
  ■ possible originated on an ancient square (urbanistic determinant)
  ■ symbolic significance
2. ■ secular square
  ■ utilitarian
  ■ no information on continuity

Dubrovnik
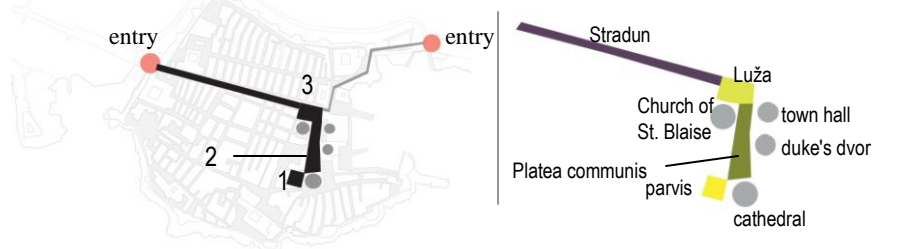
1. ■ religious space
  ■ symbolic significance
2. ■ secular square
  ■ utilitarian
  ■ no continuity from before
3. ■ mixed square (ecclesiastical, secular)
  ■ symbolic significance
  ■ central city square

Figure 68. Analysis of city squares
Slika 68. Analiza mestnih trgov

4.2.2.6 Relationship between city and surroundings

Figure 69. Relationship of the Middle Age town and its surroundings, Zadar
Slika 69. Odnos srednjeveškega mesta do zaledja, Zadar

Figure 70. Relationship of the Middle Age town and its surroundings, Split
Slika 70. Odnos srednjeveškega mesta do zaledja, Split
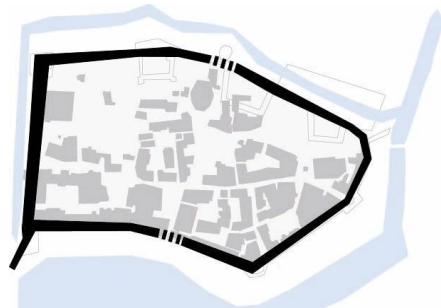
Figure 71. Relationship of the Middle Age town and its surroundings, Rijeka
Slika 71. Odnos srednjeveškega mesta do zaledja, Reka
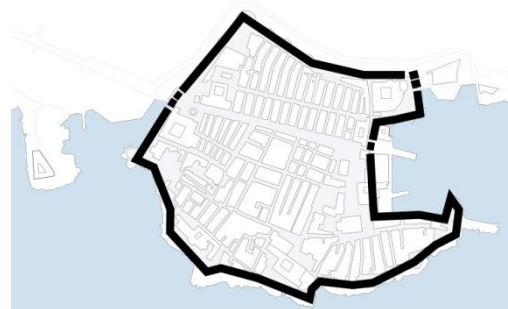
Figure 72. Relationship of the Middle Age town and its surroundings, Dubrovnik
Slika 72. Odnos srednjeveškega mesta do zaledja, Dubrovnik

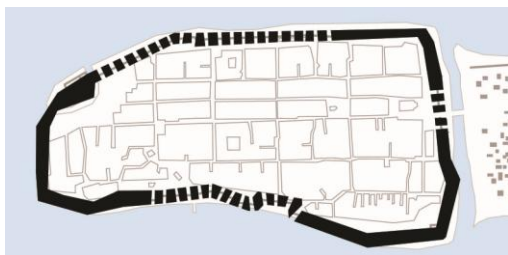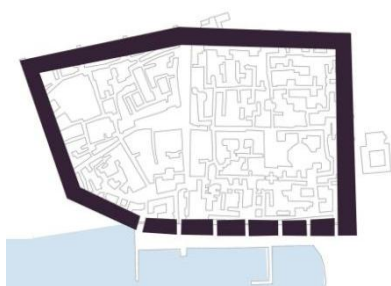The space around the city walls was natural or agricultural areas, which were due to their open nature a contradiction to the medieval densely constructed urban space. Although formally, cities were strictly separated from the surrounding landscape (especially in the early Middle Ages), because they were surrounded by a seawater-filled moat (except for Split), and encompassed by walls, they were very much connected. As the cities investigated were rather small, the surrounding space with its inhabitants was easily accessible for walking and stays (during the more peaceful times). Given that in the 13th century around a medieval Dalmatian city suburb was formed, their relationship to the surrounding landscape becomes less stringent and segregated. While this increased the distance from the open landscape, it did not become inaccessible (Benyovsky, 1999). The transition towards an open landscape in Zadar was achieved using the dispersed construction of the suburb Varoš, which based on the mock-up of Venice and the Pagano tree line had its very own defence system (Petricioli, 1959). In Dubrovnik, a manufacturing zone was located outside the city walls, but during the 13th and the 14th century, it was noted that citizens occasionally visit and engage in leisure activities in the suburban areas, cultivated with greenery, i.e. gardens and vineyards. Šišić notes that in the suburban area of Dubrovnik, called Gravosium, there exists a visible impact of humanistic characteristics, meaning that this zone was allocated to spending time outside of the city in country estates that had utilitarian gardens, but from the mid-14th century, there also appeared green spaces for leisure (Šišić, 2003). These were private properties available only to the more affluent inhabitants, while the poorer classes used the surrounding landscape of the city for walks and stays. This type of green garden zone represents a connection with the hinterland region.

104

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.3 Period from the fifteenth to the nineteenth century

4.2.3.1 The social and economic situation

The period from the fifteenth to the nineteenth century was a period during which there appeared new directions in the development of urbanism - Renaissance and Baroque. Given that these changes are visible only in the segments of the investigated cities, they are summarised in a single chapter.

Dalmatian cities at the beginning of the fifteenth century came under Venetian rule where it will remain until the beginning of the nineteenth century (Žmegač, 2003; Muljačić, 1958). These investigated cities of Zadar and Split become Venetian fortresses, and since they were forced to turn commercial transport towards Venice, free trade disappeared resulting in economic stagnation (in addition, Venice imposed high taxes making their economies non-competitive). In the second half of the fifteenth century, the Turks conquered Bosnia and closed in on the investigated cities, initiating an unstable period reflected in all aspects of life. The Turks conquered the Split and Zadar hinterlands in the sixteenth century (Muljačić, 1958; Marasović, 1997). Under such circumstances, Split and Zadar posed a strong defensive role, which led Venice to restore and rebuild medieval walls of Zadar during the 16th century, and those in Split in the 17th century (Žmegač, 2003; Milić, 1990). Zadar was very important to the Venetians and they considered it the most important stronghold on the Adriatic Sea, from where they could control the maritime traffic. Compared to other Dalmatian towns, it was the simplest to defend, as it was located on flat terrain, which offered no possible danger to the city from the nearby hills (Žmegač, 2003). Venetians treated Zadar as a defensive fortress, and its defence against the Turks became its most important role. As techniques in warfare advanced, a ring was built around Zadar and Split in the form of a defensive wall with polygonal bastions based on the principles of modern defence systems as mentioned by Mumford[24] (1988), whereas Milić (2002) says that it represented the influence by idealistic Renaissance cities on our areas. Grgic (2005) even talks about the implementation of the new Baroque Vaubaun system. In Zadar, in the year 1607, the palace of the general governor was built, so it became the administrative centre of Dalmatia and Albania. The role of the Church was great, but just as it was in Venice, the Church had no political influence (Grgić, 2005).

The surrounding space of Zadar and Split was a rural landscape influenced by a strong migration process, where even before complete Turkish occupation, troops seized livestock from the farmers. In addition, most of the farmers worked on the Venetian galleys, resulting in no workforce that could cultivate the land. Thus, most of the rural population migrated from the surrounding area stopping the flow of food into the city, especially prevalent in the case of Zadar. Although the situation at times stabilised, it was not reflected in the city's economy because the change in Zadar's position does not seem appropriate to Venice. [25] In Split, the situation is slightly better (Duplančić, 2004). Duplančić (2004) says that in the late sixteenth century, in the time of peace between the Turks and the Venetians, the economy developed due to its location being at the crossroads of trade routes. Consequently, lazarets were also built.

---

[24] Described in detail in Chapter 5.
[25] Following the defeat of the Turks at Vienna in 1683, the Venetians conquered the occupied territory around Zadar, but this did not affect Zadar's position.

Unlike Split and Zadar, Rijeka in the period from the fifteenth to the nineteenth century was not governed by the same ruler. At the very beginning of the fifteenth century, the city was ruled by the Walsee family, and later in the century it came under the possession of Frankopan. After the Zrinski-Frankopan conspiracy, it came under Habsburg rule. At the end of this period, it became part of the Croatian-Hungarian Kingdom. It flourished as a port, but it was located close to Trieste, it remained in Triestes' shadow. The Venetians at the time controlled the Adriatic, preventing Rijeka an exit to the sea by redirecting trade to other cities[26] (the development of Rijeka was not in their interest). This situation will mark the sixteenth and seventeenth centuries. Under such unfavourable circumstances, Rijeka still manages to develop (albeit slowly), and this was helped by it acquiring the position of a free municipality under the Frankopans. The city's intensive development occurred at the end of the 17th century, with the weakening of Turkey. In 1719, Charles VI declared the Adriatic a free trade zone, and Rijeka and Trieste free ports, leading to Rijeka experiencing intense economic development (Klen, 1988; Matejčić, 2000; Palinić, 2009). Rijeka experienced important changes in its urban fabric in the eighteenth century, when Maria Theresa carried a mercantilist economic program that allowed Rijeka to be included in European development tendencies. It was then that the city developed from a coastal town into a strong commercial emporium with good road links (Matejčić, 1988). Maria Teresa annexed Rijeka to the Kingdom of Croatia and Hungary, and with the abolishment of the Croatian Royal Council in 1779, its powers were transferred to the Royal Hungarian Regent Council. This was the beginning of strengthening the Hungarian claims to the territory of Rijeka. In the last quarter of the eighteenth century, Joseph II abolished serfdom and equalised taxes for the classes thereby allowing the development of civil class in Rijeka, a class that carried industrial development in the city. In 1797, Austria concluded peace with Napoleon; waiving its rights to Lombardy and Belgium, it in turn acquired the Venetian Republic along with Istria and Dalmatia. Rijeka became a location of intensive transit of goods. During this period, Trsat was completely neglected, and in the late 18 century, it was in ruins (Klen, 1988). During this period, Dubrovnik existed as an independent republic, leading to emancipation, territorial expansion and stable economic development. The Dubrovnik Republic bordered with two forces, Venice and the Turks. Dubrovnik protected in territories[27] from the Venetians and the Turks using diplomacy skills (especially in rendering diplomatic services to Turkey) in the services of the Dubrovnik fleet regarding the trade and wartime needs of Spain and paying taxes. Economic development was based on shipping and trade, and in the immediate vicinity of the city walls, on Pile, clothing production facilities were developed including glass workshops, those for making soap, leather goods and metal products (cloth and salt were the main export commodities) (Planić Lončarić, 1980). Dubrovnik had shipyards, but also one of the strongest navies in the Mediterranean. [28] Maritime and commercial expansion allowed Dubrovnik to establish links to all Mediterranean ports and most ports on the

---

[26] Hence, for a time, they redirected trade to Bakar, and exempting it from customs levies.

[27] With the expansion of the Dubrovnik Republic it took possession of Konavle, Dubrovačko primorje, Pelješće, Elafit and Lastovo, and for a time its rule expanded to the islands of Korčula, Hvar, Vis, Brač accompanied by privileges in trading on the Neretva region. Dubrovnik founded the trading colony in Goja (India).

[28] In the sixteen-seventies, Dubrovnik had over 180 ships with a maximum tonnage and 100 shipbuilders (Stulli, 1987). Numerous archaeological records testify that the Dubrovnik ships were prized as the best throughout Europe.

106

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Atlantic, [29] and alongside Venice and Ancona, the Dubrovnik became the most important Adriatic emporium. The authority of the republic was in the hands of the aristocracy, but in time and in accordance with developments in Europe, a powerful civil class of commoners was established who got rich as merchants and sailors (Stulli, 1987). Similarly, as was the case with Split and Zadar, ecclesiastical authorities did not have an impact on policymaking.

In the second half of the seventeenth century, economic stagnation occurs caused by destruction from the great earthquake of 1667, and the transferring the maritime routes to the Atlantic. Weakening the power of trade is contributed by the Venetian conquest of the Dubrovnik hinterlands, separating the city from its commercial sphere. The eighteenth century was marked by the return of the Turks in the Dubrovnik hinterlands. This led to the founding of the Neum corridor resulting in Dubrovnik being separated from its greatest, Venice. Thus, with the stabilisation of the political situation in the 18th century, Dubrovnik's economy began to strengthen, but capital remained in the hand of the civil class (Beritić, 1958.). [30] During this period, there is a significant change within the urban fabric as a great part of the city is rebuilt, but the adherence to urbanism basics from the previous period, led to the creation of almost the same urban-morphological scheme.

4.2.3.2   Structural characteristics of the investigated cities

As mentioned earlier, the investigated cities in the period from the fifteenth to the eighteenth century change the structure of the urban fabric with the walls to a minimal extent. Marasović says that the development process of Split in this period had stalled, perhaps even regressing (Marasović, 1966). Given the social and -economic situation, Rijeka, Zadar and Split experience very few interventions in the urban fabric of the city, whereas Dubrovnik basis its development on expansion outside of the walls because within the urban fabric there is no more room for new interventions. Just as in Europe there is no true Renaissance city,[31] so too changes in the investigated cities occur only in certain spatial elements. They are visible in the construction of stellar fortifications in Zadar and Split (see Figure 71, Figure 72), with relatively low walls and wider, the kind mentioned Kostof (1995), and in the creation of Renaissance suburbs in Dubrovnik. The very structure of the urban fabric is almost the same as in the Middle Ages, but inserted into it are Renaissance buildings and squares are added, as was the common example in other European cities mentioned by Mumford (1988).

Zadar and Split did not experience significant
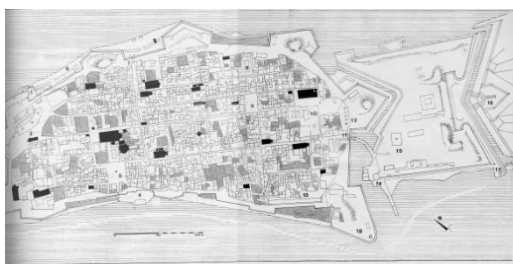
Figure 73. Plan of Zadar from 18th century
(Petricioli, 1991:48)
Slika 73. Načrt Zadra iz 18. stoletja
(Petricioli, 1991:48)

---

[29] In the 16th century, Dubrovnik had 50 consulates.

[30] Following earthquake, the nobility became less in numbers, while at the same time, according to a list of undignified occupations, added to this class of people was the retail profession, hence its status is reduced. With less invested in the education of its descendents, it becomes a less innovative and educated class of society (Beritić, 1958).

[31] According to Mumford's assertions (Mumford, 1988).

107

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

changes in urban space neither during the eighteenth century, hence they cane distinguished in terms of the urban space of Rijeka and Dubrovnik, which was then characterised by numerous alternations.

The structural characteristics of the urban fabric in Zadar are evident in the retention of regular divisions originating in antiquity. Parts of the city develop with a completely irregular urban structure (Figures 78 and 79). Thus, the city reflects multiple layers of architectural heritage, while the urban fabric remain within the same parameters as in the Middle Ages. The relationship between constructed and open areas still remained under a strong influence of a strict Antique division of space.

Figure 74. Plan of Split (Piplović, 2008:183
Slika 74. Načrt Splita (Piplović, 2008:183)

In Split, the division of palace space from Antique times is also evident, but the space around the city is characterised by an organic redefining of urban space that has for a long time had the same size at its disposal (Figures 80 and 81). This shows that the development of inner city fabric (while not referring to the defensive system) occurs spontaneously, as in the Middle Ages, but creating a very dynamic relationship between constructed and open spaces with peripheries that are constantly changing. Renaissance and Baroque influences are therefore not visible in the inner urban space of Zadar and Split, but only for urban point elements. The new defensive system is a mathematical regularity and geometry that is typical of the Renaissance architectural tradition (Milić, 2002). In Zadar, the walls became a priority because it during the construction the suburb Varoš of St. Martin was sacrificed, and residential blocks in the eastern part of the city within the walls (Žmegač, 2003). For the purpose of protection, the Foša canal was dug up providing a physical separation between Zadar and the mainland, meaning that it was even more closed in towards the surrounding space. Construction of the bulwark leads to changes at entry points into the city, and creates a new hierarchy of urban communication. Similarly to Zadar, Split's defensive system also acts to separate the city from the hinterland regions.
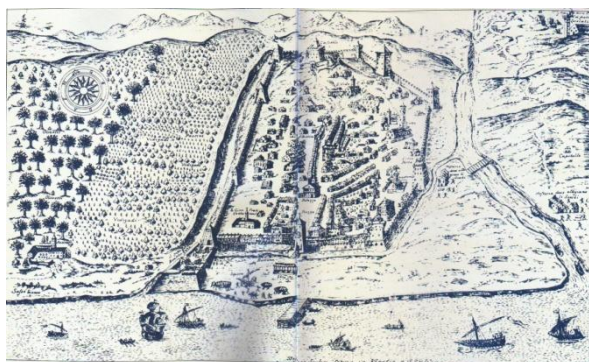

Figure 75. Rijeka, 1671 year (Andrijašević, 1984:103)
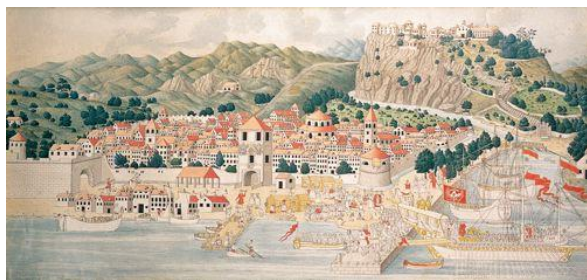Slika 75. Reka, 1671 let (Andrijašević, 1984:103)

Figure 76. View of Rijeka from 1728 (Dolazak ..., 1728)
Slika 76. Prikaz Reke iz leta 1728 (Dolazak ..., 1728)

In the period leading up to the 18th century, Rijeka was also contained within the medieval parameters of the city, crowded the point at the Augustinian monastery to the Church of St. Mary, with a somewhat more dense urban fabric headed towards the foreshore (Figure 84, Figure 85). By the 18th century, the city was pretty much closed-off, so the defensive system allowed only two entrances to the city. Except for some point elements constructed during the sixteenth century (the municipal hall in the main city square, the Great Fortress bastion, the Church of St. Vitus) there were no major interventions in the urban fabric, hence it maintained an equal relationship between the open and constructed areas in the city (Klen, 1988; Matejčić, 1988). The pictorial presentation from 1728, (Figure 74) showed a close (almost idyllic) relationship of the surrounding space, typical of medieval urban spaces. Klen (1988) says that during the Renaissance, Rijeka was a border town, meaning that Renaissance influences had bypassed it (and allowed it to retain a medieval aspect toward the surrounding space), but with the stabilisation of opportunities in the early 17th century, urban development of Rijeka will fall under the influence of Baroque. As the boundaries of the Roman city of Tarsatica began to inhibit the development of the city, Maria Teresa decides on expanding the city by not developing the old town section, but instead, a new part of the city commence with expansion before it - this called the Nova Civitas (Figure 75). The resulting regulation plan from 1755, in which features of Baroque classicism are visible because construction is based on wider linear, strokes specifying totally new relationships of the constructed and unconstructed urban space (Klen, 1988). The author Candido proposed the creation of empty spaces and squares around the old city, hence we have Jelačić Square, Rijeka Resolution Square, the Corso and the space for the markets. The plan does not retain the moat so it was filled in 1781 (Palinić, 2009, Matejčić, 1988 and 2000). Next was the demolition of the city walls[32] in residential buildings were later constructed (Matejčić, 1988). Changes in urban structure caused the opening towards the surrounding space (Palinić, 2009). This completely changed the relationship of the city towards the landscape, which surrounds it leading to its permeation.

As the gravitational point of the city was relocated to a new section, the old town became a place inhabited by people with a lower standard of living. At the same time, parts within the old town are built (which were undeveloped), but the urban fabric is created without a plan and is characterised by low living standards (the area of Gomila), so the poorer classes of the population inhabit that area (Turato, 2004).

---

[32] Though three urban plans for constructing the southern and south-eastern walls were composed following the earthquakes of 1750 and 1751, the defensive system is demolished (Palinić, 2009).

109

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

The eighteenth century saw the creation of industrial sections in the city, accommodating sugar refineries, smaller manufacturing facilities, shipyards, workshops and mills on the Rječina. The Rijeka is divided into rayons, nine of which are located in the old city, and three outside (Klen, 1988).
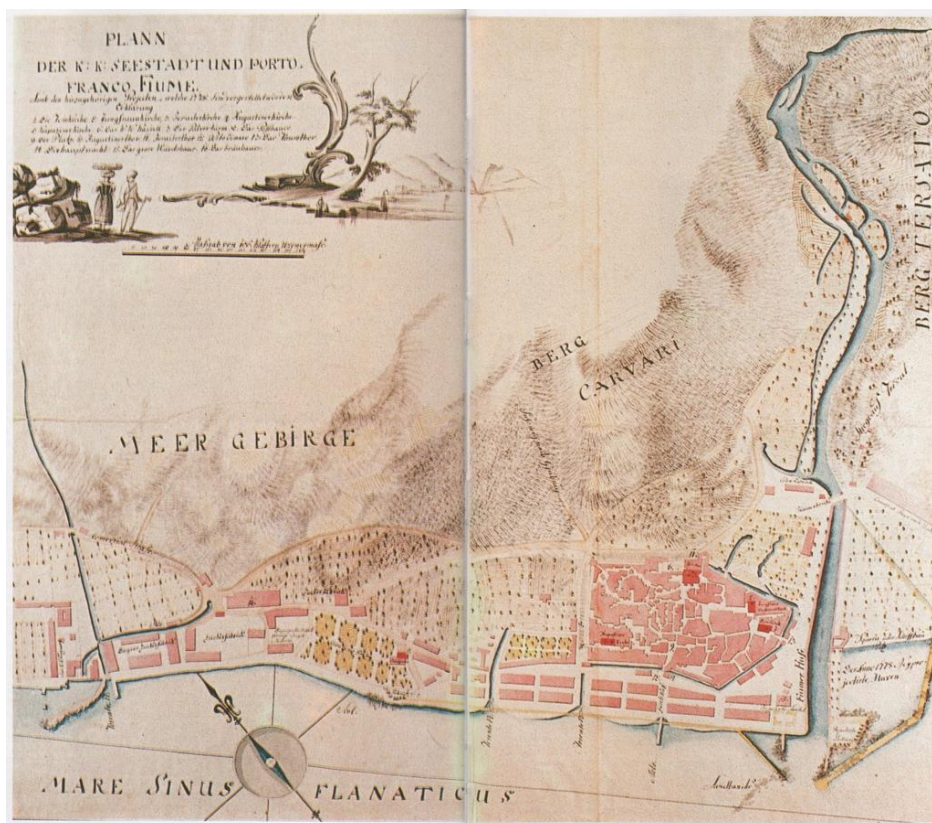
Figure 77. Plan of Rijeka from 1778 - directly before filling of moat (Hrvatski državni arhiv, 2008a)
Slika 77. Načrt Reke iz leta 1778 - neposredno pred zasipanjem jarka (Hrvaški državni arhiv, 2008a)

The construction of Civitas Nova led to the creation of explicit differences between the structural features of the new and old parts of the city. The Old Town represents an organic type of construction, typical of the Middle Ages, whereas the planned development of Rijeka took place outside of the old perimeter, which was conceived as wide linear directions, typical of Baroque classicism. Thus, the main feature of open space is the linear route of the street Corso, and becoming an important gravitational city space, playing an important role in defining urban fabric. Using the example of Rijeka, one of the main features of the Baroque city appears, which is the neglecting the importance of trade mentioned by Mumford. (1988) (the social important of the city is assumed by the street).
In the 18th century, the appearance Trsat changes because the construction of a new thoroughfare route creates a new residential area forming the Sušak area (Klen, 1988).

110

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013
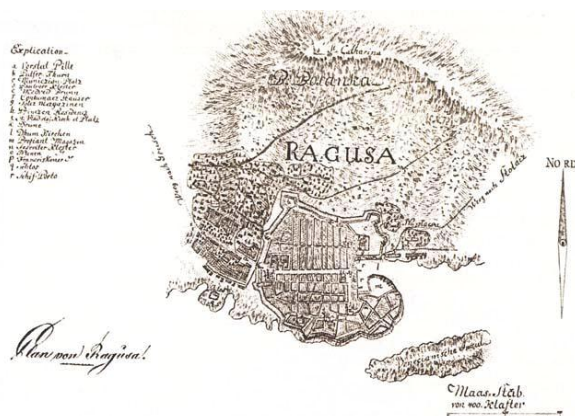
Figure 78. Plan of Dubrovnik from 1783 (Kartografska zbirka ..., 2011)
Slika 78. Načrt Dubrovnika iz leta 1783 (Kartografska zbirka ..., 2011)
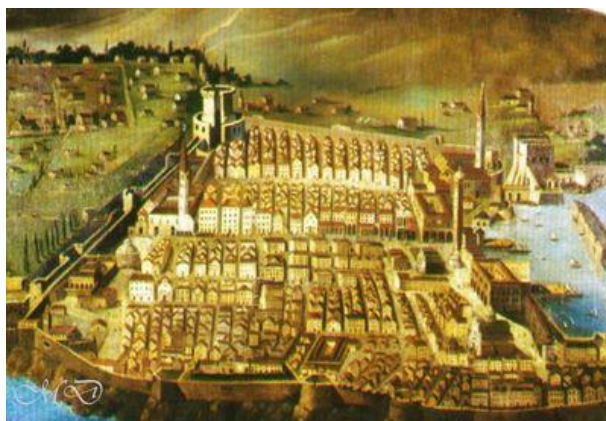
Figure 79. Dubrovnik before the great earthquake (Kartografska zbirka ..., 2011)
Slika 79. Prikaz Dubrovnika pred velikim potresom (Kartografska zbirka ..., 2011)

During this period, Dubrovnik remained within the planned network originating in the Middle Ages, so when rearranging the urban space in the sixteenth century, all the structures that were illegally built but hindered the structural regularity of the city were demolished (Beritić, 1958). It led to achieving continuity of strictly specified division of open and constructed urban areas, where open spaces were protected as much as possible due to their public importance. Also, zones of various specialised craftsmen were created, and in the 15th century smaller settlement on Pile (outside of the walls) were systematically regulated, where manufacturing facilities and living quarters for workers were situated. The Gravosa area is a part outside of the city walls, where from the mid-15th century villas with gardens were built, mainly in areas of Gornji Konal, descending through Srednji and Donji Konal to the Pile area (Šišić, 2003) (Figure 76, Figure77). This shows that the strongest Renaissance influences were in the urban planning of the Dubrovnik Garden Suburb. Urban expansion was adapted to the topography, with a series of buildings running parallel to the contour lines of the terrain. Dubrovnik has two contrasting areas. One is properly structured, a densely built urban morphological structure, where the open spaces are paved floors (no larger green areas). The second is a

spot constructed suburb characterised by dispersed construction in green gardens, with a lack of public spaces (visible from the maps from 1783cf. Figure 76, and the maps are from 1790 cf. Figure 77). In this way, various concepts of relationships between open and constructed areas existed. This shows that the city's relation to the surrounding area changes, because despite the town walls the city opens up towards the surrounding space with which it is linked.

After the earthquake in the seventeenth century, the city within the walls was restored by adhering to the original layout devised in the Middle Ages. However, as the municipality constructed new facilities along Stradun (main street), they are built with uniform street facades, and as a result of this uniformity of perspective views of the street, there is a feeling that Baroque has made an influence (Beritić, 1958). However, nowhere aspirations of Baroque urbanism for a movement into the infinity of space were not achieved, because the reconstruction remained loyal to the medieval plan of the city. This resulting open space of Stradun survived as a dominant city feature that has once again re-established a strictly defined relationship to the constructed fabric. Baroque influence is visible in the dotted elements within the fabric of the city, such as the Jesuit College with its entry stairs and square. Destruction of the housing stock meant that a large number of people moved out of the city, and settled in the suburban area that is Gravosa, thus becoming denser, hence the structures are often built in the gardens (in the late 17th and early 18th century). Subsequently, this area becomes more densely populated, but with a preserved character of the former garden suburb and a distinctive structure. Although the restoration of Dubrovnik utilised foreign builders, other centres were never copied, but instead the foreign influence was adapted to the opportunities in Dubrovnik, which were distinguished by utilitarianism and modesty (Šišić, 2003).

4.2.3.3 Presentation of structural characteristics of investigated cities from the Middle Ages

Figure 80. Constructed areas of Zadar in the 18th century (Petricioli, 1991:10)
Slika 80. Prikaz pozidanih površin Zadra v 18. stoletju (Petricioli, 1991:10)

Figure 81. Unconstructed areas within the urban fabric of Zadar in the 18th century
Slika 81. Prikaz nepozidanih površin znotraj mestnega tkiva Zadra v 18 stoletju
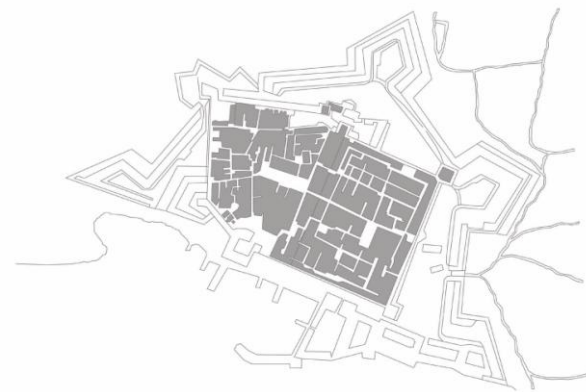
Figure 82. Constructed fabric in Split in the 17th century (Milić, 1995:421)
Slika 82. Prikaz pozidanega tkiva Splita v 17. stoletju (Milić, 1995:421)
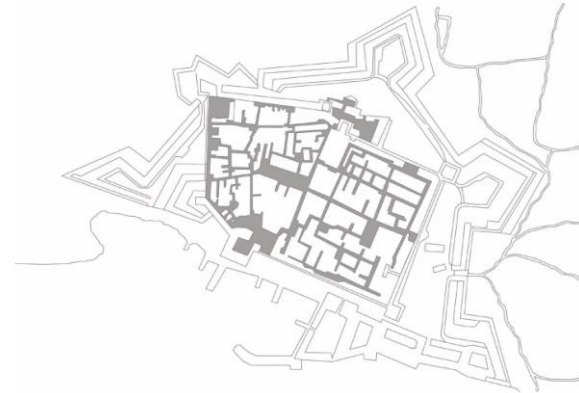
Figure 83. Unconstructed areas within the urban fabric of Split in the 17th century
Slika 83. Prikaz nepozidanih površin znotraj mestnega tkiva Splita v 17. stoletju

Figure 84. Constructed fabric in Dubrovnik in the 17th century (Beritić, 1958:77)
Slika 84. Prikaz pozidanega tkiva Dubrovnika v 17. stoletju (Beritić, 1958:77)

Figure 85. Unconstructed areas within the urban fabric of Dubrovnik in the 17th century
Slika 85. Prikaz nepozidanih površin znotraj mestnega tkiva Dubrovnika v 17. stoletju

Figure 86. Constructed fabric of Rijeka prior to regulation
(Matejčić, 1988:45, 98, 105, 156)
Slika 86. Prikaz pozidanega tkiva Reke pred regulacijo
(Matejčić, 1988:45, 98, 105, 156)

Figure 87. Unconstructed areas of the urban fabric in Rijeka prior to regulation
Slika 87. Prikaz nepozidanih površin znotraj urbanega tkiva Reke pred regulacijo

Figure 88. Presentation of unconstructed areas following implementation of Regulation Plan (Master Plan) (visible is the opening
of the city towards the surrounding area which begins to traverse the city (cartographic base: Plan of Rijeka from 1778, 2008a)
Slika 88. Prikaz nepozidanih površin po uporabi regulacijskega načrta (vidno je odpiranje mesta proti okolici in njuno spajanje)
(kartografska podloga: Plan of Rijeka from 1778, 2008a)
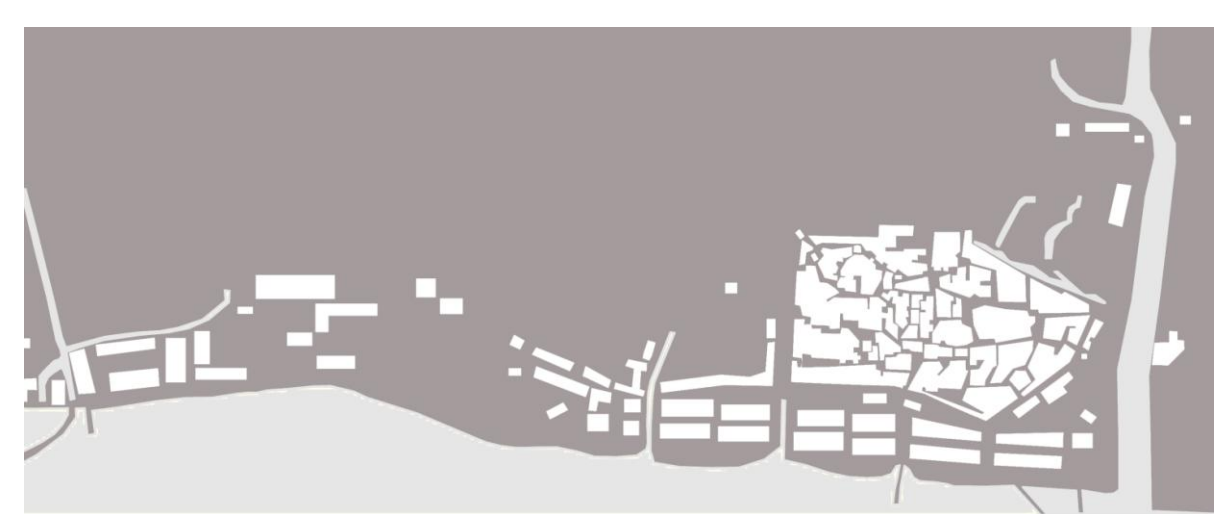
Figure 89. Presentation of unconstructed areas following implementation of Regulation Plan (Master Plan)
Slika 89. Prikaz pozidanih površin po uporabi regulacijskega načrta

4.2.3.4   Open spaces of the city

The open spaces of the city were the areas which hosted numerous functions that would later assumed by the other elements of the green system in the modern city. This important role, as in previous periods, was carried by the squares, and the streets. Although the functioning of open space in the city is described in the fifth chapter, there are authors who in the treatise on Dubrovnik have created a good picture of what life was like on the streets and in the squares of the city. Ravančić says that a good part of leisure activities took place in the urban open public areas, i.e. the streets and squares, hence this area was inundated with merchants (Ravančić, 2000.). It is particularly lively during the carnivals and feasts (Stojan, 2007). The streets and squares were often spaces for children's games, as testified by evidence from the inscription on the wall of St. Rocco dating to 1597. [33] Many authors have suggested that this inscription testifies to the fact that on the streets of Dubrovnik Renaissance football was played which was reported in Firenza at that time (Ravančić, 2000; Prosper Novak, 1991; Janekovic Romer, 1994, Stojan, 2007). Considering the assertion by Matejčić that the square in front of the Church of St. Jerome in Rijeka was a football field for patrician children, the assumption can be made that this is true for all the investigated cities (Matejčić, 1988). So it happens that the squares in the investigated cities have a political, commercial and religious function but for the city inhabitants they were spaces for staying in, going for walks, gatherings, children's games, and if possible, for recreation.

The central squares of investigated cities are the same as in the previous period, with the exception of Rijeka in which, during the eighteenth century, the most important square in the city is completely ignore, given that the city's central open space becomes the street Corso. Consequently, Zadar, Split and Dubrovnik retain the most important gravitational point or feature from the former times, and Rijeka developed in accordance with a new Baroque trends. In the investigated cities, the retention of the square's role as the central gravitational point of tradition was inherited back in the Roman period, but was not necessarily related to the same location in the urban space.

In Zadar, the Veliki trg (eng. Large square) remained the central urban space at all times (Figure 34). A similar situation occurs in Split where the People's Square retained the role of a secular centre, so despite changing its layout for the demolition of buildings around it, it did not cease to be the centre of secular life (Figure 37).

The most important main square in Dubrovnik is Luža, located between the Church of St. Blaise[34] and the customs building, which at the end of the Middle Ages became the focal point of the city. In 1440, Filipe de Divesis described in detail the role of this space in the city noting that it was a common city place for invigoration from the daily worries, for meeting people and the nobles. He further states that there were benches for sitting on, mentioning also how social games were played (chess and gambling), and there was also a part in the role of markets (Planić Lončarić, 1990). A pillar of punishment was located on

---

[33] Pax vobis. Memento mori qui ludetis pilla - Peace be with you. Remember that you will die, you who play with the ball (Ravančić,2000; Prosperov Novak, 1991; Janeković Romer, 2004; Stojan, 2007)
[34] Luža was not found at the entrance to the Church of St. Blaise, because the entry doors were on the west (Planić Lončarić, 1990).

it [35](Ravančić, 2000). After the earthquake, with the reconstruction of the Church of St. Blaise, its entrance was orientated towards Luža, hence it loses the role of the markets, but remains an important gravitational point of the city (Figure 40). The mentioned description of the events on the main square of Dubrovnik can probably be applied to the main squares in other cities because of their central role in the public life of a city (as mentioned by numerous authors).

During the period from the fifteenth to the eighteenth-century, Rijeka retained its most important open space - Kobler's Square, inherited from the previous period (Figure 39). It existed as a function of the marketplace (Piazza Erbe) and the Stock Exchange, whereas in the municipal palace numerous decisions were made in relation to city development. Notaries and merchants were located on it, and the area in front of the municipal palace purchase contracts were shouted out and the space was used as a public tribune. Matejčić (1988) says that after proclaiming the free port in Rijeka in 1719, the square occupied a special place in the city. Alongside it were shops, cafes and pharmacies, meaning that it was the centre of business life, but also a place to stay, evening promenades, presenting the central square as a place for leisure (Matejčić, 1988). With the opening of the new communication route running north-south and the opening new gates, the central square became the crossroads of the two dominant routes.

In the final decades of the eighteenth century, the role of Kobler's Square changed. With the opening of the Corso, the central square becomes a less important point in the city, because all the major urban functions are relocated to a new linear route (Figure 40). This new route defines city urbanism as it becomes the backbone of the new part of town, hence a new urban fabric develops along with it.

The role of the *parvis* (the square in front of the church) with the city space is still important during this period, and was inherited from the previous period. So it is that the peristyle in Split remains in the function of the *parvis* (Fig. 36, Fig. 45), while in Zadar some changes occur to their positions on account of construction of the urban fabric. The cathedral *parvis* is relocated to the other side of the cathedral, the Campus of St. Luka disappears, which was once a square in front of the several sacral objects, but one part of it is converted into a Zeleni trg (eng. Green square), i.e. the market (Fig. 35, Fig. 42). Prior to the earthquake, Dubrovnik had a *parvis* just like in the Middle Ages. Ravančić (2000) locates several taverns in front of the cathedral *parvis,* and thus proves that the Dubrovnik *parvis* was probably used often. After the earthquake, numerous elements of the urban fabric changed. The cathedral, during its restoration in the period from 1671 to 1713, was orientated differently, and its entrance was constructed on the east side of the building along with a new entrance *parvis* (Fig. 41, Fig. 51). This *parvis* was built to be more directly linked to the former premises of the medieval *platea communis*, and hence at this time it becomes a direct link between the Luža and the cathedral *parvis*. This reinforces even more the idea of continuity of urban open spaces in Dubrovnik. After the earthquake, another square appears in front of the Jesuit complex and Dubrovnik University (Collegium Ragusinum). It is a baroque space located within a more or less medieval urban planned Dubrovnik.

---

[35] The pillar for handing out punishing was located at the place of Orlando's Pillar (Ravančić, 2000).

Squares in Rijeka urban structure were located in front of two sacral structures created in the past period (the Augustinian monastery and cathedral of the. St. Mary), but in the 16th century at the site of the small church within the feudal citadel the
Church of St. Vitus was built (which would later become the cathedral) with a church square (Fig. 38, Fig. 48) (Matejčić, 1988).

The development of a city in all the investigated cases includes the constructed of new squares, usually a function of the marketplace (which demonstrates the development of commercial activities in the cities) or as a function of the cistern. Although the Venetian authorities marginalised Split, the opening of a new square tells us that in quieter periods commercial trading survived as an important urban activity. The new town square called Voćni trg (eng. Fruit Square), originated at the entry point from the sea (Fig. 99). As it was located by the harbour, it was probably tied to seafaring and trade, which shows that despite the dismal situation, the port was an important city space.[36] The frame of the space had irregular features, and consequently in accordance with irregular urban fabric of Split, hence regular renaissance tendencies for creating regular planned squares are not evident.
In this period, Zadar had two smaller ports, but as it role was defensive trade and Venice was inhibiting commercial development, they do not pose strong gravitations points in the city. However, near the southern port the Zeleni trg - market emerges (Fig. 96). Cisterns are located on the new Zadar squares originating in this period, hence the Trg Pet bunara (in eng. Five Wells Square) (at the entrance to the city) and the Trg Tri Bunara (in eng. Three Wells Square). In Dubrovnik, on the west side of the Stradun (main street), on the site of the cistern from the previous period, the Onofrio fountain is built. It now becomes a more important area than it was before (Fig. 105). This is contributed by the fact that Ravančić (2000) was able to identify taverns on its edge, indicating that it was probably an actively used space. After the earthquake, the Gundulićeva poljana (eng. Gundic paddock), a new town square appears, which takes the role of the marketplace that is relocated from Luža. In the old town of Rijeka, during the eighteenth century, a new square was created to function for the purpose of the specialised markets that were used for cattle and wheat fairs (Piazza dello staio) (Matejčić, 1988; Palinić, 2009). Given that it had an irregular funnel shape and smaller dimensions, it did not develop in accordance with the Baroque-Classicist formational characteristics so typical of the new city.

Here it is evident that the urban open space is differentiated, hence squares are created that are specialised in trading (this activity is relocated from the main squares) and water reservoirs. Their relocation (Fig. 88 - Fig 95) shows a uniform distribution within the urban fabric. This is an exception with regards to Dubrovnik in which all squares are concentrated in one zone (Fig. 94 - Fig. 95). Consequently, through them a relation of open and constructed urban areas is formed, because they represent the points when the urban fabric of the investigated cities opens.

An analysis of the importance of trade shows that the squares are most intensely used which are located in the very centre of the urban fabric. Markets and cisterns were located mostly along (land or sea) entry points into the city. An exception to this is Rijeka, which on the central square had a market until regulation of city space (as well as Dubrovnik prior to the earthquakes).

---

[36] The port was probably more important during the 15th century, since in the 16 th century during the war, commercial trade in Split stagnated.

Zadar and Dubrovnik during this period have a green space in the form of point elements in the city. In this period, Zadar has the monastery gardens built in the Middle Ages and once from the Renaissance, originated within the complex of the archbishop's palace. Dubrovnik has medieval monastery cloisters that have, during this period, kept their semi-public character, as they were open to the public. Apart from them, within the city centre there are the green spaces (gardens), but as only individual families are able to enjoy them, they have no public significance (Ravančić, 2000).

The suburban space of Dubrovnik is a spatial specificity, characterised by a specific Renaissance urbanism of the suburbs (Šišić, 2003). Given that private gardens were to be found there, at point in time there are no public open spaces that might be important for city life. Due to the surrounding area situated on a slope, the structural characteristics stem from the relief features of the natural substrate.

Rijeka at the end of the eighteenth century, experienced a change to its character. This change commenced with a closed city and ended in a fully open urban area. Upon demolishing of the walls and its extension into the surrounding space, the process of scattering urban fabric along the landscape and opening towards the sea begins. [37] As it expands along relatively gentle slopes, it becomes possible to conceive the regular Baroque-Classicist form basis visible through open urban areas, and their relation to the built fabric (Fig. 93.).

[37] Subsequently, Rijeka removed its defensive system earlier, because the removal of city walls in most European cities occurs in the nineteenth century.

