PROSTOR

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SVEUČILIŠTE U ZAGREBU, ARHITEKTONSKI FAKULTET

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Meanings | Značenja

PROSTOR *m* space, room; (*površina*) area; (*zona*) tract; (*prostranstvo*) extent, expanse; (*za kretanje/manevriranje*) elbow-room, playroom, leeway, scope; (*prostorije, smještaj*) premises, accomodation | **životni** ~ living space; **stambeni** ~ housing; **školski** ~ school space; **poslovni** ~ office space/premises; ~ **za noge** legroom; *prema raspoloživom* ~**u** on a space available basis; *fig* **pružati** ~**za** offer/give scope for; **posvetiti (pokloniti)** ~ (*u novinama*) devote (give) space to; **zbog pomanjkanja** ~**a** because of limited space; **radi uštede na** ~**u** to save space; **povreda zračnog** ~**a** violation of airspace, aerosp; **istraživanje** ~**a** space exploration

Željko Bujas (1999.), *Veliki hrvatsko-engleski rječnik | Croatian-English dictionary,*
Nakladni zavod Globus, Zagreb

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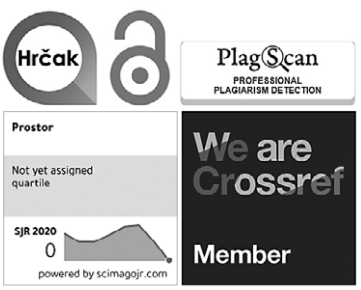

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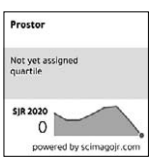

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Social Sciences: Geography, Planning and Development [Q4]
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A Word from the Editor

Dear readers,

Our scholarly journal has made some changes both in publishing and in the editorial board. The new millennium and digital technologies have created new pitches of publishing and easier access to information from distant places. A need for knowledge, a need to share information, a need for discussing problems and solutions globally has become of the utmost importance in the daily life of scientific research. Therefore, we have tried to introduce these novelties into our journal as well as the OJS platform [Open Journal Systems], with the aim of giving an opportunity and encouragement to researchers to retrieve information and exchange knowledge in an international digital environment, and pursue faster and more transparent publishing at it.

The current issue has been set up with strong determination to safeguard the continuity of the reputable journal's origin and maintain the year-long level of eminence. This is the ethos that we are dedicated to, I as the new editor-in-chief, and my renewed editorial team. I take this opportunity to express my gratitude and appreciation to our outgoing editor-in-chief, Professor Zlatko Karać, Ph.D., who successfully supervised the journal for the last 8 years. Thank you for your assistance and thoughtful guidance, your experience and professionalism have been a firm basis for the growth of the journal! I correspondingly express my sincere thankfulness to all outgoing editorial board members and at the same time take this occasion to kindly welcome all associates who have (re)assumed their accountable positions within the new editorial team.

An scholarly journal is born out of the working force of numerous people, as a perceptible outcome of the exchange of ideas, collaborative teamwork, and a pursuit of a vision dedicated to creating new paths of intellectual inquiry. Without dedication and support, this effort would be impossible. Therefore, we wove to keep on nurturing excellence and continuity in the publication of the scholarly journal Prostor, without compromise, just like our predecessors have done before us.

Assist. prof. Ana Mrđa, Ph.D., MBA
Editor-in-chief

Scientific Papers

The Editorial Board provides at least two independent reviews by prominent Croatian or foreign scholars for all the scientific contributions published in the journal PROSTOR.

Fig. 1 Glavna street in 1910. The conflict of the new and pre-existing Ottoman urban structure

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Urbanization Models of Mostar in the Period of Austro-Hungarian Rule

Austro-Hungarian rule
legal basis
Mostar, Bosnia and Herzegovina
urbanization models
urban planning engineers

In the period of Austro-Hungarian occupation between 1878 and 1918, the City of Mostar had a process of intensive urbanization. In that period, newly arrived engineers (surveyors) transformed the pre-existing Eastern – Ottoman *qasaba* (provincial town) into a Central European city. This paper revealed four models of urbanization they used in planning. The first model was developed within the existing physical structure of the city through the first regulatory plan. The second model forms the new urban centre using the empty space within the old town. The third and the fourth models expand the city over the river. While the third model forms orthogonal urban blocks, the fourth is a construction of free-standing villas within the Neo-Baroque Square in which six radial streets inflow. The engineers who worked on the regulatory plans were also discovered and presented, as well as the legislative and legal framework within which all these processes took place.

Introduction

Mostar had an intensive development during the Austro-Hungarian rule between 1878 and 1918. In that time, between the statistical periods of 1879 and 1910, the number of inhabitants increased from 10,848 to 16,392, the number of houses increased by 860 and thus from 1,909 to 2,769, and the number of apartments by 894, or from 2,535 to 3,429. An increase in the number of inhabitants by 51%, as well as in the number of houses by 45%, and the number of apartments by 35% speaks of the intensity of construction in just thirty years (Hadžibegović, 1991: 26, 31, 79).

During this period, the first trained engineers came to Mostar, masters of all professions were educated, and a state legal framework for construction and planning was created (Zadro, 2017: 63-67; Dimitrijević, 1989: VI-29), and new architectural forms of Historicism and Secession were brought.

The city is changing, the houses are no longer inside a closed and walled complex, they go out on the street and get more floors. A building for rent is a novelty in the city. Only office buildings in the city centre – bazaar *(čaršija)* are slowly disappearing, residential and commercial buildings with a different content of the construction system and materials with now decorated historicist neo-styles are appearing. The city is developing infrastructure, new water supplies, sewers, bridges, squares, public buildings, railways, tobacco factory. All this took place in a planned manner, and depending on the time or the pre-existing condition at the location within four clearly visible and recognizable models, which is the main topic of this paper.

The research that resulted in this paper was conducted on several occasions between 2016 and 2020, when the Archives of Herzegovina in Mostar, Archives of Bosnia and Herzegovina in Sarajevo, as well as well as rare literature on this topic were consulted. The research in the Archives of the Cadaster of Municipality of Mostar, the Archives of the Franciscan Monastery in Mostar and the Museum of Herzegovina was conducted between 1988 and 1990. The aim of the paper was to discover the methods used in the urbanization of the city in the Austro-Hungarian period, their trace in today's physical structure, as well as the plans and authors of the plans and the legal framework that enabled these processes.

The biggest limitation in the deeper research of the topic is the destruction of a large part of the archival material due to lack of caring it in the post-war period. The research on this topic has not yet been carried out on the territory of Bosnia and Herzegovina.

Legislative and legal framework of urbanization

Just before the end of the Ottoman occupation in Bosnia and Herzegovina, there was an attempt to modernize the Empire and transform it into a developed society as they were in the countries of Western Europe. Given that it was the very end of the Ottoman presence, as well as it was the province far from the centre, the reforms did not take root significantly and their impact was almost not felt. At that time, we record the arrival of the first few trained engineers in Bosnia and Herzegovina, and even in Mostar (Miletić, 2005: 330; Kurto, 1998: 287; Kreševljaković, 1969: 62; Puljić, 2020: 101-102). The then enacted *Law on Construction and Roads* from 1863 (Kruševac, 1960: 36; Kurto, 1998: 19; Sladović, 1913: 46) and the *Law on City Municipalities* from 1877 (Branković, 2009: 59-64) were applied only partially. With the arrival of the Austro-Hungarian rule, significant reforms in the field of construction and planning of cities and settlements began. The first was the enactment of the law "*Building Order for Sarajevo and Cities and Trade Markets in Bosnia and Herzegovina, which will be subjected to these institutions by a special order of the Provincial Government*" dated 14 May 1880 (ABiH, No. 19/602/32; Spasojević, 1988: 157-167). This building order (law) was passed only two years after the arrival of the Austro-Hungarian occupation troops. It represents a

significant progress in regulating the field of construction and planning and the adoption of modern construction achievements, and at the same time, it has been adapted to the local pre-existing conditions in order to implement it clearly. In addition to all the novelties it brought, it establishes the building permit institute and the obligatory development of architectural designs, as well as the presentation and adoption of regulatory plans, and thus establishing the city planning.

The Building Order for Sarajevo was discussed by the Construction Committee on 10 June 1886, and adopted by the Municipal Representation of Mostar on July 16 of the same year. All the proposed amendments to the Building Order for Sarajevo are the work of engineer Miloš Komadina, District Assistant Surveyor and are not small and insignificant, so we can consider him the author of this Building Order for the City of Mostar. Such an amended Building Order was prepared for the Mostar District Office, as the competent building authority, for further action by the Provincial Government where it was approved the same year (ABiH No. 19/602/32; MHM S.G.V. 5.7.1897). At several sessions of the City Council, the minutes say that Mostar does not have a building order (MHM, S.G.V. 28.10.1901, 22.8.1894), which is contrary to the documents in the Archives of Bosnia and Herzegovina in Sarajevo. It is probably thought here that Mostar did not accept the second building order for Sarajevo from 1893. Further research should provide an answer to this question.

In addition to many amendments, engineer Komadina proposed a new classification of streets. A proposal was adopted that the classification be proposed by the municipality, and adopted by the District Authority. Five categories of streets have been established for the old part of the city and the new city. The width of the first-class streets in the old town is 10 m, and in the new city is 12 m (at least 11.25 m in Sarajevo), the second class in the old town is 8 m, and 10 m in the new city (9 m in Sarajevo), the third class in the old town is 6 m, and 8 m in the new city (7.5 m in Sarajevo). Both Mostar and Sarajevo determined a street width of 6 m for the fourth class, as well as dead ends – the fifth class, both Mostar and Sarajevo at a minimum of 4 m. From these amendments one can see the desire of a smaller city for greater progress than the capital.

In Bosnia and Herzegovina, and even in Mostar, in accordance with the Order of the Provincial Government from 1878, the old Ottoman laws were applied until new ones were passed (Kruševac, 1960: 94). Although the Building Code for Sarajevo was passed in 1880, the old Ottoman Law on Construction and Roads from 1863 continued to be applied, but limited to some sensitive cases of expropriation of land, and in order to mitigate political problems (MHM: S.G.V.: 22.8.1894; 5.3.1891; 28.10.1901.). The German translation of this Law used in Mostar is located in the Archives of Herzegovina (Zadro, 2017: 62, 68; MHM, S.G.V.:16.10.1899; AHM: GHP bill of quantities K-1). At several places in the minutes of the City Council, its application can be seen over a longer period of time (MHM, S.G.V.: 5.3.1891).