4.2.3.5 Presentation of important open city spaces in the period from the 15th. to 19th century

Figure 90. Squares in Zadar in the 15th cent.
Slika 90. Trgi Zadra v 15. stoletju
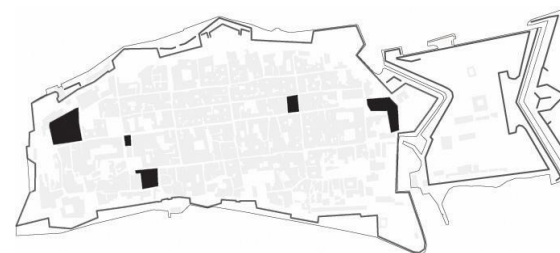
Figure 91. Squares in Zadar in the 18th cent.
Slika 91. Trgi Zadra v 18. stoletju
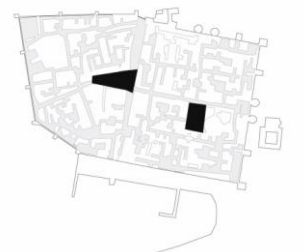
Figure 92. Squares in Split in the 15th cent.
Slika 92. Trgi Splita v 15. stoletju
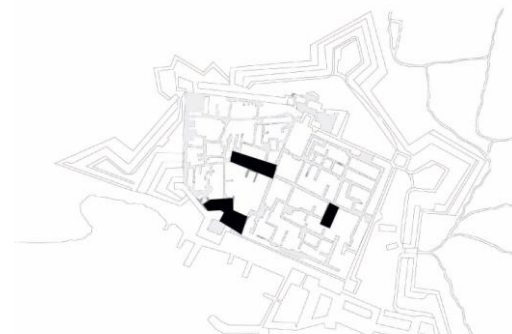
Figure 93. Squares in Split in the 18th cent.
Slika 93. Trgi Splita v 18. stoletju
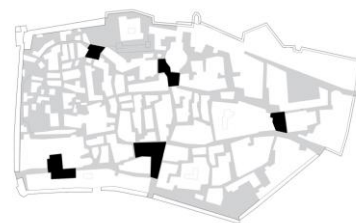
Figure 94. Squares in Rijeka in the first half of the 18th cent.
Slika 94. Trgi Reke v prvi polovici 18. stoletja

Figure 95. Squares and the Corso in Rijeka at the end of the 18th century
Slika 95. Trgi in Korzo Reke ob koncu 18. stoletja
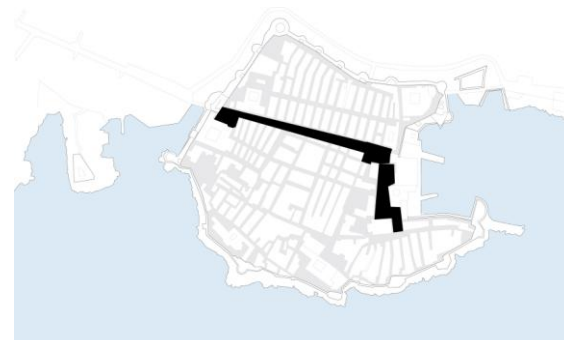
Figure 96. Squares and Stradun in Dubrovnik in the 15th cent.
Slika 96. Trgi in Stradun v Dubrovniku, 15. stoletje
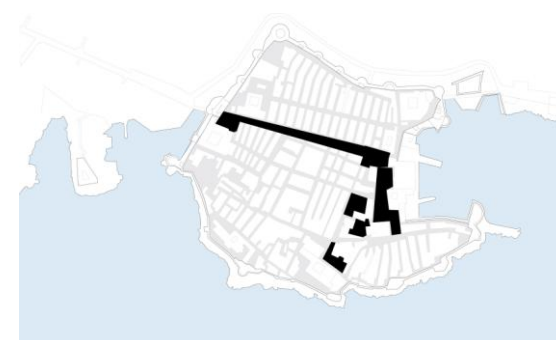
Figure 97. Squares and Stradun in Dubrovnik in the 18th cent.
Slika 97. Trgi in Stradun v Dubrovniku, 18. stoletje

4.2.3.6 Analysis of open urban areas from 15th to the 19th century
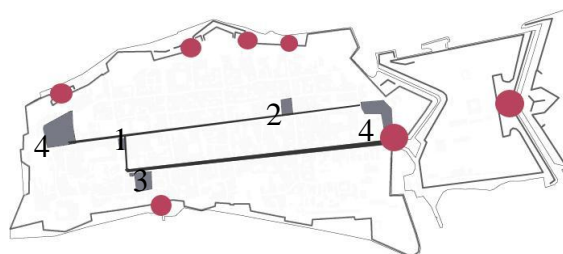
1. Square in front of cathedral – religious space, symbolic significance
2. Narodni trg – central city square, secular space
3. Zeleni trg – market, originated on the ancient square, urbanistic determinant, partially functioning as a church square
4. Cisterns (Trg tri bunara, Trg pet bunara), located on the main Roman decamunus beside the entry/exit point,

Figure 98. Squares with entry points and communications Zadar
Slika 98. Prikaz trgov z vhodnimi točkami in komunikacijskih smeri Zadra
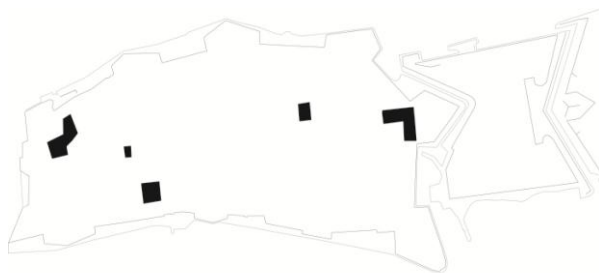
Figure 99. Zadar squares (15th to 19th cent.)
Slika 99. Zadrski trgi (15. – 19. stoletje)

Central square, strongest gravitational centre

Smaller gravitational centres
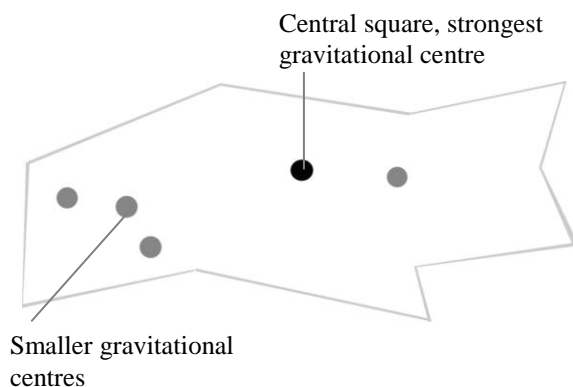
Figure 100. Analysis of importance of squares (originating upon inspection of literature)
Slika 100. Analiza pomembnosti trgov (nastala pri pregledu literature)
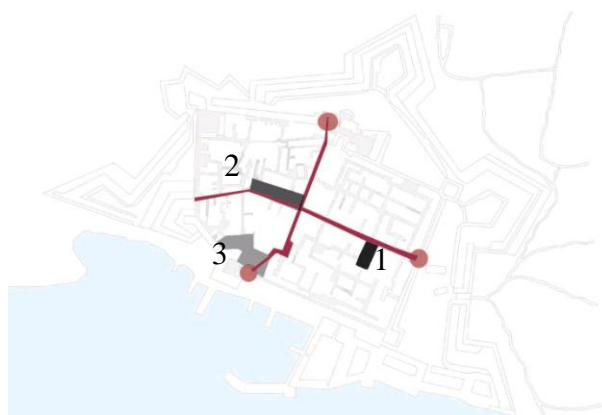
1. Peristyle – cathedral square, religious space, symbolic significance, originated on an ancient square
2. Narodni trg (People's Square– central city square, secular space
3. Voćni trg – commercial square, originated at the entry point

Figure 101. Squares in Split with entry opints and communication routes
Slika 101. Splitski trgi z vhodnimi točkami in komunikacijskimi smermi
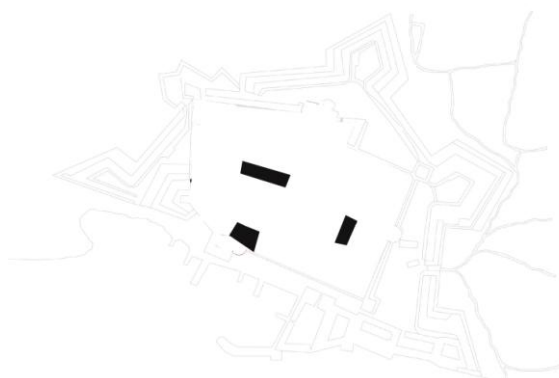
Figure 102. Squares in Split (15th to 19th cent.)
Slika 102. Splitski trgi (15.-19. stoletje)

Central square, strongest gravitational centre

Smaller gravitationl centre
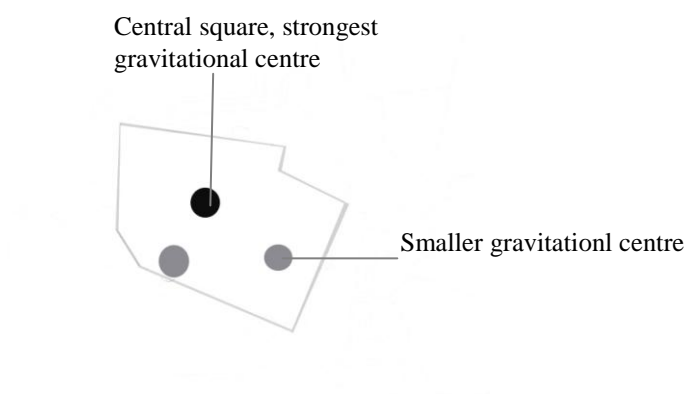
Figure 103. Analysis of importance of squares (originated from reviewing literature)
Slika 103. Analiza pomembnosti trgov (nastala pri pregledu literature)

Figure 104. Showing squares and Corso in Rijeka with communication routes
Slika 104. Prikaz trgov in Korza v Reki s komunikacijskimi smermi

1a   Square in front of the Church of St. Jerome – religious space, symbolic significance, coverage altered from previous
1b   Square in front of parish church – religious space, symbolic significance, originated on the presumed ancient forum
1c. Square in front of the Church of St. Vitus – religious space, new square, originated on the Roman cardo
2   Kobler's square– main city square leading to new regulation of space, secular space
2a   Corso – new central city space, secular centre of city
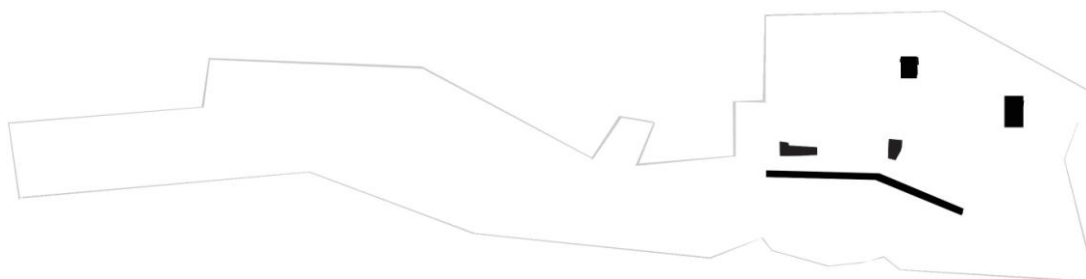
Figure 105. Rijeka squares and the Corso
Slika 105. Reški trgi in Korzo

Central square as the main graviational centre up until the second half of the 18th century

Smaller gravitational centre

Corso, new most important gravitational centre (the second half of the 18th century)
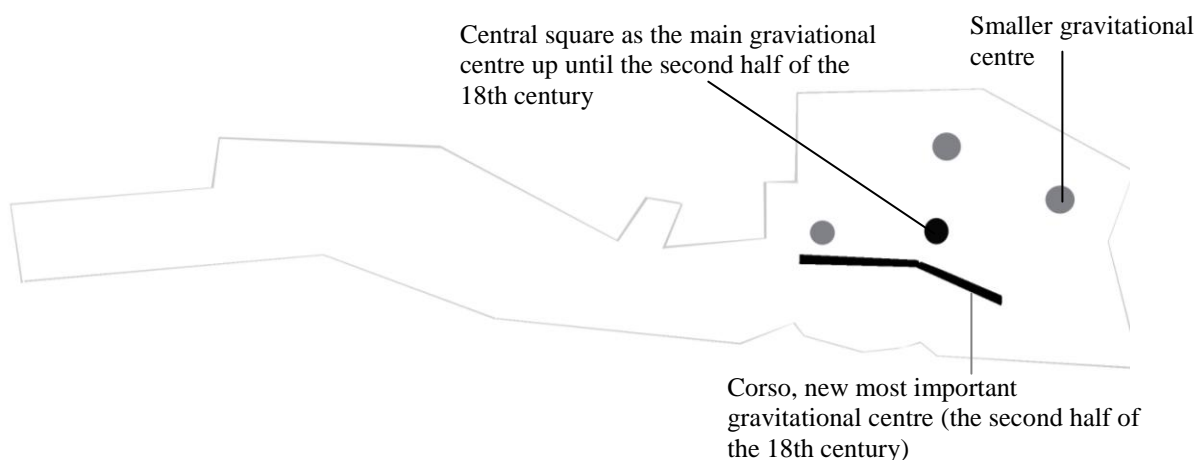
Slika 106. Analysis of importance of open city areas (originated on basis of reviewed literatuer)
Slika 106. Analiza pomembnosti odprtih mestnih površin (nastala pri pregledu literature)
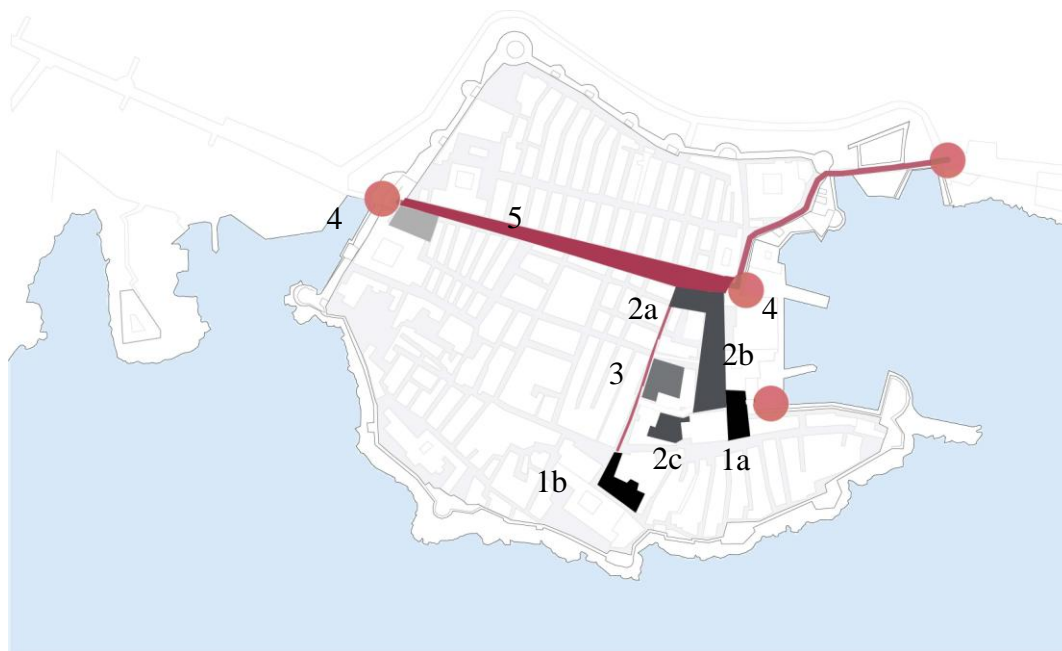
Figure 107. Squares in Dubrovnik with entry points and communication routes
Slika 107. Trgi Dubrovnika z vhodnimi točkami in komunikacijskimi smermi

1a   square in front of the cathedral – religious space, symbolic meaning, newly-formed
1b   square in front of Jesuit college – religious space, newly-formed with Baroque influences
2a   Luža – main city square, mixed usage, area in front the Church of St. Blaise, market
          (prior to earthquake), secular-religious space
2b   Former *Platea communis* – space in front of the administration structures, secular space
2c   Poljana – secular space, originated on the place of the former cathedral parvis
3   Gundulićeva poljana – markets, secular space
4   Cisterns – utilitarian space, originated on the entries to the city
5   Stradun – main city street, commercial-hospitality use, secular role
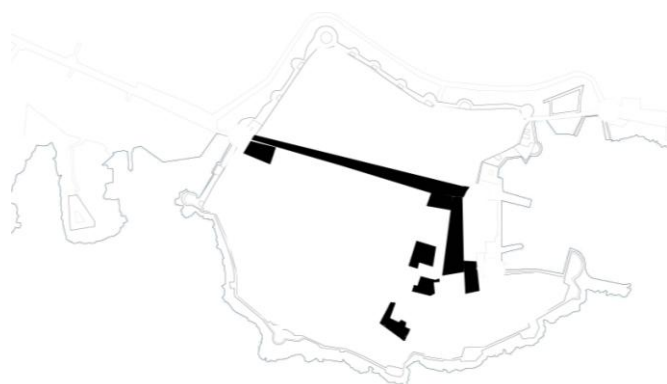
Figure 108. Squares in Dubrovnik
Slika 108. Trgi Dubrovnika
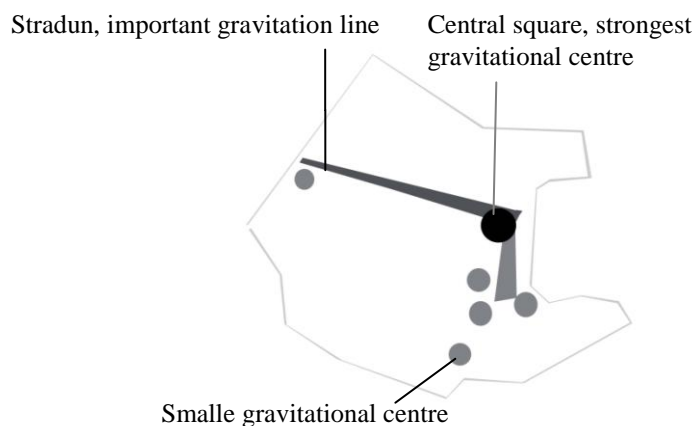
Figure 109. Analysis of importance of open public spaces (originated from reviewed literature)
Slika 109. Analiza pomembnosti odprtih javnih prostorov (nastala pri pregledu literature)

4.2.3.7 Relationship of city towards hinterland area

For this period, it becomes typical that almost throughout this whole period, the relation of the city towards the surrounding area such that all investigated urban centres are clearly defined towards the outer space due to the walls. This is particularly pronounced in Zadar and Split, where the relation to the surrounding landscape is even stronger and more stringently defined in order to create new defence system. This led to the stated cities being more sharply cut off from their surroundings, which was caused by Turkish conquests of their hinterlands (Fig.71., Fig.72.).

Perhaps this is less pronounced in Dubrovnik, which expands beyond the walls, and though the walls are preserved, even then they penetrate into the surrounding space. This phenomenon allows the urban fabric to spread to the surrounding landscape, creating a zone of mixed traits - green and constructed areas. This zone is a kind of transition from the historic, almost entirely constructed city, towards a sparsely populated landscape, and the periphery of the surroundings become soft (Fig.76, Fig.77.). A very marked change in relations between the city and the surrounding area occurred in Rijeka (late 18th century) after implementation of the regulation plan. The result was the opening of the city to the surrounding landscape with the demolishing of the walls, and the expansion of the urban fabric outside of the historical scope begin to lose the clear city limits - and the limits of the surrounding area (Fig.86, Fig.87). In this way, city loses the historical concept of the closed city - since it opens up the hinterland and the sea, creating entirely new spatial relations.

4.2.4 The nineteenth century

4.2.4.1 The social and economic situation

A characteristic feature for all of the investigated cities is that in the early nineteenth century they came under Napoleonic rule. [38] For Rijeka, Zadar and Split this meant a change of rulers, while for Dubrovnik it marked the end of its independence, since the Republic of Dubrovnik was abolished. Dubrovnik had the most to lose due to this occupation, and besides the collapse of its own republic, it came to see the city space outside of the city walls burned and ravaged by the Russian-Montenegrin Siege (Vuković, 2000).

The French organised the region with the centre located in Zadar, where the governor general resided. This town became the judicial centre, finance and mail centre, hospitals were constructed, education evolved, but it still retained a defensive role (it still remained a fortress) (Stagličić, 1996).

With the construction of schools and hospitals, Split experienced a partial improvement of living conditions (as well as Zadar), and during French rule experienced the greatest structural changes amongst the investigated cities. As Marshal Marmont razed the Split fortifications which could no longer provide a defence before the threats of the British and Russian fleets (Grgić, 2004; Muljačić, 1958; Marasović, 1997), many changes were undertaken in the structure of the city, and the city is joined to the common suburbs in Split. A change of social relations was strongly present in Zadar and Split, since balancing the citizens on the parvis and official towards the state strengthened the civil class (in Dubrovnik and Rijeka it had already strengthened earlier) (Vidaković, 2001).

After Austro-Hungarian rule, Rijeka came under the rule of Napoleon, hence its situation became unstable. French authority ceases in 1812, and the city is attacked by the British who bombed urban space in 1813, and then robbed government reserves.

This was a period of regression for Dubrovnik. The republic period brought better living conditions in the city, which possessed an established municipal legislation, while changes during French authority mostly related to the conversion of the city into a military base, and the whole town becomes subordinate to military functions. Although the city backtracked, in this period there is the development of road infrastructure, because maritime travel became unsafe. Due to the dissatisfaction with its position, Dubrovnik in 1813 started an uprising, which resulted in the termination of French authority[39] (Vuković, 2000).

After France, all the cities came under Austrian rule. In 1813, Zadar, Split and Rijeka 1813 become part of the Austrian Empire, and Dubrovnik a year later. In this period, a characteristic process as in other parts of Europe had already begun in the previous century, that is, the centralisation of economic power, political and cultural life in the

---

[38] Zadar under the rule of Napoleon came in 1805 in peace to Požun (Vidaković, 2001), with Split following in 1806 (Muljačić, 1958). The French army passed through Rijeka in 1805, but it was conquered by Marshal Marmont in 1809 (Klen, 1988). The French entered Dubrovnik in 1806, and Marshall Marmont abolished the republic in 1808 (Klen, 1988).
[39] Napoleon then lost power in other parts of Europe as well (Vuković, 2000).

metropolises. This role is assumed by Zagreb, therefore the investigated cities, especially Zadar, Split and Dubrovnik develop more slowly than the new continental centre. [40] However, as in most European cities of the nineteenth century, the investigated urban centres outgrow the limits of their walls and bastions, opening up to the sea and the surrounding area and thereby trigger the establishment of suburbs, which are included in the city territory (Milić, 2006). The port and industrial areas of the city experience development (with the exception of Dubrovnik, industry develops not until the twentieth century).

During the first half of the nineteenth century, Zadar was still a fortified city, having demobilised as late as 1868 when authority was handed over to the municipality. This led to the destruction of parts of the defensive system, considered an obstacle to further development (Stagličić, 1988). The city also changed its physical appearance, and as this meant an increase in population and a need is created for residential space, many apartment houses were built in accordance with trends present in other European cities mentioned by Mumford (1988). [41]

The first half of the nineteenth century was marked by economic stagnation in Split (some authors note that Austria favoured Trieste and Rijeka) (Duplančić, 2004). With Vitturius' and later Bajamonti's development policy, Split is more intensively developed and constructed during the fifties (Muljačić, 1958). In the second half of the nineteenth century, industry developed, with the most important building being the First Dalmatian Cement Factory, which represents the foundation of the industrialisation of Solin Bay (Marasović, 1997). Industrial development pushed the construction of the railway line in 1877.

In the case of Dubrovnik, the transition to coming under Austrian rule was more difficult than in Zadar and Split. The Austrian army entered the city in 1814 and removed Dubrovnik authority which was established in uprising. In 1816, Dubrovnik was annexed by the Austrian Empire (Vuković, 2000; Milić 2006). The formation of a new government meant that Dubrovnik found itself at a disadvantage, because it became a city with an exclusively military role, [42] a reason for dissatisfaction felt by the inhabitants. Given that Dubrovnik was devastated by the Russian-Montenegrin Siege, its fleet and commercial activities began to wane, and with the reduction of cash deposits in the Italian banks and the French looting of the city treasury, the city finds itself in a difficult situation (Viteleschi cit. by Ćosić, 2003; Vuković, 2000). After a long period of affluence, a similar fate as with most Croatian cities befell Dubrovnik. However, Viteleschi notes that even then there were intellectual salons incomparable with its size (Viteleschi cit. by Ćosić, 2003). Dubrovnik's economy continued to develop in the second half of the nineteenth century and was based on the development of a modern maritime business and shipbuilding, and leading to the development of the Port of Gruž harbour (Milić, 2006). This is even more evident after Dubrovnik was declared an open city in 1886 (Vuković, 2000).

For Rijeka the period of the nineteenth century was a period of many changes in the social and political scene. It has already been mentioned that it changed governments a number of times, so after Austrian, French and again Austrian rule, in 1822 it became a Hungarian

---

[40] Until the Baroque period, Zagreb was a smaller city than the other investigated cities in question (Milić, 2006).
[41] Chapter 5
[42] This function was given to it by the French authorities

126

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

port (Polić, 2009a, 2009b). In the first half of the nineteenth century, it went through a difficult period for trade in Rijeka as it was burdened by customs duties, and the fact that Austria favoured Trieste, meant Rijeka was lagging behind. Its position changed when in 1829 with the establishment of the trade deputation, which fuelled the development of Rijeka stores. Abolition of road tolls and the development of rail transport contributed to growth of the economy that relied on Hungarian capital (Crljenko, 2009; Polić, 2009a, 2009b), hence shipbuilding and industries developed. [43] The original shipyards of the eighteen-thirties were located outside the city, and were later relocated to the east and west of the old city, because port facilities were being developed there. Easing customs loads Hungarian products, forties occur shareholding company and established bank. So 1843.g. Rijeka has sixty-two large and small factories (Crljenko, 2009.). In 1848, Rijeka becomes part of the Croatian Ban, and a year later Croatian authorities founded the Rijeka County. The Patrician class did not accept the Croatian authorities, so they called in a number of historical sources pro-Hungarians (Polić, 2009a, 2009b). Hungary had a stronger impact on the Habsburg court, and Franz Joseph I handed over the city to the Hungarians.

With the falsification of the Croatian-Hungarian Settlement 1868 (Polić, 2009a; Klen, 1988), Rijeka came under the administration of the central Hungarian government as a special political body - *Corpus separatum* (Glavočić, 2002). Rijeka became an enclave of Hungarian capitalists, and the last decades of the nineteenth century were marked by major Hungarian investments (Police, 2009; Glavočić, 2002). It becomes a major Hungarian port linked by rail transport routes to Pešta. Although Austria was trying to slow the development of Rijeka,[44] after the Hungarians bought out the railroad line, relations with Trieste from 1880 changed. The coastal area was not becoming an area of port facilities and warehouses, and it saw the development of processing industries. The limiting factor was its dislocation from the hinterland area, which affected the development of its elongated urban fabric. Rijeka's development also affected the development of Sušak, which in 1877 became a municipal centre (Klen, 1988; Matejčić, 1988) and a strong centre of Croatian influence, while with the arrival of Frane Supilo it became a centre of an awakening of Croatian national consciousness (Klen, 1988).

---

[43] In Rijeka, some of the business operating were a paper factory, tobacco manufacturer, mills, factories making ropes, anchors, chains, leather manufacturer, wax factory
[44] Imported products from the Rijeka port were more expensive than those from Trieste.

4.2.4.2 Structural characteristics of the investigated cities

A characteristic of the nineteenth century is that it led to a change in the city's structural characteristics. Cities open up to the surrounding area, and the closed urban structures become open cities that spread to the surrounding landscape. From cities formed as nuclei, they were transformed into scattered urban agglomerations (Fig. 108, Fig. 109, Fig. 110, Fig. 111), and since Rijeka had already lost its walls in the eighteenth century, this process begins even earlier. Split and Zadar during the nineteenth century saw the demolition of their defensive systems, given that they were considered an obstacle for the future development and expansion of the city, as was often the case in other European cities mentioned by Mumford (1988) and Choay (1969). [45] Dubrovnik, however, never lost its walls, but began the process of expansion in Renaissance times, and during the nineteenth century, this process continued.

Given that Zadar got a central function in Dalmatia, it developed into an administrative and cultural centre, experiencing an increase in the number of inhabitants. Its limitations were tied to isolated accommodation on the peninsula and the walls that separated it from the surrounding area (Vrančić, 1997). What was once considered a benefit, now became a disadvantage. At first, it increased filling in the remaining open plots in the city, and is built in a vertical direction (Arbutina, 2002). Appearing on the Zadar walls and fortresses are green park areas typical of the nineteenth-century city. According to the practice that takes place in other growing cities, after being declared an open city in 1868, Zadar demolishes parts of its walls. First, the defensive walls facing the channel are demolished, and replacing them is a promenade foreshore that is filled. On account of small unattractive houses created the city's façade, soon a new series of tenant housing was built[46] (Stagličić, 1988). Their construction was carried out gradually with the unconstructed spaces landscaped with greenery, with the promenade becoming a favourite walkway and the meeting place (Petricioli, 1991).

Although the walls of Zadar randomly destroyed, a city in the nineteenth century was essentially out of the historical framework (Stagličić, 1988; Petricioli, 1959). The Austrian government has not significantly altered the structure of the city because there was no possibility of the implementation of typical procedures that period, and their expression remained at point-form grandiose buildings prisons and barracks (Petricioli, 1959).

Unlike Zadar, Split in previous centuries had a formed city suburbia located along the walls and the after the demolishing of the defensive system, the suburbia merged with the old city. The demolition of the walls happened at the very beginning of the nineteenth century under French rule, so it was that the Split fabric during the nineteenth century began the further process of expansion and integration with the surrounding area (Sirišćević, 1958). The city at the end of the nineteenth century encompassed a greater part of the area. In places where the walls were, first, parks appear, and with their subsequent development, structures are constructed on them making the city blends into the suburbs. Thus, the green barrier that separated the old from the new part of the city during the nineteenth century disappeared. The grid depicting development of the surrounding metropolitan area at times followed the grid of Roman centuries, sometimes resulting from

---

[45] Chapter 5.
[46] Fourteen four-storey buildings were constructed.

the radial lines drawn from the fender, but the space was most often developed spontaneously (Fig. 112, Fig.113, Fig 114). However, then the city spreads primarily along the lesser slopes, with expansion linked to the geomorphology. This unplanned development of the city was initially less dense than within the former fortification system, because there was more room for construction, subsequently creating a contrast. This achieves a different relation of the constructed and unconstructed areas of the old town and the surrounding area. At the end of this period, the structure of the surrounding area becomes denser filling available free spaces. Disorderly development of the city led to the creation of the regulatory plan (not preserved).

What Split and Zadar experienced in the nineteenth century, Rijeka had already experienced in the past, and it was during this period that integration with the surrounding space occurred in a lengthwise direction. During the nineteenth century, the city developed from a coastal town into a city that looked like central European urban centres (Matejčić, 1988). The city formed an elongated coastal facade creating a longitudinal settlement without deeper penetration into the mainland that was marked by steep slopes, while the roads along the contour divided the city into layers. Such forms occurred probably to avoid construction on steep slopes, but also because the city's dislocation from the less developed hinterland region, and which was not under the same ruler (Crljenko, 2009). Construction took place by creating an embankment in front of the old town, hence buildings were built in series in front of the old urban area and west of it, following the directions of the one-time Roman lines in space (Fig. 115). This formed a new relationship between the open and constructed areas of the city, but influenced by ancient structural features. On the Rječina, industrial plants sprouted, river was diverted, and its original flow regulates the port in a dead channel. The last two decades saw the city expand westward, and the industrial zone was positioned next to the sea on the filled foreshore (Klen, 1988, Matejčić, 2000). Due to the large influx of new inhabitants, new residential districts were established. There was also a regulatory plan, but it did not define the development of Rijeka because it there was a lack of agreement on accommodating the industrial and port areas. Therefore, the building ordinance dating to 1859 was important for the development of the city, and the partially made plans for certain areas. Although the urban plan was created 1898, it came into force too late since devastation of parts of the old city due to the immigration of a new population had already occurred (Klen, 1988).

Dubrovnik in this period developed outside the city walls. With a road route that went from the wall through Pile and Boninovo to Gruž, it created a new city area (Vuković, 2000; Šišić, 2003). So it happened that French rule was a period when integration of the city and its suburban areas occurred in the same administrative entity (1811), although the walls were not demolished (Vuković, 2000). Austrian rule was marked by repairs to existing buildings and road infrastructure, and devastation within the old city walls (Beritić, 1958; Viteleschi cit. by Ćosić, 2003). The short-term imperial style of the French was replaced by Baroque Classicism, but as there is no place for it, and there are no funds for more representative structures, construction becomes more modest (Vuković, 2000). This also led to the preservation of the harmony and authenticity of the old city, where construction follows a historical style, and at the same time, preserving the former relationship and structure of constructed and open urban areas (Horvat Levaj, 2000). Urban fabric develops within the already established network, with previously determined divisions and dimensions, while the area around the Renaissance suburbs of Pile and Konal became

denser. This residential zone still retains the former structural character, since (relying on inherited experience) new buildings erected in the gardens of villas have smaller gardens. This puts the principles of construction of former times, visible in the relationships constructed and unconstructed (green) space. Thus Pile and Konal district kept a few centuries old, planned historic garden space, which in the 19th century becomes an equal part of the city, and in contrast to dense fabric within the walls (the contrast is reflected in the concept of relationships between open and constructed surfaces, because in the old town it was conceived of the constructed and unconstructed non-green fabric, and outside the walls of the constructed and green fabric).

Gruž becomes a new city harbour with shipyards, modern foreshore, berths for steamboat, taverns and hotels (Milić, 2006). Industrial activity will in this part of the city develop only in the twentieth century, with the coming of the railway. Thus, some authors mention that Dubrovnik became a bipolar city, developing like two urban fabrics separated by two bulwarks and marked by a different structure, and the relationships of open and constructed areas. Although numerous public functions of the city are relocated to a newer part of town, in the old part the administrative functions remain (Vuković, 2000; Šišić, 2003).

4.2.4.3 Presentation and analysis of structural characteristics in investigated cities in the nineteenth century

Figure 110. Showing city of Zadar in the 19th century (Petricioli, 1991:69)
Slika 110. Prikaz Zadra v 19. stoletju (Petricioli, 1991:69)
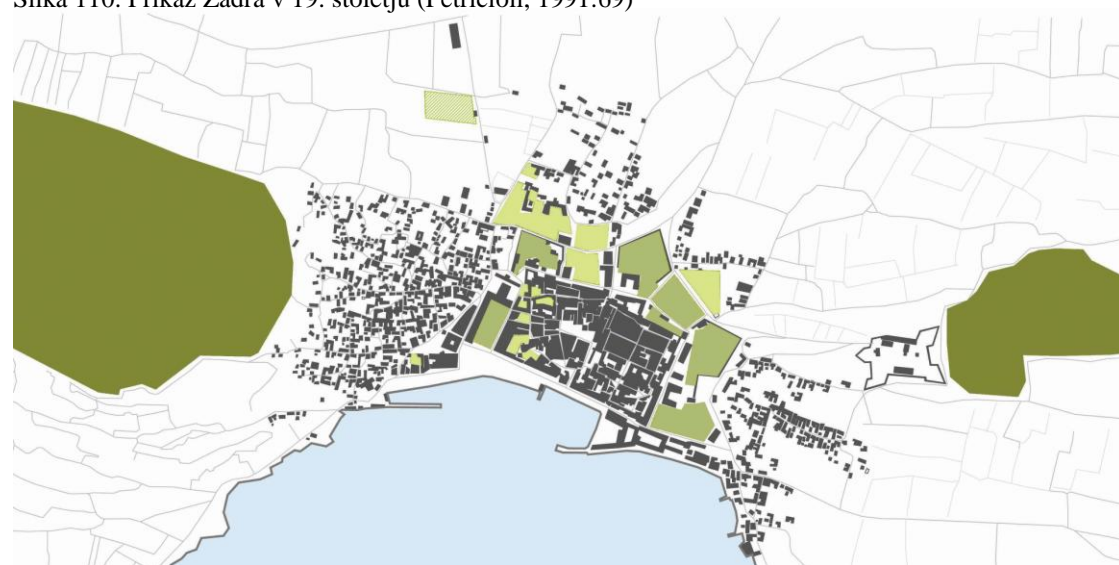
Figure 111. Showing city of Split in the 19th century (cartographic base:Situation plan Split from 1846, 2009a)
Slika 111. Prikaz Splita v 19. stoletju (kartografska podloga: Situation plan Split from 1846, 2009a)
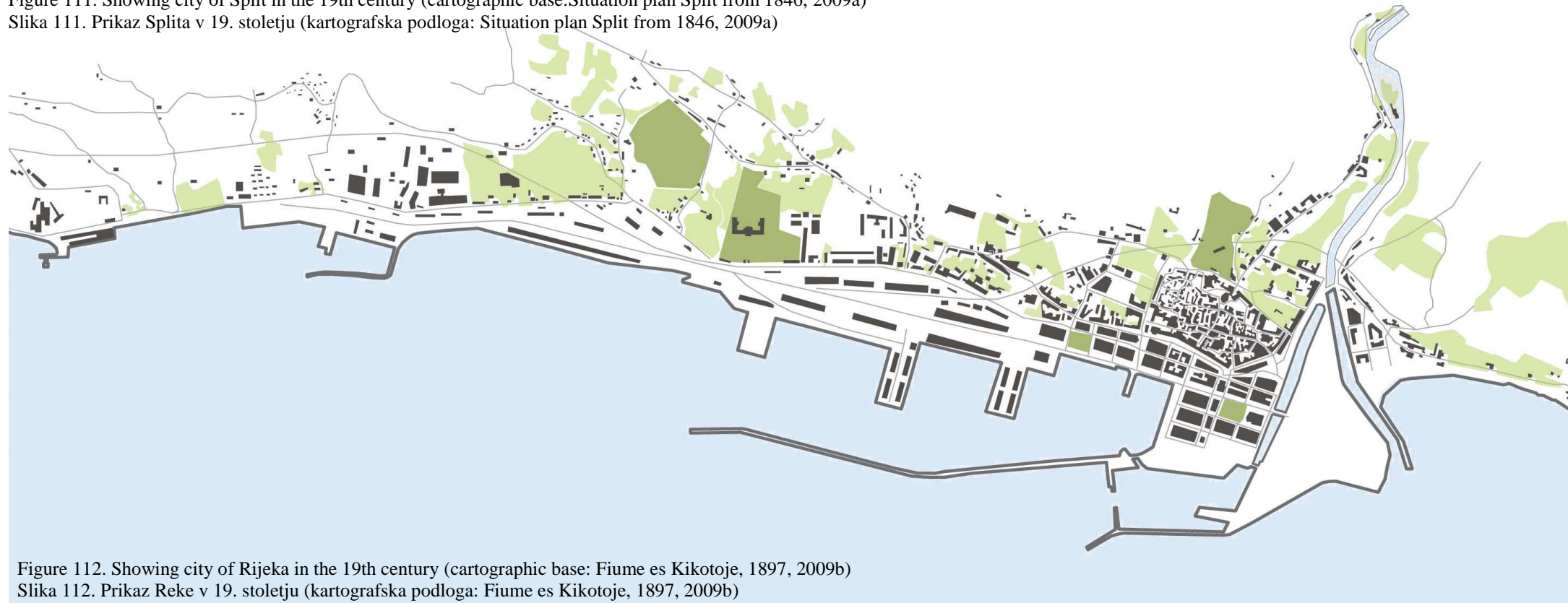
Figure 112. Showing city of Rijeka in the 19th century (cartographic base: Fiume es Kikotoje, 1897, 2009b)
Slika 112. Prikaz Reke v 19. stoletju (kartografska podloga: Fiume es Kikotoje, 1897, 2009b)

Figure 113. Showing city of Dubrovnik in the 19th century (cartographic base: Austrougarska karta, 2004)
Slika 113. Prikaz Dubrovnika v 19. stoletju (kartografska podloga: Austrougarska karta, 2004)

Analysis of anthropogenic influences on structural characteristics in investigated cities

Figure 114. Former centuriation around Split as the basis for new linear elements of the city (roads)
Slika 114. Nekdanji centuriji okoli Splita kot osnova za nove linijske elemente mesta (ceste)

Figure 115. Roads of the new fabric of Split under the influence of a stellar fortress
Slika 115. Ceste nove strukture Splita pod vplivom zvezdaste trdnjave

Figure 116. Showing line which is the basis for Diocletian's palace
Slika 116. Prikaz linij, katerih osnova je Dioklecijanova palača

Figure 117. Rijeka urbanism that follows lines from the Roman Tarsatica
Slika 117. Reški urbanizem, ki sledi linijam iz rimske Tarsaticae

134

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.4.4 Urban open spaces

As mentioned above, besides the old squares within the old urban fabric, playing an important role in the city space were the new city structures, parks and promenades. These features introduced new elements into the urban area accompanied by an expressly different character, and their more or less systematicity, we can see the beginnings of first ideas concerning urban green system.

In Zadar, besides the squares that were established in the previous period, [47] there are also parks in bastions (Fig.116). Unfortunately, demolition of bastions is the reason for some of the parks disappearing, but southwest at the location of the wall a promenade is created, i.e. the Riva (Fig. 117). With the onset of a more dense urban fabric, some of the open urban spaces are lost, but the most important survive. The first public green urban was the Zadar botanical garden founded in 1807. However, as it was demolished as early as 1813 in the war between France and Austria, it only existed for a short period of time in the urban fabric of Zadar (Petricioli, 1991). The first public urban park was founded in 1829 on the the bastion Grimani. Although the city of Zadar remained a city of primarily defensive character, the development of parks showed an awakening awareness of the importance of public green space in urban life. As this was an area with a café and podium, it became an important gravitational point in the city, [48] and today remains part of the urban fabric. In addition to that, two more parks were found on the bastions. In 1864 on the bastion of Moro, the Mali perivoj (eng. Small Park), within which another cafe was located (Petricioli, 1991; Milić, 2006; Arbutina, 2000). Up to the present today, this green urban area is survived only to a smaller extent. At the bastions of St. Rocco, in 1869 the Wagner Park was founded with views of the harbour, and which was reduced on account of the construction of other city elements on several occasions during the twentieth century. The Trg tri bunara (eng. Three Wells Square) became a park in front of the theatre in 1885. Though it may not have retained its integrity, it is still part of the urban fabric. Coincidently, the semi-bastion castle is landscaped with greenery. Between 1888 and 1890, the most important urban park in the city fortress appeared, which although it under the administration of the army, it was open to the public. One part of the Citadel bastion also functioned as a park (Petricioli, 1991).
Demolition of the walls led to the expansion of the city outside the of then city scope, hence Zadar begin to spread outside the peninsula, leading to the construction of residential buildings and factories in the areas of Voštarnica and Brodarica (Petricioli, 1991). The above mentioned indicates that completely different relationships within the urban fabric through various relationships are created between the constructed and open areas (which become green space elements).

Using the example of Split, it is evident that at the beginning of the nineteenth century, private gardens begin to appear, with the first appearing in 1808 at the former site of the Bernardi Bastion (Jardin de mr. Bernardi Alexander). A similar situation occurred in the east side of the Venetian castle, where the Jardin de mr. Joseph Andric is established, which even

---

[47] See Chapter 6.3.
[48] Since it was customary in Zadar as a city-fortress for the town gates to be closed following the ringing of the bells, no one was able to leave the city, so this garden most certainly became an important place for stays and walks.

135

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

today exists as unused green areas. Though they were private gardens, they represented the initial development of green areas at the location of the defence system, which through later developments evolved into public urban areas (Fig. 118). Thus, at the Bernardi Garden the Vid Morpurgo Field was founded which today exists as a public urban area in the form of a smaller square. The first public park, Marmont's Garden, was set up between 1808 and 1810 with the demolition of the San Antonio Bastion, called Šperum.

Soon this space decreases in size (1831), and finally destroyed with the construction of the Bajamonti Theatre in 1859 (Marasović, 1997; Grgić, 2004). Still today, in its place is an open urban area, occasionally used for events as part of the Prokurative. Another public park in Split, the Strossmayer Park, was built on the site of the void created by the destruction of the connecting wall between the Cornario and Contarini bastion (Grgurević, 2002). The town plan from 1847 shows that this space functions as a city park, and continues to exist today in the urban fabric with the same function. At the site of the Civran, Priuli, Contarini, San Giorgio bastions, and between the Baščun and Cornario fortresses, private gardens were set up, some of which have survived to the present as public areas of the city (e.g. Split fish markets). The relocation of the theatre, between the Bašćun Fortress and the Church of Our Lady of Health, led to the formation of the Trg na Dobrome (eng. Square on the Good, or now Bulat's Square). As was the case in Zadar, during the nineteenth century, the foreshore was constructed, i.e. the Split waterfront, within which in front of the the Prokurative a square appears (now called Trg Franje Tuđmana or in English the Franjo Tudjman Square). Squares within the old town nuclei have the same role as before, though some change their spatial and peripheral coverage, such as the Narodni trg (eng. the People's Square). With the opening of the old gates (*Porta Aurea*) in Diocletian's palace in the old town section, important communication at the former *cardo* site is once again re-established, which is extended and creates a link to the foreshore (Marasović, 1997). Thus, the role of the Peristyle within the urban fabric develops even further. Pazar also appears, a newly opened market place along the eastern boundary wall of the former palace.

A significant event for Rijeka is the relocation of the gravitational point in the eighteenth century, reducing the role of the historic central city square during the nineteenth century even more. In Rijeka, and in other investigated cities parks appear, but not in the places of the old forts (Fig.119). The first urban park did not appear until 1875 - called Giardino Publico (now Park Mlaka). It was planned as a space at the crossroads of two urban zones, i.e. between the old and new town sections, and as it contained a cafe and tavern, it was certainly an important gravitation point in the city.

In 1885, Rijeka got a Kazališni trg adjacent to the market square which originated in the early 19th century (Matejčić, 1988), while during the second half of the nineteenth century, a number of park areas appeared which were tied to particular public structures. These include the park in front of the Imperial Maritime Academy (now Rijeka Hospital) set up on the property of villa Cotta in 1857, the park of the governor's palace from 1896 and Meyner House Park. At the end of the 19th century, the urban fabric of Rijeka was supplemented by another park - the Park of the Habsburg Archduke Joseph (now the Nichola Host Park), but as it stood in front of a private structure, it was opened on Sundays for the public. Mentioned here are also those private green spaces which in the twentieth century become important elements of public city life.

In keeping with the new trends in urbanism of the nineteenth century, besides the existing public open spaces within the old city, in 1817 Dubrovnik received a tree-lined promenade outside the walls (at Pile). It was joined to Placeta, formed in 1830 in the area of French military training grounds (Place Clausel). As tourism started to develop in Dubrovnik, Pile became an important transport node, as it was the entrance to the old town, during the seventies in the location of Placeta it was the first public park Theodorapark (Theodora's Park) appears. The park was for a short period part of the urban fabric, disappearing with the construction of the Imperial Hotel in 1897 (Fig.120) (Šišić, 2003).

For the needs of the population living within the city walls in the period from 1889 to 1898, the Dubrovnik inhabitants reconstructed the Island of Lokrum into a public green space for the citizens, a place which will become significant only in the early 20th century. Lokrum is reconstructed with the idea of becoming a park for the population living within the old city area as there was no room for a park area within the urban fabric (though green spaces within the old urban fabric existed, they were mostly privately owned). This idea represents a shift from the other examples investigated, because it creates a green element incorporating the kind of satellite concept. Given the fact that Dubrovnik does not demolish its defensive system, there are no unutilised areas which were converted into parks as was the case in other cities. Therefore, due to the apparent lack of free space next to the old town, in 1898 the public park Gradac is formed, located some distance from the old town nuclei along the coastline to the northwest. Perhaps it is because of the location that it has been preserved to this day representing one of the most important green urban areas, which even today defines the relation of the periphery of constructed space towards the green coastal zone.

It could be said that this is a period of the characteristic creation of certain systemic features in open public spaces, which we can link with today's urban trend which brought about an awareness of the idea implying a systematicity in urban green areas. Within its defensive system, i.e. the bastions, Zadar developed green park spaces, which created a certain belt around the constructed fabric to form a ring-like of circular structure. It is actually this ring structure that can be an important feature of a green system in a contemporary town. In Zadar it was derived from forms inherited from the defensive walls. Although the most important gravitational points remain those from the previous period - squares, parks and new promenade foreshores differentiate the typology of open urban space and complement them. As most parks formed in the nineteenth century survived in the bastions, whereas the walls between them were demolished, they have survived up to this day. Maybe they were one of the reasons the defensive structures in Zadar were retained.

In Split, the demolition of the defensive system created new open areas, which in the role of parks and gardens, received a system inherited from the walls. Structurally, the city of the nineteenth century consists of several belts or zones, including the first one and the oldest representing dense urban fabric. It is encompassed by the second belt, which is formed by a ring of green urban spaces, typical of many other European cities, carrying the idea that would later evolve into just one of the forms of a green system. The third part is the loose structure of the former suburbs, which extend into the surrounding landscape (older - Lučac in the east and the in west, Veli Varos, later - Dobri and Manuš in the north) with which Split merged upon demolishing the walls. Conditions for extending the third zone were definitely determined by geomorphology, because the built up spaces are surrounded by Gripe and Marjan. Thus, in the nineteenth century, Split opens and expands to the surrounding landscape.

As Rijeka lost its walls in the eighteenth century, a period when the public urban park in the urban fabric were a rarity, there was no process of creating parks like in Split and Zadar (whose walls were demolished at a time when forming parks in the respective locations was almost an urban trend). Thus, in Rijeka, parks are created as rarer dotted elements evenly spaced along the urban fabric possessing an exemplified linear course. This led to forming the basic idea of allocating elements that now make up the green system in Rijeka.

In Dubrovnik, it is evident that the former pace in developing urban space had slowed down, and this is reflected in the development of open areas. Characteristically, the promenade is a continuation of Stradun (the main street) in the suburb, and that it the base according to which the first urban park is developed (on this side of the city a second city park is formed). Consequently, this historic open space possessing a linear character establishes the course of extending the newer parts of the constructed and open urban areas.

Given that people were increasingly involved in industrial activities, and less increasingly in agriculture, they ventured less and less into the countryside, so park areas serve as a replacement, becoming necessary urban spaces. The city is no longer introverted, but begins to open towards its surrounding area. Squares, the former open urban areas, still survive as a very intense gravitational point, but this leads to the creation of new categories of open urban areas (the park, foreshore promenade, beaches), it is relieved since some of their former functions are taken over by other urban spaces. Open urban areas that do not possess a green character, continue to be tied to the space within the former or existing city walls, while new green forms of external urban spaces (parks) occur on the periphery or outside the historic zone, which is often linked to the then still semi-agricultural surrounding landscape.

The dispersion of the urban fabric in the surrounding area, and the penetration of greenery into constructed urban fabric, leads to the loss of a sharp demarcation with the surrounding landscape. The cities that originated on the mountainous hinterland areas firstly spread to flatter and only later to the slope areas. Hence, those areas with large slopes survived as unconstructed urban areas, i.e. remaining an important resource for the later development of the city, i.e. its open elements (the very steep sections are not even built up in later periods, so they represent potential elements of green system). Therefore, we conclude that geomorphology was an important factor in the creation of open space within the urban perimeter, and was a contributing in the creation of elements belonging to a potential green system. Coincidently, landscape elements such as roads and lines of centurations dating back to Antique times, are converted into building elements of the urban fabric (most often the road), thus preserving the historic lines and spatial structures.

In this period, cities begin to open to the sea, because zones are created in which inhabitants have a direct contact with the foreshore. This is most evident in Split and Zadar, where the zone of contact with the sea becomes a public urban area - promenade, i.e. waterfront.

138

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.4.5 Presentation of the area within the investigated cities
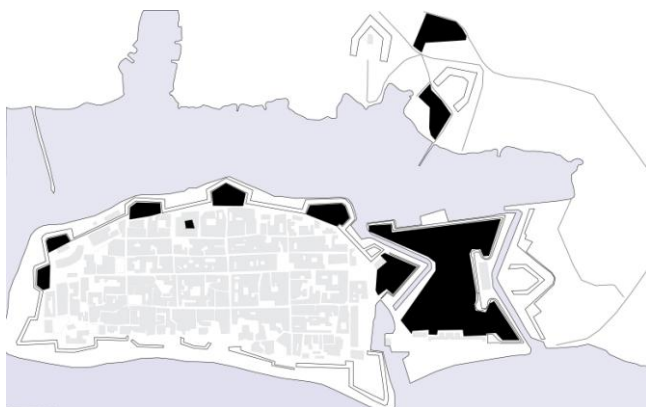
Figure 118. Showing parks in Zadar at the start of the 19th century
Slika 118. Prikaz parkov Zadra na začetku 19. stoletja

1. Blažeković Park (1888 -)
2. Main public park (1829 -)
3. Mali perivoj (park) (1864- 1889)
4. Wagner Park (1869 -)
5. Kaštel semi-bastion (1885-)
6. Space in front of cathedral
7. Park on Novoj obali
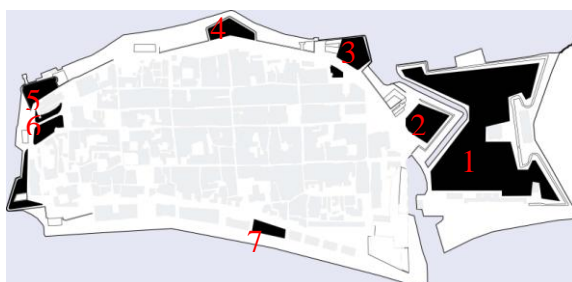
Figure 119. Showing parks in Zadar at the end of the 19th century
Slika 119. Prikaz parkov Zadra na koncu 19. stoletja

1. Jardin de Mr. Joseph Andrich
2. Jardin de Mr. Alexander Brand
3. Private parks
4. Marmont Park
5. Parks De Rossi
6. Family Park of Karaman
7. Botanical gardens
8. Strossmajer Park
9. Gardens
10. Private gardens/Gimnazija realka
11. Small Park
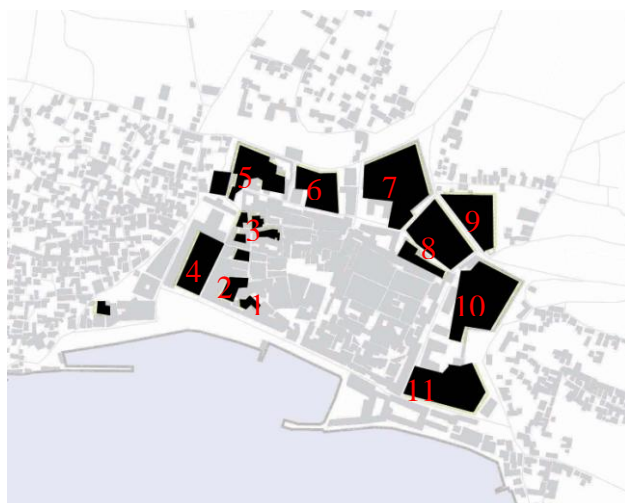
Figure 120. Shows parks and green areas in Split in the 19th century
Slika 120. Prikaz parkov in zelenih površin Splita v 19. stoletju

1. Giardino publico
2. Theatre park
3. Park in front of Imperial Maritime Academy
4. Park of the governor's palace
5. Park of Archduke J. Habzburškog

Figure 121. Shows parks in Rijeka in the 19th century
Slika 121. Prikaz parkov Reke v 19. stoletju

1. Theodorin park
2. Park Gradac
*did not exist at the same time
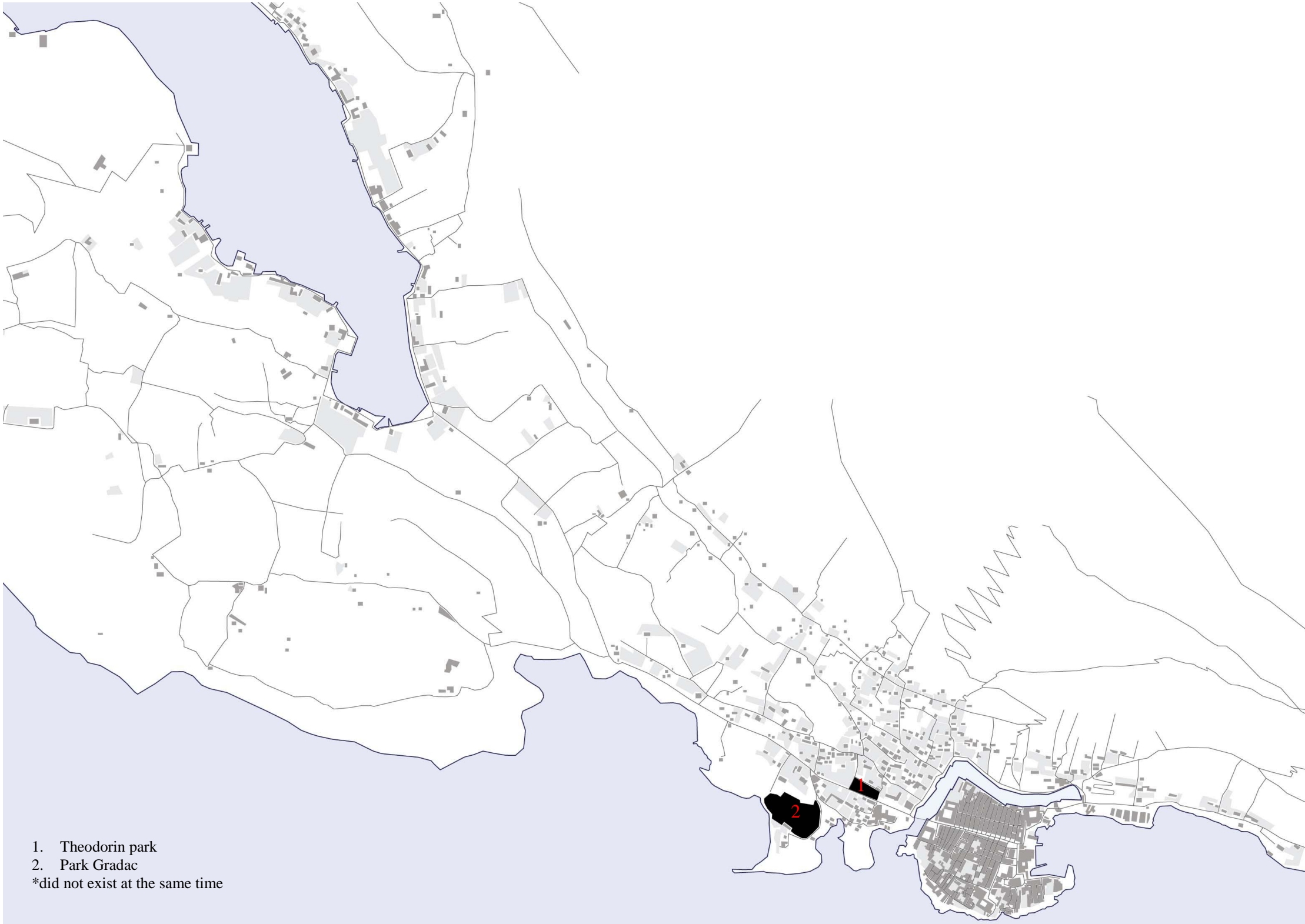
Slika 122. Shows parks in Dubrovnik in the 19th century
Slika 122. Prikaz parkov Dubrovnika v 19. stoletju

141

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.4.6   Presentation of all open public areas in investigated cities in the 19th century

■ parks and gardens (which are or could become public spaces later)

■ squares and foreshore walkways

Figure 123. Presentation of all important open public areas in Zadar in the 19th century
Slika 123. Prikaz vseh pomembnih odprtih javnih površin Zadra v 19. stoletju

Figure 124. Presentation of all important open public areas in Split in the 19th century
Slika 124. Prikaz vseh pomembnih odprtih javnih površin Splita v 19. stoletju

Figure 125. Presentation of all important open public areas in Rijeka in the 19th century
Slika 125. Prikaz pomembnih odprtih javnih površin Reke v 19. stoletju
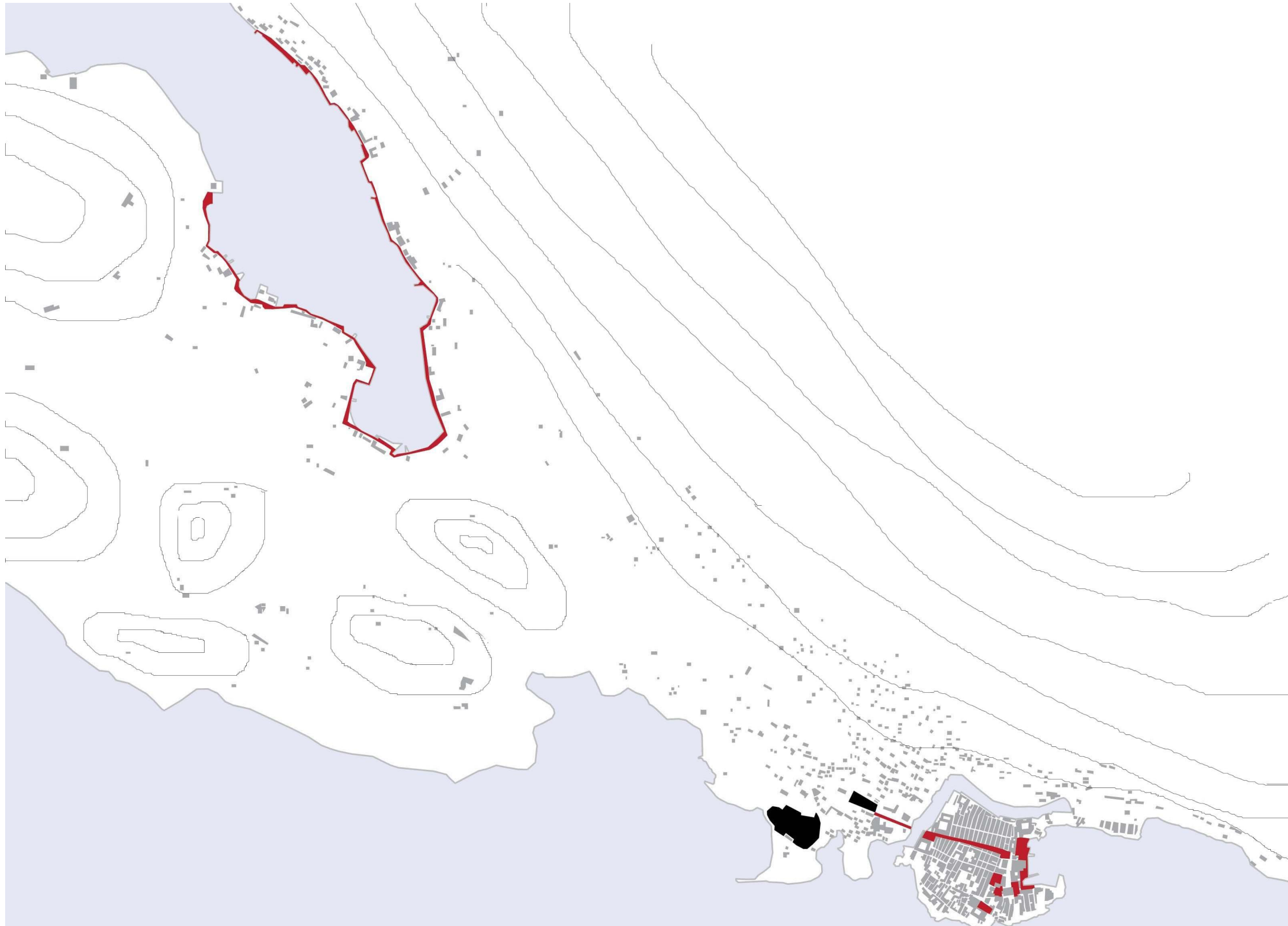
Figure 126. Presentation of all important open public spaces in Dubrovnik in the 19th century
Slika 126. Prikaz pomembnih odprtih javnih površin Dubrovnika v 19. stoletju

4.2.4.7   Analysing the intensity of usage of open public urban areas

The criteria for analysing the intensity of use were determined by reviewing the available literature for each investigated city, and the data on the distance of communication routes and entrances.

Thus for the city of Zadar, it has been determined taking into account that all administrative functions remained on the main square - Narodni trg (eng. the People's Square), it survived as the most intensely used urban space. Given that many authors cite the waterfront as an important new city space which is used as a promenade, we can conclude that even this area had become very intense used part of the city. Other squares were spaces that had specific roles in the urban fabric, and were used extensively during only one part of the day (or week) - the markets, church squares, cisterns at the entry point to the city. This category was to include the main city park, for which literature says that besides being use for daily stays outdoors it was a favourite place because it contained a cafe where dances and other similar activities were held (Petricioli, 1991). It can be assumed that the park, located along the waterfront, was used more intensively than other park areas for which it can be concluded that they were used less intensively (due to its more isolated position and less data on their use available in the literature). This category includes the cistern, located on the west side of the urban fabric.

In Split, the central square retained its central role in the city life of the inhabitants, surviving all the administrative functions of the city. However, to open the north door (Golden Gate, Porta Aurea) of the once Diocletian's Palace, the peristyle became a space located at the intersection of important communication routes, so we can assume that it was an intensely used area. This category includes the waterfront area which during the nineteenth century became an important space for city life. When considering the parks as the most important urban space, the Marmont garden is mentioned, where it is placed in a medium category of intensive usage. Less intensively used areas are the smaller parks that are mentioned as venues, so they probably functioned as places for more tranquil stays.

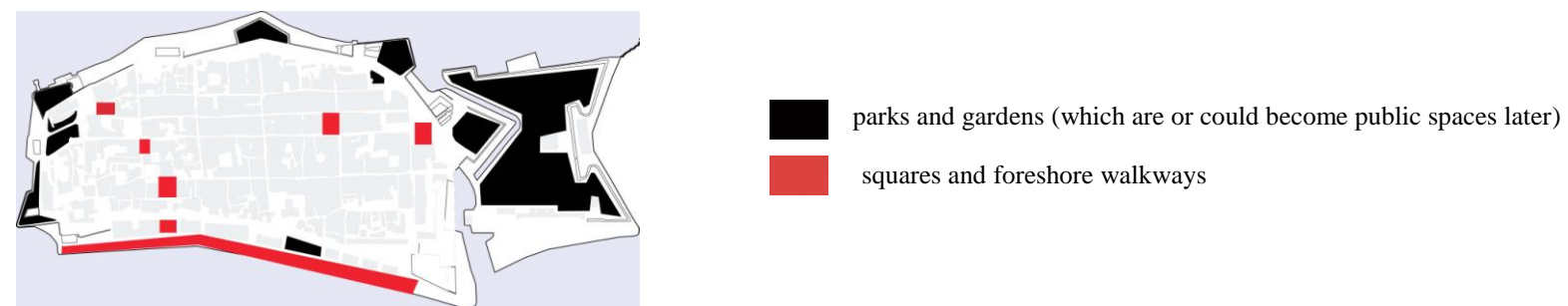The Rijeka areas is characterised in the late eighteenth century by the relocation of the main city functions along the Corso, which became the most important urban space. Former squares lost their importance in the city space, and were included in a category of medium intensively used urban spaces. Falling into this category is also theatre park that is often mentioned in literature, and given that the markets are located next to it, we can conclude that it constituted an important point in city life. In regards to the parks, the most important park was Gairdino publico, often mentioned as the major city park. Other parks and public spaces around the public buildings are mentioned less, and are therefore included in the category of less intensively used urban spaces.

Dubrovnik also retained the most important gravitational points from the previous period, but in literature it is very often mentions public life on Stradun, so along with Luža it enlisted in the category of most intensely used public urban spaces. Other city squares having specialised functions with respect to being used only during only one part of the day (the markets, church squares, cisterns / fountains) have been included in the category of moderately intensive use. Included in this category is the new walkway on Pile and the park that is connected to it (often referred to in the literature) (Šišić, 2003). Given at the

time, that Gruž harbour gains in importance because of its ports and industrial activities, it too is listed in this category. Gradac Park has been included in the category of space depicting less intensity of use due to its position tied to transportation communication, hence it is rarely used for some events, and more as a tranquil place for leisure.

Seeing that Ward Thompon speaks of the park as a central urban area in the nineteenth century characteristic of northern countries, and that the role of cities in the Mediterranean was more conceived on the concept of squares, we can conclude that the researched squares also had this kind of position (Ward Thompson, 2002). In this way, they were able to retain their role from the previous period, which dated back to Roman times (though the position of the central city square had changed through the historical period).
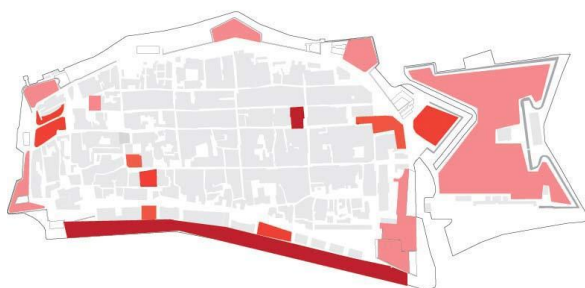
Figure 127. Analysis the intensity of usage of open public city areas Zadar
Slika 127. Analiza intenzitete uporabe odprtih javnih površin, Zadar

■	most intensively used spaces
■	medium intensively used spaces
■	less intensively used spaces

Slika 128. Analysis the intensity of usage of open public city areas Split
Slika 128. Analiza intenzitete uporabe odprtih javnih površin, Split

- most intensively used space
- medium intensively used space
- less intensively used space
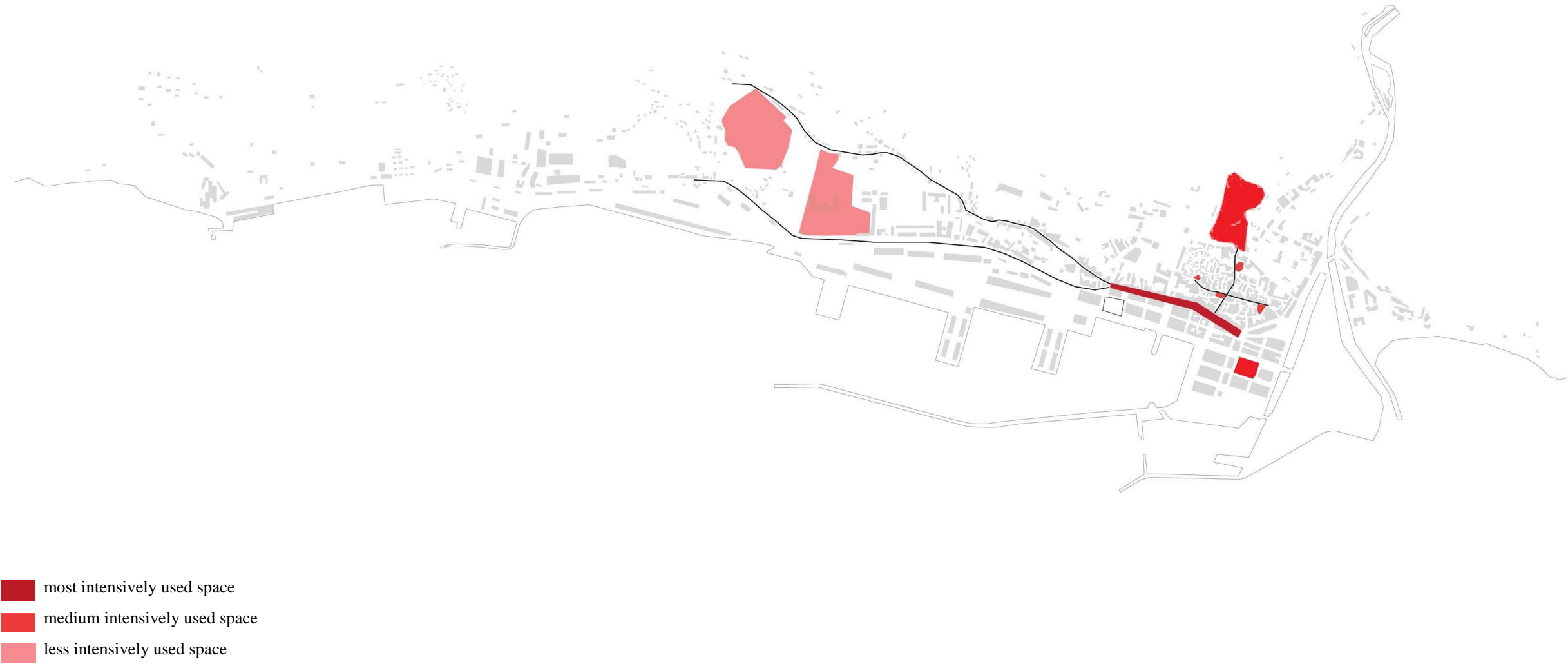
Figure 129. Analysis the intensity of usage of open public city areas, Rijeka
Slika 129. Analiza intenzitete uporabe odprtih javnih površin, Reka

■ most intensively used space

■ medium intensively used space

■ less intensively used space
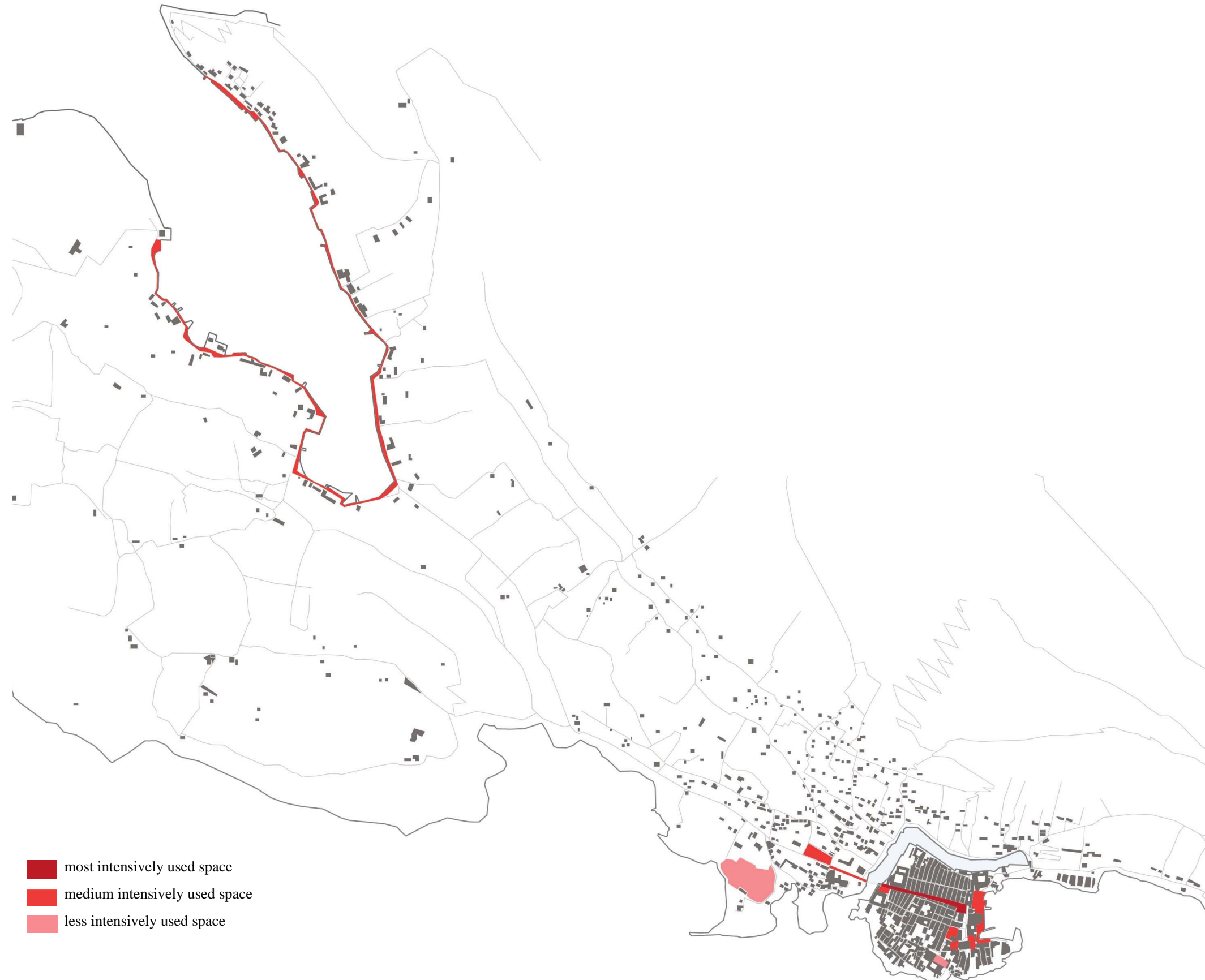
Slika 130. Analysis the intensity of usage of open public city areas, Dubrovnik
Slika 130. Analiza intenzitete uporabe odprtih javnih površin, Dubrovnik

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013
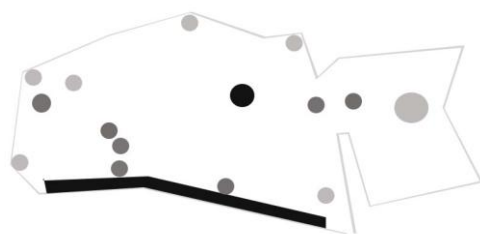
Figure 131. Diagram showing intensity of usage of
open city areas in Zadar
Slika 131. Diagram intenzitete uporabe odprtih
mestnih površin Zadra
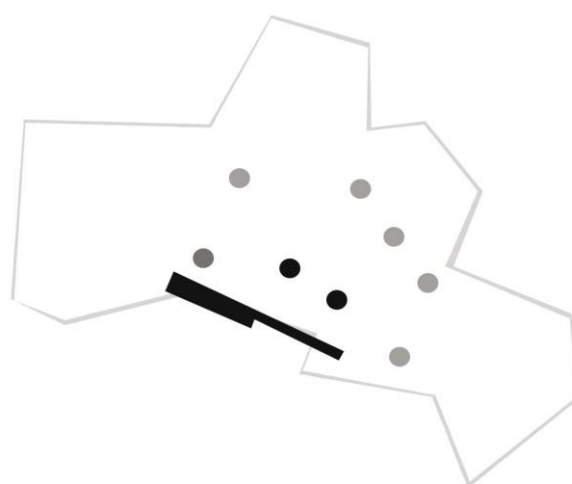
Figure 132. Diagram showing intensity of
usage of open city areas in Split
Slika 132. Diagram intenzitete uporabe
odprtih mestnih površin Splita
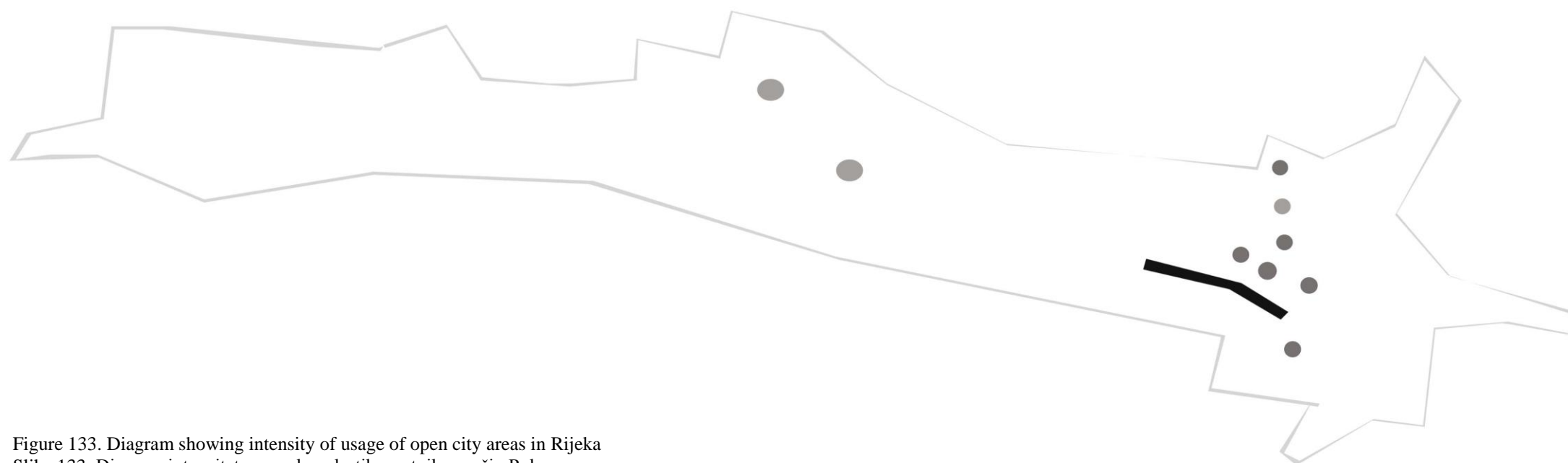
Figure 133. Diagram showing intensity of usage of open city areas in Rijeka
Slika 133. Diagram intenzitete uporabe odprtih mestnih površin Reke

Figure 134. Diagram showing intensity of usage of open city areas in Dubrovnik
Slika 134. Diagram intenzitete uporabe odprtih mestnih površin Dubrovnika

4.2.4.8 Appearance of structural systemic features in the spatial distributions

It has already been mentioned that the phenomena of spatial distribution of park areas occurred in Zadar and Split at the location of the defence system, assuming the form of a ring or circular shape as the system once had. In Split, a situation arises where they are located at sea level, while those in Zadar are formed on the fortresses. The case of Zadar in forming parks is one of the reasons why parts of the defence system are protected since it continued to be useful for citizens. The opening of the city towards the sea for both examples indicates penetration of the walls at that location for the purpose of making contact. In this way, the waterfront becomes another link within the ring. This is an indication that the issue of green rings occurred before the development of the modern idea of a green system.

Figure 135. Scheme showing the Zadar green ring
Slika135. Shema zadrskega zelenega obroča

Figure 136. Scheme showing the Split green ring
Slika 136. Shema splitskega zelenega obroča

4.2.4.9 Relationship of the city towards the hinterland region

It has already been mentioned that the relation of the hinterland area changed completely once the city opened up. The hinterland area was no longer a fixed defined space because the limits themselves are very fluid and flexible. During this period, the hinterland area does not act as a barrier because cities with relief contours (Dubrovnik and Rijeka) still have plenty of room for expansion. Although in the past, the relationship between city and hinterland area was close in a functional sense, in the nineteenth century it also again a structural sense. This means that now a phenomenon characteristic specific to certain areas appears where the demarcation of the boundary of the two entities cannot be determined. In a functional sense, however, the concept of distancing the city from the hinterland appears, since it becomes increasingly distant, making it difficult to access for daily use.

The contrast between the character of the city and its hinterland area is decreased, because parts of the city appear comprising constructed and green fabric, which is a combination of the former features of an urban area (constructed fabric) and the surrounding landscape (green fabric). This leads to a combination of these two once separated entities using the open green areas. It has already been mentioned that parts of the former hinterland area, mostly due to their morphological characteristics, exist as unconstructed and unchanged spaces within the urban fabric, or around the city. This means that the hinterland area left green elements in urban space which become more accessible to the town's inhabitants daily (Marjan Hill in Split, a greater number of hills in Dubrovnik, the tributary Riječina in the Rijeka) or as a resource for the future development of the city (either for construction or as elements of a green system).

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.5   The twentieth and twenty-first century

4.2.5.1   The social and economic situation

All the investigated cities in the early twentieth century still remained an integral part of the Austro-Hungarian monarchy, until the First World War. Though the economy during almost the entire first half of the twentieth century stagnated, industry remained the main economic branch, and was particularly important for Rijeka, Split and Zadar (Klempić Blogadi, 2008; Antoljak, 1994; Pervan and Vekarić, 1958; Kobašić, 2006). In geopolitical terms, dramatic changes occurred in the balance of power on the European continent, which was reflected in our region. So it happened that as a reward for assisting in the fight against the Austria-Hungary Empire and Germany, the Triple Entente alliance based on Treaty of London in 1915, Italy was promised part of Dalmatia, including Zadar. After the fall of the Austro-Hungarian Empire, Italy occupied part of the promise in 1918, and the Treaty of Rappalo meant that with the annexed lands the city of Zadar was also officially granted (Antoljak, 1994). The Italian government meant isolation for Zadar, since the city was separated from its natural environment, but also the cleansing of the Croatian population and migration of Italian inhabitants, which led to a complete demographic transformation (Merčep, 2005; Graovac, 2004).

What characterised Rijeka was that the collapse of the monarchy meant its entry into the Kingdom of Serbs, Croats and Slovenes, causing opposition by the Hungarianists and Italianists, leading to the formation of the Italian National Council, which sought the annexing of Rijeka by Italy. However, in November 1918, Italian forces entered the city, and later that month, British, French and American troops who were supposed to stay there until its status was determination at the Paris Peace Conference. Due to the decision concerning the possible surrender of Rijeka, Gabriele D'Annunzio and his troops on 12 September 1919 occupied the city forcing the American, British and French occupation forces to withdraw. Although D'Annunzio supporters felt that Italy would annex Rijeka, this did not happen. Italy instead began blocking Rijeka, urging the rebels to surrender. [49] At that time in the city, the Fascist regime gains momentum and the Croats are expelled, leaving power is in the hands of the legionaries led by D'Annunzio. Italy distanced itself from his government, and in their conflict in 1921 the city was greatly affected. The Treaty of Rome in 1924 saw Rijeka officially annexed by Italy. From that point on, Rijeka and Sušak located in different countries, preventing its natural connections and communication with its hinterland area, which for Italy meant that it could eliminate it as a competitor to the Port of Trieste. In such a situation, Rijeka became stagnant, Sušak took over part of the Rijeka economy (industries are developed, warehouses are built, cultural activity is intensified). Given that Italians could live in Rijeka, the remaining Croats experienced Italianization. These two settlements will reunite in 1941 when the Italians won Sušak[50] (Klempić Blogadi, 2008).

After The First World War, Split and Dubrovnik entered the Kingdom of Serbs, Croats and Slovenes, but as Zadar remained under Italian rule, Split became the centre of Primorje Banovina (Pervan and Vekarić, 1958). Given the fact that Rijeka was part of Croatia, port

---

[49] The peace conference was held in 1919 and in 1920.
[50] As part of the occupied territory of the Croatian coast and Gorski kotar (Klempić Bogadi, 2008).

152

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

traffic was partially transferred to the port of Split, hence the city develops commercially, and becomes an industrial centre (Marasović, 1997). Dubrovnik finds itself in a situation where it develops its maritime business, that is, maritime trade as an important branch of the economy it inherited from the past.[51]

The period of the Second World War was characterised as a period when all the investigated cities became an integral part of the Independent State of Croatia (ISC) that come under the authority of the Germans[52] (Muljačić, 1958; Graovac, 2004). The cities during the Allied bombing of Split and Zadar were very devastated. Particularly serious consequences were experienced by Zadar, which was the worst affected city in the former Yugoslavia. Rijeka also suffered destruction of the industrial and port complex. After the war, all the towns entered the composition of Yugoslavia and commence works in reconstructing and implementing development plans. This created a strong demand for labour that arrives in from the countryside.

Split five-year development plan, priority was given to the development of heavy industry, mining and transport, and it is being developed as a hub port and important shipyard. All of this causes great migration (mainly from rural areas) so that the population from the Dalmatian hinterland and Herzegovina Split becomes second largest Croatian city, but with changes in its social structure (Marasović, 1997; Muljačić, 1958). The transformation of the city that became the center of Dalmatia, happens in the cultural sense.

An influx of inhabitants takes place in Zadar, coming from the Zadar hinterland area and from the islands to work in the industry and to a some extent in tourism (Graovac, 2004). In this period, Rijeka is a territory of the former Rijeka and Sušak, becoming a powerful seaport, industrial and maritime trading centre with the most intense development occurring during the fifties and sixties, therefore attracting people from the surrounding area (Klempić - Blogadi, 2008).

Following the war, Dubrovnik retained only a fifth of its former shipping,[53] and since it became the property Jugolinija based in Rijeka, Dubrovnik was left without maritime fleet, and also a part of the population involved in that activity which subsequently migrated to Rijeka. Therefore, in Dubrovnik, in 1955 a new shipping company called Atlanska plovidba was founded. The industry developed to a lesser extent than in the other cities investigated as there were only a few industrial plants. Development of economy was based on the development of the city as a tourist destination. Numerous tourist complexes are built, creating the need for labour in the tourism industry, which in turn leads to an influx of inhabitants from the surrounding area and Herzegovina[54] (Kobašić, 2006).

Due to the recent Homeland War, the nineties in Split and Rijeka brought about a process of stagnation in the economy, with more intense development occurring in late 20th century (Klempić - Blogadi, 2008).
Unlike the other cities, Zadar and Dubrovnik experienced great destruction, and it was necessary to completely renew the urban fabric. The nineties in Zadar meant the decline of

---

[51] Prior to the start of the Second World War, Dubrovnik accounted for half of the navy in the Kingdom of Yugoslavia.
[52] The Independent State of Croatia (NDH/ISC) was a territorial condominium of Germany.
[53] Used for the military purposes of the allies.
[54] Dubrovnik recorded domestic product 62% more than the Croatian average (Kobašić, 2006).

153

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

industry and the urban economy turned to service-trade activities, and the development of Gaženica Port (Graovac, 2004). Dubrovnik felt the effects of the war with a population reduction, loss of industry and damage to all its tourist facilities, but the worst consequence was the loss of tourism market (Kobašić, 2006). As the fleet awaited war in foreign ports, it managed to survive, but the tourist industry recovered only in the twenty-first century.

The construction of the Rijeka, Zadar and Split motorway provided the necessary transport links and they gained a new impetus for development, while Dubrovnik continues to wait for this injected impulse.