The *"Regulation (Law) on Tax Exemption for New Construction and Reconstruction for The Cities of Mostar and Sarajevo"* published on 10 April 1884 is also important for the urbanization of Mostar and its intensity "Landesregierung für Bosnien und die Hercegovina №7458/I, Verardnung über die Steuerbefreiung von Neu = Zu und Umbauten von Gebäuden, gilting für die Städte Sarajevo und Mostar. Sarajevo von 10. april 1884." (ABiH bN. 253/1-41). It exempted construction investors from taxes in the most direct way and stimulated them to invest. This Regulation was valid for 10 years, i.e. until 1894, and its validity was extended until the end of 1899 (MHM, S.G.V.: 26.7.1897).

Registered plans (regulatory plans and sketches of plans)

By researching the Archives of Herzegovina in Mostar and the Archives of the Cadaster of the Municipality of Mostar the existence of several regulatory plans from that period was revealed. There are also a number of regulatory sketches that were analyzed to create a general picture of the development and planning of the city, but are not recorded here because we deemed it is not necessary at this level of research.

Thus, the subject of a detailed analysis were the following regulatory plans:

1. In the Archives of Herzegovina Mostar, there is a Regulatory Plan on one map for the entire western part of the then city, and in addition to part of the Rondo complex (Štefanijino šetalište street), there is also a regulated Bolnička street. Due to the year written by hand on the back, it is to be assumed that this plan was made in 1898. Due to the year written by hand on the back, it is to be assumed that this plan was made in 1898 (AHM, box No. 23) "*City Administration Mostar, Regulierungs Plan, Des Riedes Kremenak in Mostar, Mostab 1:2000*. We know from the minutes of the City Council that this plan was also discussed in 1894. The same plan is in the Archives of the Cadaster of the Municipality of Mostar, but the text has been added at the bottom: "Engetragen, Mostar, in Novembar 1900., Ing. Dragutin Köhler" (AKM, without reference number).

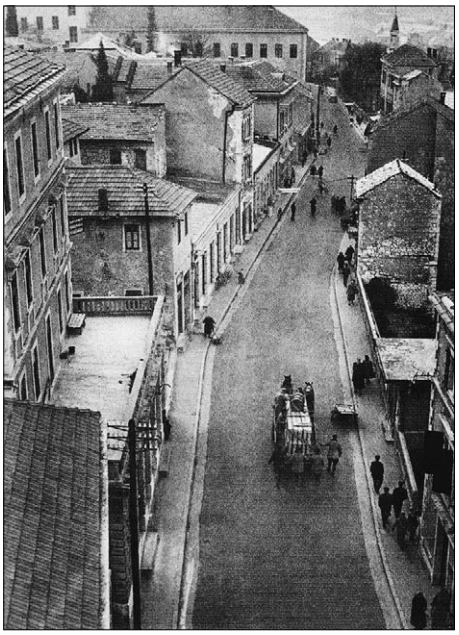


FIG. 2 GLAVNA STREET, 1920. STRAIGHTENED CENTRE LINE, EXPANDED STREET AND BUILT SIDEWALK

2. Regulatory Plan of Rondo, only partially preserved (AKM, without reference number).

This plan was originally made on a geodetic basemap on which the street, Štefanijino šetalište (Stéphanie Allée), from the Gymnasium (railway) to Balinovac and Bolnička street (today kneza Domagoja street) was planned and it is written on the plan "... in Mostar, mastab 1:2000", and at the bottom of the plan in the right corner *"Mostar im jun 1900., Hugo Jedlička Ingenier, Eugne Pogliarmicci, Stads geometar"*. On this plan, four streets are drawn in red ink as follows: *"... Pruga za kuće, Na Smrćenjake, Na Piesak, Liska"*. (These are today's streets: Kralja Tvrtka, Kralja Petra Krešimira IV, Kraljice Katarine and Višeslava Humskog), as well as the block at the intersection of Franje Josipa (Franz Joseph) and Kolodvorska streets. It is written in the red ink in the lower right corner of the plan: *"Drawn in, Mostar November 1900. Eng Dragutin Köhler"*. Considering this plan (sheet) in a unique manner, we can call it conditionally as Amendments to the Regulatory Plan of Rondo from 1894, prepared in 1900 (AKM, without reference number). It is obviously about two plans, the original one made by Eng. Hugo Jedlička and surveyor Eugen Pagliarmicci, as well as changes made by Eng. Dragutin Köhler.

3. Regulatory Plan of a part of Sauerwald and Jonica street "*Regulieungs – Skizze eines Theiles der Suerwaldgosse und der Jonićeva – street*" signature of M. Komadina. This plan forms a block, expands the street and allows wider access to Rudolf Square (AKM, without reference number).

4. Regulatory Plan of Ilička street from Balinovac to Ilici (Stara Ilička street), date and signature on the sheet are missing (Miletić, 1997: 28; AHM, folder No. 36), *"Regulierungs – Plan eines Theiles der "Ilička – street", Zahum, 1:500"*.

5. Development (Regulatory) Plan of the City of Mostar (AKM, without reference number) in the scale of 1:500 for the left bank of the river and 1:100 for the right bank. The plan has no title or signature, but we know everything about its adoption and the authors from the minutes from the City Council session between 1898 and 1903 (MHM, SGV: 27.9.1897., 16.12.1899., 23.2.1903., 28.1.1901. i 17.4.1900.).

6. Regulation of Musala Square without a title "Scale = 100, Mostar in the month of December 1910" unclearly signed and text with signature, but it can be discerned only Eng. Köhler (AHM, box No. 36).

7. Plan, sketch of establishing the Glavna street *("Glavna luka")* across the Šarić cemetery and the formation of the entrance to the city. It is made in a scale of 1:500, and the signature is *"Mostar – in the month of May 1911, Eng. Dragutin Köhler, city surveyor* (AKM, without reference number).

8. Regulatory Plan of the block system from Franje Josipa street to behind Bolnička street all the way to the Catholic cemetery *("Kreisbehörde Mostar, Zür Zehl B 292: 7 ex 1911, "Sitüations – Plan, der Bahnhofstrasse und der Ričinagasse in Mostar, Mostar, im Mai 1911, Masstab 1:1000", signature "M. Klinger (unclear)*. It is written on the back of the plan "*Stadtbezirksamt Mostar zum Z 5519:11 von 16.III.1912*" (AKM, without reference number). This plan has another variant, the same one, only its northern part. This plan was probably copied once more to serve for analysis and sketches. It is written by hand on the plan: "*Regülierning linian enigezerahnat won Hern Ing. Köhler*" (AKM, without reference number).

9. Regulatory Plan with unclear scale of only part of Ričina and Bolnička streets around the Financial Administration. *"Situationskizze, 1:500, Mostar im juni 1913, Ing Hugo Jedlička der baurat M. Komadina*" (AKM, without reference number).

10. Sketch for the requirements for the construction of a house showing that the regulation lines that break through Nova street from Glavna street to Musala Square have been determined, and it was prepared by Đorđe Knežević in 1913 (AHM: box No. 36).

11. Regulation of the street from the cemetery at Carina to the Gendarmerie Station over the Carina Bridge prepared in Sarajevo in March 1916, is in the Archives of Herzegovina in Mostar *"Bauabteilung der Landesregierung, strassen – und brückenbaudepartement Vierte Narentabrücke in Mostar, situationsplan 1:1000, Der Abteilungsudrstand (illegible signature,* probably Karl Fitzinger*), Der departementchet Reddy, OBR, Sarajevo, im märz 1916*." (AHM, box No. 23.). There is the same plan with other data from 1915 (AHM, box No. 36).

In addition to the regulatory plans found in the Archives of Herzegovina in Mostar and the Archives of the Cadaster of the Municipality of Mostar, as well as by reading the minutes of the City Council in the Museum of Herzegovina in Mostar, it is visible in many places that there were regulatory plans with bill of quantities for some streets or zones, and some of them are as follows:

1. We did not find a plan for expansion of streets from the Franz Joseph Bridge to the railway station, but several minutes from City Council sessions show that it existed *"The City and District Office in Mostar, by its Order No. 3376 of July 27 of the current year, based*

*on the Order of the District Authority in Mostar no. 3006 of 14 April 1893, i.e. the Order of the Provincial Government no. 9173 /IV of 20 February 1893, proposes a Plan for expansion of streets from the Franz Joseph Bridge – to the railway station to the Municipal Council for approval." ... From this arises the future entire width of the entire street of 16 meters ... in order to make 3 m wide sidewalks (Trotoir) for pedestrians on both sides of the street" (*MHM, S.G.V.: 7.8.1893). This plan does not exist in the Archives of Herzegovina Mostar, but there are several sketches showing a part of Musala Square and Franje Josipa street.

2. It is evident from the minutes of the session of the City Council that the land is being seized for the purpose of expanding Ričina street (today Cernica) *"on the basis of a plan"* (MHM, S.G.V: 5.4.1897). It can be concluded that there was a regulatory plan identifying the street elements.

3. On 22 July 1894, the Provincial Government approved the plan for the regulation of Bolnička street, ordering the construction of 2 m wide sidewalks on both sides, because the proposal was without sidewalk (MHM, S.G.V: 5.11.1894).

4. There was a plan to build today's Mile Budaka street from the hospital to the new Catholic cemetery (MHM, S.G.V: 5.4.1897).

Analysis of models of changes in physical structure

Immediately after their arrival, the Austro-Hungarian authorities started intensive urbanization of Mostar, as well as a change in the physical structure of the city within it. The basis of this process is the Building Order adopted in 1886 for the City of Mostar and the Law on Tax Exemption, as well as the establishment of a state and local structure that carried out all construction activities. The planning contribution of the builders of Mostar in the transformation of the pre-existing and the formation of a new urban structure can be divided into four special approaches – models. Depending on the time in which they started, each of them also represents a special time phase. After their creation, they were developing in parallel until the end of the monarchy's presence.