4.2.5.2   Structural characteristics of the investigated cities

The Zadar urban fabric can be divided into specific zones relating to the development of the city. Therefore, in Magaše's division, the peninsula zone receives a zone with an expanded zone centre (Jazine and Voštarnica), onto which again the zone of the outer town edge is joined, and which is encompassed by a zone of settlements directly linked to the city. As it is characteristic for Zadar that it only began to spread outside the peninsula in the twentieth century, the whole surrounding area is a newer urban fabric. So at the beginning of the century, a wider centre zone develops, marked by the construction of the planned country estates accompanied by gardens along the foreshore and dotted with green space, while complementing the urban fabric on the peninsula (Magaš, 1982; Stagličić 1996). This defined an entirely new concept and the relation between constructed and open urban areas, primarily conceived through a relationship of constructed and and green fabric. The start of uncontrolled urban development prompted the establishment of the Commission for City Expansion (1906) which composed an informative report on the development of urban space. It is determined that there was a need to respect the old city elements, thanks to the Commission bulwarks and bastions on the eastern side of the old town were able to be conserved (Magaš, 1982). This is certainly possible to achieve and to strengthen the conservation profession whose development is linked with the culturalist efforts in conservation of historic urban areas (Sitte's impact) (Choay, 1969; Sitte, 1967). With the fall of Zadar under Italian rule, part of a zone covering the broader centre (Brodarica) retained the character of a space for the elite establishment, but in the immediate vicinity industrial facilities are situated (Voštarnica), as well as the more distant areas of Arbanas (inhabited by Albanian descendants). It is a time of intensive urban sprawl that continues to the thirties, and is characterised by an uncontrolled single and later multi-residential construction (Magaš, 1982; Arbutina, 2002b).
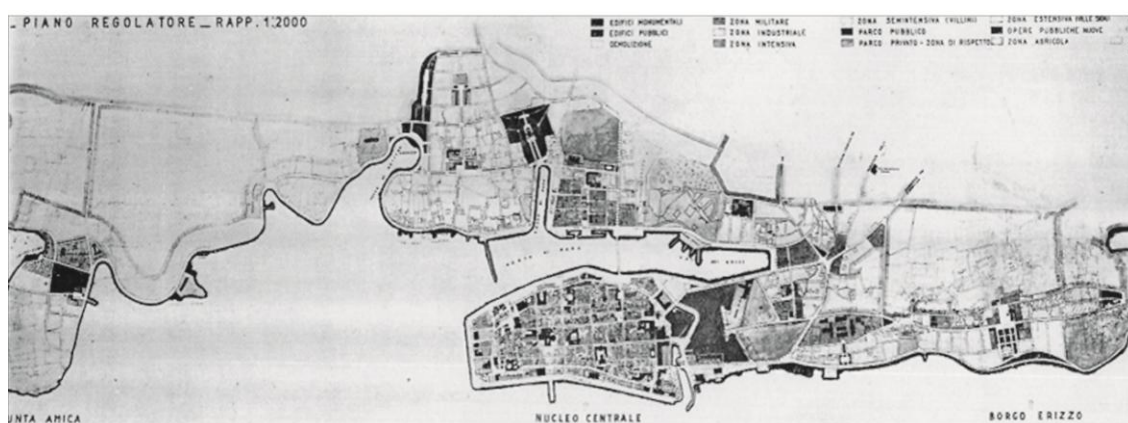
Figure 137. Regulatory plan for Zadar, 1939 (Arbutina, 2002b:21)
Slika 137. Regulacijski načrt Zadra iz leta 1939 (Arbutina, 2002b:21)

A bridge is built over the channel that connects the old town with the area of Jazine and Relje (Stagličić, 1996). There, under the auspices of the Institute for Social Housing, buildings for civil servants and workers in the factory liquors are constructed (Arbutina, 2002b; Stagličić, 1996). As the spatial plan was not adopted until 1939 (Fig. 135), part of

the city was constructed in an uncontrolled manner after 19 years of Italian government. The expansion of Zadar took place in accordance with existing Roman centuries on level terrain. In regards to the Regulatory Plan of Zadar, Stagličić says that it represents a monument to utopian urbanism, while Arbutina states that Italian urbanism aimed for a formalism defined by megalomaniac architectural achievements with pompous areas for streets and squares (Stagličić, 1996; Arbutina, 2002b). Therefore, perhaps it is a good thing that it was not incorporated into the urban fabric of Zadar, as Magaš emphasises that the plan would have sanctioned a 'too dense' construction of the centre and would seek the reconstruction of Varoš (Magaš, 1982). Such a radical proposal for the restoration of the peninsula guided in an aggressive manner traffic into the dense urban fabric, and cutting the pedestrian area. The plan was to create a vast open space that would have been gained by freeing more of the representative buildings, forcing a symmetry and radial courses (Merčep, 2005, Arbutin, 2002b). This negated the existing character of the space. Expansion of the city outside the peninsula planned to take place in a longitudinal zone, which is in the form of raster entered 300m into the mainland, creating smaller city quarters with smaller administrative centres. What is important to emphasize is that the green zones (black colour) are one of the postulates of the plan, envisaging a system of public parks across the greenery in streets links into a continuous organic network. In view of that, new relationships between the constructed and open urban areas were envisaged, with reference primarily to green space elements. As the plan envisages the retaining of existing landscape areas on the peninsula, and the new parts of the city are to receive new parks, the valuing of open urban areas is evident, but in a whole new scale (Voštarnica and Brodarica have parks, with two new parks planned for the north of the bay and the Valle de Maistre Valle de Bora) (Arbutina, 2002b).

This certainly shows the then influence of various currents of thought in other countries, where greenery begins to be viewed as an integral part of the city structure. However, because of war, implementation of that plan never happened (Magaš, 1982). As Zadar after the Second World War had experienced destruction of over 60% of its urban fabric, in the post-war period, the former town fabric is revamped. In 1947, a regulatory city plan appears as the basis for its purification (Arbutina, 2002a; Magaš, 1982). Merčep says that the basis of this plan foresaw the complete transformation of the urban structure offering the idea of a modern linear garden city. Such a city would have problems because the railroads, shipyards and industrial zones created an obstacle to its expansion and hindered its connection with the hinterland area. Merčep says that this was a solution typical of European opinions at that time, i.e. implementation of Le Corbusier's thoughts on the city and CIAM postulates (Merčep, 2005).

In the tender for the city regulatory basis (master plan) of 1953, first prize was won by Milić and associates. Their concept was based on the former street grid of the peninsula, but the new facilities are left to the devices of contemporary architectural interpretation (Marasović et al., 1958). The protection of the walls and foreshore have allowed the preservation of former city elements that constituted its identity, hence despite the expression of individual structures (often modernist features), the scheme moves away from the functionalist understanding and appreciation of traditional values by approaching culturalistic principles of urbanism. This proves that most often it was not possible to stay within a single urban model. Subsequent development of Zadar leads to an intense expansion of the city. Regulated construction is solely related to the peninsula area, hence

the surrounding space develops sporadically, often bypassing the Roman century scheme. Development of the city is marked by a fragmented structure of individual elements in the green gardens, since multi-residential construction refers to the nineteen-sixties, when the new urban fabric zone is created in the hinterland of the existing urban features on the foreshore (Višnjik), characterised by typical structures with expressionless visual characteristics typical for functionalism (Oštrić, 1991). In what was then a suburb in the east of the city, an industrial zone is established (which is now in the wider centre zone), followed by the Gaženica port, while the western part of the coastal zone is a space in which tourist zones develop. This shows that the creation of city zones linked to urban influences of the time, are most notable in functionalist cities (Fig. 94). The Master Plan (GUP) from 1974 determines the planned development of the city and is no longer focused only on the coast, and since has Zadar a flat hinterland area, it has the ability to spread towards the inland. The stated Master Plan (GUP) reduces the tendency of linear development along the coastline, and seeks to create a more compact urban fabric. Unconstructed areas within the urban zone in the pre-war period are still filled with residential buildings (Magaš, 1982). The Homeland War period slowed the physical development of the city, but construction of the motorway sped up economic progress. In the reconstruction of economy, Zadar received new areas on which residential, commercial and recreational sport zones are developed - in location of industrial facilities, and areas where former military facilities used to be. This provides an open area within the urban fabric, where it is possible to work on improving the urban structure of the city, and to establish balanced relations between constructed and open urban spaces. In the late twentieth century, with the expansion of the city, residential zones develop along the coast leading to the west (Diklo). Dotted elements are constructed in the area, including urban villas, built without consideration of the broader situation. This kind of urban fabric does not examine the relationship of open and constructed areas, which results in the so-called urbanism of building plots. In the last decade, the city scope still does not expand significantly, since the filled unconstructed areas within the urban fabric are filled up (Fig. 139).

In Zadar, it is obvious that most of the town evolved organically. The reason for this is partly linked to the devastation of the city on several occasions, and since time was needed for drawing up reconstruction and development plans, in the meantime, the city developed in an uncontrolled manner. This was certainly contributed to by the unstable political situation in the first half of the twentieth century, marked by changes in government. Despite that some areas were created deliberately by expanding Zadar, during the twentieth century a fully defined urban area was not achieved, because in subsequent periods is continued to be filled. So it happened that in some areas, first the industry arrived and the its zone was filled with family homes (Arbanasi Voštarnica), whereas in certain space, houses first appeared filling the zone with multi-residential buildings (Brodarica, Stanovi). This is happening in a similar manner today, with space abandoned by industrial or military zones. In such conditions for development, it becomes more difficult to create a completely functional urban fabric with a balanced ratio of constructed and unconstructed urban areas. For the city of the twentieth century, it is obvious that it fully opens up to the surrounding area, including the sea (Fig. 143). Given that Zadar has no relief obstacles in the surrounding space, expansion is achieved by particular penetrations with respect to existing communication routes towards the inland (Fig. 147).
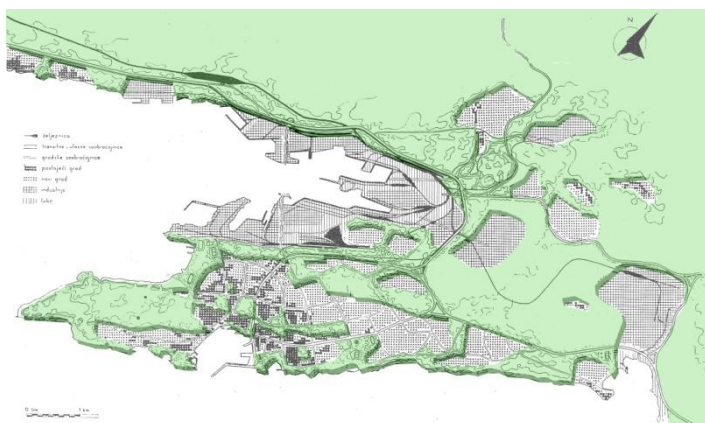
Figure 138. Regulatory plan for Split from 1924.g. (arch. W. Schürman) (Piplović, 2006:150)
Slika 138. Regulacijski načrt Splita iz leta 1924 (arh. W. Schürman) (Piplović, 2006:150)

Figure 139. Direct regulatory basis for narrower city area in Split from 1950 (Budimir Pervan 1966: 53)
Slika 139. Predpisana regulacijska osnova ožjega mestnega področja Splita iz leta 1950 (Budimir Pervan 1966: 53)

Split's development during the twentieth century can be divided into particular phases related to the social and political situation of a specific period. The beginning of the century is a period when limits of the old town are gradually transformed, as green spaces possessing a public or private character are converted into paved or constructed areas. This leads to the disappearance of the former green ring around the older part of city, so the old and newer urban fabric is linked. The absence of a physical plan caused an unplanned urban sprawl in radial directions that had already being determined in the 19th century from the peaks of defence system sections. Field paths are transformed into roads, so this is a period marked by a new urban fabric of Split, which has an organic character. As this space was created at the time of the development of capitalism, private property has great power and in certain locations, large secession villas with gardens are built which are on occasion concentrated in locations providing a characteristic to a particular part of the city.

However, other parts of the urban fabric are characterised by a very dense construction that lacks green urban areas. Consequently, a social division between higher and lower classes is evident in the building fabric of Split. An urban zone is crated that usually has a very thick and irregular structure (with little green spatial elements), and very contrasting parts of a sparsely constructed fabric in greenery. Inside the new urban structure, new public open areas are not created. While in the old town, former public green spaces are converted into private or public structures that later disappear. This period can be described as representing changes typical for the era of advancing capitalism, while carrying the negative side effects, which were discussed earlier (3.1). There was an attempt to direct random construction of the city via the first known urban plan from 1914. Though the plan was far-reaching in its anticipation of a great expansion, the urban fabric was not sufficiently differentiated (Muljačić, 1958). The Plan from 1924 (Fig. 136) conceived a development concept for the city in which the urban area would be developed in zones. It planned to create a sports and recreation section of the city on the western foreshore, where a small recreational boating port was evolving. [55] It was a period when great importance was given to Marjan as the largest green area and coastal zone where the city could completely open up. City zoning is consistent with the new influences that are associated with progressivist models (e.g. Garnier Cité Industrielle), but with the zoning from Howard's Garden City. At the same time, care for green spaces (Marjan) can be linked to reactions to the industrial city, which is typical for developed countries. However, the new residential part of town rarely opens a new open surface. Houses and villas with gardens are certainly compensated for the need to create green public spaces for the upper classes, while less attention was given to the needs of the lower classes. This social and political situation defined the relationship between the constructed and open urban areas.

The second part of the construction of Split takes place between the 1946 and 1966 when Split II occurs. (Fig. 97) (Muljačić, 1958). In this period, a large number of immigrants arrived on account of the need for renewal and a workforce in industries, shipbuilding and other developing activities, hence the population rapidly increases. Originally, nationalisation confiscated houses or the parts of houses from those owners who were considered to have too much. This practice often led to the disappearance of private residential gardens which in turn became greenery or parking sites. In the later part of this stage, new multi-rise residential buildings were built.

The urban plan from 1950 (Fig. 137) begins to comprehensively address open urban spaces as an integral part of the city, by envisaging green zones which would be connected to the Marjan forest, and separate the industrial port from the residential areas of the city (Pervan and Vekarić, 1958). Even the planned separation of the old town nuclei from the remaining urban fabric envisaged using smaller parks for this task. There was also the idea of protecting the coast as a green zone, which would create a fundamental balance in the relationship between constructed and open urban space. This implied the development tendencies in the plan from 1924, and the further development of ideas relating to zone division of space and green spatial barriers under the influence of the previously theoretical urban models (from and progressivists and culturalists). Unfortunately, the subsequent development of the city increasingly moved away from this plan. However, the special treatment of the historic centre and awareness of the importance of cultural heritage had a

---

[55] This was a period when Split developed as the sporting centre of Croatia.

159

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

positive impact on the protection and usually occurred due to the conservation profession in connection with cultualist influence from the end of the late nineteenth century. Due to increasing growth of the population, in the late fifties, there is a need for typical cheap construction of apartment buildings that are duplicated when required. The concept of a multi-residential settlement in reality has functional green space only superficially and sporadically. This is a characteristic feature of functionalist settlements which had problems because of the loss of identity and the lack of open space areas with social significance. However, perhaps the disadvantages of multi-residential green surface areas mitigates the fact that at that time are formed a new city parks (Sustjepan, Emanuel Vidović Park, Park Pomoraca - Seafarer's Park, Turska kula – Turkish Tower), and later (in the sixties) Marjan became a city park. New public green space are created to increase awareness of the importance of greenery to the life of the working class, since most of them live in apartments covering very small surface areas (in accordance with ancient urban tendencies).

Structural characteristics of this zone are characterised by low-density buildings that were planned as multi-storey buildings with new spatial relationships and proportions of the constructed and open urban fabric.

The third phase of development was completed in Split 3, which by its initial concept differs from other residential areas. It is conceived as a multifunctional complex, which is based on the idea of pedestrian streets taken from the historic town, but now shaped into a new type of open settlement (Kukoč, 2010). In this case, the unconstructed urban area (the idea of a street) is treated as the equivalent part of the space, creating a balanced relationship between the constructed and open urban spaces. In accepting the Mediterranean town street concept, the idea was to create public living spaces for the citizens in the immediate vicinity of their place of residence, designed as spaces between buildings. Tušek even mentioned the subject of a garden city manifested in greenery, which enters between structures (Tušek, 1996). New larger green areas are places specialised for sports and recreation. Structure as part of its concept respected old Roman lines of centuriation, but only a third of that planned was actually built, so many extra facilities were not developed. This concept is a postmodern approach to urbanism, because the idea was developed from Mediterranean tradition, respecting the spatial context, and is especially manifested in the theme of pedestrian streets, advocated by Jane Jacobs (Jacobs, 1993). Multifunctional complexes that represent a departure from the strict zoning plans also indicate a post-modernistic approach. At the same time the openness of the settlement, still is uses the positive heritage of a functionalist settlement.

The subsequent development of Split led to a rejection of these urban ideas, since the concept of development was based on the idea of a closed block. However, in the coming decades, the urban area has less open area for residence, thus creating an unbalanced relationship in the constructed urban fabric. This trend culminated in the mid-nineties and the beginning of this century, when a new concept of building structures appeared, so-called urban villas. In the absence of complete solutions for certain settlements, there was no space for public areas because structures usually occupied most of the land plot areas. Urbanisation was developed through the creation of point elements without a broader vision of space. The ratio of the surrounding area was such that with the complete freedom of expansion of the urban fabric, and without limiting factors of urban policy (mentioned in previous chapters), Split merged with nearby settlements of Kaštel. During this process,

the city largely bypassed the sloped areas of Marjan Hill (which is protected) (Figure 148). Lately, protection is circumvented and new constructed begins to appear on Marjan. This distorts the relationship of the open areas within the city and urban hinterland area.

The relation towards the sea is defined by geomorphology because Split is completely opened in places that cover the low coastal zone, while in places where cliffs exist, it is closed (the foreshore edge of Marjan) (Figure 144).

Characteristic for the Rijeka is the plan developed in 1904 and adopted in 1917[56] (Matejčić, 1988; Turato, 2004). The focus of the plan was on the experiencing Rijeka with the sea, where the sea is seen as a square. The plan foresaw a series of squares, open spaces and fewer parks (Lozzi Barković, 1997, 2012). Since the Hungarians only subsequently approved the plan, circumstances on the ground changed, so it had to be modified several times for the purpose of adapting to new conditions (Matejčić, 1988). Given that housing construction was intensive at the beginning of the century, the plan was difficult to implement in parts of the city that were already built new (Lozzi Barković, 1997, 2012). The beginning of the century was characterised by increasing urban surface that caused the formation of a longitudinal zone by the sea, formed from closed vertical blocks that optimally the surface of land plots. At the periphery of the city, the crowded working class quarters without a concept of open public spaces grew and on hillsides, villas with gardens were built. This created different relations between the constructed and open space. Rijeka was transformed so its identity was sacrificed for the vision of a cosmopolitan city in Central Europe, characterised by monumental buildings. Demolition of the buildings led to the devastation of space in the old city, since neither the Austro-Hungarian nor the Italian government took into consideration its value. With the development of Sušak led to the creation of residential areas on Brajdica, and industrial zones was also formed. From the maps from 1924, it is evident that the city began to expand in the radial courses towards the hinterland area, hence it was a period when the Rijeka began to change structurally. In thirties, Rijeka and Sušak received regulatory plans that pursued repairing, i.e. cleaning up the old town, typical of Italian urban planning in this period (Matejčić, 1988; Turato, 2004). The plan aimed towards to block division and similar to the Zadar plan, paid great attention to the squares and urban greenery, but identically to Zadar, it was not implemented. As already mentioned, drawing attention to open urban areas (especially greenery) was a typical phenomenon especially pronounced at the beginning of the twentieth century, as it was in other European countries (relating to urban city models at that time).

Given that Rijeka was heavily damaged by the ravages of the Second World War, in the post-war period, its renewal began, and it developed into the most important port of Yugoslavia. In addition, with the unification of the two settlements, Rijeka and Sušak (1948), the city began to develop as a single organism. In the fifties, there was a gradual economic development, which caused a population increase and lack of housing. Due to the numerous planning problems, a conceptual urbanistic basis was developed by where Rijeka spread to the west and east, while urban functions in the city centre Delta and Brajda were established. The anticipated relocation of industry is related to the effects of urban trends that tended to humanise industrial cities. Since the relocation of industries planned for the eastern part of the city was complicated in Sušak, it survived in old

---

[56] The plan was drawn up by Paolo Grassi and has not been found to this day.

locations along the foreshore in the central part of the city (and thus remained at the level of an industrial city of the nineteenth century). On the western side of the urban area, new residential areas were created (especially visible in Zamet) in which structure is a visible functionalist spirit of modern urbanism and characterised by the reproduction of residential units on a green basis.

In the sixties significant changes in the physical structure of the city occurred, and as a result of the new influx of population, new housing units are raised on the edge of city. As a clear housing construction policy is formed, complex settlements are developed as neighbourhood units. Given the fact that this concept is retained until the eighties, with it, the eastern and western part of the city was developed, and its idea was even more remote from functionalism. For the purpose of directing development, during the sixties there were three attempts is bringing about the urban plan for the city (in 1962, 1965, 1969), but with no results. [57] Until 1968, city space was formed by filled the voids between the surfaces of existing constructed areas towards the inland. So the city became in a certain way rounded, forming an elongated strip along the foreshore that eventually grew larger, but emphasised a longitudinal direction (Figure 158). Its shape was determined by the topography of the terrain and the limitations caused by mountain ranges that surround the Rijeka (Figure 149). Given that there were no official plans, the development of industry would continue without them,[58] but not without problems. In the seventies, Rijeka becomes a city congested with traffic and with its industrial zones located in the most attractive coastal parts. As coastal development made the coast unavailable to citizens (Figure 145), and coincidently growing environmental problems are generated, development studies begin to treat the ecological segment in line with contemporary trends in urbanism. Enhanced industrial development of the region brings the increasing inflows of new population, and the suburban areas are very quickly involved in the urban fabric, but without increasing the quality of urban life. Therefore, by the plan of Rijeka municipality in 1978[59] part of the active population have been focused on a polycentric network of settlements in the surrounding municipalities (Klen, 1988). In eighties were created two fully methological settlements: Krnjevo i Donja Vežica with complex open areas. The last two decades the intensity of development reduced, and this is particularly emphasised from the nineties, when Croatia was at war. Today present problems of Rijeka expansion are related to its topography, given that the mountainous chain reduces the possibility of further expansion in depth. So the city was during the twentieth century elongated along the coast (Glavočić, 1998). Given that the industry is linked to the coastline, it represents a barrier for city to open towards the sea so Rijeka isn't true coastal urban centre. Structural features within the urban fabric are improper, since they are classified by topography to which the urban fabric was adjusting.

---

[57] Only the Revitalisation Plan of the Old Town Nuclei from 1969 was adopted, which is later implemented.

[58] Since the dynamics of city development were too fast, there were three attempts in making an urban plan for Rijeka - 1962, 1965 and 1969. It was only in 1969 that the plan for revitalising the city nuclei was adopted and which were later implemented.

[59] Before that, the general urban plan for the city was issued in 1974 (Klen, 1988).

At the beginning of the twentieth century, Dubrovnik experienced a pronounced stagnation, and with no significant urban development of the city. Expansion was defined by the individual buildings near the old town from the east and west side of the city, in the areas of Pile and Ploče (Figure 142) (Beritić, 1958). The development of the Gruž harbour (northwest of the old town) which experiences increased maritime traffic and its connection with the railway transport line, contributes to the expansion of the suburban settlement of Gruž in which small industrial zone is located (Milić, 2006). Between the two world wars, the unconstructed urban area west of the old city (Lapad) became urbanised, where tourist facilities also started to be built (Šišić, 2003). Such zoning is consistent with the functionalist tendencies in urbanism at that time. Expansion primarily led to the occupation of the southern slopes, and later other expositions. Though in past periods, Dubrovnik had already implemented a relationship between constructed and green spaces through the Renaissance garden suburb, now this kind of relationship occurred in newly urbanised areas, especially in areas with tourist facilities. After the Second World War, the old city was declared protected, and it managed to preserve its urbanism (Marinović, 1959;

Figure 140. General urbanistic plan for Dubrovnik (wider area) from 1969 (Marić, 2008:115)
Slika 140. Generalni urbanistični načrt Dubrovnika (širše območje) iz leta 1969 (Marić, 2008:115)

Beritić, 1958). Since this phenomenon is already mentioned in the cases of other cities, we can conclude that culturalistic influence contributed to protection against further destruction of cultural heritage. Gradually, the city area increased outside the walls, and in fifties two- thirds of the population lived outside the old city. Marinović notes that the period of the fifties and sixties was period of haphazard construction without any plan. He says it was very important to establish a urban plan that would prevent further construction in the immediate vicinity of the walls, and states that the area behind the city should strive to replace existing buildings with greenery (Marinović, 1959). [60] The urban plan of the city of Dubrovnik (Figure 138) was adopted in 1969 after the regional physical plan of the southern Adriatic region was drawn up. Meaning that, Dubrovnik only received a tool for guiding its growth. [61] The plan shows that great attention was paid to tourism development (red), but still, some of the hills were retained as green space (green). Marić said that the plan had a problem because it failed to direct and encourage positive change in the region, and coincidently it had significant shortcomings because it did not take into consideration

---

[60] The author is Antun Marinović.
[61] Other investigated cities had some form of plan in periods prior to the twentieth century, but often they were not implemented.

underlying spatial values (Marić, 2008). Subsequently, construction during the intense period of development in Dubrovnik from the fifties to the eighties flowed largely unplanned. Most often, individual structures and typical functionalism structures were built, but in the later period residential architecture was increasingly moving away from modernist settings. This provided a more complex relationship between constructed and open urban areas. An influx of inhabitants occurred primarily for the purpose of tourism development, since many hotels and tourist complexes were built at that time. Given that the idea at that time was to adapt hotel buildings to existing geomorphic surfaces, this led to new ideological concepts of development in accordance with the ancient urban tendencies of postmodernism (although F. L. Wright used the idea of topographical adaptation in the first half of the twentieth century).

Structural features of the city were marked by an expansion across the slopes (because of the little available flat terrain), but the hill peaks remained unconstructed spaces. Therefore, the cliffs along the sea and the mountain peaks remained unconstructed, creating a significant caesura in the city. It follows that we can say that Dubrovnik urbanism, which for a long period of time was developing without a plan, was classified by reliefs that determined the relationship between constructed and unconstructed spaces within the city area (Figure 150). On the low-lying coastal region, the city opened up towards the sea but in places with cliffs it was characterised by a closed physical edge (Figure 146). The city's urban plan in 1980 tended to increase the number of users in limited urban spaces, but also established guidelines for its scattered expansions in the form of new suburbs. The twenty-first century has been marked by urban areas in the southeast (Župa) and to a smaller extent in the northwest (Orašac, expansion of the suburban settlement of Mokošica). However, there occurs an increasingly intense filling of open spaces within the urban perimeter. Structural characteristics of the city have an irregular character, especially in those areas that have incurred prior to compilation of the plan, so transport infrastructure is shaped as an irregular network adapted to the rugged terrain topography. This was also the character and relationship of constructed and open urban areas. A regular network is visible in the oldest parts of the city (the old city and the area of the Renaissance suburb of Pile), while the rest of the urban fabric provides most often irregular geomorphology. In past century, the city itself treated walls as permeable membrane, and this character has been retained to date.

All the investigated cities have showed that urban space had opened up and in places had closed towards the sea, whereby this ambivalent relationship can be linked to the historical development of its relationship with the hinterland area, characterised in the same way.

164

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.5.3 Presentation of structural characteristics of the city space in investigated urban centres in the twenty-first century
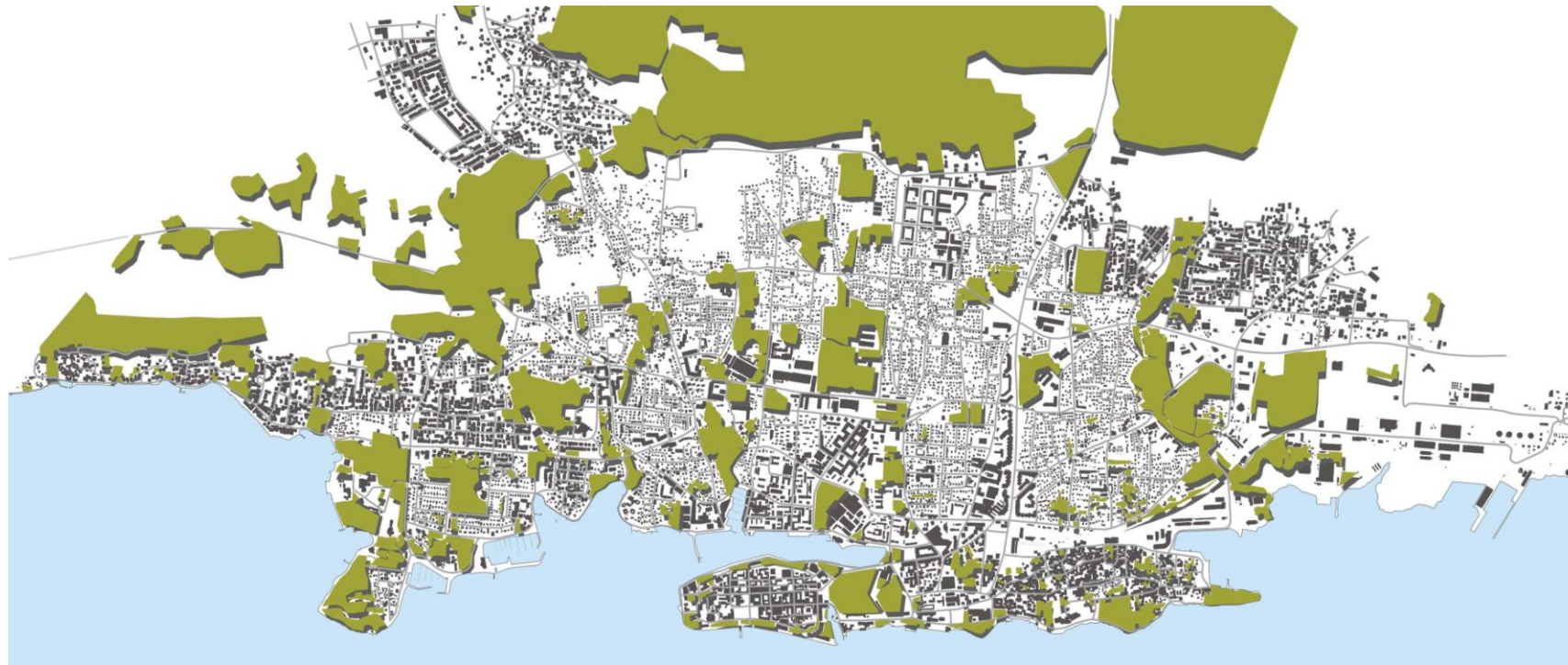
Figure 141. Structural features of the urban area in 20th and 21th century, Zadar (cartographic base. Ortophoto of town Zadar. 2004)
Slika 141. Prikaz strukturnih značilnosti mestnega prostora v 20. in 21. stoletju, Zadar (kartografska podloga: Ortophoto of town Zadar. 2004)

Figure 142. Structural features of the urban area in 20th and 21th century, Split (cartographic base: HOK, 2004)
Slika 142. Prikaz strukturnih značilnosti mestnega prostora v 20. in 21. stoletju, Split (kartografska podloga: HOK, 2004)

Figure 143. Structural features of the urban area in 20th and 21th century, Rijeka (cartographic base: HOK, 2009)
Slika 143. Prikaz strukturnih značilnosti mestnega prostora v 20. in 21. stoletju, Reka (kartografska podloga: HOK, 2009)

Figure 144. Structural features of the urban area in 20th and 21th century, Dubrovnik (cartographic base: DKO, 2003)
Slika 144. Prikaz strukturnih značilnosti mestnega prostora v 20. in 21. stoletju, Dubrovnik (kartografska podloga: DKO, 2003)

4.2.5.4 Presentation of relationship between the city and sea

Figure 145. Relationship of the city and the sea, Zadar
Slika 145. Prikaz odnosa mesta do morja, Zadar

Figure 146. Relationship of the city and the sea, Split
Slika 146. Prikaz odnosa mesta do morja, Split

 closed towards the sea

 open towards the sea
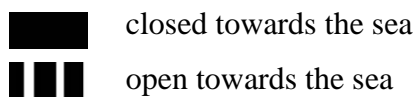
Figure 147. Relationship of the city and the sea, Rijeka
Slika 147. Prikaz odnosa mesta do morja, Reka

Figure 148. Relationship of the city and the sea, Dubrovnik
Slika 148. Prikaz odnosa mesta do morja, Dubrovnik

closed towards the sea

open towards the sea

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013
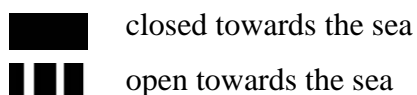
4.2.5.5 Presentation of relationship between the city and relief

Figure 149. Scheme of the relationship city and topography, Zadar
Slika 149. Shema odnosa mesta in topografije, Zadar

Figure 150. S Scheme of the relationship city and topography, Split
Slika 150. Shema odnosa mesta in topografije, Split
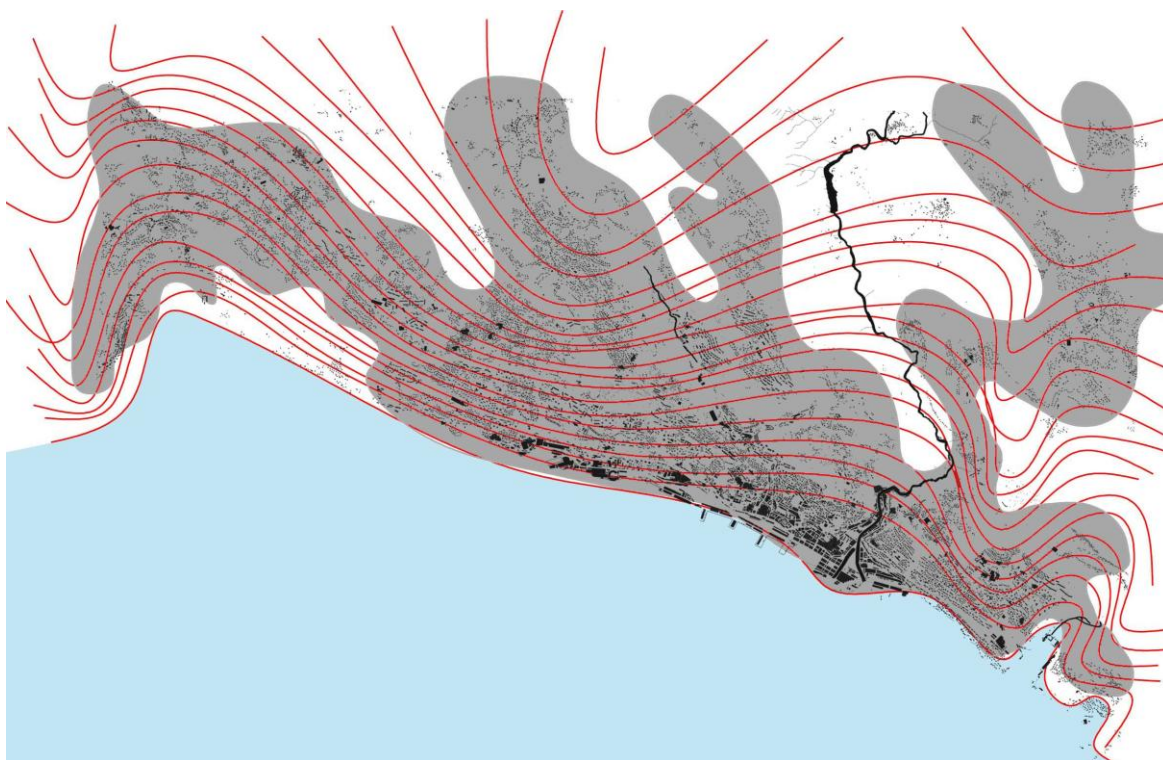
Figure 151. Scheme of the relationship city (with its suburbs) and topography, Rijeka
Slika 151. Shema odnosa mesta (s predmetji) in topografije, Reka
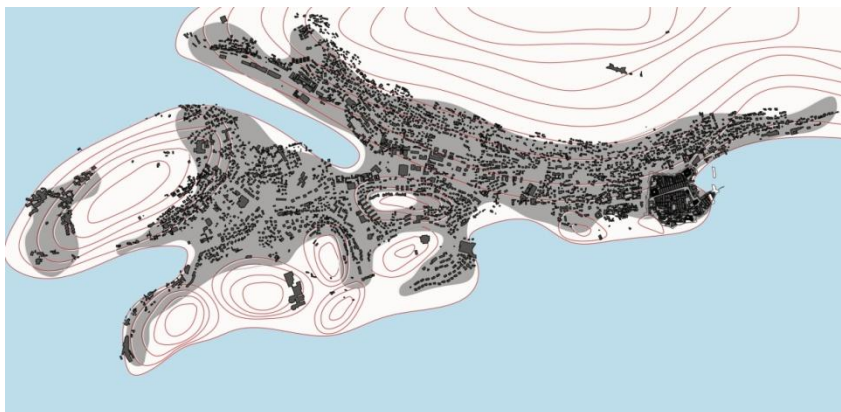
Figure 152. Scheme of the relationship city and topograpy, Dubrovnik
Slika 152. Shema odnosa mesta in topografije, Dubrovnik

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.5.6   Urban open spaces

Characteristic of the twentieth century is the spread of the urban fabric towards the surrounding area, resulting in a mix of urban open spaces with the surrounding landscape. In such instances, the vegetation that remained in the urban area represented a former landscape in a functional, and sometimes in a structural sense.

4.2.5.6.1 The open spaces of Zadar as elements of a green system

Zadar is one of the few cities, which has kept within its urban fabric parks from the nineteenth century (Fig. 151, 152, 153). The reason for this is probably the fact that they were created on its defence system, and not in open areas resulting from the system's destruction, and consequently increasing the awareness of the value of cultural heritage stemming from the protection of the remaining walls, and retaining parks on them. If culturalistic effects act on increasing the awareness of the value of historic cities, then in this case they have succeeded in the preservation of the old Zadar parks.

Arbutina says that the new settlements built during Italian rule were planned to contain residential greenery, and in the thirties within the new parks, playgrounds were planned (Arbutina, 2000). This testifies to the diversification of open public spaces in Zadar. The plan from 1939 represents a monumental approach to urban development, but also had a positive role in highlighting the importance of open spaces in the urban fabric. So Arbutina says that green oasis are one of the postulates of the plan, providing a system of open public parks connected by a green linear street routes, and creating a network structure. The plan is dominated by two large parks, Valle de Maistre and Valle de Bora, for which Arbutina says were planned on a traditional excursion place for Zadar inhabitants and concludes that the in 1947 Zadar had seven park areas (Arbutina, 2000, 2002b). This plan complied with contemporary trends, since the reflection of urban open areas at that time had been an important concern of progressivists and culturalists. Since the bombing of a series of buildings during World War II on the southern side of the peninsula resulted in the destruction of the whole foreshore façade, in their space park areas were formed (Petricioli, 1991). This introduced a public green space within the oldest part of the urban fabric, creating a new relationship between the constructed and urban open spaces.

As mentioned earlier, in the post-war period, the Regulatory basis[62] was created upon the inspiration of CIAM's premises, and characterised by the idea of a modern city, but with an extremely linear character. The plan did not see the light of day because it had a serious problem - isolation from the hinterland area due to a railway line. This shows us that an understanding exists of the importance of the close relationship between a city and its hinterland area. As already noted, in 1955 a new tender for the Regulatory basis was published. In preparing the tender, some criteria are set which show that the Commission took into account open spaces as an important segment of city life. [63] Milić's winning design of public spaces is adapted to the human scale within the peninsula. New squares were conceived as chamber spaces, and this character is carried on by old squares and

---

[62] Founded in 1964.
[63] Some of the criteria were to form a balanced city nuclei possessing a harmonious relationship between the constructed and unconstructed, the creation of smaller-dimensioned open urban spaces matched to the historical city - the squares and streets, a solution to urban greenery (Merčep, 2005).

some of the streets, such as former main *cardo*. Particularly important is that the walls and parks on them were regarded as an element of spatial identity and preserved as such. Besides squares, the street network and proportional relationships of urban fabric were preserved, i.e., the constructed and unconstructed space (Merčep, 2005). The winning work can be tied to culturalists, primarily with Sitte (1967), because he magnifies the importance of the old squares, their dimensions and proportions. Subsequent development of the city led to the creation of new public urban areas. Thus, their scheme shows uneven geographical distribution of space within the city, because they are concentrated in the centre and along the coastal edge (Figure 169). When taking considering all of the public open spaces, squares retained the role of gravitational points in the life of the city (Figure 173). Miškic-Domislić et al (2012) conducted research showing that the most frequently visited Zadar square is - Narodni trg (eng. the People's Square), located at the beginning of Zadar's most famous street, the famous promenade Kalelarga. As noted above, by city development in the second half of the twentieth century took on new open public spaces which were rarely formed, but within the urban fabric unoccupied areas appear (abandoned industrial and military areas, and on account of actions due to specific geomorphologic phenomena). These in the future have the potential of elements of a green system possessing exceptional ecological values (Figure 153). This led to opportunities for establishing new relationships between constructed and open urban spaces, conceptualised through new elements of a green system. Zadar is characterised by a surrounding landscape of forests and agricultural areas, which are divided by Roman centuriation. Upon expansion of the urban fabric, the surrounding space becomes less available to the urban population because of its increased remoteness.

Presentation of open areas in Zadar

Figure 153. Open spaces, Zadar in 1941 (cartographic base: Plan of Zadar from 1941, 2008)
Slika 153. Prikaz odprtih površin, Zadar, 1941 (kartografska podloga: Plan of Zadar from 1941, 2008)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade

Figure 154. Open spaces, Zadar in 1957 (cartographic base. Plan of Zadar from 1957, 2008)
Slika 154. Prikaz odprtih površin, Zadar, 1957 (kartografska podloga. Plan of Zadar from 1957, 2008)

Figure 155. Open spaces, Zadar in 2004 (cartographic base. Ortophoto of town Zadar. 2004)
Slika 155. Prikaz odprtih površin, Zadar, 2004 (kartografska podloga: Ortophoto of town Zadar. 2004)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade

174

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.5.6.2 Open spaces in Split as element of a green system

The beginning of the century in Split is marked by unplanned development, and park areas from the nineteenth century slowly disappear. Therefore, in the absence of open public spaces, greater concern is dedicated to Marjan, which becomes a 'natural park' used for walks by the city inhabitants (Marasović, 1997; Pervan and Vekarić, 1958). While older squares are important gravitational points of the city, only Strossmayer Park is preserved. Although coincidently with culturalist influences, thought was given to the value of historic sites, the survival of the old squares is linked to the former continuity of their use (Figure 154, 155, 156). Besides being one of the city's spatial identities, they are still the most intense gravitational points because they continue to represent the main places used for gatherings, and around them the city's administrative activities continue to take place (Figure 173). Thereby, they affect the survival of the former relationship of open and constructed spaces within the old urban fabric.

Planning open spaces in the newer parts of the city is importantly related to the second half of the twentieth century. Although the Schuman Plan[64] foresaw a green zone in Split, the creation of park areas in the pre-war period did not occur. Still, the idea of green zone contained in the Regulatory basis (1950-ies) developed as a space with sporting and recreational facilities between industrial and residential spaces (Pervan and Vekarić, 1958), With this kind of zoning linked to the characteristics of functionalist planning, and to the structure of a zone of greenery in the Garden City. Since in the second half of the twentieth century the city intensively spread, new parks were formed because urban inhabitants were moving away from the natural landscape and from the squares and the promenades in the old town. Subsequently, in the fifties, parks were scattered across the urban fabric (Figure 155) (Emanuel Vidović Park, Hatz Park, the Bačvice promenade, Memorial Park, Park pomoraca - Seafarer's Park - at Katalinić Hill, the old cemetery Sustipan, sculptures park in front of the Meštrović villa (Grgić, 2005; Grgurević, 2002)). Consequently, they significantly affect the structure of the urban fabric, and the relationship between constructed and open urban spaces. In later stages of development, park areas were rarely formed, and during further development of Split, only two larger parks were established (the Mertojak Park Resort and park at the Duilovo Military Resort) (Grgic, 2005). This created an unbalanced relationship within the urban fabric. The development of the concept of city streets in the Split III settlement represented a thematic return to tradition (being inspired by an urbanism of historic cities), so pedestrian streets are its determinant. Unfortunately, plans for Split III were only partially implemented.

The city in the twentieth century changed substantially compared to previous periods because of its opening to the sea, hence the coastal edge of the city became very important public space. Thus, important element of Split's social life led to the use and formation of beaches, promenades and sports and recreational facilities. Although the promenade in front of the old town was typical for the urbanism of Split and Zadar even in the nineteenth century, in the twentieth century, the entire foreshore became a very important public space. This is recognised in a plan detailing Split drawn up in 1950, which called for the protection of the foreshore zone as the city's green belt, which unfortunately not literally carried out. If we take into account Turner's assertion that the coastal areas are rare areas

---

[64] Developed in 1924.

where people are free, it is important to recognise that all the investigated cities possess a priceless value because of its location near the sea (Turner, 1996). This value is reflected as an ecological quality of space, which in the case of Split is particularly important because it is connected to an important ecological area of the Marjan Park forest. As mentioned above, in the second half of the twentieth century, new park areas are rarely formed, and the scheme of their allocation (Figure 170) shows uneven distribution of the urban fabric. They are concentrated in the old part of town, and in the sports and recreational areas (Poljud) including the coast. In the newer parts of Split, they do not exist at all. With the development of the city, Split became separated from the hinterland area because, upon its merger with surrounding settlement, the remoteness from the countryside increased, so in this situation, the lack of park space is even more highlighted.

Presentation of open areas in Split

Figure 156. Open spaces, Split in 1947 (cartographic base: Plan of Split, 2007)
Slika 156. Prikaz odprtih površin, Split, 1947 (kartografska podloga: Plan of Split, 2007)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade
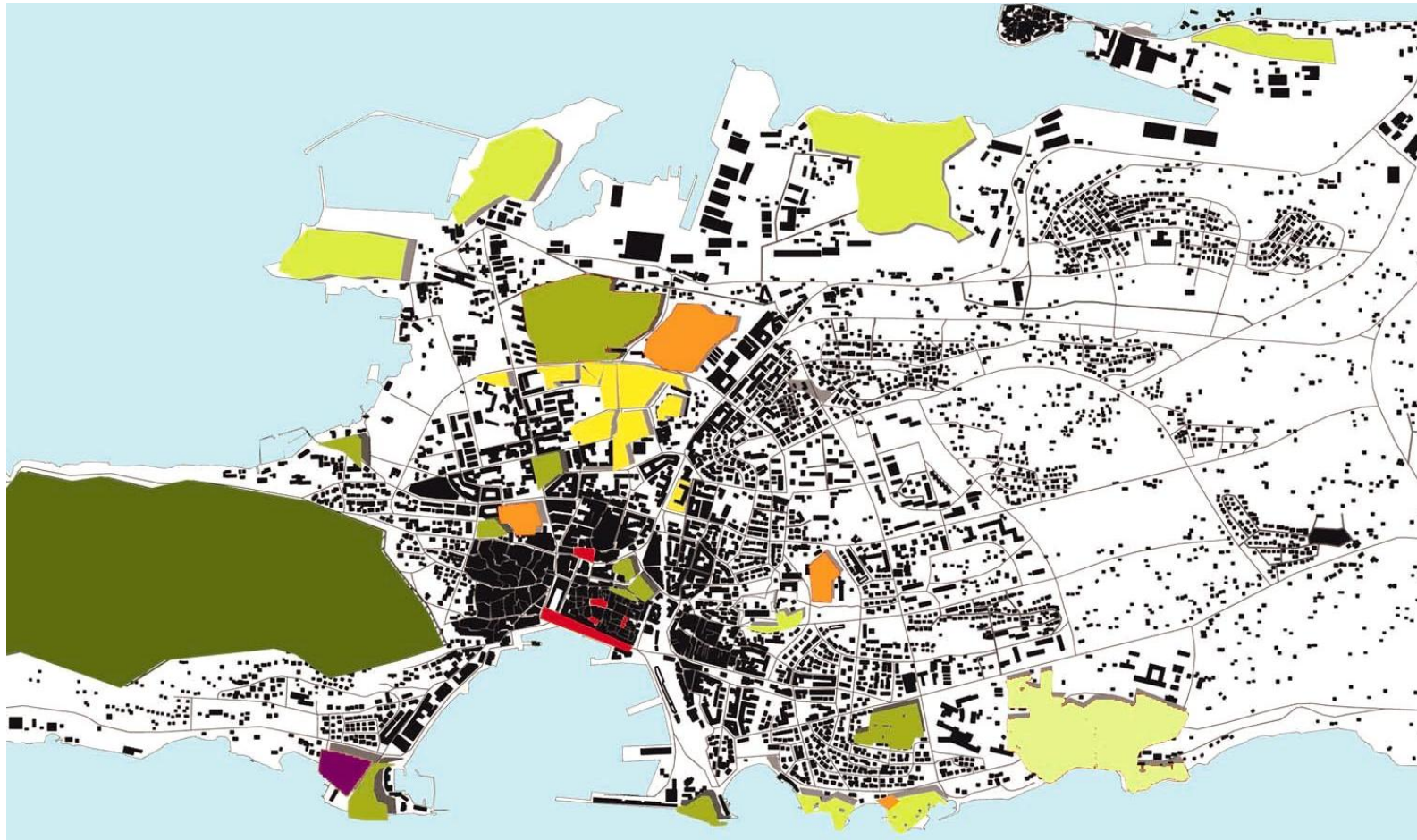
Figure 157. Open spaces, Split in 1968 (cartographic base: Plan of Split from 1968, 2009)
Slika 157. Prikaz odprtih površin, Split, 1968 (kartografska podloga: Plan of Split from 1968, 2009)
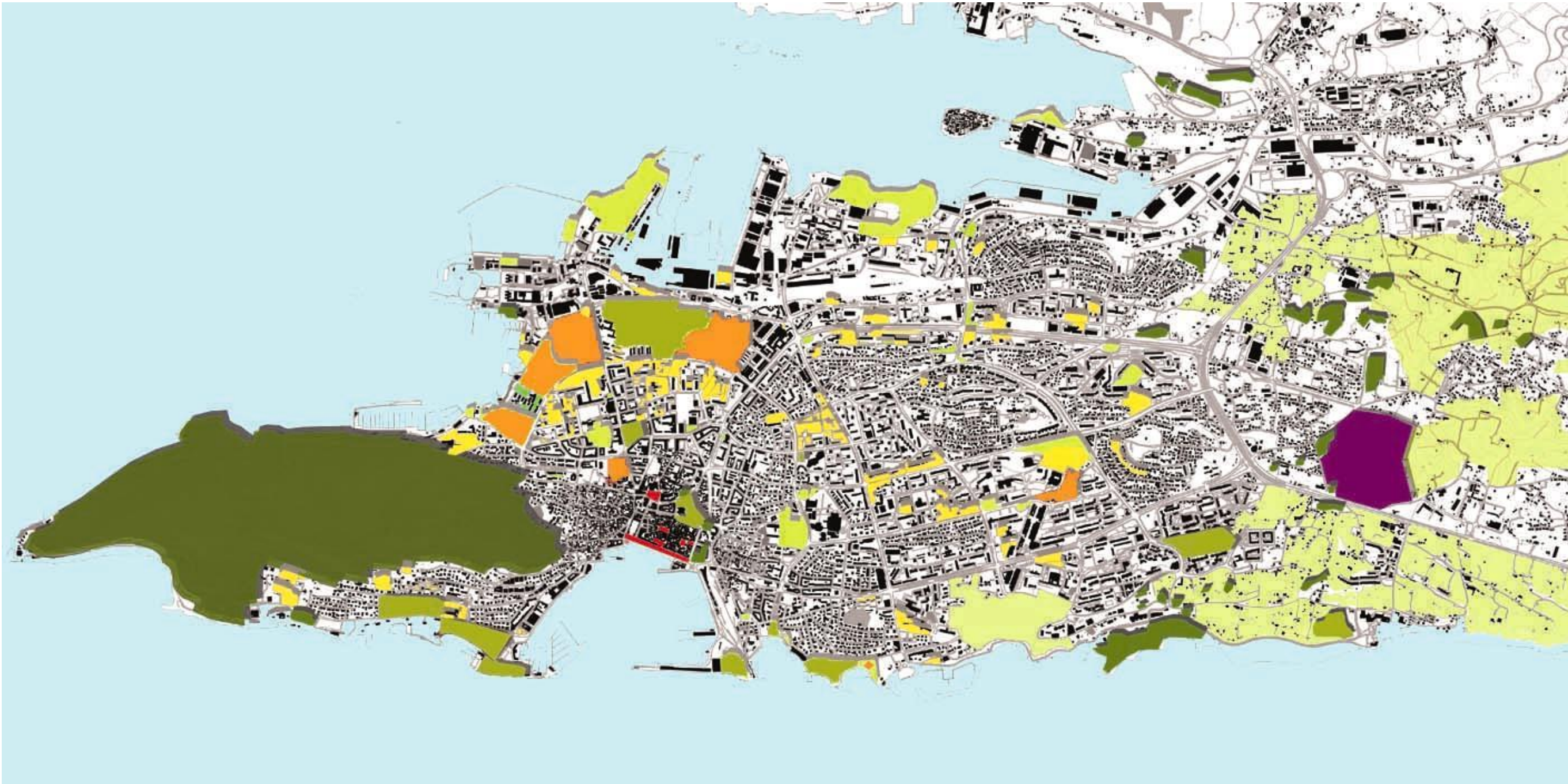
Figure 158. Open spaces, Split in 2004 (cartographic base: HOK, 2004)
Slika 158. Prikaz odprtih površin, Split, 2004 (kartografska podloga: HOK, 2004)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade

4.2.5.6.3 Open spaces in Rijeka as elements of a green system

What is characteristic for Rijeka in the first half of the twentieth century and due to the stagnation of development does, is that new public urban spaces were not formed (Figure 157). The positive aspect is that the parks created in the nineteenth century have survived within the urban fabric and experienced less degradation, while some private gardens become public urban spaces (the park beside the governor's palace, garden at the villa Aciducale which was in 1924 donated to a children's colony, and from which the park around Kantrida Children's Hospital originated). Although the plan for Rijeka during Italian rule had devastating effects for the old parts of the city, it treated the open public space (parks and squares) similar to that in Zadar, i.e. an equally valuable part of urban space.

Unlike Rijeka, at Sušak there are numerous changes to the urban fabric, so within the city new park areas are formed, especially during the time of the Mayor, Juraj Kučić. The year 1927 was marked by the creation of Sušak's new parks (the park on Trsat, Pančić Park (park Heroja - Park of Heroes) and Vidikovac Park (the Ivo Lola Ribar Park), while later a few more were formed (Wilson Park - today August Cesarac Park, Vid Park and Niko Katunar Park) (Matejčić, 1988). The creation of parks is one of the basic premises of urban models, but these areas in Sušak can be connected to it only at a conceptual level, because they are worked out in more detail than was the case in typical functionalistic settlements (and the representative character is revealed in them).

Due to the intensive expansion of the city, in the second half of the twentieth century, several park areas were formed, but this was a rare occurrence.[65] Since this was a period when, due to the development of settlements containing multi-residential units, public open areas were more important for city life, they were partially implemented in the form of multi-residential greenery located between the buildings. In recent decades, Rijeka was mainly involved in the renewal of older open public spaces, rarely create new ones. Therefore, the presentation of schemes for important public open spaces indicate their concentration in the old part of the city and surrounding areas, and in the area of Sušak (Figure 171). From all of the open areas, the most intense gravitational space is Corso (Figure 175) for which Miškic-Domislić (2012) says that even today it represents the centre of Rijeka, and research on the usage intensity of Rijeka squares has shown that it is the most visited Adriatic square (Jadranski trg) that represents an entrance onto the Corso. By actualising the topic of relocating industry and warehouses, there was a tendency in liberating the coastal zone, which would become an open public space for the city. This would open the Rijeka to the sea, and it would create a new gravitational zone for the city, inside of which perhaps all those functions, to a bigger or smaller extent, are present in the other researched cities (waterfronts, bathing resorts, beaches, promenades, parks, sports and recreation facilities). This would achieve an entirely new relationship between the constructed and open urban spaces. Since inside the city perimeter tributaries can be found linking the coastline with the hinterland area, and the fact that there exist features in geomorphologically specific elements which in places cut through the urban fabric, a basis for the sustainability of the city is established, especially because of high ecological potential.

---

[65] The following parks are formed: Joža Vlahović Park, the shipyard park at Dnja Vežica, the park beside the Clinical Hospital Centre and the Ciottin Park.

Presentation of open areas of Rijeka

Legend

■ constructed areas

■ green landscaped areas

■ forests

■ green unlandscaped areas

■ sport and recreation

■ cemetery

■ squares, waterfront promenade

Figure 159. Open spaces, Rijeka in 1910 (cartographic base: Plan of Rijeka, 2010)
Slika 159. Prikaz odprtih površin, Reka, 1910 (kartografska podloga: Plan of Rijeka, 2010)

Figure 160. Open spaces, Rijeka in 1968 (cartographic base: Plan of Rijeka from 1968, 2010)
Slika 160. Prikaz odprtih površin, Reka, 1968 (kartografska podloga: Plan of Rijeka from 1968, 2010)

Legend

- ■ constructed areas
- ■ green landscaped areas
- ■ forests
- ■ green unlandscaped areas
- ■ sport and recreation
- ■ cemetery
- ■ shops, waterfront promenade
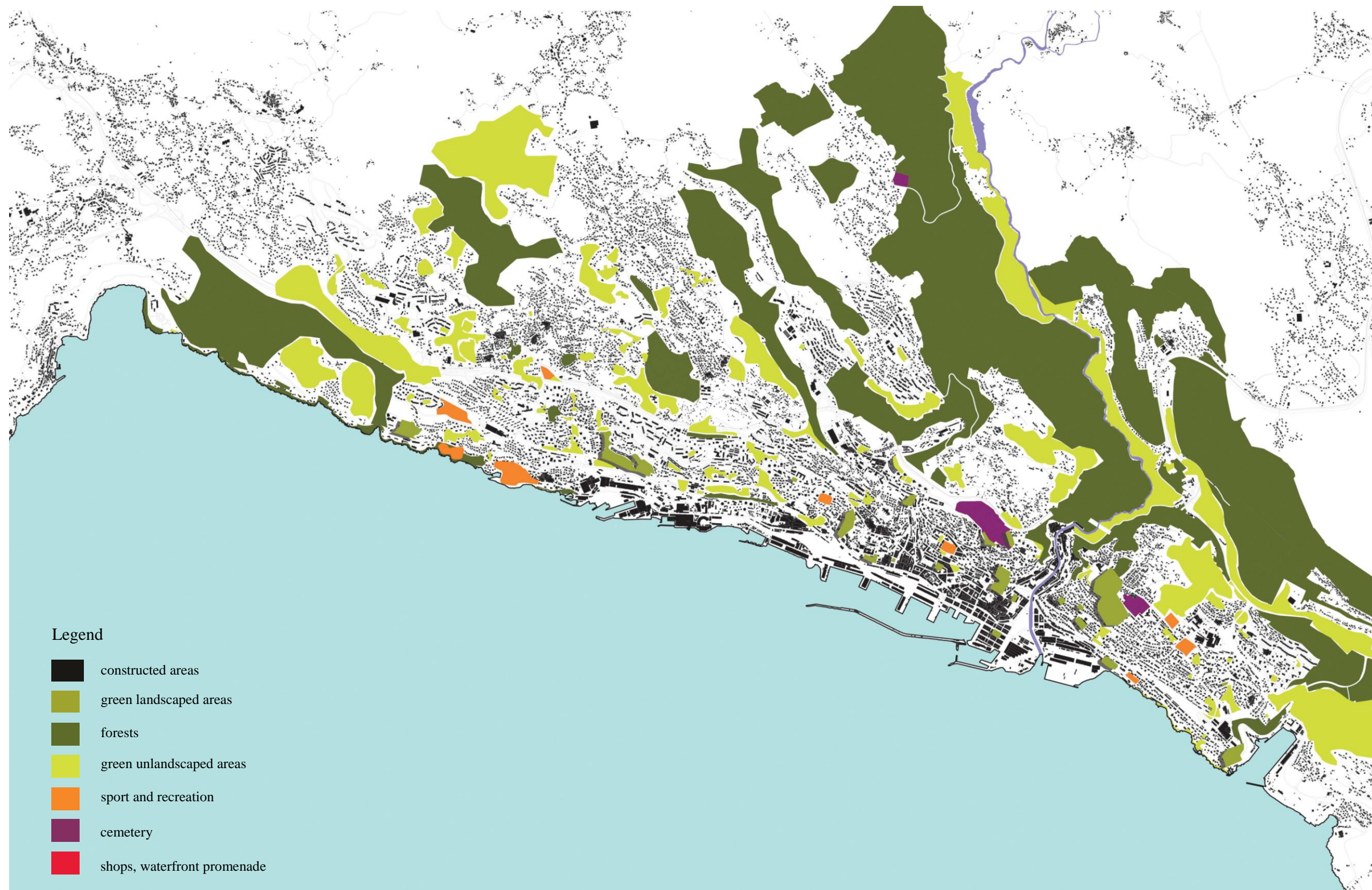
Figure 161. Open spaces, Rijeka in 2009 (cartographic base: HOK, 2009)
Slika 161. Prikaz odprtih površin, Reka, 2009 (kartografska podloga: HOK, 2009)

4.2.5.6.4 Open spaces in Dubrovnik as elements of a green system

There are only two park areas in Dubrovnik in the nineteenth century, with one of them disappearing due to construction. At the beginning of the twentieth century, new city parks are created in accordance with ancient urban influences, such as by filling the defensive ditch, the forming of the park in Pile, Bogišić Park was founded, Lokrum becomes a large park area open to the public (Figure 60).

The war situation in the country was the obvious cause of stagnation in development during the first half of the twentieth century. Later, urban space is more intensively developed, when new parts of the city are created due to expansion. They often devastated the old summer garden spaces (Šišić, 2003). In a new city urbanism, built during the post-war period, the park appears as the main form of the open public urban area, and similar to the other investigated cities, the new squares are an unusual occurrence.

In the second half of the twentieth century, parks are formed as a structural element in the old urban fabric (The park under Lovrijenac in 1954, the park under Boninovo in the sixties), or as part of a new urban space (Lapad, Babin Kuk, Gospino polje), forming the relationship between the constructed and open urban areas. When comparing all the city park areas, we can conclude that based on its dimensions, Gradac Park (formed in the 19th century) remained a dominant park area in Dubrovnik. Since that streets and square motifs appear only during the seventies in new hotel and tourist zones, with certainty we can link them to postmodern urban influences.

The coastal zone of Dubrovnik is partially accessible to users, and due to its beaches and promenades it is an important public space. Of all the open urban areas, we can consider the most prominent gravitational points to be the main open areas of the city centre, which are a unique identifying element of Dubrovnik (similar as in other investigated cities). Given that the expansion of the urban area can be characterised as filling voids in the urban fabric, a scheme of open public spaces shows their even distribution within the city, and thus behave in a balanced relationship between the constructed and open urban fabric (Figure 172).

The last decade of the twentieth century was marked by a transitional process, which led to reduced concerns about public grounds. Undeveloped areas within the city perimeter (unfurnished green city spaces) disappeared, and in the twenty-first century some begin to reflect on their importance. Given that Dubrovnik urbanism considers it important that the hill peaks remain natural surfaces whose slopes have been urbanized (Figure 162), an idea is born to convert them into city parks, which would preserve the green zone, but also integrate them into the urban fabric, acting positively on the relationship between constructed and open urban spaces. Having said this, numerous interventions are planned in the future - shaping the slopes of Srđ as a large public park, and the construction of a sports and recreational zone on Mount Montovjerna. The Mount of St. Blaise, Velika i Mala Petka are residual town hills with intact forest vegetation, and its integration into the urban area is imminent. The mentioned natural green spaces in the form of trees or underbrush are an important ecological potential in space, which due to their fragmentation, tend to create relationships between the elements of a green system.

Presentation of open areas in Dubrovnik

Figure 162. Open spaces, Dubrovnik in 1910 (cartographic base: Plan of Dubrovnik from 1910, 2011)
Slika 162. Prikaz odprtih površin, Dubrovnik, 1910 (kartografska podloga: Plan of Dubrovnik from 1910, 2011)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade

Figure 163. Open spaces, Dubrovnik in 1988 (cartographic base: Plan of Dubrovnik from 1988, 2011)
Slika 163. Prikaz odprtih površin, Dubrovnik, 1988 (kartografska podloga: Plan of Dubrovnik from 1988, 2011)

Figure 164. Open spaces, Dubrovnik in 2003 (cartographic base: Digitalni katastarski plan, 2003)
Slika 164. Prikaz odprtih površin, Dubrovnik, 2003 (kartografska podloga: Digitalni katastarski plan, 2003)

Legend

- constructed areas
- green landscaped areas
- forests
- green unlandscaped areas
- sport and recreation
- cemetery
- squares, waterfront promenade

*   *   *

This chapter has shown us that the squares, acting as the city's former main open spaces, do not appear at all during the twentieth century. In contrast, the park becomes a spatial element implemented in the urban fabric of all the investigated cities. So we have it that Rijeka parks were built in the nineteenth century and survived in the urban fabric, and a few new amenities was created at the beginning of the twentieth century. They occur in Sušak in the twenties and upon personal initiative of Joseph Kuflanek (Matejčić, 1988). Dubrovnik experienced the development of park space in two phases, at the beginning of the twentieth century and in the period from the fifties to the eighties (mostly relating to the development of tourism). Except for the nineteenth century, Zadar parks were typically formed during the period of Italian rule until World War II (later it involved primarily individual building equipped with gardens that did not create an imperative for their implementation). In the Split, a specific situation occurs because parks from the nineteenth century began disappearing, and new one was established only in the fifties (due to the large influx of residents and the emerging concept of multi-residential settlements). Though in the second half of the twentieth century leads to the development of multi-residential settlement, the emphasis is placed on the green space within them (rather than on city parks). The last twenty years have been marked by a negation of all forms of open public spaces. With the introduction of green public surfaces in the urbanism of the city, completely new relations within the city between the constructed and open urban spaces have evolved.

4.2.5.6.5 Synthetic presentation of all elements in the green system evident in today's situation of the investigated cities

4.2.5.6.5.1 Zadar

The remains of former historical period lie in today's urban fabric of Zadar, which for the purposes of this study should be emphasised as a spatial qualities of a future city. Urban fabric is a combination of various historical periods that have left even today visible elements and divisions in the area.

The oldest remains from the Roman period are most notable on the Zadar peninsula (no. 1), where, despite the manifold devastation of space the dominant Roman division is still present and the relationship of constructed and unconstructed areas are maintained. The one-time forum is even today an open space in the town, which by its recent rearrangement represents an archaeological park that joins the important city square in front of the church buildings. This church square represents the former *parvi*s, which in the early Middle Ages was the most important open public space of Zadar. However today, within the old city, the most important square - Narodni trg (Eng. the People's Square) dominates, built in the late Middle Ages and is considered the most important city point that has survived to date (Miskić Domislić, 2012). In the period from the fifteenth to the nineteenth century, other squares were formed, and less important urban gravitational points. In this period, it is important development of the suburb Arbanasi which is still visible in the urban pattern (1x).Parks within the old city were built in the 19th century on the defence walls (17th century). Due to the strong influence from the conservation profession advocated by the culturalist approach to urbanism, parks (abandoned or maintained) have been present in the urban fabric right up until present time. Though in the nineteenth century city, the promenade rose at the southern ruined defence walls, this function is now replicated by Kalelarga - Široka ulica (eng. Broad Street), which traverses within the urban fabric from the land entrance via the Narodni trg (Eng. the People's Square) to the west. Only with the recent reconstruction of the Zadar Riviera, has its use again intensified. Roman remains are clearly visible within the remaining urban fabric there once was agricultural land, divided into centurias by the Romans implementing proper distribution (centuriation). These lines are still the baseline of Zadar urbanism (Figure 167), most often usually presented in the communication routes that simultaneously determine the constructed and green urban spaces. Parts of the city that were formed under Italian jurisdiction at the beginning of the twentieth century are partly visible today. So along the coastal edge there is a series of villas with gardens representing the remains of the former elite housing zone (2a) in the area of Brodarica, spreading to the bay of Draženica. These areas are still dominated by the Vruljica park area (1a), which was one of the major points of the Italian regulatory plan from 1939 (Valle de Bora) and Arbutina (2002b) mentions it as the pine forest which was a favourite resort of the inhabitants of Zadar in the nineteenth century. In the same zone there are smaller parks overlooking the Maestral Bay which are fragments of the former forest area (1b) which was included by the Italians in the regulation plan of the park from 1939, and Arbutina also (2002b) mentions it as favourite resort in the nineteenth century. Therefore, these surfaces are very important parts of the urban fabric of the city, and the above mentioned talks of their historical significance. In the zone of the expanded centre, today there are still visible elements of industrial zones from the period of Italian rule (2b, 2c, 2d), and these zones

were further complemented by city's development. After World War II, construction takes place involving individual objects (6), and their expansion is present until today. These areas represent significant patterns of diverse density (a highly dense city centre, less density periphery). Since they are characterised by the family houses with gardens, these zones do not have open public urban areas.

The area of Višnjik and Voštarnica (3a) is an area that still reflects the functionalist concept of settlements that emerged in the sixties, but was filled with architectural structures during seventies and eighties. Oštrić says that they were typical structures of an expressionless character (Oštrić, 1991), but they are important because by their appearance the development of the idea of residential greenery begins, typical for functionalist settlements. The feature of multi-residential buildings alongside the Boulevard is a creation from the seventies and eighties (3b). Constructed space was developed using a wide green belt in front of the buildings facing the road, but with the lack of functional facilities. The tourist zone in Borik (4) was created during the sixties and seventies, characterised by large green park areas for tourism purposes. Industrial zones (2c, 5b, 5a) which were spreading and complementing each other did not create protective greenery towards the residential parts of the city, so numerous conflict points occurred within the urban fabric. As some of the parts of industrial zone were filled by residential buildings, so problematic parts of the town were developed (2c). Parts of the city arising in eighties were characterised by multi-residential settlements with well thought-out residential greenery (4a, 4b, 4c, 4d). This phenomenon probably occurs as a reflection of postmodern aspirations in urbanism, expressed in the more complex green and paved areas within residential settlements. The western part of the city (5d) is an area that is connected to the construction of the nineties and the first decade of this century, was marked by the construction of the so-called typical urban villas that represent condominium buildings which are located on small plots of land, without the development of public open space in the narrow and broad concept. Since this zone is located along the sea, the coast can be a substitute for the lack of functional public facilities. Zadar urbanism has been in a specific situation in the last twenty years that has occurred due to army leaving the city, and abandoning industry, on account of which within the urban fabric there have remained large and predominantly urban area remain. Today, these areas possess a public spaces, such as sports and recreational zones (fulfilled with residential zone) (5a) and shopping centres (5c), while still some are undeveloped and represent an extraordinary potential for the future (5c). Within the urban fabric there still appear highlighted green wedges which have remained undeveloped due to their geomorphologic character. These are streams (7a, 1a) and dry valleys (7), which today represent an extraordinary potential for the development of a sustainable green city with high ecological significance, because it connects the Zadar hinterland to the coast. The Zadar hinterland still faithfully depicts the Roman division of space, so it represents valuable structural pattern that is added onto the existing urban morphology. As Zadar surrounding landscapes are characterised with woodlands which in a certain zones came in contact with the urban pattern, there is a possibility of their implementation into the green system of the town.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Figure 165. Synthetic presentation of elements in the green system, Zadar
Slika 165. Sintetični prikaz elementov zelenega sistema, Zadar

4.2.5.6.5.2 Split

The urbanization of Split contains more or less visible layers from previous times. The old town (No.1) has recognisable elements from Roman times, present in the communication routes and in open space on the square in the eastern part of the urban fabric, on the site of the former peristyle. This same area in the early Middle Ages assumed the role of the church *parvis*, and persisted for some time as the central point of the city. In the western part of the old city, the Narodni trg (eng. People's Square), there is a major gravitational space which as such originated in the late Middle Ages. This area has so far maintained an important role in city life, with the central functions of buildings surrounding it. In today's urbanism there a significant gravitational urban point making up the waterfront, created as a promenade in the nineteenth century. From that period, the Strossmayer Park is still visible as the only remaining park of the few park areas that appear in the nineteenth century on the location of the defence system. Others have been eliminated due to construction or are still unpaved surfaces with a significant potential (social, environmental). This shows that the urban fabric still preserves the old layers visible in the open areas of the city. The former Roman centuriation of agricultural land partially survived in the lines of roads directions, creating borders of constructed or open urban space (Figure 168).

With the city's development in the early twentieth century, Split I appears (2) where still are evident differences, which was brought about by capitalism. Thus, within the urban fabric the fragmented structure is characterised by smaller buildings of the lower classes and the fragile structure characteristic for secession structures with gardens. Open public spaces from this period do not exist, because at that time these surfaces within the city were not created. The Split II zone (3), formed between the 1946 and 1966, is characterised by typical public buildings that have been duplicated regardless of context (in accordance with the principles of functionalist urbanistic principles) (Muljačić, 1958). Although the residential green was simplified, in this period new city parks appear which are visible within today's urban fabric. They represent the majority of green park area of today's Split, including Marjan, which has been fully integrated into the urban fabric. Since at that time awareness of the importance of green space in the city had already been developed, we can conclude that Sustipan (3f), Emanuel Vidovic Park (3a), Seafarer's Park (Park pomoraca ili Katalinića brig) (3e), the Turkish tower (3b), and the very important Marjan city park (6) are the result of modern urban trends. Simultaneously, smaller zones of unplanned suburban areas characterised by fragmented structures of family structures were created (3g (Kman, Kocunar), 3h (Sućidar), 3i (Blatine, Škrape). In this zone, port-industrial spaces and a shipyard, which are zoned on the north foreshore, are visible, under the influence of the urban plan from 1950.[66] This plan has set today's belt of sport recreational zone with green park elements (3b), set up as a buffer between industry and housing and so represents an implementation of the functionalist urbanistic principles. This is the period when attention is paid to the south-eastern part of the town where an area called Bačvica is regulated as a major urban beach, with accompanying park spaces (3d, 3c).

The area of today's Split III is part of the city in which more complex structural elements are visible than in the previously described zones (4). Urban concept is based on existing

---

[66] This has been from the beginning of the century an area where industrial buildings have developed.

values and the tradition of the use of space, emphasising the outdoor open areas designed as a pedestrian Mediterranean street. The idea is complemented by smaller park spaces that represent residential green. Directions of sprawl are in contrast with the surrounding lines of constructed fabric since the lines move with the direction of the Diocletian's palace (that had departure from centuriation). At the same time, this zone is occasionally intersected by units characterised by family objects that create a fragmented, less planned structure of the urban fabric (4b, 4c (Visoka), 4d (Mejaši, Deagovode). Subsequent development of this zone complements the multi-residential buildings that have less functional open urban areas.

The last twenty years represents a new period of development trends. Split widens towards the east (5a), swallowing the former illegally built suburbs (Smokovik, Dujmovača) and connects with the neighbouring city Solinom. Along the coast, new urban spaces develop, filling the remaining urban area (Pazdigrad, Žnjan, Stobreč) (5b). The structural characteristics of these areas are irregular spatial elements based on smaller components. Slightly larger spatial elements are visible in the area of Dugopolje where the Split business area has developed. In the new parts, there is evidence of a lack of thinking concerning urban open public spaces, since they do not exist in this zone. The city is also developing in the western direction over the southern slopes of the Marjan (Meja) (5c), to the detriment of Park Forest. So the new part of the Split is characterised by the contrast between the area with new multi-residential buildings, commercial zones and areas with dense unplanned urban fabric with a very low degree of urbanity. In such conditions, the construction has not materialised opportunity for systematic planning of public green space. Split in its final development phase surrounds neighbourhoods causing remoteness from the hinterland, so causing it to lose connection with it, denying the importance of the relationship with the surrounding landscape.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Figure 166. Synthetic presentation of elements in the green system, Split
Slika 166. Sintetični prikaz elementov zelenega sistema, Split

191

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

4.2.5.6.5.3 Rijeka

Although the spatial volume of Rijeka has multiplied in the last two centuries, the former dimensions of the city and its features can still be discerned in the urban structure. The old town (no.1) hides visible elements of previous years that were overlapped and occasionally deleted. Thus, the Roman remains are visible from communication lines, where we can still observe the main decumanus and on the site of the assumed forum there remains an open urban area, but today has no characteristics of urban square. Since it is located in front of the church choir, this open space is directly linked to its role in the late Middle Ages, when it was an important urban *parvis*. Today Kobler's Square represents an open space in the town that was the main urban public open space until the end of the eighteenth century. Although today it is not the main point of the city, it survived as a square within the old urban areas.

The structure of the urban fabric of the old city reveals its organic character, whose uncontrolled development has survived as a form of development up until today. Around the oldest part of the city, there is a zone in which proper spatial separation occurred in the eighteenth century (2), notable under the influence of Baroque streams from the Austrian palace. Proper construction of the block is partly opened in the public area of the urban fabric that is clearly distinguishable in the Kazališni park (Theatre park) (2b) and Corso (2c) with squares (the Jadranski trg (eng. Adriatic Square), the Rijeka Resolution Square). The industrial zone (3) along the coast hides the typical characteristics of the nineteenth-century industrial city, and parks, which are inserted into the fabric, reveal the response to industry, typical for nineteenth century. These parks have survived today in terms of their importance for the urban population since they have kept the same intensity and continuity of use (Mlaka (3a), Nikola Host Park (3b), Vladimir Nazor Park (3c)). Linking onto this zone of the urban fabric are zones that still have a typical block structure (4a) from the late nineteenth and early twentieth century (characteristic of Austrian cities), and the zones with individual objects (4b) which develop on the slopes of the hill with a very dense or less dense structure (detached houses with gardens).

Zones of multi-residential building (5) (derived from post-war period) have been designed using a pattern composed of very simple forms. These forms, which are usually standard structures, were created in the fifties and have been duplicated in a number of urban settlements (Kozala (5a) Turnići (5b) Krnjevo (5c) Pećine (5d)). The areas were complemented with residential buildings possessing more complex structures that occur in the later period (until the eighties) in the mentioned settlements, but new settlements in the area of Škurinjska Draga, Drenova, Rastočina, Kantrida, Lenci and in Sušak in the areas of Donje i Gornje Vežice have been developed. Residential greenery has simple structural characteristics. Between zones with the residential buildings, there are areas with family buildings possessing an unplanned form of structure. In the eighties, the zones that have open spaces with a variety of functions and take up a smaller surface area of the existing housing settlements were developed, but also a full multi-residential resort complex on Krnjevo conceived by the constructed and open public spaces (6) has been built. As the city had expanded, numerous streams were channelled beneath the earth's surface, or were used in industrial plants due for industrial development purposes. Those that are still visible in the urban area are surrounded by abandoned or active industrial plants (Rječina watercourse (9c) and the creek that runs through Škurinjska Draga (9d)). In this way,

Rijeka vividly illustrates how the industrial city treated the valuable spatial elements, since due to industrial development and the port it lost most of the valuable urban spaces - the seacoast and waterways.

In addition to these areas, Rijeka's fabric includes linear features that relate to the geomorphologic surface, which remain undeveloped as ridges or relief cuttings remained due to the great escarpment (8a). This category includes the valley courses (9b). Today, one can notice very important ecological potential in it because it connects the hinterland region with the city, spreading almost to the coastal edge, representing an important element of the green urban system. Expansion of Rijeka in recent decades has resulted in its connections with surrounding settlements characterised by detached structures (8), new businesses and industrial zones not to mention new multi-residential settlements (7). The relationship to the surrounding area still retains connections with the surrounding landscape (especially important in an ecological sense) since that is due to relief formation which pose difficulties for construction.
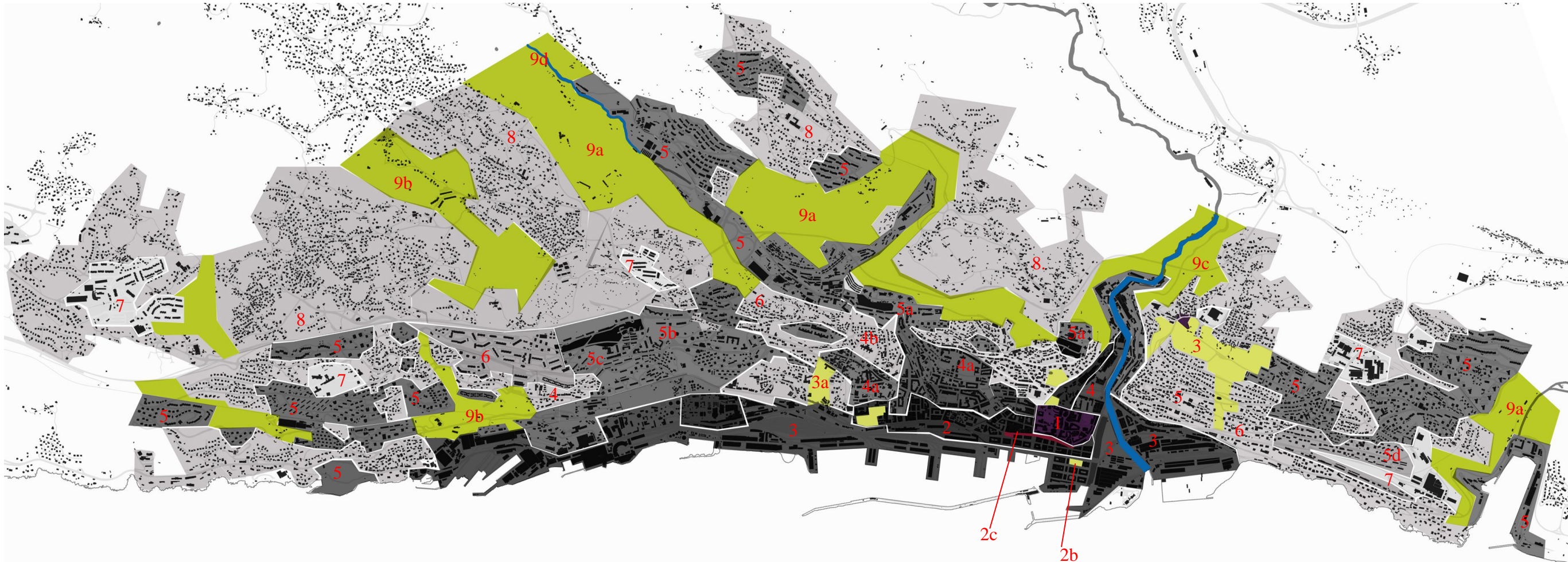
Figure 165. Synthetic presentation of elements in the green system, Rijeka
Slika 165. Sintetični prikaz elementov zelenega sistema, Reka

4.2.5.6.5.4 Dubrovnik

Dubrovnik is a very complex area in which it is more or less obvious that the urban fabric comes from different historical periods. Although some authors (Beritić, 1958; Marinović, 1959) say that cardo and decumanus from Roman settlements are visible in the oldest part of town, the most dominant are medieval elements within the old town (1). Their planned foundation has given a basis for the development of space in subsequent periods, and the city kept the size and division from former period, especially visible in open urban spaces. The most important open central area, Stradun, Luža and the square (former *Plateau communis*), which linked them to the cathedral, in the structural and social terms represent continuity from the time of their formation (in the late Middle Ages). In today's urban fabric, Renaissance construction can still be read on the surface of the former suburbs (2). Although the structure is much denser, it retains its character as a sort of garden urbanism, representing the area of landscape villa. Their mixing with objects from later periods is most pronounced around the port of Gruž (2b) where spaces of mixed samples were created (Renaissance, nineteenth century, twentieth century), but also in the area of Konal (2a) and Lapad (2c) (most pronounced mixture of Renaissance and nineteenth centuries). Gradac park is a surface typical of nineteenth-century urbanism (2d). The areas that were built on these zones are spaces created at the beginning of the twentieth century, characterised by family buildings with gardens. From this period, we can found Bogišić Park (3a) and Lokrum island (3b), which is designed as a park for the citizens of the old town.

Within the urban fabric, there is a strong contrast to the regular old city within the walls and other urban areas, which have developed on irregular terrain, so they have the structural characteristics of an irregular quality. Buildings that are characteristic for the post-war period are also adapted to the topography, which was hard to ignore. Some parts of the city are characterised by typical public buildings that emerged in the nineteen-fifties and sixties, and mostly situated along the main street, on the sloped parts of the city (4) (the simple forms typical for functionalist settlements could develop since the structures did not have to adapt to the sloping terrains). Coincidently, green spaces occur within multi-residential settlements that complement the urban structure, but with rather simple features reflecting the functionalist principles of urbanism. During the fifties and sixties, new parks began to complement the new parts of the city, but the old urban fabric is made less dense. Urban areas with patterns of greater complexity refer to parts of the city developed in the nineteen-seventies and eighties, when settlements were developed with decomposed open areas which still have diverse functions (playgrounds, bowling alley, sports fields, walking street) (5). Frequent use of pedestrian zones between structures reflects former postmodernist influences of urban streams. At that time, there is more and more constructing taking place on the slopes of the hill, because flat surfaces were expended in the previous period. Hence, the structures are adapted to the terrain on which they originate (in a cascading manner). In such circumstances, the remedial role of green space elements was very important, for the purpose of making devastation of space visibility during construction on slopes. This is the time of developing large tourist resorts at Babin Kuk (5a), and the area of Lapad (5b), where structures are adapted to the relief contours. However, it is in this period that, in terms of space, vertical skyscrapers (5c) were developed which on account of their great dimensions become very dominant spatial elements, and open areas around them do not have the necessary facilities because they are

converted into large parking areas. Thus, spatial accents are more pronounced since they are located on a slope. In the eighties, the city starts to become unburden on account of the Mokošica and Župa Dubrovačka suburbs which were built as multi-residential settlements for people who work in Dubrovnik. These resorts have complex structural features, with open areas, but are often insufficient. A fragmented urban structure is formed around these zones, and represents single-family buildings that were constructed throughout the twentieth century (7).

The urban fabric of completely disorganised character is typical for the development in nineteen-nineties and the beginning of the twenty-first century (6). Then multi-residential structures are built on small plots of land. In this kind of urban fabric, there is no systematic approach, so pubic areas are not properly developed. These zones are filled with unconstructed spaces between older multi-residential suburbs by destroying necessary caesura of urban fabric which is highly visible since it is located on the slopes. At the same time, some of the remaining urban green space are protected (8a, 8b, 8c, 8d), and they have the park and recreation area in order to be preserved for the future. Now they represent the forest or macchia peaks or hills, which are to be implemented in urban space. They have an important ecological, structural significance for the urban green system and with the existing plans will become important social and urban areas. Development of urbanised settlements around the city of Dubrovnik is also present in this period with the formation of the multi-residential settlements in existing suburban zones of Župa Dubrovačka, Mokošica and Orašac. There is not creation of new public spaces in these areas, and they serve mainly as a dormitory or rely on the network of content, which includes rural villages out of which or with which they occurred.

Since the city of Dubrovnik is surrounded by the slopes of Srđ Hill (8d), it enables it to spread to the surrounding area. However, it can be viewed as a green zone towards the surrounding suburbs. Its planned transformation into large park areas will have an impact on the sustainability of the city, and at the same time can become a link instead of an obstacle for the populated areas in the Dubrovnik region.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013
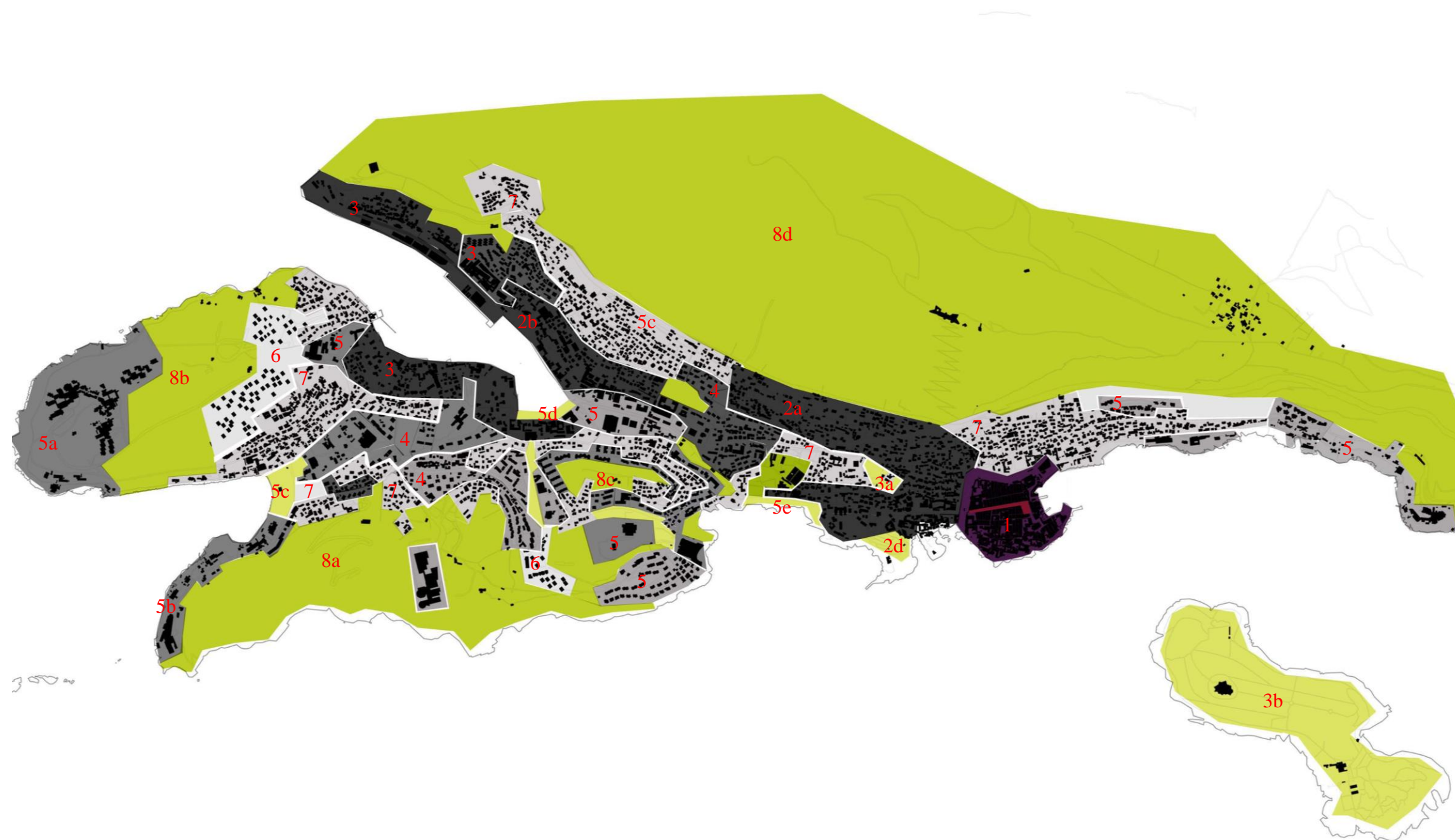

Figure 168. Synthetic presentation of elements in the green system, Dubrovnik
Slika 168. Sintetični prikaz elementov zelenega sistema, Dubrovnik

4.2.5.6.5.5 Defining the impact which acted on the development of elements from the green system in the investigated cities

The earlier chapters defined that all the investigated cities have a unique system of green spaces, which were developed due to different conditions of development in different periods. In the present situation in the urban composition of the city, various factors acted that caused the existence of unconstructed land within the city. In addition to open public space, which we have inherited from the past, Split was mostly influenced by good planning practices, and we can point out a plan from 1950 which plans green zones (recreational, sports and park purposes) and the protection of coastal zones (Pervan and Vekarić, 1958). Although the development of the city did not literally follow the plan's recommendations, part of this thinking is implemented in Split's urbanism. Other cities obtained their plans later, when large areas of the urban fabric had already been developed without a plan.