• **The first approach**, conditionally called the "irregular block model" (Fig. 3), was formed in the old part of the city in the current Ottoman urban form. This model was developed from the beginning of the Austro-Hungarian period on the basis of the Building Order for the City of Mostar from 1886, and it reached its full application after 1903 with the adoption of the Regulatory Basis. This plan was made by the municipal surveyor Anton Janaček from 1898 until 1899, and continued by Eugen von Pagliarucci until 1903., for planning purposes the geodetic maps of the whole city were made in 1878 and 1882, and exact geodetic plans at a scale of 1:500 for the left and 1:1000 for the right side of the river between 1898 and 1903 (Puljić, 2020: 10-12; AKM, without reference number). All the axes of the streets were drawn on it along the corrected direction where possible, as well as the central points of their connection. Then, construction routes were established at an equal distance from the axles and a new shape of the intersection of streets was determined. The construction routes, which fixed the width of the streets, were determined depending on their category. As a novelty, the division of the street into a carriageway and a sidewalk appeared, separating the vehicular from the pedestrian traffic. Such construction encroached on the private ownership of land and existing buildings. This was possible given the long period of implementation of the plan, within which the creation of conditions was waited for its implementation in each new individual con-

Fig. 3 Irregular block model

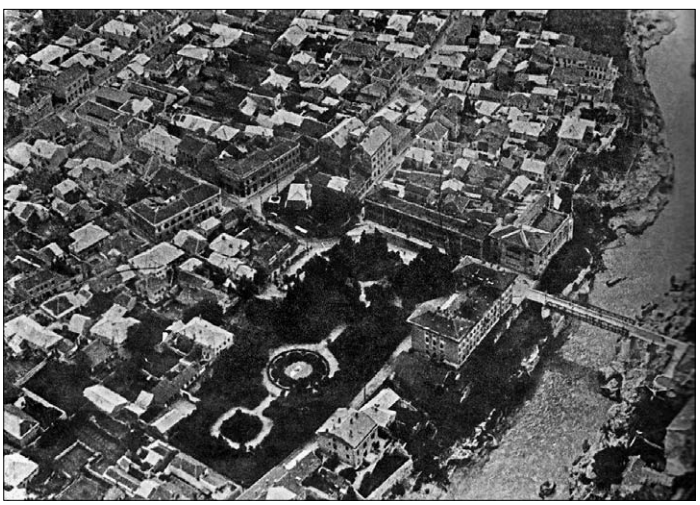
struction. This happened when the owner submitted a request for new construction or it was ordered the demolition of an old dilapidated building that endangers the public interest, and sometimes at the initiative of the Municipality. The initiative of the Municipality appeared when the owner had a request, so the interests were reconciled. In the case of a request for construction, it was, as a rule, moved to a new construction direction with the simultaneous correct payment of damages to the owner of the house or land. (MHM, S.G.V.: 7.12.1891; 7.4.1891; 4.4.1892; 20.3.1899; 28.8.1899). This step-by-step approach to city regulation has achieved its goal, works on new streets, their classification and expansion, correction of directions and establishing sidewalks (Fig. 2), as well as development of new streets. The expansion of the streets with the construction of buildings on the new construction line is visible in a number of sessions of the City Council (MHM, SGV), as well as on the accompanying regulatory sketches (MHM, S.G.V.:16.10.1899; 20.5.1901; 22.7.1901; 21.3.1903; 28.9.1903; 3.9.1908; 25.9.1908; 5.12.1892; 5.7.1893; 16.5.1898). Another big novelty brought by this plan is the establishment of residential and residential-commercial blocks. They were relatively easy to implement because the pre-existing Ottoman structure suggested them somehow in a layout sense. Old dilapidated, plain buildings of poor quality were demolished with a pre-planned intention to form residential and commercial, and often in combination with commercial urban blocks. Somewhere we see their beginnings, and in other places they are completely established. Finally, as a result of the application of this regulation, the irregular structure of the streets was corrected and some form of urban blocks was formed. They arose where it was possible between Glavna street (today Titova) and Srednja street, and then called Sauerwald (today Braće Fejića) street. Within these blocks, a square was shaped (today Trg 1. maja) (MHM, S.G.V.:17.6.1886; AFS, Glas Hercegovca No. 26 of 28 June 1886) on the site of the Ottoman square. This square began to be formed in the previous Ottoman period with the construction of a post office, telegraph office and the building of the district head, and now completed by widening the access streets and building an officer's casino in 1885 (AFS, Novi hercegovački bosiljak of 7 February 1885). Since it was the end of the 19th and the beginning of the 20th century, new street facades were created on buildings in the Historicist style, and in some places in the Secession style.

Thus, part of the old town, and especially its business part: Glavna street (Velika tepa) and Srednja street (Sauerwald street) changed its image and partially took on the characteristics of other provincial Central European cities of the Empire. This is evidenced by many minutes of the City Council, as well as daily sketches of construction conditions in the Archives of Herzegovina in Mostar (MHM, SGV: 7.12.1891; 2.5.1892; 15.10.1892; 7.4.1892; 5.6.1893; 21.5.1904). Many engineers were involved in the planning and implementation of this model (Knežić, Köhler, etc.), but most often Engineer Miloš Komadina.

- **The second model** developed in the open space Musala located on the northern periphery of the city (Fig. 6). It encompasses a newly built street, "Nova street" (Braće Brkića street) from Glavna street to Musala Square (MHM, S.G.V: 5.3.1891), Musala Square and the street across the Franz Joseph Bridge. This street went from the Square over the Franz Joseph Bridge and further to the railway, so it belongs to both the second and third model. The Square itself was framed by buildings: Municipal Public Bath (Banja; Loose, 1914), Hotel Neretva (1890,

FIG. 4 MUSALA SQUARE WITH THE PARK, NOVA STREET AND THE FRANZ JOSEPH BRIDGE, AERIAL SHOT FROM 1929

FIG. 5 TRAIN STATION SQUARE FRAMED BY BUILDINGS OF THE DISTRICT AUTHORITY, HOTEL AND TRAIN STATION, PHOTO FROM 1900



Aleksandar Witek) (AFS, Glas Hercegovca, No. 20 of 25 March 1891 and No. 32 of 3 June 1891), city park, elementary school (1880, Franc Vacek), city fountain (1883) Kjose Jahija Hojja mosque (Vakuf – Endowment building developed in 1937; Fig. 4).

This model has the shape of a square as advocated by Kamilo Zite in the early twentieth century (Zite, 1967: 32-49, 134-151). It is now becoming the centre instead of the bazaar in the Old Town and Mostar gets a new city hotspot. The entire complex was built over a long period of time, and began in 1882 with the development of Nova street (MHM, S.G.V.: 5.1.1891, 20.1.1891; Miletić, 1997: 29, 37), and then by building the Square and surrounding buildings. We did not find the Regulatory Plan for Musala Square in the archives, but we know that it existed from the minutes of the City Council and regulatory sketches. In the end, Franje Josipa street was taken shape from 1894 to 1902 and buildings were built along the new construction line.

Firstly, its northern and then its southern street façade was decorated (MHM, S.G.V: 7.4.1892; 5.12.1892; 7.8.1893). Drago Karlo Miletić claims that the Regulatory Plan for Musala Square was made by Miloš Komadina (Miletić, 1997: 41).

• **The third model** of urbanization was developed from the Neretva River in the east to the railway in the west (Figs. 7 and 9). It regulated the space to the Crafts School and the Catholic cemetery in the north, and to Franje Josipa street in the south. This model should also include streets that go even south of Franje Josipa street, namely Ričina street, which is today called Cernica (MHM, S.G.V.: 16.5.1898) i and a parallel street along the railway that goes to the Franciscan Monastery (MHM; S.G.V.: 13.11.1899) as well as another street across the railway, Bolnička (today Kneza Domagoja) street. This street connected Štefanijino šetalište from the Gymnasium with the newly built hospital, and it also passed by the access to the train station that went over the railway tracks. The proposal for its regulation was deficient with regard to the establishment of sidewalks, so

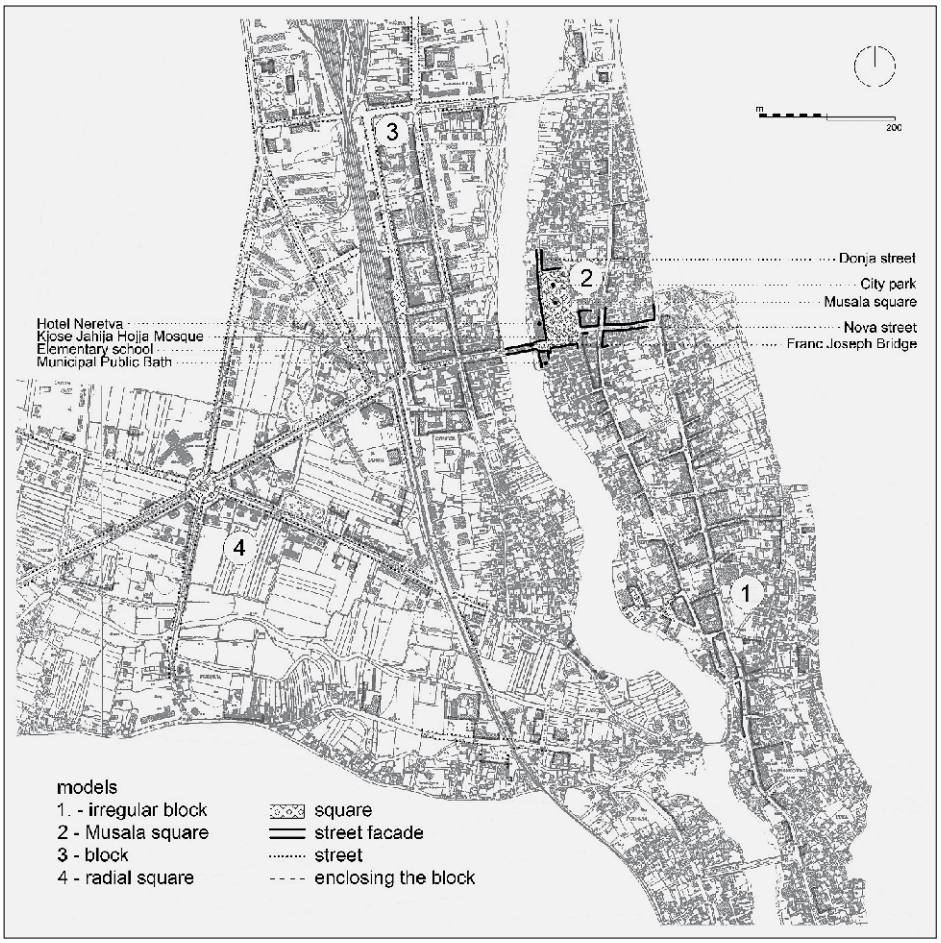
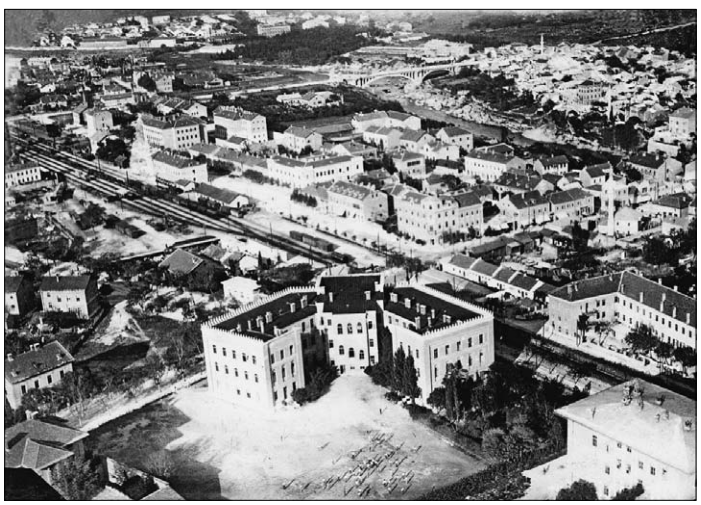