Impact on the development of Split was influenced by some historical layers. The Roman network is significant even today because it defined the communication network and the borders of green and open spaces, partially defining contemporary urbanism. Thus, it retained a role in creating the image of the landscape, which it had since its inception (formerly agricultural and today urban). This network is especially visible in the urban area of Zadar, and it can be seen as an active participant in the formation of structural characteristics of the green system (Figure 167, 168).

Besides the anthropogenic impact on undeveloped surfaces, the urban area was influenced by geomorphology. So in Split it is expressed in the example of Marjan Hill, in Dubrovnik by existence of several hills within the urban area, and in Rijeka and Zadar, a characteristic fact is that some linear zones and watercourses gully, dry valleys within the city fabric remained undeveloped. These areas now represent important ecological zones or corridors in the city. The geomorphology of Dubrovnik and Split acted on use of the coast. Since the towns (especially Dubrovnik) have parts of the coastal belt on a large slope, these areas have not been constructed. The concept of development and implementation of these zones in the city is imminent.

The coast is very important urban area. Due to an increasing of awareness of the importance of the coastal foreshore, and the impact of urban streams, which are based on protecting the space from the negative impact of the industrial town, Zadar and Split have waterfront and coastal areas that are used as public open areas. Rijeka, however, represents an example of a city that, despite suggestions, which complied with the urban tendency for improving the lives of the citizens of this industrial town, failed to make changes in space. Since the coast was sacrificed for industry, it has developed into a coastal city which is not tied to the sea (however, by recent development plans this section intends to be turned into a public urban areas). Dubrovnik does not have a typical Mediterranean waterfront, because that part of the coast that enabled its construction (low shore) was designed for industry and harbour plants. New city development plans indicate that the space within the Gruž harbour will be converted into a pedestrian zone in order to achieve the role of the city's waterfront.

The urban hinterland region is very important for the green system. There is a need for highlighting an example of Rijeka and Dubrovnik for which the relief barrier is one of the defining elements of the green system. It also had a negative effect since, due to the narrow area of the Dubrovnik city, in the absence of construction areas, it has created a lot of pressure to open urban surface. Urbanisation of suburban areas perhaps represents the most important factor in preserving the balance within the urban fabric of Dubrovnik and Rijeka. Coincidently, hilly hinterland represents a barrier to expansion, but it also can be seen as a green belt towards the polycentric network of suburban settlements that began to develop.

Presentation of the line from the Roman period as a determinant of today's urbanism

centuriation lines
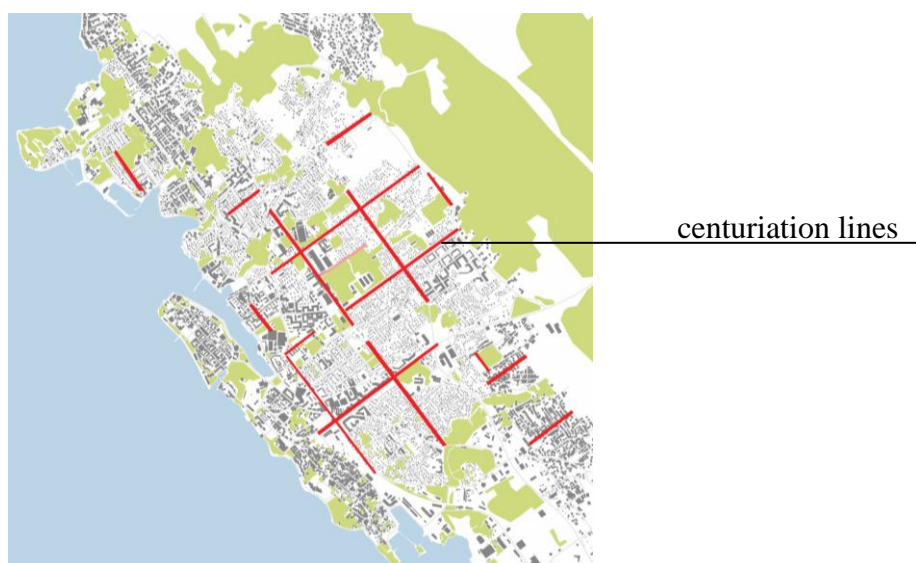
Figure 169. Roman division of space in today's Zadar
Slika 169. Rimske razdelitve prostora v današnjem Zadru

centuriation lines
lines from
Diocletian'spalace

Figure 170. Roman division of space in today's Split
Slika 170. Rimske razdelitve prostora v današnjem Splitu

4.2.5.6.5.6 Comparing the most important urban open areas in the investigated cities

Structural features of the most important urban areas are shown in the scheme (Figure 169, 170, 171, 172). The scheme involved squares (red), parks (green), sports and recreational zones (orange), the active edge of the coast with promenades and beaches (yellow), and cemeteries (because they represents the green urban spaces with ecological significance) (purple). In this scheme, multi-residential greenery that has more local importance has not been included, and is therefore important for the whole area of the city. By comparing the schemes of open public spaces in the investigated cities, it was observed that their greatest concentration occurs within the old urban fabric and the zones around it. In this case, Dubrovnik is an exception where the open public spaces are evenly placed throughout the metropolitan area. The reason for this probably lies in the fact that the Dubrovnik urban fabric developed on wide area in previous centuries (suburbs), and the older urban fabric was spread out all over the city coverage (villas). An important role in the distribution of public open space was provided by the capacity of tourist accommodation that is evenly distributed in the urban fabric, and tourism has also influenced city regulation, and consequently the creation of public open spaces. For all the cities, it is characteristic that squares are related exclusively to the old parts of the city, while the newer parts are missing them. Park areas are scattered throughout the urban fabric, while recreational areas are linked to specific urban area. The active edge of the coast is broken with long (Zadar, Dubrovnik) or shorter continuous segments (Split, Rijeka).

A scheme of open areas in the investigated cities
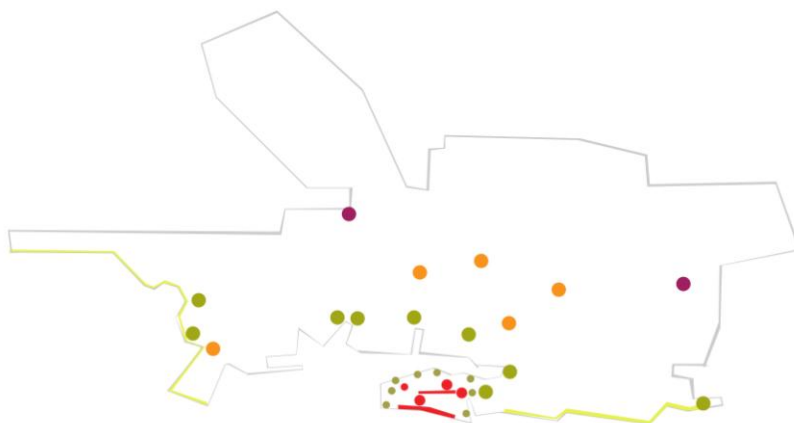
Figure 171. Scheme of the open areas, 21th century, Zadar
Slika 171. Shema odprtih površin, 21. stoletje, Zadar

Figure 172. S Scheme of the open areas, 21th century
Slika 172. Shema odprtih površin, 21. stoletje, Split
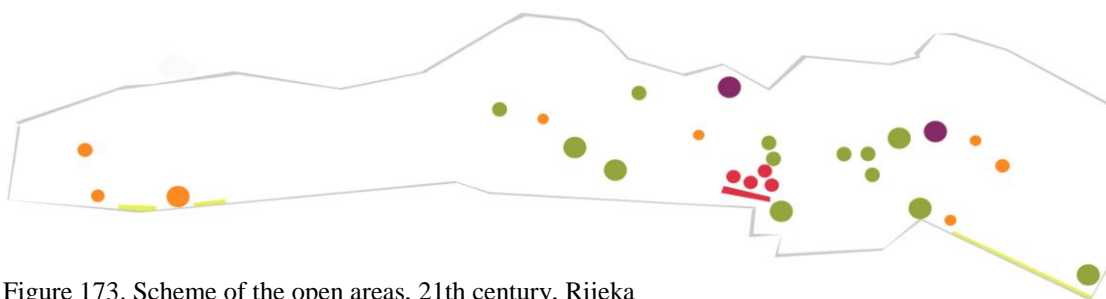
Figure 173. Scheme of the open areas, 21th century, Rijeka
Slika 173. Shema odprtih površin, 21. stoletje, Reka

Figure 174. Scheme of the open areas, 21th century,Dubrovnik
Slika 174. Shema odprtih površin, 21. stoletje, Dubrovnik

4.2.5.6.5.7 The intensity of usage for the open public areas

Criteria for analysing usage intensity of open public spaces were formed by reviewing the available literature, using the survey from Miškić Domislić (2012) or the cities of Rijeka and Zadar, checking data with local experts in the field of landscape architecture and architecture, and with the staff of city services assigned for the maintenance of green public surfaces. This made us realise that the most intensively used city space was the point (square) or line (pedestrian street) in the old urban fabric, with a continuity of use from the past (the Narodni trg - the People's Square in Zadar; the Narodni trg - the People's Square in Split including the Peristyle; the pedestrian street Corso in Rijeka; in Dubrovnik old square Luža and Stradun). This category includes the spaces that are created in recent past, and this includes the Split waterfront (nineteenth century), Zadar waterfront and the central pedestrian street Kalelarga taking the role of a promenade space that it received in the twentieth century. The above-mentioned spaces have a symbolic meaning for the cities representing the element of urban identity. In regards to the park lands within the cities, the most intensively used are the old parks, located near the old town, which falls into the middle-intensive category of usage (Zadar - Queen Helen Park and Park Vladimir Nazor on the old walls of the city, and park Vruljica close to it; Split - Strossmayer park on the site of the former defence bastion, and Emanuel Vidović Park near the town; Rijeka - Theatre Park, Mlaka Park in the city dating from the late eighteenth century, Trsat Park and park spaces along the coast on Sušak; Dubrovnik – park on Pile next to the city walls, and the park in the Gruž port). Falling into the same category are some squares in the old urban fabric (Zadar - Forum, Rijeka - central square in the old town, Kobler Square, Gat Karolina Riječka, Marshall Square, Dubrovnik - the square in front of the cathedral, Gundulić Square, Bunić Square, the square in front of the Jesuit Collegium) and linear elements (Split - West Coast, Rijeka - coast on Sušak, Dubrovnik – Uvala Lapad, east coast of Gruž bay). In the category of space with the lowest intensity of use there are less important squares in the old city, and less substantial park areas and recreational areas.

This analysis shows that the most intense gravitational points are connected to the older urban fabric, while the newer urban areas are characterized by their lack and the reduced intensity of use.

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Figure 175. Analysis of usage intensity of public open areas, 21th century, Zadar
Slika 175. Analiza intenzitete uporabe odprtih javnih površin, 21. stoletje, Zadar
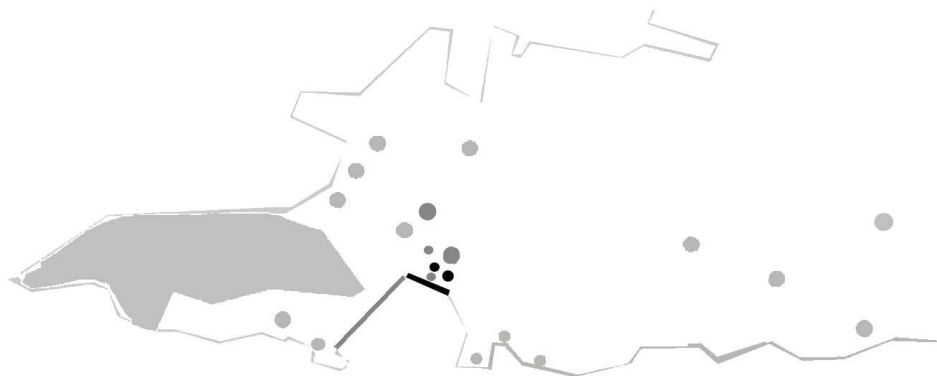
Figure 176. Analysis of usage intensity of public open areas, 21th century, Split
Slika 176. Analiza intenzitete uporabe odprtih javnih površin, 21. stoletje, Split
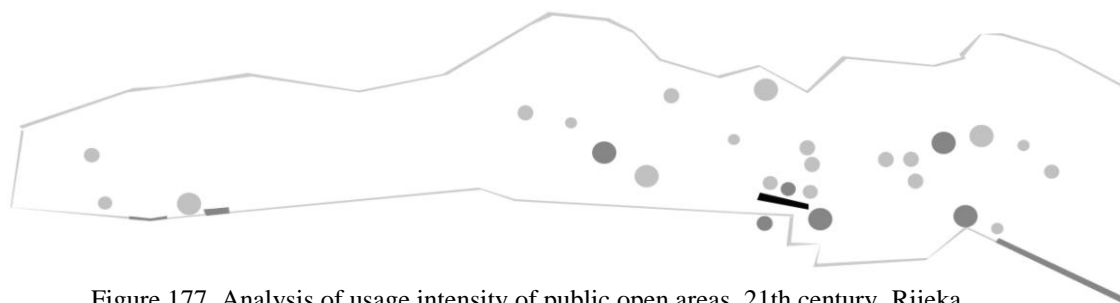
Figure 177. Analysis of usage intensity of public open areas, 21th century, Rijeka
Slika 177. Analiza intenzitete uporabe odprtih javnih površin, 21. stoletje, Reka
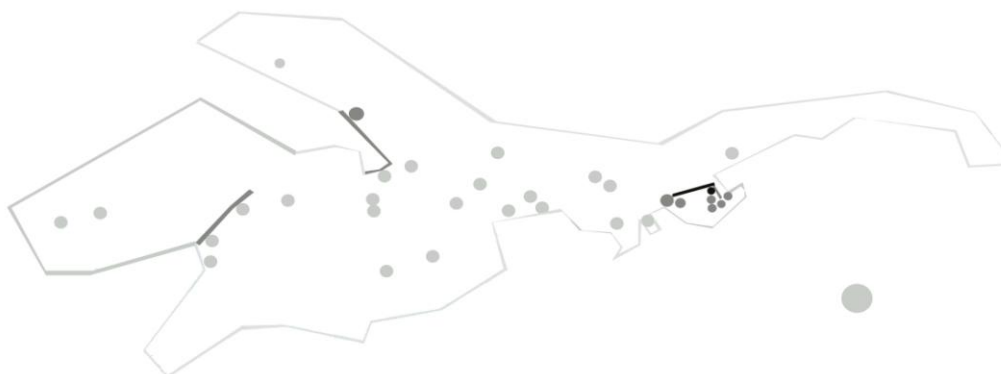
Figure 178. Analysis of usage intensity of public open areas, 21th century, Dubrovnik
Slika 178. Analiza intenzitete uporabe odprtih javnih površin, 21. stoletje, Dubrovnik

4.2.5.6.5.8 The relationship of the investigated cities towards the hinterland region

All of the investigated examples show one common feature: expansion means that they move away from the surrounding landscape, meaning that the hinterland area becomes increasingly available to residents. Yet their attitude towards the hinterland varies, and the most common cause of diversification are geomorphic characteristics of surrounding space. So those cities that have evolved along with relief contours (Rijeka, Dubrovnik), become urban areas with space limitations. Mountain chains prevent their spread so less flexible boundaries of constructed fabric develop. In this case, the city spreads across the polycentric suburban areas that are located behind or on the hill. Consequently, the hinterland area becomes a potential green space element that can functionally connect these urbanised areas. If the hinterland space is not implemented in the city area, it will remain difficult to access for their city residents and as such will remain unused potential.

Those cities, which have originated on flat terrain, create a flexible relationship towards the hinterland because their boundaries are constantly changing for the easy expansion of the city. Unfortunately, this has led Split to merger with surrounding towns. Zadar for example shows the potential of applying historical elements that are stored in the background, so it spreads by respecting (more or less) the networks of Roman centuriation. Since there are also large forest areas in its hinterland, these should be viewed as quality space, which can enrich the future Zadar urbanism.

5   DISCUSSION

In this chapter we will discuss the results of the research. For this purpose, will compare information from the theoretical part of the research (when referring to the findings of research on the role of open space in the historic city, knowledge gained on green systems in a modern city and urban theories that appeared in the nineteenth and twentieth centuries) with the results of empirical research, conducted in four cities on the Adriatic coast in order to verify the hypothesis.

Many authors have spoken about the importance of open spaces of a historical city in the structure of the urban fabric, in the social life of citizens. Coincidentally, these surfaces represent the space which were from an anthropocentric point of view sustainable on account of the optimal adherence to natural quality (solar, wind) and a minimal destructive effect on the environment, and it had those qualities that are the major determinants of a contemporary ecological city. Thus, both the Hippocratic theory of a town, built at the end of 5th and early 4th century BC, spoke of the importance of the location of open space in the city compared to the sun, wind and water source. Equally important is the tenth book *De Re Aedificatoria*, by the Renaissance theorist Alberti, in which when describing the ideal city, talks about the importance of the topography, and also the dimensions of the street because of the need for shade and ventilation. These features of open areas (structural, social and environmental) of a historical city can be brought into direct contact with the characteristics of green elements in a modern city, where they are equally important.

Thus, the analysis of the historical relationship and contemporary urban space led to numerous data supporting the hypothesis that **there is a connection between the historical distribution of open space and green elements of the newer parts of the city**. It is reflected in the fact that despite the changes in the position of the central city square in the investigated cities, it was always on the most important communication routes, and along some important urban structures or intersections. So it happens that today's most important urban green spaces are subject to availability, hence they are located along the communication routes and the important gravitational points, which in this case constitutes the old town. Less intensively used areas are located further away from the old town, similar to the historical urban area when such areas were more peripherally allocated. Squares are almost always dispersed, dotted and evenly distributed along the urban fabric. This includes the previously mentioned exception of Dubrovnik, since the urban open spaces are complemented, i.e. develop in such a way so they physical link to one another, creating a linear character. The reason for this lies in the fact that the city has developed on an irregular topographic surface, and the structure of open urban areas was designated by geomorphology. Given that open urban spaces occurred on the flattest parts of the city area, this confirms the fact that urban open areas were positioned on the best locations for their development, often defining the urban centre. This factor is visible in other investigated cities by the fact that the central squares are usually located on the best spots in the urban centre areas, on flat ground, where they were most protected from the adverse effects of nature (especially wind). This means that their locations are determined by a geomorphologic basis (which will be discussed later), including other natural influences. The distribution of green elements that were created in the nineteenth and throughout most

of the twentieth century shows that the park areas along the town fabric are evenly distributed, with the use of high-quality space of the urban area. Subsequently, some of them develop along existing waterways or are located in coastal areas, sometimes using existing quality vegetation (the Zadar parks in Valle de Maistre and Valle de Bora; Park Pomoraca, Bačvice in Split; parks by the sea in Sušak in Rijeka; Park Gradac, Batala and Uvala Lapad in Dubrovnik). This was contributed to by the concept and establishment of CIAM's doctrine, the Athens Charter of 1933, which noted the four basic functions of a city (housing, work, exercise and recreation), determines the role of vegetation in the urban space. However, in recent times, this criterion is lost and one can see that within urban areas only the least favourable areas for construction (for morphological specificity) have survived, and represent the remnants of an urban space that is not suitable for construction. Talking about this phenomenon is Steiner (2011), so it is evident that it is present in other parts of the world. Subsequently, urban open areas have lost their former important role in defining the urban fabric. Despite the observed deviation in the development of open areas, these 'remnants' are potential elements of a green system (although it deviates from these criteria that have influenced the development of the city throughout history, so too it is necessary to think about the need to recreate a balance in the concept of developing constructed and open urban areas).

It has already been mentioned that the historic city was established in accordance with the topographic characteristics of the area, influencing the distribution of open spaces (the city squares are always established on flat surfaces). Even today, one can see that the city's topography determines the shape of the structure, and the occurrence and distribution of urban open space. Thus, the uneven topography of cities have large undeveloped areas that are steep and now have potential to become green elements of the system (in the investigated cities it is evident that they create connections from the hinterland to the coast, and that they also affect sustainability in terms of an anthropocentric and biocentric ecological sense). Unfortunately, it has already been said that the difference lies in the fact that the former historic squares emerged in the best urban areas, while in the investigated cities today's dominant green parts of green spaces are the least quality spaces for construction, so they have remained undeveloped.

The distribution of the green elements in a system affects the concept of continuity of green spaces (corridors, wedges or belts), which is linked to its ecological importance, and is now recommended in the planning of urban green spaces as an important element of the new urban city model. This concept can be interpreted in historical cities because continuity is visible in the landscape surrounding it (or even around it), for which it has already been established that it was used daily by citizens, and has assumed the role of some elements of today's green system (parks, playgrounds, recreational areas, walkways, and so on). The continuity of open urban areas is evident in the example used for analysing the historical city of Dubrovnik, where the idea of continuity is also developed for reasons that made the city seems like a sustainable system (adaptation to topographic base), and is thus linked with the idea of ecologic value particularly important for the green system.

The relation in the distribution of open space in the historic town and elements of the green system is evident in the fact that the central public area of the historical urban space was its nuclei. The analysis for contemporary cities is significant in that even today, the most intensely urban public open spaces as those that have been inherited from a historical

period, and located in the old city (they were not always the same), i.e. in the centre of the urban system. This can be linked to culturalistic influences that have made an impact on protecting historic urban areas against devastation. If the open areas of old cities are interpreted as part of the green system in a contemporary city, then the old town area in which the centre has always been represents the nucleus of today's city. This means the the distribution system is the same, only the remaining gravitational points are now located in the nearby area which had increased in time, hence there are more of them. Given that Ward Thompson (2002) says that the most intense gravitational points in Mediterranean cities are old streets and squares, we can conclude that this situation occurs in many other urban centres. However, in the investigated cities, the problem arises during the final decades on account of the city area increasing, but new gravitational points are not established.

If the former central open urban area defined urbanism, perhaps the open spaces of a contemporary city, that is, a green system can have such a role in the urban fabric. Given that today there is increasing consideration given to the importance of green spaces in urban space (with a new concept of the urban planning of landscape urbanism), it is evident that the strengthening of green systems in the investigated cities could possibly be again linked to the role of open space in a historical city, from which they have evolved.

As research has shown that the **development of a green system can be studied through the development of open areas in a historic city**, the stated hypothesis is confirmed. The fundamental assertion starts from the fact that the historic central square of the city was an area used as a multifunctional space with many roles, which would later be transferred to the subsequent development of certain elements of a green system. Although previous investigations have not confirmed that the investigated cities originated from the Greek urban settlements, it was actually in the Greek city that a significant milestone took place because it occurs with the inception of the city square - the agora. This agora puts combines a number of urban functions (ruling, legal, administrative, judicial, religious and commercial role, and is the centre of sporting and cultural events, but is also used for daily sojourning and socialising), which represents a precursor to many of the elements of a contemporary green city. So too French (1973) argues that the agora is a precursor of the city square, parks and markets, and most certainly represents a precursor of sports and recreational areas in a contemporary city. Its characteristics will be assumed by the Roman forum, found in several of the investigated cities or nuclei from which the settlement developed (Tarsatica, Jadera, and is an integral part of Diocletian's palace). Their roles are inherited by the medieval square that is used for political, legislative, administrative and commercial functions, but also represents a space for daily sojourning and socialising, where Matejčić (1988) and Ravenčić (2000) note that it was also a space for sports and children's games. Urban development during the late Middle Ages is evident in the differentiation of open urban areas, which is the initial process leading to their development in parts of the green system accompanied by specific specialized roles.
In this way, the urban area of the late Middle Ages is no longer an open urban area, but two (Zadar, Split) or more (Rijeka, Dubrovnik) of such areas. They develop as functionally specialised areas, with the establishment of squares having an exclusively secular nature besides the city halls and lodges which assume administrative, legislative and political roles, and those in functioning as a *parvis* as spiritual spaces with an exceptional symbolic

207

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

role in the city. Although staying in these areas reported due to different reasons, they are extensively used, as evidenced Ravenčić's (2000) study in which are located the medieval tavern on the square in front of the cathedral in the late Middle Ages (and later period). In all the investigated cities, the same process appears which is manifested in the separation of the secular centre acting as a new city square and the maintaining of religious roles in ancient squares.

Today, some of the historical role of the square has moved to new city areas that specialise for specific functions - playgrounds, parks, recreational areas, and represent the elements of a green system. The surrounding landscape has satisfied the need for green spaces, and today the city is trying to satisfy that need using other elements from the green system, which replace the former natural and cultural landscapes. Given that medieval prayer books - calendars[1] (mentioned by Shepard, (2002)) show miniatures representing typical activities throughout the year. This includes citizens staying out in natural or agricultural landscapes around the city (lying on grass, preparing a picnic, walking in nature or amongst the agricultural areas, using the rivers and creeks to ride in boats or go swimming), thereby proving the human need for green spaces, meaning that man often used the surrounding landscapes for sojourning (2002).

The role of the hinterland region around the historic town will be later taken over by some other forms of open urban areas, primarily the park, which appears in the investigated cities in the 19th century. Although in the medieval period, the city and the landscape are separate entities as discussed by Shepard (2002), the city remained in harmony with the surrounding landscape. As soon as the urban area exceeded certain parameters, it lost its medieval character, because besides the ecological reasons, the surrounding landscape was becoming too distant for its daily use (Mumford, 1988, Kostof, 1995). This shows that the concept of medieval city's relationship with the surrounding landscape was important, just as in the case of the sustainability of the modern town, the relationship with the urban hinterland was important.

Although the Renaissance and Baroque periods left some spot changes in the urban fabric of most of the investigated cities, Baroque influences are evident in the analysis and hierarchy of open urban spaces in Rijeka. By giving priority to the linear elements, the Corso street established a new concept of open areas to the detriment of the old square, in line with European trends mentioned by Mumford (1988). The theme of the main street was already conceived in Dubrovnik, but the reason for its origin is somewhat different. *Platea communis* and somewhat later Stradun, are products of earlier historical periods, while their development was probably tied to the limited flat space in the city, and not tied to the Baroque axes and extended views. However, the relocation of the gravitational zone from Luža Square (which Planić Lončarić (1991) speaks of) onto the linear element, Stradun street, can be linked with the trends of the time. In space, these linear elements in the later stages of development, developed into a significant ties between the individual elements of a green system, which had an exceptional importance for its ecological value. Therefore, their idea is very important in establishing the contemporary city.

In the Baroque period in Rijeka, a new phenomenon occurs, on account of the demolition of the defensive walls meant its expanding to the surrounding area. Here processes are revealed that becoming a typical urban trend in the 19th century (evident in Split and Zadar). Expansion of the city to the surrounding landscape leads to the alienation of the

---

[1] Book of hours.

inhabitants from natural and agricultural hinterlands, resulting in the establishment within the urban fabric landscaped greenery, parks that assume some of the roles of the historic square and surrounding landscape. Consequently, the former square and surrounding landscape as spaces used for many functions, become the nucleus from numerous other roles of open urban areas developed into green elements of a contemporary city due to their specialization. However, the investigated cities show that the squares, as its oldest parts, are still an active part of urban life. Subsequently, they are not only the nuclei, but an active nucleus that has generated other elements of a green system, which is still their active centre.

In this study, a note was made that better information would have been gained, had 3D images being created of the cities being created during the workflow. Had this been done through all of the historical periods studied, it would have even better demonstrated the development of relationships of the urban open areas towards the surrounding context, which in the modern city (as opposed to historical) often cease to be ambient.

Investigations have led to information confirming the hypothesis that the **development of a green system was affected by different natural and social factors, bringing about the creation of diverse typological forms (functional, structural and environmental).**
Since the identification of certain specifics of the examined cities, it is necessary to say something more about their characteristics and conditions thereof.

In its urbanism, Zadar has exhibited two contradictory spatial determinants. On the one hand, there exists a flat basis, which has allowed a proper expansion of space, hence open urban spaces appear possessing partialy regular structural features originating under a strong influence of Roman network of centuriation (but with a distinctive fragmentation). On the other hand, open urban spaces have been identified that possess irregular characteristics, representing geomorphic features that due to the unfavourable conditions for building on its surface, remained unconstructed (dry valleys, water features). These spaces are the continuous green wedges that connect (or almost joined) the coast to the hinterland region. Given that they dominate, it is clear that for the green system in Zadar there is less fragmentation of elements in the green system, and this is directly linked to the geomorphology, i.e. continuity as attributed by the streams and dry valleys. They are only partly in a man's social function, as opposed to those elements that originated from the Roman network. Therefore, the green system of Zadar City affected the natural and anthropogenic factors, taking into account that natural influences acted on the formation of an environmental and structural value, whereas anthropogenic factors are related to the appearance of important social spaces.

Split is developed on the gently sloping space that is encompassed by the Marjan Hill. The flat topographical surface, forming part of the city area, has created the preconditions for developing systematic sporting and recreational zone (Poljud), possessing more regular spatial characteristics, forming a ring joining the park-forest on Marjan. The belt emerged as a product of urban planning, showing that a good urban plan influenced the concept characterised by a concentric continuous green belt as the backbone of a green system. Given that the plan itself is tied to urban trends, their influence on the concept city's concept of development is evident.

209

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

The irregular structure of the Marjan Park is directly related to its topographical basis, but as a product of planning presents the park with a social role within the urban area. Other spatial elements possess more regular structural features, scattered around the city area, and which suggest a structure that could be developed along the lines of the principle that French (1973) defined as a Swiss cheese system. As part of Split originated spontaneously, the city joined the surrounding settlements (and losing its link with the hinterland region), thus showing the negative anthropogenic impacts on the green system concept. The mentioned influences allowed the green system to exhibit a strong importance for anthropogenic and only in certain places natural factors (conservation of Marjan on account of topography) on its development.

Rijeka is a city whose contour elevations determined spatial boundaries, hence the urban space has an elongated form. The green areas themselves are located on slopes and possess irregular structural features (especially visible in the Sušak area). Those that have originated on the level terrain, especially during the period of block-type construction, with regular characteristics, are fragmented. This shows how a certain historic epoch of urban development affected the development of urban open spaces. Given that within the Rijeka area there were green corridors formed by the hill ridges and tributaries (natural factors), they have the ability of establishing ecological ties with the hinterland and coast, but unlike the earlier mentioned, they represent spaces that as yet do not possess social significance for the life of the city. They are sporadically cut off structures, and represent fissured corridor links or the principle of the ecological concept of stepping-stones. From what has been said above, the conclusion can be made that the green system of Rijeka was directly affected by natural factors, while an anthropogenic influences is more dominant on level spaces. Evidently, they are open spaces located in the urban area on account of their natural features which are important for structural and environmental values of a green system, whereas those areas that originated due to anthropogenic influences are the socially important areas of the city.

Dubrovnik features a variety of structural patterns, covering park areas that were founded on the flatter spaces and characterised by a more regular structural features, while the green areas on the hills had more irregular patterns. The unconstructed green (hilltops) spaces are fragmented spatial units of irregular forms and spatially almost evenly distributed along part of the urban fabric. Since they are dominant, geomorphology is the dominant factor, i.e. a structural factor of an urban green system. Most of these elements are associated with the coastal belt, which has not been affected by construction because of its very steep contours. Given that today the ability to utilise them is small, they do not represent significant social urban areas. Future park areas on hills that surround the city can be viewed as a green city belt that separates (or joins) the suburban settlements. Consequently, it is evident that natural factors have affected the continuity of elements in a green system (in the form of ecological corridors and green belts or zones), while those anthropogenic factors affected the even distribution of smaller fragmented individual spatial elements throughout the whole urban space (the Swiss cheese principle) as important social spaces.

In light of the above, we conclude that the structure of the green system in the investigated cities originated under the influence of natural and anthropogenic factors, but at the same time, more important was the natural basis, which enabled the manifestation of

anthropogenic activities. Subsequently, only on the flatter topographical parts of the settlement could elements of a green system be developed so that they possess more regular structural features. The investigated cities have thus shown that the natural terrain substrate was a very significant factor in developing the structural characteristics of a green urban system; hence, it greatly differs in cities that possess urban areas originating on a flat or those originating on steeper topography.

As the overall urban character is the more regular if the city developed on a flatter surface, so is the open central area (more regular structural features), which can be noticed that the form is often dependent on the topographic base (the exception is the old Dubrovnik which developed as a planned city proper on an irregular background).

For all the investigated cities, it is evident that function, i.e. the typology of open urban areas is related to the period of development during history, meaning that their formation is linked to urban tendencies from certain historical periods. This indicates that the functional development of the green system was directly influenced by social factors. So we have it that squares and streets are elements that are typical of the historic sections of cities, parks are founded in zones covering larger urban centres which are developed in the nineteenth and early twentieth century. In addition, multi-residential greenery is typical of the later decades of the twentieth century, meaning that it is located somewhat further from the urban nuclei. Greenery in multi-residential settlements that appeared in the nineteen-seventies and eighties becomes more complex, and at that time, pedestrian streets appear, typical for the postmodernism period (Dubrovnik, Split). Sports and recreational zones are usually concentrated in certain city sections, and as they occur in the second half of the twentieth century, this concept can be linked to zoning typical for functionalism. In more recent times, parts of urban space without open public areas are created, and undeveloped areas that remain unconstructed on account of geomorphology represent new resources. These parameters influenced the differences between the investigated cities, due to the fact that during history there were times of strong development in various periods. Consequently, within the urban texture there appeared more or less common elements typical of a certain historical period (the pedestrian street from the 18th century is characteristic of Rijeka and Dubrovnik, the historical parks of the 19th century for Zadar, functionalist zoning of continuous belts for recreation and sport in Split, and so on).

Lately, there have appeared tendencies to create new green spaces, but given that planners incorporated segmented ideas, we can conclude that the latest urban trends stemming from systematic thinking about the open spaces of the city had not yet taken hold. Their environmental significance is not taken into consideration, but this investigation has shown that they still have great potential. Obvious environmental and social problems caused by unsustainable development, particularly prominent in the case of Split, will surely encourage systematic reflection on this issue. Therefore, we can predict that in the future the natural and social factors will encourage the development of green systems in the cities investigated.

In the investigated cities is clear that the principle of continuity in the use of certain urban open spaces that represent elements of a green city can be considered one of the anthropogenic factors for the development of open urban spaces. The concept of continuity is visible through the development of the Zadar forums on previous cultic places which subsequently became a *parvis*, and now all the *parvises* continue to function as church squares.

Equally important is the fact that the Park Vruljica in Zadar developed in the 20th century in the woodland, a traditional resort in former times. This shows that a usage tradition can be a factor in developing the function of urban open areas, hence in the development process of green systems in contemporary cities it should be taken into account.

6 GUIDELINES FOR FURTHER DEVELOPMENT OF THE GREEN SYSTEM OF INVESTIGATED CITIES

The investigated cities showed that all urban centres have certain resources in the area that are not used adequately. Thus, with the further development of the urban fabric certain elements of green system that would allow the creation of sustainable urban spaces should be strengthened. In assessing green space, special attention should be paid to individual elements of public importance present in urban space. Research work by Bruns and Schmidt points to the need for a detailed analysis of the rural spaces around the cities in order to preserve the existing historical system and much information provided by areas that can be used for a green urban system (Bruns and Schmidt, 1997).

6.1 GUIDELINES FOR DEVELOPMENT OF A GREEN SYSTEM IN ZADAR

Zadar's green system already has some areas that have not been built up, and represent particular geomorphologic zones that can have a very significant role in the urban area. Given that some of these features are continuous lines from the city's hinterland region to the sea, they can be considered green pegs with the role of ecological corridors. For those, which in some places are not continuous, an attempt should be made towards their potential linking up or treating them as discontinued corridors. In the green system of a city, public open areas are scattered like dots throughout urban space, so it is necessary to create new public urban spaces on parts of the urban fabric which they do not have, and is possible, link them using linear tree-line elements. As Milić had already mentioned the green walls when drawing up the plan for the restoration of Zadar after World War II, it becomes necessary to protect them as much as possible and emphasise the structure of urban space. The expansion of urban fabric should be directed in a way that respects the Roman grid of the centuriation that has already partially defined the urban space of the city, and can therefore be applied to the concept of green networks. Prior to the expansion of the city it is necessary to think about establishing a green zone, which in this case can simultaneously adapt to the aforementioned Roman division of space.

Given that in the hinterland of Zadar there are larger forest areas, these should be viewed as spaces that can be elements of a green system in the future. The coastal zone of the city should be protected as an important backbone of the system, which is to be developed as a public open urban space.

Figure 179. Presentation showing possible diagram of Zadar's green system
Slika 179. Prikaz možnega diagrama zelenega sistema Zadra

○ park

● sport recreation

● cemetery

● central open surface of historic town

● necessary potential elements of the green system

▢ existing green surfaces

▪▪▪▪▪ potential green link

···· potential linear green element – park and other areas

Figure 180. Presentation showing possible scheme of Zadar's green system
Slika 180. Prikaz možne sheme zelenega sistema Zadra

6.2 GUIDELINES FOR DEVELOPMENT OF A GREEN SYSTEM IN SPLIT

Split suggests its space has great problems caused by unplanned development of the urban fabric. With its expansion, the city connected to the unplanned constructed settlements, leading to the complete disregard of links with the surrounding landscape. Within the urban area, there are individual elements scattered around the park area of the inner city centre. However, there are large parts of the city that have park areas, so they definitely need to be complemented. Development of the urban fabric can revitalise the former structure of the Roman centuries, which could be an important determinant of urbanism in Split, and hence its green systems. A positive feature in the scheme of green areas in the city is evident in zone allocated for sport and recreation, at the point where its semicircular scheme is legible and is planned to be linked to Marjan Hill. Given that this continuity today is distorted, it is necessary to strive for its revitalisation because Marian is an important park area of the city. Although urbanism in Split shows numerous problems, the possibility of establishing linear relationship is evident in the coastal zone, which could represent a continuous zone functioning as a green corridor possessing social and ecological importance. This zone should be connected with the mentioned semicircular zones, and with individual elements that are found in its proximity.

Parallel to it through the urban fabric and stretching out are two avenues that are important inear features and connections throughout the urban area, and should therefore generate new elements in the system. The green belt (possessing a diffusive character) could be established in the east as a kind of resource for the newly merged villages that are not accompanied with public facilities. Certain elements important to the social life of the city are closely connected with the green linear elements functioning as wedges, where it is particularly important to establish connections in the zone for sport and recreation (Poljud) with the city centre, i.e. its open areas.

○ park

● sport recreation

● cemetery

● central open spaces of the historic city

● necessary potential elements of the g. system

　 existing green corridors (intermittent)

　 wedges

⋯⋯ required link between elements of the green system

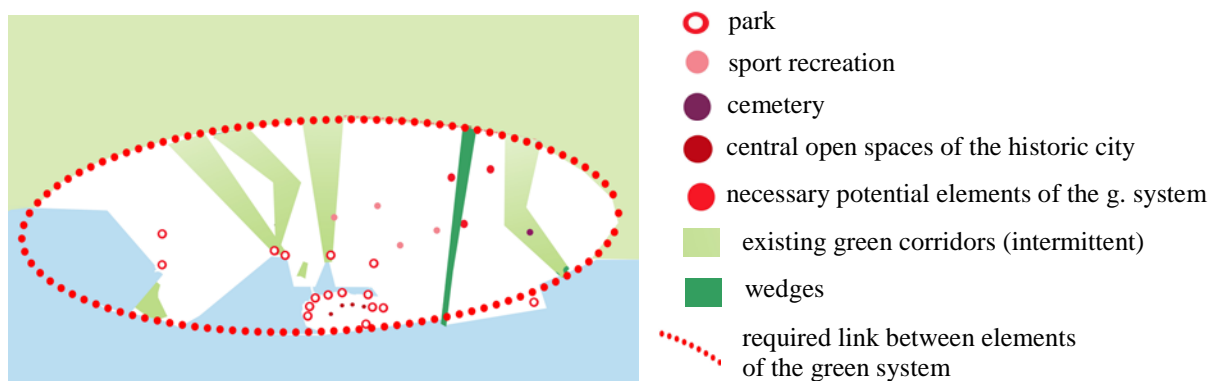Figure 181. Presentation showing possible diagram of Split' green system
Slika 181. Prikaz možnega diagrama zelenega sistema Splita

215

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

- ⭕ park
- 🔴 sport recreation
- 🟣 cemetery
- 🔴 central open spaces of the historic city
- 🔴 necessary potential elements of the green system
- 🟩 existing green areas
- ▪▪▪ existing green corridors (intermittent)
- ···· potential linear green element – park and other surfaces

Figure 182. Presentation showing possible scheme of Split' green system
Slika 182. Prikaz možne sheme zelenega sistema Splita

6.3 GUIDELINES FOR DEVELOPMENT OF A GREEN SYSTEM IN RIJEKA

Rijeka is a space where running through the urban area are linear features determined by certain geomorphologic specifics, representing the ridge of hills and tributaries. Given that they are intersected with structures, they can be viewed, in ecological terms, as interrupted corridors or as a form of stepping-stones. Since their continuity would contribute ecological role of the city, an effort should be made to establish links where possible. Given that there are numerous tributaries that are currently unavailable because they channelled beneath the earth's surface, they should be revitalised. In this way they would provide identity to the space, and those that are located outside the city perimeter, it becomes necessary to incorporate them into the municipal system during its expansion. Dotted and scattered individual elements can function based on the concept of Swiss cheese (French, 1973), that is to be further supplemented, and if possible, connect using linear tree-line elements.

The coastal area, after the relocation of industry and port facilities, as well as the public urban belt, should be able to connect with the sea, and with the existing green and non-green open areas in its proximity, as well as the green corridors (especially the Riječina corridor). The boundary towards the surroundings can be established as a diffuse ring conceived on the idea of green public spaces (since the city in the notches of the mountain chain has expanded and begun to connect with the surrounding settlement).

○ park

● sport recreation

● cemetery

● central open spaces of the historic city

● necessary potential elements of the green system

existing green spaces

wedges

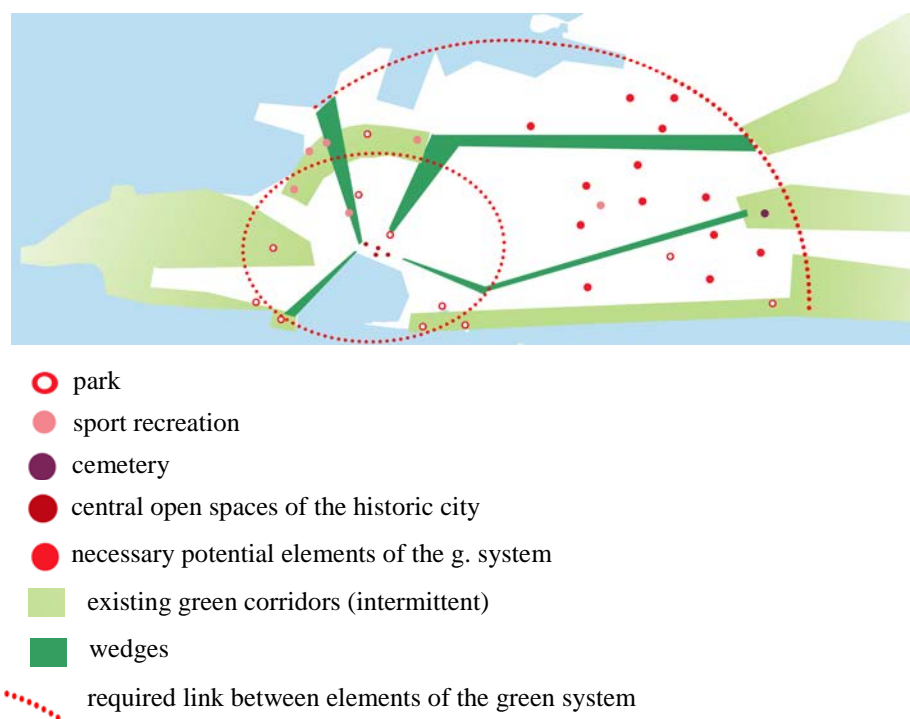····· required link between elements of the green system

Figure 183. Presentation showing possible diagram of Rijeka's green system
Slika 183. Prikaz možnega diagrama zelenega sistema Reke

○ park

● sport recreation

● cemetery

● central open spaces of the historic city

● necessary potential elements of the green system

existing green spaces

▪▪▪▪ potential link

···· potential linear green element – park and other areas

Figure 184. Presentation showing possible scheme of Rijeka's green system
Slika 184. Prikaz možne sheme zelenega sistema Reke

6.4 GUIDELINES FOR DEVELOPMENT OF A GREEN SYSTEM IN DUBROVNIK

The green system of the city is dominated by natural geomorphic specifics that create a green oasis (mountain peaks), connected to one another via a coastal zone, and thus creating a large green zone with great potential. Given that there are plans to turn them into a urban park area, they should become the green backbone of Dubrovnik urbanism. Since the coastal zone is interspersed with cliffs, it is not adequately integrated into the urban fabric, it should be connected to the urban space so that it becomes an important zone for the social life of the city. At the same time, the coastal zone needs to maintain its present ecological value. The existing social spaces of the city are fragmented, but also evenly dispersed throughout the urban space.