Fig. 6 The second model, Musala square, Nova street and Franje Josipa (Franz Joseph) street

Fig. 7 Aerial shot from 1941. The third model, the block building system

Fig. 8 Photo from 1900. Gymnasium and Štefanijino šetalište (Stéphanie Allée)



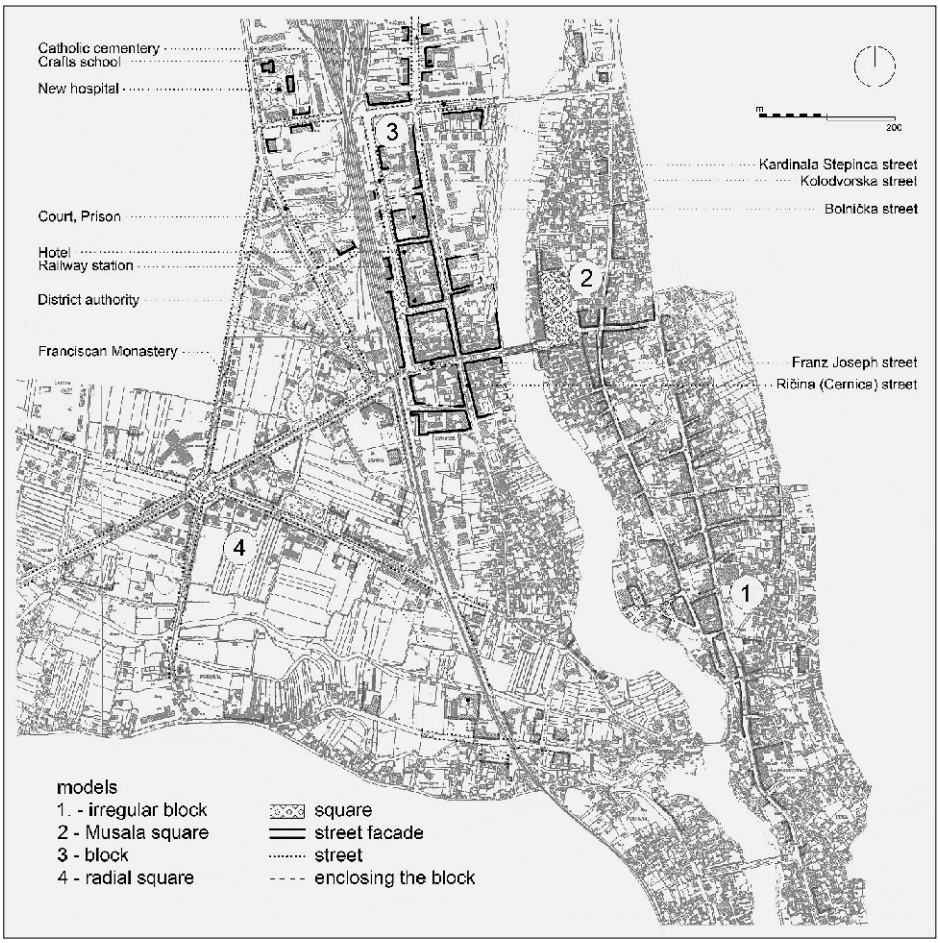


FIG. 9 THE THIRD MODEL OF BLOCK CONSTRUCTION

when approving its Regulatory Plan, the Provincial Government in Sarajevo, by letter dated 22 July 1894 ordered to add a 2 m wide sidewalk on both sides of the street to the Regulatory Plan (MHM, S.G.V: 5.11.1894, 5.4.1897. From the same minutes it is evident that there is a regulatory plan and bill of quantities for extension of this street from the New Hospital, next to the Crafts School to the Catholic cemetery, and that the City Council allocate funds to purchase land for its construction in 1897 (MHM, S.G.V: 5.4.1897; 13.11.1899). The part of the city that was built within this model, there is also a street from the Carina cemetery to the Gendarmerie Barracks (today Kardinala Stepinca street). It is planned by the Regulatory Plan from 1916 *"Vierte Narentabrücke in Mostar"* signature *"der departementchet Reddy o.b.r.,* and on the right the signature is unclear, probably Karl Kneshaurek, at the bottom of the sheet it is written *"Sarajevo, im märz 1916."* (AHM, box No. 36). If we exclude Franje Josipa street, which has been under construction since 1893, this area was urbanized only after 1900. It represents a clear block system and an orthogonal network of streets. The construction of this complex represents the beginning of a new city and new urban principles. The specificity of this model is the construction of public buildings such as the District Authority, hotel, Financial Administration, court (1891) (AFS, Glas Hercegovca No. 11 of 18.2.1891 and No.36 of 17.6.1891), prison, railway station, New Hospital (1885 and 1888) and Crafts School with apartment blocks. Another contribution is the development of the train station square between the train station and the District Authority building (Fig. 5).

For this area, we found several regulatory plans or traces of their existence in other documents. Those are the Regulatory Plan of Kolodvorska and Ričina streets (AKM, without reference number; MHM, S.G.V.:5.4.1897), another version of the same Plan (AKM, without reference number) and Regulatory Plan of Franje Josipa street (MHM, S.G.V: 7.8. 1893). We did not find the plan of Ričina street from Franje Josipa street to the south, but their existence is visible as information about the widths of streets and sidewalks in them (MHM, S.G.V: 5.4.1897, 8.2.1894).

- **The fourth model** is the construction of the city towards the West and Cernićko polje, and across the railway. Great obstacles have always been the impetus for the development of a new model of urbanization, first the river and now the railway. This construction, planning is performed according to the new urban model of the Neo-Baroque circular square, which has six streets that connect at one point (Fig. 10). Free-standing urban villas are being built along the streets, all in the spirit of historicist architecture. From that time, in addition to the visible and valuable urban complex, we are left with alleys of plane trees as very valuable monuments of landscape architecture. This urban model is a product of historicist architecture and urbanism. Its construction took place in several waves. The first was the construction of Štefanijino šetalište street (Fig. 8; MHM, S.G.V.: 17.6. 1886; AFS, Glas Hercegovca, No. 26 of 28 June 1886) that went from the railway all the way to Balinovac. In essence, it was an extension of Franje Josipa street. The planning of this stretch started with the initiative of the district head Wilhelm von Sauerwald already before 1894. This street was developed already then, and a small number of urban villas were built on both sides of the street. It is clear that the basic length and direction of the street had already been planned and formed (MHM, S.G.V: 8.2.1894). The second wave of construction started from the session of the City Council held on 8 February 1894 when the regulation of Štefanijino šetalište street was discussed (MHM, S.G.V.: 22.8.1894). This is about the regulation of part of Rondo Square and the proposed plan

submitted to the Council for consideration. It was noted that then Mayor Ibrahim Kapetanović proposed that this street be widened to 8 m and a sidewalk of 2.5 m on both sides and a green belt on both sides of 0.5 m, that houses be 6 m away from the sidewalk, and that houses are lonely or open *("freigestellt"),* and that the whole concept of construction is a system of free-standing villas *("Villen System"*; MHM, S.G.V: 8.2.1894). His proposal for the amended plan was prepared for the High Government in Sarajevo, through the District Office for adoption. The Government adopted this plan proposal on 22 July 1894 (MHM, S.G.V.: 5.11.1894). The year 1898 is handwritten on the back. The discussion at the sessions of the Council was regularly attended by the chief-engineer Miloš Komadina, under whose leadership the implementation of the plan was carried out (MHM, S.G.V.: 8.2.1894, 22.8.1894, 12.4.1894; AHM, box No. 36). The plan shows three waves of planning in different colours. The initiative to seize the land for the construction of the Rondo roundabout, which the people then called *Gumno*, was realized only in 1897 (MHM, S.G.V: 10.3.1897, 16.10.1899).

• **The third wave** is the construction of four more streets which, with two more old ones (interrupted by Štefanijino šetalište on two streets), complete the entire complex. This phase began in 1900, when its Regulatory Plan was made, that is, the amendment of the basic plan. It was made on a geodetic base map (basic regulatory plan) which has only Štefanijino šetalište street. This plan was signed by Engineer Hugo Jedlička (AKM, without reference number), and everything else was planned (drawn in) by the city surveyor Dragutin Köhler, so we can say that he is the author of the Rondo regulation for the most part since at the bottom of the plan it is written in red ink *"... drawn in, Mostar November 1900 by Eng. Dragutin Köhler"*. Rondo and the four streets framing the urban solution is drawn in red ink (AKM, without reference number). The last phase of construction is the planning of Muštovića street (today Bariše Smoljana street) and Kalemova street (today Zagrebačka street; MHM, S.G.V: 16.10.1899).

Continuation of construction according to the pre-existing urban form

Arriving in Mostar, Austro-Hungarian engineers found a clear urban structure of the city divided into neighbourhoods *(mahale)* for housing and a bazaar with shops, ground floor office buildings. The same principle was preserved in the last Ottoman period when stone ground floor and high-rise buildings were built in the bazaar, but again completely office ones without housing. This principle of exclusively office buildings, and not residential-commercial ones, continues on some street stretches. The only difference is that these are now buildings with a higher clear height of rooms of 3.5 m and more, infrastructural equipped and dressed in the guise of historicist architecture. It means with regard to architecture we have street canvases with buildings of the new time, but the old urban principle, solely office buildings in the bazaar-centre.

Fig. 10 The fourth Neo-Baroque Rondo Square with urban villas

These buildings are visible on the section of Glavna street (Fig. 11) within the first model of urbanization as an exception, but also partly in Franje Josipa street within the third model (Fig. 12). This phenomenon has also been noticed in other cities in Bosnia and Herzegovina, but it seems nowhere like in Mostar. It is a connection with the pre-existing and the preservation of one of the principles of Ottoman construction. Several engineers are their designers, but mostly Đorđo Knežić construction technician from Mostar. It cannot be answered whether this phenomenon is the product of a deliberate approach of the

FIG. 11 GROUND FLOOR, EXCLUSIVELY OFFICE PREMISE WITHOUT DWELLING ON GLAVNA STREET. PHOTO FROM 1905.

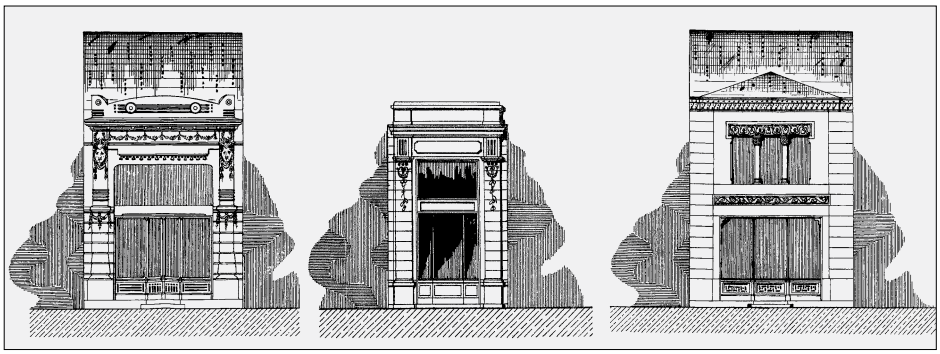


FIG.12 SHOPS IN THE BAZAAR OF THE KNEŽIĆ, BETWEEN 1900 AND 1910

authorities, as we can say for the Neo-Moorish style, which is a political project or the inertia of the learned and repeated experience of investors.

PLANNING ENGINEERS (SURVEYORS) AND THEIR ACTIVITY

Technical staff employed in the state administration prepared planning documents (regulatory sketches and regulatory plans), in addition to activities related to design, supervision and organization of construction of state facilities. Their activity took place within the Construction Office of the City Administration of Mostar and the Technical Department of the District Authority of Mostar and the Construction Department, and later within the Departments of the Provincial Government in Sarajevo.

In principle, the plans were prepared in the Technical Department of the District Authority, submitted for opinion, objections and suggestions to the City Government (Council) of Mostar. With those possible modifications through the District Office or directly through the District Authority they went to the Construction Section (later the Department) of the Provincial Government for approval. This referred only to more serious spatial interventions, while frequent corrections of street expansion were done through regulatory sketches, which were prepared within the City Office of the City Administration. They determined building lines and seizure of land for public use and were adopted by the City Council. This way of working is visible in a whole series of interventions recorded through the minutes of the City Council (AFS, Glas Hercegovca, No. 16 of 6 March 1885). A major limitation in attributing the authorship of individual plans is the lack of a consistent rule when signing on drawings, so we do not know who is the author and who is the chief who approves them (Dimitrijević, 1989: VI-27). There are also rare supporting documents that would clarify this issue. Therefore, we have limited our work only to those attributions of authorship for which we are sure of, not only through the plans but also other documents. Through our research, we unequivocally found that, along with other participants (Miloš Komadin, Hugo Jedlička and Eugena Pagliarucci), the author of the regulation of the baroque square Rondo is the city surveyor Dragutin Köhler (MHM, S.G.V: 18.11. 1898; AKM: without reference number; MHM, S.G.V.: 8.2.1894 and 12.4.1894, 10.3.1897). This claim overturned the previous conviction that Rondo was the work of Miloš Komadina. It is now known that he regulated only Štefanijino šetalište street in 1894, and the concept of the square into which the six streets inflow was created in 1900 after amendments to this plan, which was signed by Dragutin Köhler. Dragutin Köhler is the author of the Regulatory Plan based on which all the streets and all blocks of buildings from Franje Josipa street to the Catholic cemetery in the north were constructed (AKM: without reference number). This plan was made in 1911, and according to it, construction continued also in the following period until the end of the 1960s. As a city surveyor, Köhler is often the author of other regulatory sketches and a large number of architectural designs (Puljić, Šetka-Prlić, Rakić, 2017: 10). According to the number of regulatory sketches, and probably also regulatory plans, the greatest contribution to the development of the city was given by the city surveyor, and part of the working life as the head of the Construction Office of the District Authority, Miloš Komadina (Puljić, Šetka-Prlić, Rakić, 2017: 10) over a period from 1883 until 1919. He is probably the author of the regulation of Musala Square (Miletić, 1997: 41), but those plans were not found in the archives.

CONCLUSION

The City of Mostar was urbanized in a planned manner during the Austro-Hungarian period, unlike the previous Ottoman period. This urbanization was a transformation of the pre-existing physical structure, but also the construction of new parts of the city. The entire activity of planning, design, building permits, construction and construction control took

place in a planned manner and in accordance with legal solutions. Within this process, four recognizable urban models were created, different in their physical structure, but also in contents. These were: the first model of an "irregular block system" by which the pre-existing urban form was transformed. The second model is visible in establishing Musala Square and new streets coming to it. The third one was developed between the Neretva River and the railway as a model of block city construction, and the fourth is construction of free-standing villas within the Neo-Baroque Square called Rondo in which six radial streets inflow. The specificity of Mostar, but also other cities of Bosnia and Herzegovina is the continuation and partial preservation of the pre-existing Ottoman urban principle, the construction of exclusively office buildings, without residential part in the business part of the city, but also in newly built neighbourhoods.

The paper revealed several authors of these urban models, as well as overturned the established attributions of the authors of the plan. The legislative, legal and state organizational framework of the urbanization process was also presented. This paper deals with a whole historical architectural and urban layer of a cultural monument that has been devastated in the past hundred years, and very often completely destroyed, but it remains a trace in the urban matrix of today's Mostar.

[Translated by Zlatan Buljko, prof., Certified Court Interpreter for English]

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Author's biography

Borislav Puljić, PhD, grad.eng.arch., Assoc. Prof., graduated from the Faculty of Architecture in Sarajevo in 1983, and received his PhD from the Faculty of Architecture in Zagreb in 2012. He has worked on architectural design and urban and spatial planning tasks. In addition to these tasks, he was engaged in scientific work studying the urban development of cities from the Ottoman and Austro-Hungarian periods. He has published several scientific articles and a book "Reading the City; Urban Structure of Mostar from 1440 to 1878".

The author prepared the whole work.

Archive sources

ABiH – Archives of Bosnia and Herzegovina

AHM – Archives of Herzegovina Mostar

MHM, S.G.V. – Museum Herzegovina Mostar, minutes from the sessions of the City Council