Given that rarely do links exist between them, it becomes necessary to create a linear relationship with the concept of tree-lined thoroughfares, bike paths, etc. Srđ Hill itself was considered a great barrier to urban expansion. The plan for its interpolation into urban space functioning as a park, it will, instead of being an obstacle, become a link to the surrounding suburban settlements. We can view it as a unique green urban zone. By attributing a social role to such an environment, it can develop into a significant area for the life of citizens. Creating an awareness of its ecological role can become an important factor in sustainability of the urban environment for the future.

○ park

● sport recreation

● cemetery

● central open spaces of the historic city

● necessary potential elements of the green system

▢ existing green spaces

▢ wedges

⋯⋯ required link between elements of the green system

Figure 185. Presentation showing possible diagram of Dubrovnik's green system
Slika 185. Prikaz možnega diagrama zelenega sistema Dubrovnika

- ○ park
- ● sport recreation
- ● cemetery
- ● central open spaces of the historic city
- ● necessary potential elements of the green system
- ▨ existing green spaces
- ▪▪▪▪ potential link
- ···· potential linear green element – park and other areas
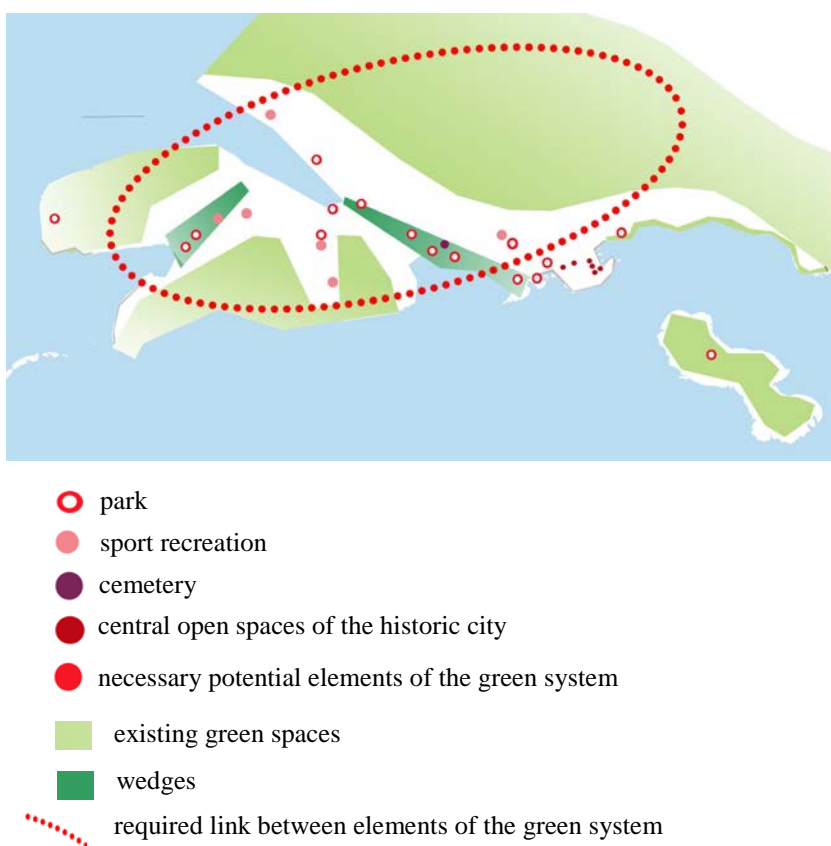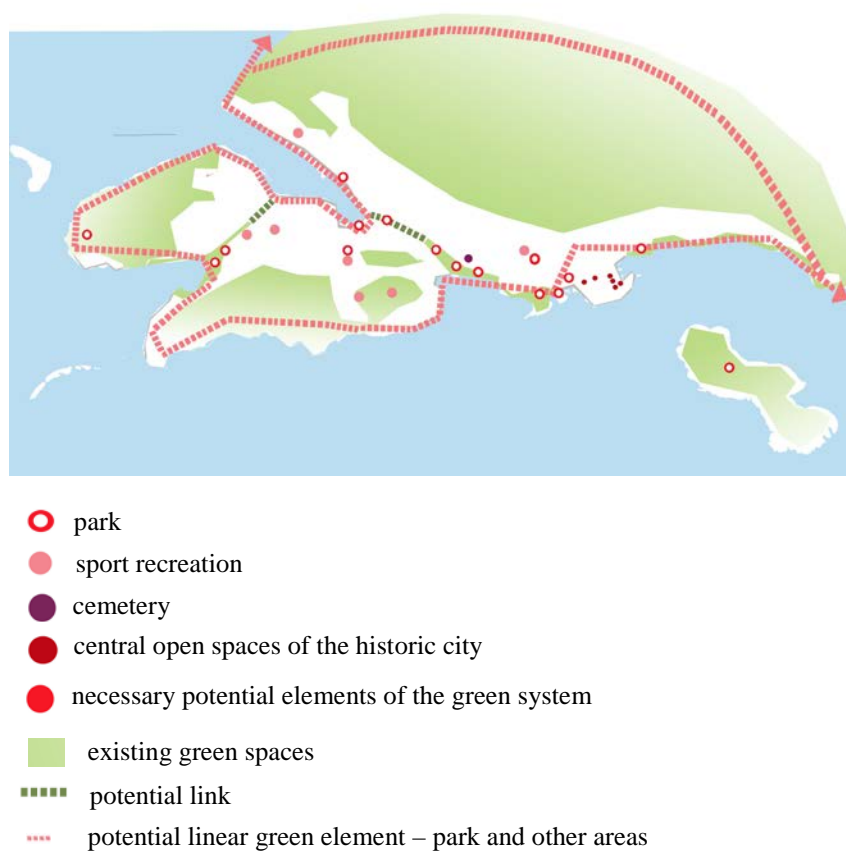
Figure 186. Presentation showing possible diagram of Dubrovnik's green system
Slika 186. Prikaz možne sheme zelenega sistema Dubrovnika

7   CONCLUSION

This dissertation investigates the relationship between open space of a historic town and the concept of a green system in a contemporary city. The results obtained by empirical research can be summarised in the following conclusions.

Although numerous studies have dealt with green systems in contemporary cities, no previous research work link it to the open areas of a historical city. This research has shown that there are numerous connections.

It has subsequently been established that the central open area of a city meets the many functions of urban life, and it has in essence generated elements of the green system in contemporary city. Links are most clearly expressed in the roles that the former central square had, which as development progresses were separated from the specialised areas possessing different functions (such as the active elements of a green system).

The results of this study have confirmed that a specific situation has occurred in the investigated cities. It is a characteristic of many Mediterranean cities, and is reflected in the fact that the mentioned old urban areas continued to survive as the active central part of the city, and therefore constitute a specific nucleus of the entire green system.

The position of the central city square is tied to its structural impact on the urban fabric. So in representing the city centre, in essence it was the defining structural element. The connection is evident in the fact that today, green systems have been developed with an emphatic ecological importance, where the elements of the green system constitute an active factor in the sustainability of urban systems. Thus, the historical urban space was sustainable and fulfilled recommendations created for the development of modern eco-cities (Gafron, 2008). Its open spaces embodied the principles of sustainability as they had to be suitable for use throughout the year due to the many roles that they played in the life of the city. In regards to this, their position has always been such that they were located in the urban area of the utmost quality, and are embodied anthropocentric principles of sustainable construction, which optimally used positive natural conditions, but without the appearance of their devastation. In the investigated cities, this is especially pronounced in urban areas on a slope, because the flattest (best) urban space is used specifically for the development of urban open spaces. Therefore, these may be useful guidelines for the development of a green system.

The present state of the investigated green cities shows that they are not systematically planned and thoroughly defined, but the elements are often the product of uncontrolled development. All investigated cities have the potential for the development of a green system that could become the determinant of urban planning. This is the direction, which has become stronger in urbanism lately. This shows that the concept is very applicable to a variety of urban spaces (because the cities investigated showed differences in terms of size, relief, existing greenery fund, the relationship to the surrounding landscape and the sea).

Investigations have shown that green systems in the investigated cities have occurred due to various anthropogenic and natural factors. Given that urban areas most often evolved randomly, the concept of green systems is most affected by act of natural factors that have given rise to the creation of large green spaces and corridors unsuitable for construction because of morphological characteristics (streams, gullies, dry valleys and ridge tops on hills). So today they are the most dominant elements of a green system, because they created differences between the systems in the investigated cities. Given that Split has less

of these elements, its urbanism is most influenced by the action of good urban planning practice, so some of its continuous features are caused by these anthropogenic influences.

The most important elements of the green system for social life are tied to the oldest part of the city or the area around it, and are fragmented by scattered elements of the urban fabric. They do not have such an important role in the ecological importance of the green system, because they are not connected to each other. Given that connection was once useful also for the social importance of open urban areas, its absence can be a disadvantage.

Those cities that have an interpolated part of the coastal zone in a green urban system show an exceptional importance of public utilisation of the coastal zone. It is therefore a part of urban spaces that constitute elements of a green system (founded in the nineteenth century), which must be protected (Split, Dubrovnik) or revitalised (Rijeka, Zadar).

The development of urban space since the nineties, in regards to all the investigated cities shows an exceptional backtracking in the development of the urban fabric, especially manifested in the green urban system. During this period, there are almost no new public open urban spaces, despite the spread of cities. However, despite the negative trend, today the response to a poor relation towards the public segment of urban life can be observed, and is increasingly occurring is the idea of creating new, but also the renewal of old elements in a green system. Here it is evident that there is still a need for them.

Given that the investigated cities have great potential, they should be utilised because in this way the urban space will be preserved for us and for future generations.

221

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

8   SUMMARY (POVZETEK)

8.1 SUMMARY

The thesis is based on the assumption that open spaces of historic towns can be linked to the green system of the contemporary urban area in a social, structural and ecological sense. Therefore the goals were to determine structural and functional characteristics of the open spaces in the historic town as well as green elements of new parts of the urban texture, with the special attention given to the appearance of their systematic relationships. The special attention was given to the relationship of the town and its surrounding landscape. Therefore through the relationship between built and open urban areas in historic and contemporary urban spaces, the problems of this research were based on the exploration of wider aspects of the role and importance of the urban landscape, as well the relationship of the town and its surrounding landscape. Hypotheses were based on the presumption that there are links between distribution of open areas in the historic and contemporary town, and that the development of the green system can be explored through the development of the historic town, i.e. through the development of its open spaces. At the same time, there are different natural and social factors that affect the differences of the urban green systems (in its structural, social and ecological characteristics).

The research was based on the four Mediterranean towns on the Croatian coast with a comparable historical development. Therefore Zadar, Split, Rijeka and Dubrovnik were explored. For that purpose historical maps and historical archive data were examined. Cartographic data was digitalised for the preparation of the comparative analyses. The data was compared with new ortophoto maps in order to make analyses in the purpose of defining links between open spaces of historical and green system of the contemporary town. The results show that during the historical development of urban centres open spaces had a very important role in the urban fabric. This was very obvious in the Roman period when a forum had a function of the urban nucleus, where most of the public activities took place. In that period surrounding landscape, where inhabitants used to spend their time in a green environment, was used for everyday activities. This scheme of the urban form was kept during the Middle Ages, but the urban fabric became more irregular and the pattern more organic. At the end of this period more squares developed, making specialised open spaces for certain functions. In this way the differentiation process of open public spaces began, even though the main squares kept most of the public functions. The Renaissance and Baroque period did not have a great influence on the urban morphology, except on the city of Rijeka, which experienced a complete transformation at the end of the eighteenth century. This transformation was manifested in the ignorance of the old public square and development of the new urban core visible in the linear element –as in Corso street, as well as in the elimination of the strict border line between urban and surrounding landscape area. The Baroque influence opened the town and brought the new urban scheme with fluid urban borders. The nineteenth century brought this new scheme to other researched towns which became open to the surrounding landscape. The new form of the open space, a park, became a very important element of a town. It was a certain substitute for the surrounding landscape, which became more distant for everyday usage. The twentieth century brought an intensive development of the researched towns, which started a process of further diversification of the open public spaces, made under the influence of the urban theories,

primarily under the influence of functionalism (even though the cultural urban concept had an influence on the preservation of the oldest urban areas). The planning tools directed the development but most of the urban texture is a result of the spontaneous, non-planned growth. Those areas had a lack of the new open public spaces with a social significance. The biggest problems are visible in the transitional period, i.e. in the last twenty years, when the development did not consider public interests. Therefore these areas are characterised by the absence of the open public spaces. So the new urban trends around the world, which are visible through the increased significance of the urban landscape and its systematic character, are still not visible in the urban texture. Therefore non-built areas inside the urban parameters are mostly the places not suitable for construction, and consequently they can be considered as leftovers in the building process. The awareness of the urban problems, i.e. the absence of the urban public areas, is arising. Due to that there are tendencies of implementation of non-built areas in the urban parameter in the form of green public spaces (in the researched towns).

The results showed that during the historic development open public spaces were always situated on the most valuable areas inside the urban parameter. A certain change happened during the twentieth century when public open spaces started to be "leftovers" in the building process. It resulted in schemes of the green systems which were mostly influenced by the natural background not suitable for construction (relief, water features, coast line). As in both situations, urban landscape is a very dominant feature inside urban texture. It represents the evidence that open spaces of the historic town, as well as the green system of the contemporary town, have an effect on the structural character of the urban area. At the same time we can consider the historic square the core which generated other types of the public open spaces with specialised functions (which are now elements of the green system). As in the Mediterranean towns, the tradition of the usage of these old cores is maintained. They have preserved their central role in the public urban life, therefore they are still an active core of the green urban system. Urban open spaces have always had an ecological function, but it has changed from the anthropocentrically one (in the historic town) to the ecocentred (in the contemporary urban area). For that reason the green system is an active element of the urban sustainability today.

Basic differences in the character of the green systems of the researched towns are mainly based on their natural features, caused by the lack of the strict urban planning tools. These elements are therefore based on the existence of the water features, relief, coast line, i.e. cliffs (which were not suitable for the construction). As they show a certain continuity of the linear forms which are connected hinterland to the sea, they can become very important elements of the urban morphology and take over a significant function in ecological sustainability of the city. At the same time their implementation in the public urban life can be of lots of benefit to the inhabitants of researched towns. Thus they represent very valuable potentials which can become equal to the value of other parts of the urban area.

8.2 POVZETEK

Doktorska disertacija se je ukvarjala s problematiko odprtih območij zgodovinskega mesta in z njihovim razvojem v koncept zelenega sistema 20. in 21. stoletja. Cilj je bil določiti strukturne in funkcionalne (socialne in okoljske) značilnosti odprtih mestnih prostorov zgodovinskega mesta in zelenih prostorov novejšega urbanega tkiva, preučiti njihove medsebojne odnose in raziskati pojav sistemskih lastnosti. Hkrati je bila posebna pozornost namenjena odnosu do prostorskega konteksta, v katerem se mesto razvija, oziroma okolni krajini.

Problemska osnova dela temelji na raziskovanju razlik in podobnosti zelenih površin v mestih, ki so se pojavile v različnih naravnih in družbenih razmerah, ter na preučevanju njihovih povezav z odprtimi prostori zgodovinskega mesta. Raziskava je osnovana na preučevanju širšega vidika vloge in pomembnosti urbane krajine, skozi odnose in zakonitosti med pozidanimi in odprtimi mestnimi prostori v zgodovinskih in sodobnih pojavnih oblikah. Tako problem v študiji izhaja iz dejstva, da je še vedno neraziskan tako odnos med pozidanim delom mesta in njegovimi odprtimi površinami kot tudi odnos odprtih mestnih površin do krajinskega zaledja. To razmerje pa je nosilec številnih informacij, pomembnih za razumevanje zelenega sistema mesta ter razlogov in načinov povezovanja obstoječih elementov mestnega odprtega prostora s krajinskim zaledjem, kakor tudi za ugotavljanje možnih načinov preoblikovanja vasi v mesto, uporabnih kot koristnih ukrepov v urbanističnem načrtovanju. Raziskava se je osredotočila na zgodovinski razvoj urbane matrike s poudarkom na razporedu, obsegu, obliki in funkciji odprtih prostorov. Posebna pozornost je bila posvečena obdobju 19. in 20. stoletja, v katerem je prišlo do členitve nuklearnega mesta, ter načinu in vzrokom širjenja mesta v zaledje.

Namen postavljenih hipotez je bil ugotoviti, kakšne so povezave med sodobnim in zgodovinskim mestom. Predpostavke tako govorijo o povezavi med elementi zelenega sistema novejših delov mesta in zgodovinsko razdelitvijo odprtih prostorov mesta, sam razvoj zelenega sistema (katerega razumemo kot sestavni del sodobnega mesta) pa je možno preučiti skozi razvoj odprtih površin zgodovinskega mesta. Postavljena je bila tudi hipoteza, da različni naravni in družbeni dejavniki vplivajo na to, da mesta razvijajo različne tipologije in posledično z njimi različnosti v posameznih sistemih, vidne v funkcionalnih, strukturnih in ekoloških značilnostih.

Z uporabo metod inventarizacije in analize (strukturne analize in analize družbenega pomena odprtih prostorov) so bila izbrana štiri mesta na hrvaški obali s specifičnimi socialnimi in naravnimi dejavniki njihovega razvoja. Raziskana so bila urbana območja Zadra, Splita, Reke in Dubrovnika. Primerjalne analize so prinesle rezultate v obliki podatkov o položaju, strukturi in funkciji odprtih mestnih prostorov skozi vsa zgodovinska obdobja njihovega obstoja, kakor tudi podatke o odnosu mesta do okolice. Tako je bilo ugotovljeno, da je v rimskem obdobju nastalo jedro mesta, ki ga tudi opredeljuje, in je bilo vključeno v osrednji odprti prostor mestnega foruma, ki je bilo središče javnega in družbenega življenja prebivalcev. To predstavlja novejšo razvojno formo od tistega, kar se je zgodilo v grškem polisu. Grško mesto pooseblja najbolj pomembno zgodovinsko prelomnico v smislu razvoja odprtih mestnih površin, saj je bil takrat zasnovan mestni trg – agora. Agora je združevala številne mestne vloge – upravno, pravno, administrativno, sodno, versko in trgovsko, bila je tudi središče športnih in kulturnih prireditev. Poleg tega

pa je imela agora zelo pomembno vlogo v življenju polisa tudi kot prostor vsakodnevnega bivanja in druženja, kjer je prihajalo do izmenjave novic in mnenj v demokratičnih razmerah, značilnih za grško kulturo. Predstavljala je družbeni prostor, ki so si ga delili prebivalci, kmetje in sužnji. Glede na navedeno je ta odprti prostor pomenil začetek različnih oblik današnjih odprtih prostorov in agora tako predstavlja predhodnika mestnega trga, parka, tržnice in športno-rekreacijskih površin sodobnega mesta. Ker iz obdobja starih Grkov ni bilo podatkov o obstoju urbanih središč v raziskovanih mestih, je bilo možno opraviti analize odprtih mestnih prostorov za naslednje obdobje, za čas Rimljanov. Osrednji rimski mestni prostor foruma je predstavljal za rimsko mesto tisto, kar je za grško mesto predstavljala agora. Analize so pokazale, da so se v raziskovanih mestih pojavili določeni odmiki od rimskih standardov, kar kaže na fleksibilnost ter spoštovanje naravnih in kulturnih danosti prostora ob procesu gradnje rimskega naselja. Odstopanja so vidna tudi v položaju dveh osrednjih rimskih trgov, Jadere (v Zadru) in Tarsaticae (v Reki), ki se ne nahajata v središču mesta, kot je sicer značilno za rimska urbana središča. Za zadrski trg zanesljivo vemo, da je njegov odmik iz središča mesta povezan s položajem nekdanjega kultnega prostora in svetišča iz predrimskega obdobja, kar priča o spoštovanju obstoječe tradicije. Čeprav je pojav rimskega mesta povezan z verskim razumevanjem (saj je projekcija idealnega nebeškega mesta), pa je iz navedenega primera razvidno, da se na nepravilnem terenu ali na prostorih že obstoječih naselij razvoj mesta prilagaja naravnim ali antropogenim lastnostim prostora. Na ta način se spoštuje prostorske in kulturne vrednote, ne da bi jih žrtvovali zaradi vizije idealnega mesta (kar se odraža tudi v odprtih urbanih prostorih). Dober primer tega sta prav raziskovani mesti Reka in Zadar, saj se Tarsatica (v Reki) z nepravilno strukturo prilagaja topografiji, Jadera (v Zadru) pa razvija omenjeni forum ob nekdanjem kultnem prostoru. Predvideva se, da je na prostoru današnjega Dubrovnika najstarejše naselje prav tako nastalo na nepravilni topografski podlagi, zaradi česar so tu (in tudi v Reki) nadrejeni cardo in decumanus nepravilni. Iz tega je razvidno, kako se je zaradi pomanjkanja ravnih površin gradilo s potrebnimi prilagoditvami tudi na strmejših območjih. Kljub temu, da je bilo rimsko mesto od okoliške krajine ločeno z zidom, je bilo s strukturnim vzorcem vseeno povezano z zaledjem, saj je iz samega mesta izhajala mreža centuriacije, ki je predstavljala razdelitev kmetijskega prostora. Analize raziskovanih mest tudi v tem kažejo na odmik od standardnih norm, saj se pojavljajo premiki naselij Jadere in Dioklecijanove palače glede na razdelitev kmetijskih prostorov okoli njih. Na primeru Zadra je vidno, da je do tega premika prišlo zaradi spoštovanja poteka obalne linije, s čimer se še enkrat potrjuje, da so bile prostorske kakovosti lokacije, na kateri se je gradilo naselje, bolj pomembne od strogih verskih stališč. Osrednji mestni trg se je običajno gradilo na mestnem prostoru najvišje kakovosti, imel pa je tudi ugodne mikroklimatske pogoje za bivanje. Tako so v raziskovanih mestih okoliške stavbe zagotavljale zavetje pred vetrom, stebri, ki so jih obkrožali, pa so nudili senco v času sončne pripeke. Raziskovana mesta zato predstavljajo primer ustvarjanja trajnostnih odprtih prostorov znotraj urbanega območja. Sam okolni prostor je bil, podobno kot v naslednjih obdobjih (vse do 19. stoletja), vsakodnevno uporabljan in je s tem zadovoljeval osnovno človekovo potrebo po zelenih površinah. Osrednje jedro foruma je tako prevzelo vlogo prostora za aktivne dejavnosti na odprtem, okolna krajina pa je postala prostor za mirnejše dejavnosti. Podoben vzorec mesta ima tudi srednjeveško mesto, ki kljub nepravilni strukturi ohranja osnovni diagram, realiziran v osrednjem mestnem jedru v obliki odprtega mestnega trga – parvisa pred cerkvenim objektom. Vendar pa so analize pokazale, da v poznem srednjem veku pride do

diferenciacije odprtih površin, ker se pojavita dva glavna trga (v Zadru in Splitu) ali več njih (v Reki in Dubrovniku), med katerimi eden ohranja vlogo duhovnega središča mesta, drugi pa ohranja vlogo svetovnega mestnega prostora. Razvijajo se kot funkcionalno specializirana področja in tako nastajajo trgi izključno svetovnega značaja z mestnimi hišami in ložami, ki prevzemajo administrativno, zakonodajno in politično vlogo, ter trgi v funkciji parvisa kot duhovni prostori z močno simbolično vlogo v mestu. Čeprav je imelo zadrževanje na teh območjih drugačne razloge, so se ta območja intenzivno uporabljala. To je razvidno iz Ravenčićeve študije, v kateri so locirane srednjeveške gostilne na trgu pred dubrovniško katedralo v poznem srednjem veku (in poznejšem obdobju) (2000). Analize so pokazale, da se pri vseh raziskovanih mestih pojavi enak proces, izražen v ločevanju svetovnega središča kot novega mestnega trga ter v ohranitvi verske vloge na antičnih trgih. Iz tega je razvidno, da se pri raziskovanih urbanih naseljih spoštuje tradicija in se na ta način razvijajo permanentni odprti mestni prostori. Izjema je Dubrovnik, ki se od 13. stoletja edini razvija načrtovano, pri čemer glavne odprte mestne površine premika na ravno površino, oddaljeno od nekdanjega mestnega jedra, ki je bilo na hribu. V strukturnem smislu so odprti mestni prostori razdrobljeni, nahajajo se v središču in so najpogosteje povezani z nekdanjimi antičnimi komunikacijskimi potmi. Pri tem je prav tako izjema Dubrovnik, kjer se najpomembnejši odprti mestni prostori združujejo oziroma se razvijajo tako, da se navezujejo eden na drugega. Iz Gervaisovega opisa iz 15. stoletja lahko razberemo, da je njihova uporaba raznovrstna in da sta se na trgu pred cerkvijo sv. Vlaha nahajali tudi občinska loža in tržnica. Glede na dejstvo, da je med raziskovanimi mesti Dubrovnik edino načrtno grajeno mesto, je možno, da je bila vzrok temu premišljena uporaba prednosti topografije. Tako so pri vseh raziskovanih mestih srednjeveški trgi prostorske točke presenečenja, konceptualno zaprte narave, medtem ko se v Dubrovniku pojavlja nekoliko drugačen koncept stalnega nizanja pomembnih vsebin, tipičnih za kasnejša obdobja, z oblikovanjem dolgih razgledov, posebno po izgradnji ulice Stradun (Placa) v 14. stoletju. Srednjeveške molitvene knjižice (koledarji) vsebujejo sličice, ki predstavljajo običajne dejavnosti skozi vse leto, prikazujejo prebivalce v naravni ali kmetijski krajini v okolici mesta (kako ležijo na travi, pripravljajo piknik, se sprehajajo v naravi ali med kmetijskimi površinami, uporabljajo reke in potoke za vožnjo s čolni in kopanje), kar dokazuje, da je bila človeška potreba po zelenih površinah od nekdaj prisotna in da je človek okolico pogosto uporabljal za bivanje. Raziskava je tako pokazala, da sta bila v srednjeveškem obdobju mesto in krajina sicer ločeni enoti, a je bilo mesto vseeno v harmoniji z okolico. Takoj ko urbani prostor preseže določene parametre, izgublja svoj srednjeveški karakter, saj (poleg okoljskih razlogov) okolna pokrajina postaja preveč oddaljena za njegovo vsakodnevno uporabo. To dokazuje, da je za koncept srednjeveškega mesta pomemben njegov odnos do okolne krajine. Analize raziskovanih mest potrjujejo, da so se tudi ta mesta v obdobju srednjega veka razvijala tako, da so načrtovalci maksimalno spoštovali topografsko podlago in jih zasnovali na čim manj strmem terenu. Tako je odnos mesta do naravnih vrednot prostora izražen skozi njegov odnos do okolne krajine in topografije, s čimer pooseblja načela trajnosti. Ker je moral človek v tistem času graditi čim bolj v skladu z naravnimi danostmi, spodbujen z merili lažje gradnje na ravnem terenu in dejstvom, da so morali biti objekti grajeni tako, da so maksimalno izkoriščali naravne vire energije (insolacija, veter), se je to odražalo tudi na odprtih mestnih prostorih, na katerih se je človek vsakodnevno zadrževal. Raziskovani primeri mest kažejo, da so bili odprti mestni prostori zaščiteni pred močnimi zimskimi vetrovi, po drugi strani pa so ozke ulice, ki so vodile do njih, omogočale gibanje zraka in s tem poskrbele za njihovo zračenje.

Insolacija je bila takšna, da se je trg nahajal pretežno na sončnem delu, zato se pogosto uporabljajo stebri in verande za bivanje v senci v poletnih mesecih (prav tako kot v prejšnjem rimskem obdobju). Pri njihovem oblikovanju je bilo torej treba izkoristiti pozitivne naravne vplive in se zaščititi pred negativnimi, da bi tako bili življenjski pogoji v urbanem središču čim bolj ugodni in bi jih bilo mogoče uporabljati v čim večji meri (kot je navedeno v zakonskih predpisih o gradnji v Dubrovniškem statutu). Tako so bili odprti mestni prostori znotraj mesta trajnostni iz nuje in moralo jih je biti dovolj za sprejem mestnega prebivalstva (ki je živelo v hišah, a v zelo skromnih življenjskih razmerah, tako da se je večino dneva zadrževalo na javnih mestnih prostorih). Trgi so se nahajali na najboljših mestnih površinah (ponavadi na najbolj ravnih delih mesta, z najbolj primerno mikroklimo) in analiza je pokazala, da so bili prav ti opredeljujoči element urbanega prostora, ki je ustvarjal odnose med pozidanimi in odprtimi mestnimi prostori.

Vpliv urbanističnih tokov renesanse in baroka v obdobju od 15. do 19. stoletja je manj viden, tako da lahko rečemo, da so analize pokazale, da raziskovana mesta ostajajo znotraj srednjeveške sheme. Tako kot pri ostalih evropskih mestih so tudi pri raziskovanih mestih prisotni zgolj minimalni renesančni posegi v prostoru in ni bistvenih prostorskih sprememb v notranjosti urbane strukture. Veliko spremembo pa je v mesti Zadar in Split prinesla gradnja zvezdastega obrambnega sistema proti Turkom, kar je povzročilo še večjo ločitev mesta od okolne krajine in ga naredilo manj dostopnega njihovim prebivalcem. Ti dve mesti sta v tem obdobju (pod beneško vlado) razpolagali z manjšo mero svobode kot v prejšnjih obdobjih in postali izjemno introvertirani. Za razliko od njiju pa je Dubrovnik (ki je bil svobodna republika) uporabljal osvojeno turško ozemlje kot nov trgovinski prostor, imel pa je tudi nekoliko drugačen odnos do okolne krajine, saj mesto ni bilo v veliki nevarnosti pred sovražnikom. Pomembna sprememba je vidna v razvoju pravega renesančnega vrtnega predmestja, ki je tako kot v drugih evropskih mestih služilo za pobeg iz urbaniziranih območjih, ki znotraj svoje strukture niso imela pomembnih zelenih prostorskih enot. Osrednje življenje raziskovanih mest se je tudi v tem obdobju še vedno odvijalo na njihovih trgih in ulicah, kjer je bilo vsakodnevno zelo živo. Trgi so bili večnamenski prostori in poleg njihovih že omenjenih funkcij (v opisu njihove vloge v srednjem veku) obstajajo dokazi, da so bili uporabljani tudi za otroško igro (v Reki trg pred cerkvijo sv. Jerolima) in kot neke vrste rekreacijske površine (trg pred cerkvijo sv. Roka v Dubrovniku je bil uporabljan za renesančni nogomet). Baročno obdobje prinaša velike spremembe v urbanistični koncept zahodnoevropskih mest, vendar pa te spremembe pri raziskovanih mestih bodisi sploh niso vidne ali pa je vpliv baroka pri njih opazen v zelo majhni meri. Na splošno pa je barok kot koncept razvoja urbanega prostora pomemben, saj temelji na odprtih mestnih površinah, s katerimi se manipulira z urbano strukturo. Tako barok postane pomembno obdobje, v katerem se razvijajo tudi nekatere nove oblike odprtega mestnega prostora, ki bodo postale sestavni del zelenega sistema sodobnega mesta. Evropska mesta se z razvojem baročne osi spreminjajo, ustvarjajoč nova dimenzijska razmerja, ki so velikopotezna in velikodimenzionirana, trgi pa postajajo prostori večjih dimenzij, ki se iz introvertiranih prostorskih enot pretvorijo v ekstrovertirane prostore. Osi ulic, ki sekajo mestno strukturo, so običajno bulvarji z drevoredi, ki predstavljajo novo obliko odprtega mestnega prostora in simbolizirajo centralizirano državo ter moč vladarja. Njihov nastanek je pomemben zato, ker v sodobnem urbanizmu predstavljajo enega od možnih načinov fizičnega povezovanja posameznih elementov zelenega sistema. Trgi v obdobju baroka izgubijo meje in intimnost, zanemarja se njihova družbena vloga, saj niso zasnovani kot prostori za

227

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

vsakodnevno druženje, temveč kot prostori reprezentativnega značaja, ki se uporabljajo za pompozne dogodke in manifestacije. Spričo dejstva, da se gradijo v bogatejših četrtih in za bogatejši sloj, pri njihovi uporabi umanjka demokracija. Baročna mesta v razvitih državah postajajo ogromne aglomeracije, ki se konceptualno oddaljujejo od srednjeveških trajnostnih urbanih naselij. Prebivalcem mesta okolna krajina postaja vse manj dostopna, še posebej nižjemu razredu, ki nima konj. Pomembno vlogo pa imajo v tem obdobju vrtovi oziroma zasebni parki, ki postajajo element novih urbanističnih želja. To kaže na zavedanje o pomembnosti zelenih površin, ki se v tem obdobju že vključujejo v mesto z njegovim širjenjem. Primerjalne analize so pokazale, da večina raziskovanih mest v obdobju baroka ni doživela velike spremembe. Izjema je le mesto Reka, kjer se je proti koncu 18. stoletja zgodila sprememba v lastnostih mestnega vzorca. To mesto se je takrat pod vplivom baročno klasicističnih trendov z avstrijskega dvora začelo spreminjati v urbani prostor brez obzidja, ki je bil popolnoma odprt proti okolni krajini. S tem se ni spremenila le shema urbane strukture, v kateri je ulica osrednji odprti javni prostor, temveč se je v celoti spremenil tudi odnos do okolne krajine. Takšne spremembe se v ostalih raziskovanih mestih pojavijo kasneje, v 19. stoletju. Ob zanemarjanju starega trga v Reki kot osnovnega elementa javnega mestnega življenja se uveljavijo sodobni načini rabe prostora v obliki baročne ulice (Korzo), tipične za urbanizem tega obdobja. Tudi razvoj blokovske sheme novega dela Reke, Civitas Nuova, je tipičen baročni produkt, ki se je razvijal na ravnem terenu, linearno ob obali. Opazimo lahko prilagoditev mesta topografiji, vendar pa so pri večjih blokih vidna tudi baročna načela podrejanja naravnih in kulturnih razmer vladarju. Omenjeno odpiranje mestnega tkiva Reke proti okolnemu prostoru je zasnovano tako, da pozidano območje v okolico prodira postopoma, izogibajoč se področjem z večjim naklonom. Med vsemi raziskovanimi mesti pa je bil baročni vpliv najmanjši v Splitu in Zadru, saj sta bila v tem času še vedno pod beneško okupacijo, kateri je bila v interesu stagnacija razvoja okupiranih mest. Čeprav je bil Dubrovnik razvita republika, je v tistem času ostal v srednjeveških okvirih in ni udejanjil velikih projektov rekonstrukcije, temveč se je gradilo zgolj manjše baročne prostorske elemente. K temu je nedvomno prispevalo dejstvo, da je bil vladajoči razred sestavljen iz večjega števila plemiških družin in v takšnih okoliščinah se ni mogel uveljaviti en sam močan absolutistični vladar, kar je bila sicer osnova za velike baročne stvaritve. Kljub temu je bila tudi v Dubrovniku poudarjena tema glavne mestne ulice, vendar je bila zasnovana že prej, razlog njenega nastanka je drugačen. Platea communis in nekoliko kasneje Stradun sta produkta zgodnejših časovnih obdobij, njun razvoj pa je verjetno povezan z omejenostjo ravnih prostorov mesta in ne z baročnimi osmi ter podaljšanimi vizurami. Filipe de Divesis leta 1440 govori o dubrovniški Luži, trgu pred današnjo cerkvijo sv. Vlaha, kot o najbolj pomembnem mestnem prostoru. Kasneje je ta vloga pripadla Stradunu, kar bi lahko bilo povezano z vplivi baroka. Baročni vplivi se kažejo tudi pri obnovi Straduna po velikem potresu, saj je vključevala izgradnjo enotnih fasad ob glavni mestni ulici z namenom poenotenega videza ulice.

19. stoletje je prineslo velik preobrat v prostoru in njegovi družbeni vlogi in tudi analize raziskovanih mest so pokazale, da je prišlo do velike spremembe v urbani strukturi. Industrijska revolucija je povzročila popolno spremembo urbane strukture in načina življenja, mesta so postajala vse bolj neugodna za bivanje. Razvija se nov tip urbanega naselja, ki je značilen za vsa mesta, zaznamovana z razvojem industrije, tako imenovano Dickensovo »premogovno mesto«. Kar se tiče raziskovanih mest, je bil ta fenomen morda še najbolj izrazit v Reki, ki je zaradi prodora avstrijskega kapitala že zgodaj začela s

procesom industrializacije. V času industrializacije je prihajalo do devastacije nekdanjih urbanih prostorov, delavci so živeli v nečloveških razmerah in ta proces se je v blažji obliki pojavil tudi pri raziskovanih mestih. To je vidno zlasti v velikih razlikah med urbanim tkivom, kjer so živeli bogatejši sloji, in tistimi deli mesta, ki so bili namenjeni revnejšim prebivalcem. Intenzivnejši razvoj industrije pa se je v raziskovanih mestih pojavil v 20. stoletju, zato so tudi negativni učinki v tem obdobju najvidnejši. Številni avtorji reakcijo na industrijsko mesto navajajo kot najbolj dragocen urbanistični produkt 19. stoletja, razvidna pa je iz teorij in vizij idealnih mest, ki predlagajo izboljšanje mestnega življenja. Te teorije lahko razdelimo v dve skupini: progresivne teorije, ki so bile zasnovane na novem pristopu, ustoličenem v znanosti in tehniki, in kulturalistične teorije, ki so bile navdahnjene z zgodovinskim mestom. Slednje so pomembne zato, ker na njihovi podlagi v 20. stoletju nastanejo urbanistični tokovi, ki so vplivali na urbanizem mest (tudi na raziskovana mestna središča) in s tem tudi na razvoj koncepta zelenega sistema. Pri obeh skupinah teorij pa se pojavlja nostalgija po zelenih površinah, ki so v vsakodnevnem življenju postale popolnoma nedostopne. To je še posebej izrazito v ameriških mestih, kjer se urbana območja razpršujejo z nenadzorovanim širjenjem. Posledično se pojavi eden izmed najpomembnejših fizičnih elementov mesta 19. stoletja – park, saj se mesto z intenzivnim širjenjem vedno bolj oddaljuje od okolne krajine, kar se poskuša nadomestiti z zelenimi elementi v urbani strukturi. Park uteleša ideal dostopnosti narave, ki je bila nekoč na voljo vsem družbenim razredom. Razmerje med mestom in okolico se spreminja in tudi sama oblika mesta ni več tako močna in jasno ločena od okolice, temveč se mesto preliva in meša s krajino, pri čemer pušča zelene krpe znotraj pozidanega dela mesta, kar nekateri avtorji opisujejo kot vnašanje krajine (podeželja) v mesto v obliki parkov. Na parke lahko gledamo tudi kot na ostanek narave v mestu ali pa kot na preoblikovane naravne ali delno zasebne vrtove, v vsakem primeru pa je njihov nastanek povezan z že dokazano človekovo potrebo po bivanju v zelenih prostorih. Novi zeleni elementi znotraj mest vplivajo na njegovo strukturo. Tako načrti Pariza (Haussmann), dunajskega Ringa (Wagner) in bostonske Emerald necklace (Olmstead) dokazujejo pomembnost premišljene razporeditve zelenih površin in njihovih povezav, kar predstavlja osnovo za kasnejšo idejo zelenega sistema sodobnega mesta. V skladu z urbanističnimi tendencami tudi raziskovana mesta dobivajo parkovne površine znotraj mestnega tkiva. Ker pa so parki nastali predvsem zaradi občutenja negativnih posledic industrializacije v 19. stoletju, so se v Dubrovniku, ki v tem času še ni razvijal industrije, pojavili pozneje kot v ostalih raziskovanih mestih. V Zadru in Splitu je razvoj parkov neposredno povezan z rušenjem obrambnega obzidja, ker se zadrski razvijajo na njih, splitski pa nastajajo na njihovem mestu po rušenju, in se v novih delih mesta ne razvijajo nove parkovne površine. Reka je proces rušenja obrambnega obzidja doživela že prej in se v 19. stoletju nemoteno širi ter razvija parkovne površine. Enaka situacija se odvija tudi v Dubrovniku, kjer parki nastajajo izven starega mestnega jedra (ki ni nikoli izgubilo obrambnega sistema). Parkovnih prostorov v Reki in Dubrovniku sicer ni veliko, so pa zato večjih dimenzij (verjetno zato, ker imajo več prostora za razvoj). Splitski in zadrski parki so razdrobljeni, vendar so med seboj povezani in spremljajo pas nekdanjega obrambnega sistema. Kar zadeva prej omenjene spremembe odnosa mesta do okolne krajine, lahko ugotovimo, da je ta proces najbolj očiten v mestih Split in Reka, ki v 19. stoletju najbolj širita prostor mestnega območja (Dubrovnik ima razširjeno območje že iz prejšnjega obdobja, ki se dopolnjuje na območju nekdanjega predmestja, Zadar pa je še vedno v okvirih nekdanjega mestnega območja). Split se širi proti okolici tako, da zaobide neraven teren, medtem ko se Reka in Dubrovnik zaradi

229

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

pomanjkanja ravnih prostorov razvijata na pobočjih (večinoma usmerjenih proti jugu) in se zato tudi njuni parki razvijajo na neravnih površinah. To kaže, da se mesto še vedno razvija z upoštevanjem naravnih kakovosti in tako ne ogroža identitete okolnega prostora. V raziskovanih mestih parki nikoli niso postali najpomembnejši odprti mestni prostori, kot se je zgodilo v Veliki Britaniji, temveč so kot najbolj pomembne točke mesta (v skladu s sredozemsko tradicijo razvoja mest) ohranili stare trge ali ulice. Poleg parkov se je v tem obdobju v nekaterih raziskovanih mestih pojavil še en nov element odprtega prostora – riva (sprehajalna pot ob morju). V Zadru in Splitu je riva postala pomembna točka mesta, medtem ko Dubrovnik in Reka rive nimata (Dubrovnik zaradi ohranitve obzidja, mestoma skalnate obale in razvoja pristanišča, Reka pa zato, ker obalno cono v skladu z razvojnimi trendi 19. stoletja žrtvuje za industrijo in pristanišča). Morda je razlog za odsotnost rive tudi v tem, da sta Reka in Dubrovnik kulturo sprehajanja razvila že v prejšnjih obdobjih na glavnih mestnih ulicah, Korzu in Stradunu.