AKM – Archives of the Cadaster of the Municipality of Mostar

CIDOM – Centre for Information and Documentation Mostar

Illustrations Source

CIDOM

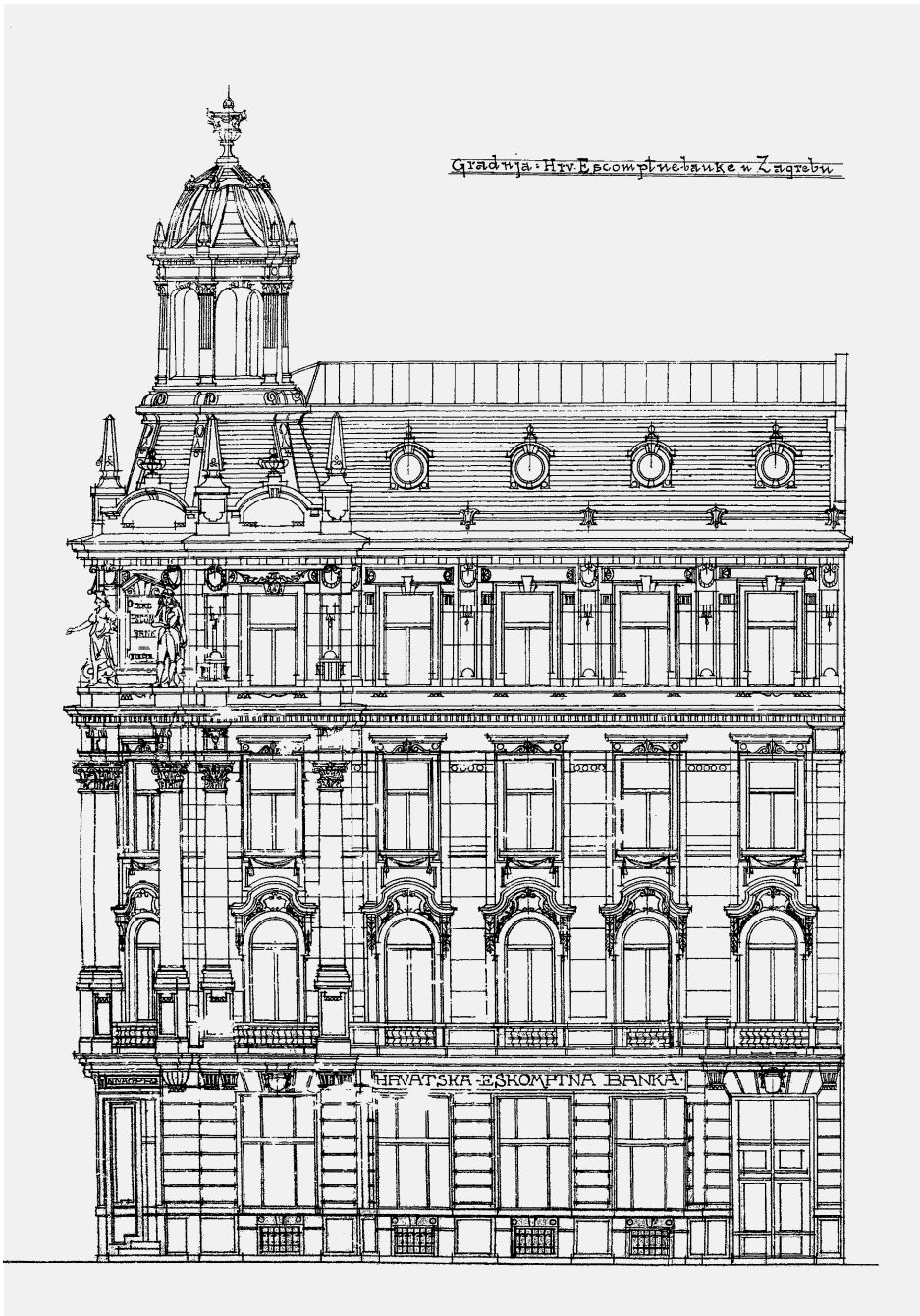

Fig. 1 Croatian Escompte Bank, north façade, Fellner and Helmer, 1898

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Monetary Institutions and the Emergence of a New Building Type

Fellner and Helmer's Design for the Croatian Escompte Bank in Zagreb

Croatian Escompte Bank
Fellner and Helmer
monetary institutions
typology
Zagreb

In the late 19th and early 20th centuries, Zagreb witnessed the appearance of a new building typology meant to accommodate various sorts of monetary institutions: banks, savings banks, insurance companies and stock exchanges. This paper presents one important early example of that type – the seat of the Croatian Escompte Bank in Zagreb. It was designed in 1898-1899 by the Vienna-based studio Fellner and Helmer for a prominent location at 3 Ilica Street and it heralded the defining features of the new building type, such as the union of diverse facilities within a single structure, imposing architectural features and overall grand appearance, and a highly prominent role in the urban fabric of the city.
In particular, it contributed to the definition of a spatial and formal scheme for commercial corner buildings, as the most exposed and attractive segments of downtown city blocks. In that sense it served as a productive model for a number of corner buildings intended for business purposes that were to follow.

Introduction

The second half of the 19th century saw a wave of accelerated social and economic development. In the midst of these advances, a distinct new architectural type emerged – buildings constructed for monetary institutions. They included banks, savings banks, insurance companies and stock exchanges, and were undergoing a period of swift expansion. In Zagreb, at the same time as this new institutional and building type was developing, another urban process was intensifying – the construction of the modern city in the new urban area, the so-called Lower Town. The formation of the new architectural type thus coincided with the formation of the new modern city, with its novel structure and overall urban prospect. The principle of an orthogonal grid and a system of perimeter blocks, rendered in a selection of Historicist idioms, was chosen as the basis of the city's future development.

A small yet significant episode in that overall development, important both in terms of establishing the new building type and as a confirmation of its urban position and role, was the building of the Croatian Escompte Bank. Constructed in 1898-1899 according to a project by the Viennese architects Fellner and Helmer, the building was located in a prominent position at the very beginning of Ilica Street, as an emblematic link between the historical and the modern parts of the city. This influential building has already been considered from various perspectives in the scholarly literature: primarily the art historical, the history of architecture and the history of banking and the economy in Croatia. However, the building itself has rarely been the sole focus of scholarly research, and it has not yet been the subject of a detailed monographic study. Of the studies that have been undertaken it is worth mentioning those by Đurđica Cvitanović (Cvitanović, 1978), Olga Maruševski (Maruševski, 1993, 1997), Aleksander Laslo (Laslo, 2003), Jasna Galjer (Galjer, 1997, 1999), Siniša Lajnert (Lajnert, 2008), Iskra Iveljić (Iveljić, 2007), Mira Kolar-Dimitrijević (Kolar-Dimitrijević, 1992) and Igor Karaman (Karaman, 1973, 1991, 2000). Relying on their valuable insights, this paper undertakes a detailed spatial analysis of the building, primarily in order to determine its significance for the establishment of the new building typology, as well as for confirmation of its significant urban role.[1] The most important features of this new typology are namely materialised particularly vividly in this building. They include: the union of diverse facilities within a single structure, imposing architectural features and overall grand appearance, and a highly prominent role in the urban fabric of the city. The position of the building on the very corner of a city block is particularly interesting. It is the most exposed and attractive segment of the Lower Town block, but it also requires a specially configured spatial and design scheme. This building was not only a success in terms of its own spatial scheme, but also had a productive influence on a range of commercial corner buildings as the city continued to develop.

1 This paper is the result of the first author's ongoing research for a PhD thesis at the University of Zagreb, Faculty of Architecture.

2 Monetary institutions are legal entities and enterprises whose main business is dealing with cash and valuables, or those that use substantial amounts of cash and valuables for their main activities, or else whose premises are used for activities that involve cash and valuables. https://www.zakon.hr/z/784/Zakon-o-za%C5%A1titi-nov%C4%8Darskih-institucija [Accessed: 7 February 2021].

3 Szabo, on the other hand, in addition to the Croatian Escompte Bank, mentions only savings banks in Osijek and Sisak. (Szabo, 1985: 41)

4 Although similar to savings banks, commercial banks are separate financial institutions. In contrast to savings banks, they do not focus primarily on savings, but rather accept funds in the form of deposits and place them in loans with the goal of maximising profit. In terms of their functional design, meanwhile, they do not differ significantly from savings banks; differences are apparent rather in terms of programme. Savings banks frequently incorporate public facilities into their structure, given that by their very nature they are connected with the broadest possible range of social classes. This can be seen in examples from Zagreb, which tended to integrate cafés, bars and even libraries, as is the case with the First Croatian Savings Bank at 5 Ilica Street, the Croatian-Slavonian National Central Savings Bank at 25 Ilica Street, the City Savings Bank on Ban Jelačić Square and others. (Lajnert, 2008: 9)

5 The Croatian version of the bank's name was *Hrvatska eskomptna banka*. The term *escompte* (Croatian *eskompt* or *eskont*, English *discount*) is a French term for a legal

The earliest monetary institutions in Croatia

At the time of the 1868 Croatian-Hungarian Settlement, there were five monetary institutions[2] in northern Croatia (Karaman, 2000: 217): four savings banks (the First Croatian Savings Bank in Zagreb and the savings banks in Rijeka, Osijek and Varaždin),[3] and the newly established Croatian Escompte Bank in Zagreb. The Croatian Escompte Bank was founded in 1868, as the first banking institution of this kind in Croatia, and the second monetary institution after the First Croatian Savings Bank, which had been established earlier, in 1846.[4] (Karaman, 1973: 96; Bagarić, 2011: 167; Iveljić, 2007: 269)

The establishment of the Croatian Escompte Bank was initiated in 1864 by the Foundation Board of the Zagreb Chamber of Commerce and Industry headed by Guido Pongratz (Karaman, 1991: 96). The scope of its banking activities was supposed to include "receiving and accumulating cash, discounting bills of exchange[5], granting loans to debentures issued by the state and transport companies, and to goods and money-transmission and clearing activities" (Iveljić, 2007: 75). Unlike all previous such initiatives, the establishment of this bank was required to be backed by domestic capital, and the bank was supposed to be accessible to every competent inhabitant of Croatia.[6] After a long establishment process, the bank was finally launched on 16 November 1868 (Szabo, 1985: 38).

The Croatian Escompte Bank operated successfully for years, so in 1898 plans were drawn up for a new building for the bank's headquarters and offices. The Bank functioned successfully until 1928, when it merged with the Croatian-Slavonian National Mortgage Bank and became the Yugoslav United Bank (Kolar-Dimitrijević, 1992: 162).

In 1898, following the decision to build new bank headquarters in Zagreb, the Croatian Escompte Bank entrusted the task of its design to the renowned Vienna-based Fellner and Helmer architecture studio.

Fellner and Helmer's projects in Croatia

The architecture studio Fellner and Helmer was established in 1873, when Ferdinand Fellner Junior (1847-1916), following the death of his father, the builder and architect Ferdinand Fellner Senior, entered into a joint practice with his former schoolmate Hermann Helmer (1849-1919).[7] Although they designed and constructed as many as 48 theatre buildings throughout Europe, their production included numerous other public and private buildings as well, primarily prestigious and sumptuous public palaces as symbols of the thriving new bourgeois society and of intensely growing metropolises, as Zagreb was at the end of the 19th century, especially after the earthquake of 1880 (Dobronić, 1983: 99). In their designs, they relied on a Historicist stylistic palette, primarily the Neo-Renaissance and Neo-Baroque styles, only to turn to the inspiration of Art Nouveau after 1900, developing their own version of it with somewhat more moderate and more reduced decoration (Damjanović and Iveljić, 2015: 124).

Fellner and Helmer's first project in Croatia was the construction of the Croatian National Theatre in Varaždin, following an architectural design competition in 1870. It was followed by the theatre building in Rijeka (Teatro Comunale) in 1885, the Rijeka Savings Bank building (Palazzo Modello) in 1883-1885, the National Theatre in Zagreb in 1895, and the extension of the National Hall (the seat of the Croatian Falcon sporting association and the Kolo singing society) with a third wing that would house the theatre's power generator (Knežević, 1996: 408). Fellner and Helmer also reconstructed a pavilion for art exhibitions, later called the Art Pavilion, which opened in 1898 after the end of the 1896 Millennium Exhibition in Budapest for which it had originally been built.[8]

Through their work on seven branches of the Austro-Hungarian Bank in the Czech Republic, Poland, Romania and Ukraine at the turn of the 20th century[9], Fellner and Helmer gained abundant experience in designing buildings for monetary institutions. Before the bank in Zagreb, they also made a valu-

process referring to the encashment of a bill of exchange before the date of its maturity. The bill of exchange is discounted at an agreed rate (discount credit). The bank's name is usually translated into English as the Croatian Discount Bank or the Croatian Escompte Bank. (*** 2011)

6 For more details on the bank's establishment, key participants and overall socio-political circumstances, see: Szabo, 1985: 38 and Iveljić, 2007: 74-81.