Mesto 20. stoletja je zaznamovalo nekontrolirano širjenje, kar se je poskušalo reševati z orodji urbanističnega načrtovanja. Hkrati so se iz predurbanih teorij razvili urbani modeli, ki so vplivali na razvoj mest, z njimi pa so nastali tudi temelji za razvoj koncepta zelenega sistema. Tako je predstavnik kulturalističnega modela Sitte deloval na ozaveščanju o pomembnosti zgodovinskih odprtih površin mestnega prostora in starih trgov, medtem ko je Howard s svojim diagramom Vrtnega mesta pokazal na pomembnost načrtovanih zelenih površin v mestu kot njegovih sestavnih elementov s svojevrstnimi sistemskimi lastnostmi v obliki kontinuiranih obročev. Pri raziskovanih mestih je vpliv kulturalistične smeri možno povezati z ohranjanjem tradicije uporabe odprtih površin v starih mestih, ki so do danes zadržale vlogo najpomembnejših gravitacijskih točk mesta, kar potrjuje tudi anketna raziskava Miškić-Domislić in sod. (2012). Progresivistični model urbanističnega načrtovanja, temelječ na CIAM-ovem nauku, Atenski listini iz leta 1933, je bil najpogosteje implementiran do šestdesetih let in je določil videz mest tako po Evropi kot tudi v ostalih delih sveta. Listina temelji na štirih osnovnih funkcijah – bivanje, delo, gibanje in rekreacija, iz česar je razvidno, da poudarja pomembnost zunanjega odprtega prostora. Z razvojem koncepta »mesto v parku« puščajo vertikalni monoliti kolektivnih stanovanj proste velike zelene površine, ki postajajo nepogrešljiv element urbanih prostorov. Zeleni urbani prostori niso več posamezni mestni elementi, temveč se razvijajo kot mreža povezanih delov, vendar z manjšim družbenim pomenom v mestu, kot so ga imeli nekdanji odprti mestni prostori. Za raziskovana mesta je značilno, da se funkcionalizem izraža v ustvarjanju večjega deleža zelenih površin z novo diferenciacijo. Raziskovana mesta so ta proces v največji meri doživela po drugi svetovni vojni. Diferenciacija zelenih površin je povezana s coniranjem funkcij (začetki tega so vidni v regulativnih načrtih Zadra, Splita in Reke z začetka tega stoletja). V skladu s tem se pri raziskovanih mestih vse večja pozornost posveča obalni liniji, kjer se gradi nove javne odprte površine plaž, sprehajališča (lungo mare) in športno-rekreacijske prostore, povezane z vodnimi športi. Znotraj mestnega tkiva se razvijajo tudi nekatere nove oblike, kot so športno-rekreacijske površine s spremljajočimi parki kot samostojnimi conami, spodbujeni z že omenjeno delitvijo mestnega prostora, ki je značilna za funkcionalistično načrtovanje (Poljud v Splitu, Kantrida v Reki, Gospino polje v Dubrovniku). V povojnem obdobju nastajajo funkcionalistična stanovanjska območja, ki se razvijajo na večjih (Split) ali manjših površinah (Zadar, Dubrovnik, Reka). Njihov prispevek se kaže v oblikovanju preproste stanovanjske vegetacije, ki predstavlja novo kategorijo odprtih mestnih prostorov in ki bo v naslednjih obdobjih (v postmodernem obdobju) postala bolj kompleksna. Njihov

koncept je možno povezati s tretjim urbanističnim modelom – antiurbanim modelom iz prve polovice 20. stoletja, ki ga je zasnoval Frank Lloyd Wright. Ta model ni imel tako velikega pomena v neposredni uporabi v urbanizmu, je pa s svojo idejo o prilagajanju naravnim danostim zagotovo vplival na postmoderno dojemanje mesta in na zavedanje ljudi o ustreznem odnosu mesta do krajine. Urbana območja raziskovanih mest, ki so nastala v sedemdesetih in osemdesetih letih 20. stoletja, karakterizirajo vse bolj kompleksne stanovanjske enote, ki se prilagajajo topografiji, zunanje površine pa postajajo vse bolj pomembni socialni prostori (pri Reki in Dubrovniku nastanejo večinoma na nagibih). V tem času se poleg oživitve ideje o zelenih površinah ponovno pojavlja tudi ideja o ulici za pešce, na kar so pomembno vplivala predvsem dela Jane Jacobs, Gordona Cullena in Kevina Lyncha. Analize so pokazale, da je to še posebej očitno v konceptu večstanovanjskega naselja Split III in v turistični coni Babin Kuk v Dubrovniku. V postmoderni dobi se razvija interes za zgodovino, tradicijo ter trajnostni razvoj, in je tako na primer tradicionalna uporaba ulice za pešce kot osnovna ideja koncepta Split III dober pokazatelj takratnih vplivov.

Kljub temu pa analize od devetdesetih let 20. stoletja dalje kažejo, da pri raziskovanih mestih prihaja do velikega nazadovanja pri dojemanju odprtih mestnih površin. To nazadovanje je še posebno očitno v zanikanju njihove pomembnosti, razvijajo se namreč deli mest brez kakršnihkoli javnih odprtih prostorov. Vzrok temu je krepitev zasebnega kapitala, ki je povzročil upad pomena urbanističnega načrtovanja. Razvoj mest se tako odvija po posameznih enotah, pri čemer se pozornost posveča zgolj omejenemu aktualnemu območju gradnje, ne razmišlja pa se o vplivu, ki ga bo imela ta gradnja na širši urbani kontekst. Tako nastajajo netrajnostni urbani prostori, ki računajo na že obstoječe odprte javne mestne površine, novih pa se ne načrtuje. Na ta način se še bolj poudarja neenakomernost porazdelitve zelenih javnih površin, kar je vidno zlasti na primeru Splita. Tudi kar se tiče upoštevanja priporočil glede maksimalne oddaljenosti uporabnikov od otroških igrišč, kažejo raziskovana mesta vidne pomanjkljivosti. To dokazuje, da pozitivni urbanistični trendi ne sežejo do Hrvaške, ki v tranzicijskem obdobju doživlja popolno zanikanje tega, kar je pomembno za javno dobro. Kakor v času omenjenih urbanističnih razmer, ki so skozi zgodovino povzročile nazadovanje mestnega življenja, je v raziskovanih mestih mogoče opaziti najpomembnejši produkt – reakcijo nanje. Odraža se v ponovnem oživljanju ideje o pomembnosti javnega odprtega prostora, kar je vidno ob pregledu časopisne literature o načrtovanih investicijah v posameznih raziskovanih mestih (objavljeno v času volilne kampanje in uporabljeno v politične namene). Tako se pri vseh mestih pojavljajo ideje o ustvarjanju novih javnih odprtih prostorov (Zadar – park Musapstan; Split – obnova Marjana in ureditev obalne cone ožjega mestnega središča, t. i. Zahodne obale; Reka – ureditev obalne cone kot javnega mestnega prostora (rive) z velikim mestnim parkom na Delti; Dubrovnik – vzpostavitev katastra vseh zelenih območij znotraj mesta, da bi jih zaščitili in spremenili v javne mestne prostore, preurejanje hriba Srđ v urbani areal v obliki velike parkovne površine ter pretvorba dela gruške obale v rivo oziroma cono za pešce), redko pa se pojavi zamisel o vzpostavitvi zelenega sistema mesta, kljub vse pogostejši prisotnosti tovrstnih zamisli o razvoju mest v drugih delih sveta. V mestih so poleg že uporabljanih javnih mestnih površin prisotne tudi površine, ki jih zaradi njihovih geomorfoloških značilnosti niso pozidali (suhe doline, jaruge, vodotoki, hribi, obalni pas) in danes predstavljajo potencial za razvoj trajnostnega mestnega prostora. Njihove linearne oblike je možno povezati z Olmsteadovimi koridornimi parki iz 19. stoletja, s klini Eberstadta, Mohringa in Petersona (primer Berlina iz leta 1908) ter s

231

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

konceptom zelenih prstov (finger plan) kot obliko razvoja zelenih sistemov številnih mest v 20. stoletju. Danes so v ozadju gradnje linearnih zelenih elementov dodatni motivi, prisotna je tudi vse večja ekološka zavest in analize kažejo, da bi nepozidana zelena območja raziskovanih mest lahko postala pomemben element mesta z vidika njegovega trajnostnega razvoja. Pri tem bi urbana krajina linearnih ali drugih formalnih značilnosti morala postati dobro premišljeni segment urbane strukture, katere sistemski značaj prispeva k njenemu trajnostnem razvoju, ki lahko postane koncept urbanega modela.

Iz vsega navedenega lahko zaključimo, da kljub odsotnosti raziskovalnih nalog, ki bi povezale odprte površine zgodovinskega mesta in zeleni sistem sodobnega mesta, pričujoča raziskava dokazuje, da ta povezava obstaja. Osrednja odprta mestna površina zgodovinskega mesta je namreč generirala elemente zelenega sistema sodobnega urbanega središča. Številne vloge trga so se z razvojem urbanega prostora ločile kot specializirane površine različnih funkcij, ki v 20. stoletju postajajo aktivni elementi zelenega sistema. Kot rečeno, je trg kot osrednji del mesta opredelil pozidano mestno območje. Podobna vloga se danes pripisuje zelenemu sistemu, saj številni urbanistični tokovi poudarjajo njegovo urbanotvorno vlogo v sodobnem mestu. Z ekološkega vidika lahko gledamo na osrednjo mestno površino zgodovinskega mesta kot na prostor, ki je nastal z upoštevanjem načel trajnostnega razvoja, zato je mesto v svoji zasnovi antropocentrično. Podoben pomen ima zeleni sistem v sodobnem mestu, ker je aktivni dejavnik trajnostnega razvoja urbanega območja, vendar pa se je danes fokus s človeka razširil tudi na ostale žive organizme.
Raziskovana mesta kažejo, da so ob odsotnosti sistematičnega načrtovanja odprtih mestnih območij na karakter zelenega sistema vplivali pretežno naravni in družbeni dejavniki. Definirali so različnosti, ki se pojavljajo pri raziskovanih mestih, in ki pomenijo dragocene potenciale za ustvarjanje trajnostnih urbanih središč v prihodnosti.

9   REFERENCES

9.1. CITED REFERENCES

Alison J. 2007. Future City: Experiment and Utopia in Architecture. London, Thames & Hudson: 336 p.

Amati M., Yokohari M. 2005. Temporal changes and local variations in the functions of London`s green belt. Landscape and urban planning, 75, 1-2: 125-142

Andrijašević M. Prilozi za proučavanje razvitka riječke luke do 1800.godine. Radovi IPU, 8: 95-113

Aničić B. 1995. Zeleni sustav u okviru cijeline grada. Grad kao složen sustav, Nakladni zavod matice Hrvatske, 2: 111-112

Antoljak S. 1994. Pregled hrvatske povijesti. Split, Orbis/Laus: 248 p.

Arbutina D. 2000. Glavna obilježja urbanističkog razvoja Zadra 1918-1944.g. Magistarski rad, Zagreb, Arhitektonski fakultet: 164 p.

Arbutina D. 2002a. Zadarski urbanistički i arhitektonski opus Brune Milića. Zadar, Narodni muzej Zadar: 130 p.

Arbutina D. 2002b. Regulacijski plan Zadra iz 1939.g. Prostor, 1, 21: 15-29

Austrougarska karta Dubrovnika i okolice iz 1837. 2004. Split, Državni arhiv u Splitu

A strategy for urban green space. 2008. GreenKeys (18. aug. 2008.) http://www.greenkeys-project.net/en/home.html (2. may 2012.)

Bacon E. 1976. Design of cities. Revised edition. New York, Penguin Books: 336 p.

Bar-yam Y. 2003. Dynamics of complex system. Reading, Mass., Westview Press,: 848 p.

Beatley T. 1999. Green urbanism: learning from european cities. Washington, Island Press: 512 p.

Bengston D.N., Fletcher J.O., Nelson K.C. 2004. Public policies for managing urban growth and protecting open space: policy instruments and lessons learned in the United States. Landscape and urban planning, 69, 2-3: 271-286

Benyovsky I. 1999. Reguliranje gradskog prostora u Dalmatinskim komunama razvijenog i kasnog srednjeg vijeka. Acta Histriae, VII: 543-564

233

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Beritić L. 1958. Urbanistički razvitak Dubrovnika. Zagreb, Izdanje zavoda za arhitekturu i
   urbanizam instituta za likovne umjetnosti Jugoslavenske akademije znanosti i umjetnosti:
   76 p.

Blau E., Platzer M. 1999. Shaping the great city, modern architecture in central Europe,
   1890-1937. Munich, Prestel: 240 p.

Blau E. 1999. The architecture of Red Vienna, 1919-1934. Cambridge, Mass. and London,
   The MIT Press: 530 p.

Blečić M. 2001. Prilog poznavanju antičke Tarsatike. Vjesnik arheološkog muzeja u
   Zagrebu, 34, 1: 65-122

Bening S. 2012. Book of hours, April – Courting couples from 1540. Victoria & Albert
   Museum, London
   http://www.bridgemanart.com/ (18 june 2012)

Bening S. 2012. Book of hours, Medieval ladies and lords. London, Victoria & Albert
   Museum
   http://www.bridgemanart.com/ (18 june 2012)

Bock M., Rossem V. 2001. Cornelis van Eesteren, archietct, urbanist (Vollume 1).
   Rotherdam, Den Haag: 344 p.

Bruns D.F.W., Schmidt A.J., 1997. City edges in Germany: quality growth and urban
   design. Landscape and urban planning, 36, 4: 347-356

Butula S. 2004. Vrijednosni sustav riječnih krajobraza kao osnova za planiranje. Doktorska
   disertacija, Agronomski fakultet sveučilišta u Zagrebu: 128 p.

Buxton M., Goodman R. (2002). Protecting Melbourne`s green belt. Urban policy
   research, 21, 2: 205-209

Carmona M., Heath T., Oc T., Tiesdell S. 2003. Public places, urban spaces, The
   dimensions of urban design. Boston, Architectural Press: 320 p.

Case study Oslo. 1997. Oslo Municipality (15 aug. 1997)
   http://www.greenstructureplanning.eu/COSTC11/Oslo.htm (13 apr. 2008)

Cawood P., Somers Smith D. 2006. Designing greenways: suistainable landscapes for
   nature and people. Washington, Island Press: 288 p.

Cerar M., Dimitrovska Andrews K., Doležal M., Jordan F., Jurančić J., Mlakar A., Pavlin
   A., Prelovšek A., Souvan T., Stanič I. 2002. Prostorska zasnova, Prostorski plan mestne
   občine Ljubljana. Ljubljana, Oddelek za urbanizem: 39 p.

Chidister M. 1988. Reconsidering the piazza. Landscape architecture, 78: 40-43

Choay F. 1969. The modern city. New York, George Braziller, Inc.: 128 p.

Choay F. 1978. Urbanizam utopija i stvarnost. Beograd, Izdavačko preduzeče građevinska knjiga: 379 p.

Conine A., Xiang W., Young J., Whitley D. 2004. Planning for multi – purpose greenways in Concord, north Carolina. Landscape and urban planning, 68, 2-3: 271-287

Cooper Marcus C., Francis C. 1998. People, places, Design guidelines for Urban Open Space. New York, John Wiley & Sons: 384 p.

Crljenko I. 2009. Rijeka – razvoj grada na prijelazu iz 19. u 20. stoljeće. Geografski horizonti, 55, 1: 7-17

Crysler C.G. 2003. Writing spaces, Discourse of aArchitecture, urbanism and the built environment, 1960-2000. London, Routledge: 224 p.

Cvitanić A. 1985. Statut grada Splita, srednjevjekovno pravo Splita. Split, Književni krug: 349 p.

Ćosić S. 2003. Lorenzo Viteleschi, Povijesne i statističke bilješke o Dubrovačkom okrugu. Dubrovnik, Matica Hrvatska i Državni arhiv u Dubrovniku: 211 p.

Čurković M. 1985. Gradski centri. Sarajevo, Svjetlost / OOUR Zavod za udžbenike i nastavna sredstva: 208 p.

David Nicholson Lord, 2002. Green cities - and why do we need them. London, NEF: 60p.

Digital publication featuring innovation in world architecture – Emerald necklace. 2012. Architype Review (2012) http://architypereview.com/20-landscape-architecture-/iconic_projects (18 may 2012)

DKO - Digitalni katastarski plan k.o. Dubrovnik u mjerilu 1:1000. 2003. Dubrovnik, Geodetska uprava Dubrovnik

Dimitraova E., Markova A., Kovacheva I. 2006. Activating the potentials of public urban green spaces. Sofia – Skopje – Vienna, Austrian Science and Research: 95 p.

Dolazak cara Karla VI u Rijeku 1728. godine. 2012. Muzej grada Rijeke http://muzej-rijeka.hr/rijecka-luka/povijest-luke.html (10 mart 2012)

Doležal M. 1991. Pregled zelenih površin in možnosti njihove povezave v sistem na ožjem območju mesta Ljubljane. Diplomska naloga, Ljubljana, Biotehniška fakulteta: 114 p.

Dramstadt W.E., Olson D.J., Forman R.T.T. 1996. Landscape ecology principles in landscape architecture and land-use planning. 1th edition, Washington DC, Inland Press: 80 p.

235

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Dubrovnik before the great earthquake, 2011. Dubrovnik, Kartografska zbirka Dubrovačke
knjižnice

Duplančić V. 2004. Obalni pojas grada Splita u urbanističkim planovima, projektima i
  studijama u razdoblju od 1914. do 1941. godine. Prostor, 12, 1: 111-122

Eckardt F. 2008. Media and urban space, understanding, investigating and approaching
  mediacity. Berlin, Frank and Timme GmbH: 356 p.

Enciclopedie 2012. Georges Eugène, baron Haussmann, Administrateur et homme
  politique français (Paris 1809-Paris 1891).
  http://www.larousse.fr/encyclopedie/personnage/Haussmann/123312 (15 june 2012)

Fine J.A. 1991. The Early Medieval Balkans: A Critical Survey from the Sixth to the Late
  Twelfth Century. Michigan, University of Michigan Press: 336 p.

Fishman R. 1977. Urban utopias in the twentieth century. New York, Basic books inc.:
  332 p.

Fiume es Kikotoje, 1897. 2009b. Zagreb, Hrvatski državni arhiv

Flotête J.C., Piombini A. 2006. Urban layout, landscape features and pedestrian usage.
  Landscape and urban planning, 81, 3: 225-234

Forman R.T.T. 1995. Some general principles of landscape and regional ecology.
  Landscape Ecology, 10, 3: 133-142

Forman R.T.T., Godron M. 1986. Landscape ecology. New York, Wiley: 619 p.

French J.S. 1973. City parks of the western world: Urban green. Dubuque, Iowa, Kendal/
  Hont publishing company: 129 p.

Gafron G. 2008. Ecocity: How to make it happen. Vienna, Facultas Verlags - und
  Buchhandels AG: 82 p.

Gallion A.B., Eisner S. 1963. The urban pattern: city planning and design. Princeton,
  D.Van Nostrand Company Inc.: 435 p.

Gälzer R. 1970. O načrtovanju zelenja v okviru urbanističnega planiranja v Hannovru.
  Proceedings of the international symposium Green spaces in the urban environment,
  Ljubljana, 3-4. Sept. 1970.
  Ogrin D. (ur.). Ljubljana, Biotehniška fakulteta, Inštitut za vrtlarstvo in oblikovanje
  krajine: 115 – 130

Garača Ž. 2008. Poslovni informacijski sustavi. Split, Ekonomski fakultet: 235 p.

Gazvoda D. 1993. Strukturni vzorci mestne krajine. Magistarska naloga, Ljubljana,

236

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Biotehniška fakulteta: 202 p.

Gazvoda D. 1998. Persistent urban landscapes, Ljubljana (Slovenia). Doctorial thesis, Cambridge, Mass., Graduate school of design, Harvard University: 295 p.

Gazvoda D. 1999. Planiranje urbanizacije unutar prirodnih urbanih krajolika. Agriculturrae conspectus scientificus, 64: 253-258

Giedion S. 1965. Space, time and architecture, the growth of a new tradition. Cambridge, Mass., Harvard University Press: 897 p.

Glavočić D. 1998. Kako bi bilo kad bi bilo. Sušačka revija, 6, 22-23: 27-33

Glavočić D. 2002. Arhitektura historicizma u Rijeci. Rijeka, Moderna galerija: 690 p.

Gobster P.H., Westphal L.M. 2004. The human dimensions of urban greenways, Planning for recreation and related experience. Landscape and urban planning, 68, 2-3: 147-165

Graovac V. 2004. Populacijski razvoj Zadra. Geoadria, 9: 51-72

Grgić A. 2005. Vrtovi i perivoji Splita, nastajanje i razvoj perivojne arhitekture grada. Prostor, 13, 1: 79-92

Grgurević D. 2002. Kultura vrtova, perivoja i parkova na području Splita tijekom povijesti. Split, Književni krug: 111 p.

Gupta K., Kumar P., Pathan S.K., Sharma K.P. 2012. Urban neighborhood Green Indeks – A measure of green space in urban areas. Landscape and urban planning, 105, 3: 325-335

Hall P. 2011. Urban and regional planning. 4th edition. London and New York, Routledge: 281 p.

Hirt S.A. 2005. Toward postmodern Urbanism? Evolution of planning in Cleveland, Ohio. Journal of planning education & research, 25: 27-42

Hitchock H.R. 1978. Architecture: nineteenth and twentieth centuries. New York, Penguin books: 696 p.

HOK - Hrvatska osnovna karta u digitalnom obliku 1:5000 – područje Splita, 2004. Zagreb, Državna geodetska uprava

HOK - Hrvatska osnovna karta u digitalnom obliku 1:5000 – područje Rijeka, 2009. Rijeka, Geodetski zavod Rijeka

Horvat Levaj K. 2000. Od baroknog klasicizma do neoklasicizma, stilsko tipološke transformacije stambene arhitekture Dubrovnika između 1780. i 1900. godine. Radovi instituta povijesti umjetnosti, 24: 61-73

237

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Hostetler M., Allen W., Meurk C. 2011. Conserving urban biodiversity? Creating green
  infrastrucutre is only the first step. Landscape and urban planning, 100, 4: 369-371

Howard E. 1965. Garden cities of tomorrow. Cambridge, Mass.,The Massachusetts
  Institute of technology: 164 p.

Jacobs J. 1993. The death and life of great American cities. New York, Modern Library:
  458 p.

Janeković Romer Z. 1994. Nasilje zakona: gradska vlat i privatni život u
  kasnosrednjevjekovnom i ranonovovjekovnom Dubrovniku. Anali Dubrovnik, 41: 9-45

Jenks C. 1985. Jezik postmoderne arhitekture. Beograd, Vuk Karadžić: 228 p.

Jim J.Y., Chen S.S. 2003. Comprehensive greenspace planning based on landscape
  ecology principles in compact nanjing city, China. Landscape and urban planning, 65, 3:
  95-116

Jun Yu X., Nam Ng C.N. 2007. Spatial and temporal dynamics of urban sprawl along two
  urban-rural transects: A case study of Guangzhou, China. Landscape and urban planning,
  79, 1: 96-109

Kampen A. Here Comes the Sun – Utopian Architecture in Le Corbusier's Cité Radieuse.
  2010. Space is the place (3 May 2010)
  http://litspat.medialoperations.com/2010/05/03/here-comes-the-sun-%E2%80%93-
  utopian-architecture-in-le-corbusier%E2%80%99s-cite-radieuse/ (1 dec. 2012)

Kaplan R., Kaplan S. 1989. The experience of nature: A Psychological Perspective.
  Cambridge, Mass., Cambridge University Press: 340 p.

Kečkemet D. 1994. Splitsko groblje Sustipan. Split, Logos: 168 p.

Kipar A. 2008. Making Milan a permeable city. Topos, 64: 44-48

Klaić N., I. Petricioli 1976. Zadar u srednjem vijeku do 1409. Zadar, Filozofski fakultet:
  606 p.

Klen D. 1988. Povijest Rijeke. Rijeka, Izdavački centar Rijeka: 512 p.

Klempić – Blogadi S. 2008. Utjecaj migracije na demografski razvoj riječke aglomeracije.
  Hrvatski geografski glasnik, 70, 1: 43-65

Kobašić A. 2006. Uspješna i krizna razdoblja u dubrovačkom gospodarstvu u 20. stoljeću.
  Naše more, 53: 244-250

Kostof S. 1991. The city shaped, urban patterns and meanings through history. London,

238

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Thames & Hudson Ltd.: 352 p.

Kostof S. 1995. A history of architecture: Settings and rituals. 2nd edition. New York, Oxford University Press: 792 p.

Koščak V. 2000. Prostorni potencijali za uspostavu zelenog sistema grada – primjer Zagreba. Magistarsko delo, Ljubljana, Biotehniška fakulteta: 138 p.

Krajnik D. 2007. Preobrazba bastionskih utvrđena grada Karlovca. Prostor, 15: 42-56

Kučan A. 2001. Along the footsteps of drawing. International student workshop: Rovinj, town development and the landscape, 20-25 oct.1999.
  Ogrin D., Kučan A., Košem G., Klemen M., Demšar T. (ed.). Town Rovinj: 34-42

Kühn M. 2003. Greenbelts and green heart: separating and integrating landscape in European city regions. Landscape and urban planning, 64, 1-2: 19-27

Kukoč V. 2010. Razvoj Splita III od 1968. do 2009. godine. Prostor, 18, 1: 167-177

Lassus B. 1998. The landscape approach. Philadelphia, University of Pennsylvania Press: 196 p.

Laurentiu R. 1975. At Europe's borders: medieval towns in the Romanian principalities. Boston, Leiden: 619 p.

Lavedan P. 1959. Géographie des villes. Paris, Gallimard: 341 p.

Levin N., Lahav H., Ramon U., Heller A., Nizry G., Tsoar A., Sagi Y. 2006. Landscape continuity analysus: A new approach to conservation planning in Israel. Landscape and urban plannning, 79, 1: 53-64

Lopez R. 1967. The Birth of Europe. New York, M.Evans & Company: 440 p.

Lozzi Barković J. 1997. Genius loci riječkog secesijskog graditeljstva na primjerima značajnijih stambenih najamnih zgrada. Vjesnik Državnog arhiva u Rijeci, 39: 241-283

Lozzi Barković J. 2012. Paolo Grassi i regulacijski plan Rijeke iz 1904. godine. Vjesnik Državnog arhiva u Rijeci, 40: 157-183

Magaš D. 1982. Prostorni razvoj Zadra iza drugog svjetskog rata (1944-1981). Magistarski rad, Zagreb, Arhitektonski fakultet: 136 p.

Mahmoud A.H.A., El-Sayed M.A. 2011. Development of suistainable urban green areas in Egyptian new cities, The case of El – Sadat City. Landscape and urban planning, 101, 2: 157-170

Maksimović B. 1976. Istorija Urbanizma - novi vek. Beograd, Izdavačko- informativni

centar studenata: 231 p.

Mandelker D.R. 1962. Green belts and urban growth, English towns and country planning in action. Madison, The University Wisconsin Press: 176 p.

Manlun Y. 2003. Suitability Analysis of Urban Green Space System Based on GIS. University of Twente: 101 p. http://www.itc.nl/library/Papers_2003/msc/upla/yang_manlun.pdf (20 feb. 2008.)

Marasović T., Kalogjera B., Marasović, J. Pervan B., Sumić D. 1958. Zaštita, asanacija i rekonstrukcija urbanističkog naselja u Dalmaciji. Urbs, XII/1958

Marasović J. 1966. Historijat prostornog razvitka Splita i prvi urbanistički planovi do oslobođenja - Glavne faze urbanističkog razvoja splitske aglomeracije. Urbs, 6: 1-42

Marasović T. 1997. Split: 1700 godina razvitka. Zagreb, Buvina: 176 p.

Margetić L. 2007. Srednjevjekovni pojam grada. Zbornik Pravnog fakulteta sveučilišta u Rijeci, 28: 897-904

Marić J. 2008. Prostorno planiranje u Dubrovačko – Neretvanskoj županiji. Geoadria, 14: 87-140

Marinović – Uzelac A. 2001. Prostorno planiranje. Zagreb, Dom i svijet: 548 p.

Marinović A. 1959. Urbanistički razvoj staroga grada Dubrovnika i potrebna asanacija i rekonstrukcija. Urbs, XI: 55-61.

Maruani T., Amit-Cohen I. 2007. Open space planning models: A review of approaches and methods. Landscape and urban planning, 81, 1-2: 1-13

Matejčić R. 1988. Kako čitati grad, Rijeka jučer, danas. Rijeka, Izdavački centar Rijeka: 487 p.

Matejčić R. 2000. Izleti u prošlost. Rijeka, Adamić d.o.o.: 383 p.

Mell I.C. 2010. Can green infrastructure promote urban sustainability? Proceedings of the ICE - Engineering Sustainability, 162, 1: 23–34

Merčep I. 2005. Natječaj za regulacijsku obnovu Zadra iz 1953.g. - predeset godina poslije. Prostor, 13, 1: 67-78

Mihelič B. What makes historic towns identifiable, What to preserve and what to transform? 2010. 14th IPHS conference in Istanbul (12-15 July 2010) http://www.iphs2010.com/abs/ID310.pdf (10 june 2012)

Milić, B. (1985). Funkcionalni grad prije i poslije atenske povelje. Arhitektura,

240

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

189-195: 54-62

Milić B. 1990. Razvoj grada kroz stoljeća. Zagreb, Školska knjiga: 291 p.

Milić B. 1995. Razvoj grada kroz stoljeća II. Zagreb, Školska knjiga: 424 p.

Milić B. 2002. Razvoj grada kroz stoljeća III – Novo doba. Zagreb, Školska knjiga: 505 p.

Milić B. 2006. Urbani razvoj gradova na tlu Hrvatske – 19. stoljeće. Prostor, 14, 2: 197-218

Milinović D. 1997. Dubrovnik- Ragusium, prilog viđenju nastanka i razvitka grada na kraju kasne antike. Dubrovnik, 8: 124-144

Miškić Domislić M. 2012. Trgovi kao javni prostori grada – primjer gradova Zagreba, Rijeke i Zadra. (not published)

Morancho A. B. 2003. A hedonic valuation of urban green areas. Landscape and urban planning, 66, 1: 35-41

Moravanski A. 1998. Competing vision, aesthetic invention and social imagination in central european architecture, 1867-1918. London, The MIT Press: 508 p.

Morris A.E.J. 1994. History of urban form before Industrial revolution. 3rd edition. New York, Longman Scientific & Technical: 444 p.

Moughtin J.C. 2003. Urban Design: Street and Square. Oxford, Architectural Press: 300 p.

Moughtin J.C., Shirley P. 2005. Urban design: Green dimensions. 2nd edition. London, Architectural Press: 272 p.

Muljačić S. 1958. Kronološki pregled izgradnje Splita u XIX i XX stoljeću (1806.-1958.). In: Zbornik društva inženjera i tehničara Splita. Sirišćević S.J. (ed.). Split, Društvo inženjera i tehničara: 61-96

Mumford L. 1968. The urban prospect. 1th edition. London, Secker & Warburg: 255 p.

Mumford L. 1988. Grad u historiji, njegov postanak, njegovo mijenjanje, njegovi izgledi. Zagreb, Naprijed: 636 p.

Najstariji prikaz Rijeke iz 1578.g. 2012. Muzej grada Rijeke http://muzej-rijeka.hr/rijecka-luka/povijest-luke.html (10 mart 2012)

Nassaeur J.I. 1999. Culture as a means of experimentation and action. In: Issues in Landcape Ecology. Wiens J. A., Moss M. R. (ed.). Guelph, International Association for Landscape Ecology, Faculty of Environmental Sciences, University of Guelph: 129-133

241

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Novak N. 2009. Prinos ranom kršćanstvu i urbanizmu Tarsatike. Histria archaeologica, 38-39: 169-196

Novak G. 1965. Presjek kroz povijest grada Zadra. Radovi instituta Jugoslavenske akademije znanosti i umjetnosti u Zadru, XI-XII: 7-76

Novak M. 1965. Zadar glavni grad mletačke Dalmacije i Albanije. Radovi instituta Jugoslavenske akademije znanosti i umjetnosti u Zadru, XI-XII: 187-202

Ogrin D., Marušič I., Kučan A., Simoneti M., Kopač M., Doležal M. 1994. Zeleni sistem Ljubljane. Raziskovalna i projektna naloga, Ljubljana, Biotehnička fakulteta univerza v Ljubljani, Inštitut za krajinsko arhitekturo: 97 p.

Ogrin, D. 1985. Zelenilo u atenskoj povelji – povijesni doprinos ili utopija. Arhitektura, 189-195: 66-74

Ogrin D. 2007. Lecture notes from the undergraduate studies - Landscape architecture, course: Design of urban landscapes, Zagreb, Agricultural Faculty

Ogrin D. 2010. Krajinska arhitektura. 1th edition. Ljubljana, Oddelek za krajinsko arhitekturo, Biotehniška fakulteta, Univerza v Ljubljani: 324 p.

Ortophoto of town Zadar. 2004. Zagreb, Državna geodetska uprava

Oštrić I. 1991. Stambena arhitektura u Zadru – zone iskoraka (1924-41, 1945-90). Arhitektura, 1-3: 19-25

Owen R., Claeys G. 1991. A new view of society and other writings. London, Penguin Classics: 432 p.

Palang H., Spek T., Stenseke M. 2011. Digging in the past - New conceptual models in landscape history and their relevance in peri-urban landscapes. Landscape and urban planning, 100, 4: 344-346

Palinić N. 2009. Projekti kazališta Bono – Gerliczi i Teatro Nobile – najstariji nacrti kazališnih zgrada u Rijeci. Prostor, 17, 1: 53-64

Palmer J. F. 2003. Using spatial metrics to predict scenic percpetion in a changing landscape in Dennis, Massachusetts. Landscape and urban planning, 69, 2-3: 201-218

Peković Ž. 1998. Dubrovnik: nastanak i razvoj srednjevjekovnog grada. Split, Muzej hrvatskih i arheoloških spomenika: 146 p.

Pereković P. 2011. Percepcija uloge složenosti u oblikovanju krajobraza. Doktorska disertacija, Zagreb, Agronomski fakultet: 174 p.

Pervan B., Vekarić,Ž. 1958. Urbanistički razvoj Splita. Zbornik društva inženjera i

242

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

tehničara Splita, 1: 23-25

Pervan B. 1966. Direktivni urbanistički plan iz 1951. godine. Urbs, 6: 35-54

Petricioli I. 1959. Dva tisućljeća zadarskog urbanizma. Urbs, 1959: 65-69

Petricioli M. 1991. Prilog poznavanju povijesnih vrtova i perivoja Zadra. Magistarski rad,
    Zagreb, Agronomski fakultet: 84 p.

Piplović S. Urbanistički razvitak Splita između dva svjetska rata. In:Zbornik 1. kongresa
    hrvatskih povjesničara umjetnosti, Zagreb, 15 – 17 sept. 2001
    Pels M. (ed.). Zagreb, Institut za povijest umjetnosti: 145-152

Piplović S. 2008. Područje starog "Hajdukovog" igrališta u Splitu, povijesno – prostorni
    razvitak. Prostor, 16, 2: 180-191

Plan of Dubrovnik from 1783. 2011. Dubrovnik, Kartografska zbirka Dubrovačke
    knjižnice

Plan of Dubrovnik from 1910. 2011. Dubrovnik, Kartografska zbirka Dubrovačke
    knjižnice

Plan of Dubrovnik from 1988. 2011. Dubrovnik, Kartografska zbirka Dubrovačke
    knjižnice

Plan of Split from 1947. 2007. Zagreb, Hrvatski državni arhiv

Plan of Split from 1968. 2009. Zagreb, Kartografska zbirka Nacionalne sveučilišne
    knjižnice

Plan of Rijeka from 1778. 2008. Zagreb, Hrvatski državni arhiv

Plan of Rijeka from 1968. 2010. Zagreb, Hrvatski državni arhiv

Plan of Rijeka from 1910. 2010. Zagreb, Hrvatski državni arhiv

Plan of Zadar from 1941. 2008. Zagreb, Kartografska zbirka Nacionalne sveučilišne
    knjižnice

Plan of Zadar from 1957. 2008. Zagreb, Hrvatski državni arhiv

Planić Lončarić M. 1980. Planirana izgradnja na području Dubrovačke republike. Zagreb,
    Centar za povijesne znanosti, Odjel za povijest umjetnosti: 181 p.

Planić Lončarić M. 1990. Dubrovačka luža. Radovi IPU, 14: 93-95

Polić M. 2009a. „Riječka krpica" 1868. Godine i uvjeti za njezino naljepljivanje na

243

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
  Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

hrvatsko – ugarsku nagodbu. Rijeka, 15: 57-92

Polić M. 2009b. Prilog poznavanju prilika u Rijeci i njenom zaleđu uoči hrvatsko –
  ugarske nagodbe te njihov utjecaj na hrvatski čitaonički pokret. Historijski zbornik, 62:
  391-410

Prelog M. 1987. Dubrovnik – prostor i vrijeme. In: Zlatno doba Dubrovnika. Marković V.,
  Prelog M. (ed.). Zagreb, MTM: 27-32

Prikaz Dubrovnika prije velikog potresa u 17. stoljeću. 2011b. Dubrovnik, Kartografska
  zbirka Dubrovačke knjižnice

Prosperov Novak S. 1991. Hrvatski pluskvamperfekt. Zagreb, Mladost: 376 p.

Richardson B.W. 2010. Hygeia, A city of health. London, General Books: 24 p.

Ravančić G. 2000. Javni prostor i dokolica u kasnosrednjevjekovnom i renesansnom
  Dubrovniku. Anali Dubrovnik, 38: 53-64

Roelofs J. 1996. Greening Cities: Building Just and Sustainable Communities. New York,
  Rowman & Littlefield Publishers: 256 p.

Rombant E. 2009. Urban Planning and Biodiversity: Thoughts about an ecopolis, plea for a
  lobe-city. Case-study of the Belgian cities Sint-Niklaas and Aalst. SDSEE Cogress
  Bankok (7-9 april 2009)
  http://users.telenet.be/demeesterheylen/LobbenstadEricRombaut.pdf (10 june 2012)

Sandström U.G. 2002. Green Infrastructure Planning in Urban Sweden. Planning Practice
  & Research, 17, 4: 373-385

Shepard P. 2002. Man in the landscape, a historic view of the esthetics of nature. Athens,
  Georgia, The University of Georgia Press: 344 p.

Sobel L.S. York county, Pennsylvania: A region of Diamonds. 2007. Walkable Urban
  design and suistainable placemaking (10 dec 2007)
  http://pedshed.net/?p=156

Soleri P. 1987. Arcosanti: An Urban Laboratory. 2nd edition. New York, Vti Pr: 94 p.

Sdoutz F. Architecture theory.net in the making links. 2009. Media architecture
  (31 dec 2009)
  http://www.mediaarchitecture.at/architekturtheorie/patrick_abercrombie/2011_patrick_ab
  ercrombie_links_en.shtml

Sirišćević S. 1958. Jubilarni zbornik Društva inženjera i tehničara Split MCMLVIII. Split,
  Zbornik Društva inženjera i tehničara u Splitu: 736 p.

244

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
   Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

Sitte C. 1967. Umetničko oblikovanje gradova. Beograd, Izdavačko preduzeće građevinska knjiga: 174 p.

Situation plan Split, 1846. 2009a. Zagreb, Hrvatski državni arhiv

Stagličić M. 1988. Graditeljstvo u Zadru 1868-1918. Zagreb, Društvo povjesničara umjetnosti SR Hrvatske: 165 p.

Stagličić M. 1996. Klasicizam u Zadru. Zagreb, Institut za povijest umjetnosti: 83 p.

Steiner F. 2011. Landscape ecological urbanism: Origins and trajectories. Landscape and urban planning, 100, 4: 333-337

Stojan S. 2007. Slast tartare. Dubrovnik. Zavod za povijesne znanosti u Dubrovniku: 286p.

Stulli B. 1987. Dubrovačka Republika u XV. i XVI. stoljeću. In: Zlatno doba Dubrovnika. Marković V., Prelog M. (ed.). Zagreb, MTM: 15-19

Suić M. 1981. Zadar u starom vijeku. Zadar, Filozofski fakultet: 393 p.

Suić M 1996. Odabrani radovi iz stare hrvatske povijesti. Zadar, Ogranak matice Hrvatske: 928 p.

Suić M. 2003. Antički grad na istočnom Jadranu. Zagreb, Golden marketing: 528 p.

Supek R. 1987. Grad po mjeri čovjeka. Zagreb, Naprijed: 248 p.

Šišić B. 2003. Vrtni prostori povijesnog predgrađa Dubrovnika: od Pila do Boninova. Dubrovnik, HAZU: 272 p.

Tang B., Wong S., King –Wah Lee A. 2006. Green belt in a compact city: A zone for conservation or transition? Landscape and urban planning, 79, 3-4: 358-373

Tannier C., Foltête JC., Girardet X. 2011. Assessing the capacity of differenet urban forms to preserve the connectivity of ecological habitats. Landscape and urban planning, 105, 1-2: 128-139

Teng M., Wu C., Zhou Z., Lord E., Zheng Z. 2011. Multipurpose greenway planning for changing cities: A framework integrating priorities and a least – cost path model. Landscape and urban planning, 103, 1: 1-14

Toccolini A., Fumagalli N., Senes G. 2004. Greenways planning in Italy: the Lambro River Valley Greenways System. Landscape and urban planning, 76, 1-4: 98-111

Trancik R. 1986. Finding Lost Space: Theories of Urban Design. New York, Van Nostrand Reinhold: 256 p.

Turato L. 2004. Gomila – sjeverozapadni dio riječkog starog grada, analiza arhitektonsko urbanističkog razvoja Gomile od 18. do 19.stoljeća. Prostor, 12, 2: 179-189

Turner T. 1996. City as landscape, a postmodern view of design and planning. London, E&FN Spon: 256 p.

Tušek D. 1996. Arhitektonski natječaji u Splitu 1945.-1995. Split, Građevinski fakultet sveučilišta u Splitu, DAS: 558 p.

Tyrväinen L., Mäkinen K., Schipperijn J. 2007. Tools for mapping social values of urban woodlands and other green areas. Landscape and urban planning, 79, 1: 5-19

Tzoulas K, Korpela K, Venn S., Yli – Pelkonen V., Kaźmierczak A., Niemela J., James P. 2007. Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. Landscape and urban planning, 81, 3: 167-178

Utopian Cityscapes of Ludwig Karl Hilberseimer. 2012. New Social Research (25 feb 2012)
   http://newsocialresearch.wordpress.com/2012/02/25/cityscape/ (25 may 2012)

Vandermeulen V., Verpecht A., Vermire B., Van Huylenbroeck G., Gellynck X. 2011. The use of economic valuation to create public support for green infrastructure investments in urban areas. Landscape and urban planning, 103, 2: 198-206

Velibeyoglu K. Urban design in the postmodern context. 1999. Izmir instutute of tehnology
   http://www.angelfire.com/ar/corei/ud.html (16 june 2012)

Vidaković J. 2001. Povijest hrvatskog novinarstva, Zadar u 19.st. Zagreb, Hrvatsko Komunikološko Društvo: 196 p.

Vrančić J. 1997. Kako čitati prostorni kompleks Forum/Obala? (u kontekstu urbanističkog planiranja Zadra). Radovi Filozofskog Fakulteta u Zadru, 35, 22: 305-329

Vuković G. 2000. Preobrazba Dubrovnika početkom 19. stoljeća. Radovi instituta povijesti umjetnosti, 24: 35-61

Vuković Lj. 2003. Pejzažna arhitektura, planiranje i projektovanje. Beograd, Šumarski fakultet: 224 p.

Waldheim 2006. The landscape urbanism reader. 1th edition. New York, Princeton Architectural Press: 288 p.

Ward Thompson C. 2002. Urban open space in the 21st century. Landscape and urban planning, 60, 2: 59-72

Weng Y. 2006. Spatiotemporal changes of landscape pattern in response to urbanization.

Landscape and urban planning, 81, 4: 341-353

Whiston Spirn A. 1985. The granite garden: Urban nature and Human design. New York, Basic Books: 352 p.

Wiebenson D. 1969. Urban Aspects of Tony Garnier's Cité industrielle. The journal of the society of architectural historians, 19: 16-24

Xi Jun Y., Ng C.N. 2007. Spatial and temporal dynamics of urban sprawl along two urban – rural transects: A case study of Guangzhou, China. Landscape and urban planning, 79, 1: 96-109

Zipperer W., Wu J., Pouyat R.V., Pickett S.T. 2000. The application of ecological principles to urban and urbanizing landscapes. Ecologial Application, 10, 3: 685-688

Zabel G. 2012. The world of Pythagoras, Emedocle and Plato. Faculty UMB http://www.faculty.umb.edu/gary_zabel/Courses/ Philosophy/html (15 june 2012)

Zucker P. 1973. Town and square. Cambridge, MIT press: 298 p.

Žile I. 1997. Naselje prije grada. Dubrovnik, 8, 4: 97-119

Žmegač A. 2003. Zadarske utvrde 16. Stoljeća. Radovi instituta povijesti umjetnosti, 27: 107-118

247

Hrdalo I. Green systems in the evolution of the open space of selected Mediterranean towns.
    Doctoral dissertation. Ljubljana, Univ. of Ljubljana, Biotechnical Faculty, 2013

9.2 OTHER REFERENCES

Balantič I. 2007. Regionalni urbani sistem Ljubljanske urbane regije. Diplomsko delo, Oddelek za krajinsko arhitekturo, Biotehniška fakulteta, Univerza v Ljubljani: 115 p.

Gutkind E.A. 1964. International History of City development,vol1. Central Europe. New York, Free Press of Glencoe: 492 p.

Kučan A. 1996. Zeleni sistem Ljubljane kot razvojni in varovni dejavnik. In: Varstvo narave zunaj zavarovanih območij. Međunarodna konferencija, 1-10 nov. 1995. Kučan A. (ed.). Ljubljana, Ministarstvo za okolje in prostor, Biotehniška fakulteta, inštitut za krajinsko arhitekturo: 225-241

Lynch K. 1960. The image of the city. Boston, Mit Press: 194 p.

Ogrin D. 1993. The World heritage of gardens. London, Thames & Hudson: 400 p.

Valena T. 1990. Stadt und Topographie, die europäische Stadt im topographischen Kontext unter besonderer Berücksichtigung der bayerischen Stadt. Berlin, Ernst & Sohn: 188 p.

ACKNOWLEDGEMENTS