7 Researching the circumstances around the adaptation of the Pongratz Palace, Dragan Damjanovic and Iskra Iveljic argue that Helmer, who was Fellner's junior by two years, had worked as an architectural draftsman in the studio of Fellner's father, and that their collaboration had begun even before the company was officially founded in 1873 (Damjanovic and Iveljic, 2015: 124).

8 The pavilion was originally built for the Budapest exhibition according to a design by the Hungarian architects Korb and Giergl. Fellner and Helmer subsequently reworked the design, and the new structure was ultimately placed on Franjo Josip I Square (today King Tomislav Square). For more details on the construction of the pavilion, see: Perusić, 2015.

9 Out of a total of 30 branches of the Austro-Hungarian Bank in the former Czechoslovakia, Fellner and Helmer worked on 3 buildings: in Olomouc in 1898-1899 and Ostrava and Trutnova in 1900. https://www.historie.cnb.cz/cs/bankovni_budovy_a_pobockova_sit/vyvoj-pobockove-site/1919_1926.html [Accessed: 7 February 2021]. We also know of their work on branches of the Austro-Hungarian Bank in the cities of Bielsko-Biala in Poland, Lviv, Chernivtsi and Drohobych in Ukraine and Oradea in Romania (*** 2001).

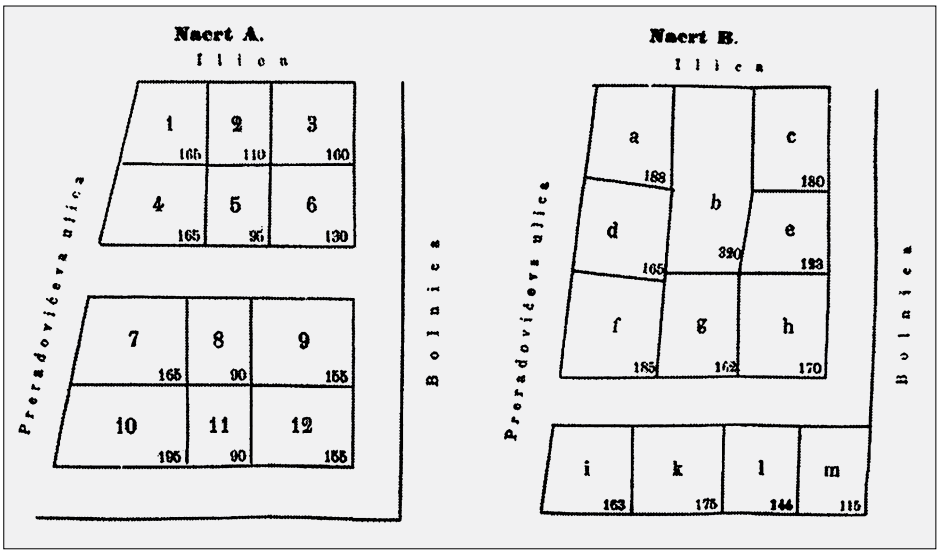
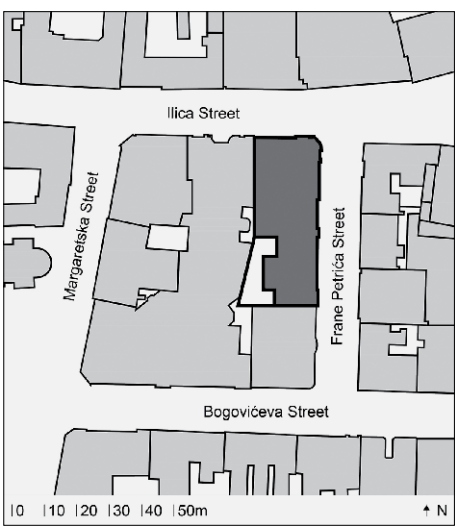


Fig. 2 Two versions of plot subdivision made on the land of the "theatre foundation" and regulation of the area with three new streets. Version B was eventually implemented.

Fig. 3 Site plan



able contribution to this building typology in Croatia, with their design for Palazzo Modello for the Rijeka Savings Bank (Glavočić et al., 2002: 204-205).

The Croatian Escompte Bank Building – Its design and construction

The construction of the Croatian Escompte Bank in Zagreb, in a prominent location at 3 Ilica Street, was preceded by many years of debates about the site. However, these debates related not to the construction of a new bank, but rather of a new theatre. Namely, the first master plan of Zagreb from 1865 envisaged the construction of a new theatre building precisely on that very same location in Ilica Street, on land belonging to Baron Jelačić Bužimski (1813-1871), who had announced that he would donate his part of the family estate for the construction of a theatre (Knežević, 1996: 100). The plot was situated between the Merciful Brothers Hospital block on Jelačić Square and Svilarska Street, i.e., a block formed by today's Ilica, Petrićeva, Bogovićeva and Margaretska Streets.[10] The plot was situated between the Merciful Brothers Hospital block on Jelačić Square and Svilarska Street, i.e., a block formed by today's Ilica, Petrićeva, Bogovićeva and Margaretska Streets (Fig. 3). In 1881, Fellner and Helmer made a conceptual design for a theatre building at that location (Knežević, 1996: 100). The selected site was also confirmed in the new master plan of 1887 (Knežević, 1996: 107). However, Ban Khuen-Héderváry (who served as ban[11] from 1883 to 1903) advocated for the theatre to be situated on another location – on what was at that time known as Sajmište (meaning "the Fairgrounds" in Croatian; later University Square). As a result, the conceptual design was revised, and Sajmište confirmed as the new building site (Knežević, 1996: 100-101). After the final decision was made[12], the land on Ilica Street was subdivided into plots (Fig. 2) and a part of the land on the corner of Ilica Street and the newly formed Baron Jelačić Street (today Petrićeva Street) was bought by the Croatian Escompte Bank with the intention of constructing a building that would serve as its headquarters and branch office.

Therefore, the choice of the Fellner and Helmer studio for the task of building the new bank was most likely based on the fact that 17 years earlier, they had designed a new theatre building for that very same location. Additionally, the decisive part was arguably played by the fact that Fellner and Helmer, while working on the design for the Art Pavilion, which they had started in 1896, met Gustav Pongratz, a member of the Art Pavilion Construction Committee, who was the son of the presiding member of the Croatian Escompte Bank's foundation committee, and a member of the bank's board of directors.[13]

These circumstances led to the commissioning of the Fellner and Helmer studio for the construction of the bank. In 1898, their design was finished, and the building permit obtained. The construction, run by the firm Hönigsberg and Deutsch, was completed as early as 1899. In that same year, a certificate of occupancy was issued. Also worth noting that while working on the Croatian Escompte Bank, Fellner and Helmer simultaneously participated in a design competition for the First Croatian Savings Bank's new building, which was to be built on adjacent plots located at 5 Ilica Street.[14] However, the winner of the competition was Josip Vancaš who, in 1898-1899, built his famous bank, which inte-

10 For more details on Baron J. Bužimski's land, see: Knežević, 1996: 100, footnote 36; and Buntak, 1984: 156-157.

11 "Ban" was a title akin to that of viceroy.

12 For more details on the plans for the theatre's construction, see: Knežević, 2011; and Knežević, 1996: 168-185.

13 The president of the foundation board of the Croatian Escompte Bank was Guido Pongratz, a member of one of the most important entrepreneurial families in Croatia and Slovenia from the late 19th to the early 20th centuries. His son, Gustav, served as a member of the bank's board of directors from 1876 (Damjanovic and Iveljic, 2015; Bagarić, 2011: 167).

14 The plan was for both monetary institutions, the Croatian Escompte Bank and the First Croatian Savings Bank, to be built on the aforementioned piece of Baron Jelačić's land.

15 For more on the construction of the First Croatian Savings Bank, see: Vancaš, 1900: 76-79; Maruševski, 1997: 225.

16 More in: Maroević, 1968

17 According to the design kept in the Bankhistorisches Archiv der Oesterreichischen Nationalbank, file no. 2505, item no. 252.

18 Maruševski, 1993. The Croatian Commercial Bank had offices at 20 Ilica Street, but these were clearly inadequate, and so a new space for the Bank was planned as

grated a public passage into its structure, today popularly called the Octagon.[15] It should also be noted that the First Croatian Savings Bank was the first Croatian monetary institution to start investing in new buildings for their business needs; its branches in Zagreb included the savings bank on the corner of Ban Jelačić Square and Praška Street built in 1871 (designed by Grahor and Klein), and the savings bank at 30 Radićeva Street, constructed in 1880-1882 (designed by Janko Josip Grahor)[16], thus introducing this particular building type to Croatia.

It is worth noting that all of these monetary institutions were located in the very heart of the city, on Ban Jelačić Square or its immediate vicinity. This also includes a branch of the Austro-Hungarian Bank that was placed on the first floor of Stanković House at number 1 Ban Jelačić Square in 1882[17], and the extension of the Croatian Commercial Bank's 1880 building on the corner of 20 Ilica Street and Tomićeva Street (the former Brdovita Street), which was the work of the architects Herman Bollé and Kuno Waidmann.[18] It was in this representative central zone of the city that the Croatian Escompte Bank's new building would eventually be built.

• **The main elements of the programme and the building's spatial structure** – In the case of the Croatian Escompte Bank, the task was to create spacious, functional and imposing bank spaces: a cashier's hall with accompanying chambers on the ground floor and offices for the bank on the first floor. The architects also needed to design a sumptuous, elegant and high-profile building that would highlight the bank's important position in the social and urban fabric of late 19th century Zagreb. The 634 m² plot was planned to contain 85% of the built structure, which was the maximum plot ratio for a corner building according to the building code of the time.[19] Although the specified functional programme could not be found in the documentation of the bank that is kept in the archives, the spatial and functional organisation can nevertheless be faithfully reconstructed using the original drawings, which have been preserved (Fig. 4). Moreover, a detailed description of the bank, published immediately after its completion in 1899 in the Viennese magazine *Wiener Bauindustrie-Zeitung*, provides additional information for its reconstruction[20], as does a description in the local paper.[21]

The building is an L-shaped structure, whose longer wing faces Petrićeva Street, and has a total of seven levels: the basement, ground floor, mezzanine (only in one part of the building), three upper floors and the attic. The entrances and main stairways are situat-

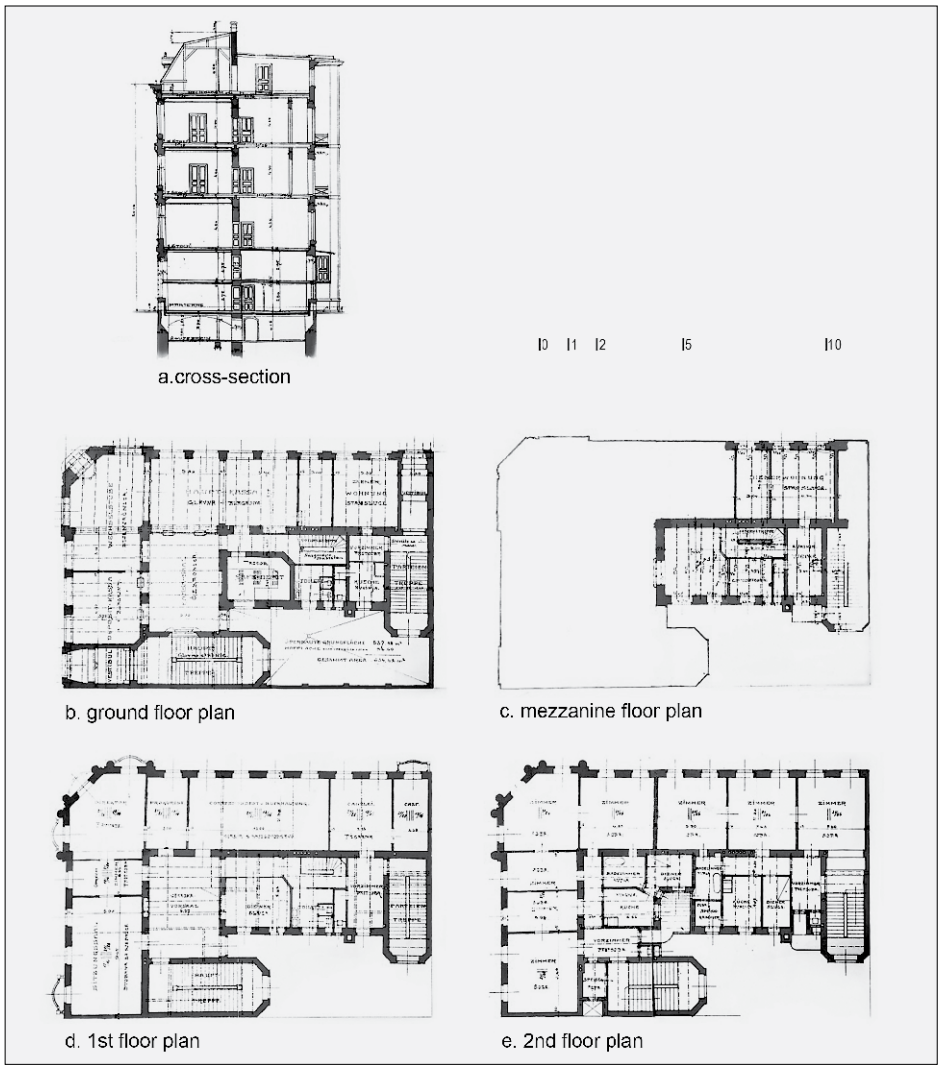


Fig. 4 – Cross-section through a part of the building with the mezzanine, b – ground floor plan, c – mezzanine floor plan, d – first floor plan, e – second floor plan. In this view, the cashier's hall extends through the entire height of the ground floor and mezzanine.

part of the designs for the First Croatian Savings Bank's new public palace at 5 Ilica Street, built in 1898-1899. Plans dating to 1880 for the remodelling of the building at 20 Ilica Street (on the corner with Tomićeva Street) for the Commercial Bank show that only one part of the ground floor was in fact designated for the bank. It consisted of two rectangular spaces about 100 m² (5´20 m) in size along with ancillary spaces, which was clearly insufficient for the bank's needs. Plans in HR-DAZG. For more details, see: Damjanović, 2013: 569.

19 Since 1896, the defined minimum of the open courtyard for a corner building had been 15% of the entire plot area. The building code came into force in 1857, but only the 1896 amendments prescribed the maximum construction of the plot and the ratio of the courtyard depth to the building height, i.e., the incidence angle of sunlight. For details see: Kahle, 2004: 203-205. With the later extension of the bank's Currency Department on the ground floor (plan in HR-HDA, fonds 535, box 101, not dated), the building covered the entire surface of the plot.

20 The text about the bank building published after its completion in the *Wiener Bauindustrie-Zeitung* is a valuable source of information on the tasks and execution, as well as the impression, perception and valorisation of the building at the time. *** 1899: 57

21 In the text "Nova zgrada Eskomptne banke" (*** 1899a, no pagination).

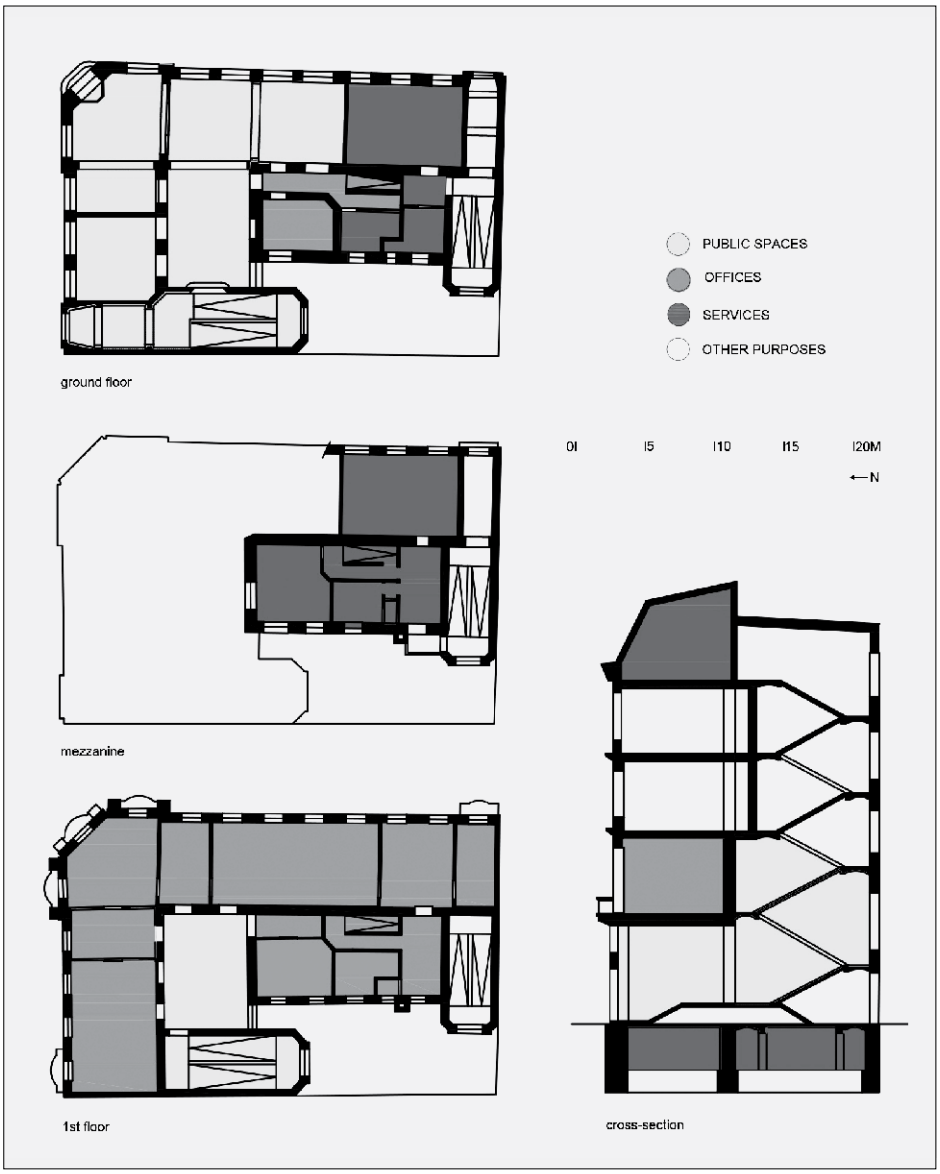


Fig. 5 The layout of the main functional zones of the building – ground floor, mezzanine, first floor and cross section

ed at the two far ends of the building. The main entrance was on Ilica Street and was intended for clients and bank management, as well as providing access to the apartments for rent on the upper floors. The side entrance was on Petrićeva Street, and was envisaged as a service entrance, intended for bank employees; in addition, it also offered access to the apartments for rent on the upper floors. The third and most noticeable entrance was situated in the building's chamfered corner, and was intended to provide direct access to the exchange office. The external stairs leading up into the exchange office were the subject of negotiations when issuing the permit and they had to be located within the building alignment (HR-DAZG--1122). All of these three entrances were emphasised by shallow avant-corps that ran up the full height of the façade.

The basic functional layout of the building can be divided into four different units, typical of this building type: public spaces or spaces for business activities with clients (cashier's hall, exchange office, vestibule with hallways); office spaces and rooms for employees; ancillary spaces; and residential spaces (*** 1902: 146-147; Fig. 5).

The ground floor, mezzanine and first floor accommodate the bank's business spaces, while the second and third floors are residential. The basement contains a space for central heating and storage. The mansard attic (above the 3rd floor) was meant as a laundry, for ironing, and storage.

The main entrance to the bank on Ilica Street leads through a remarkably designed vestibule with a short flight of stairs to the main landing, which provides access to the cashier's hall to the left or, more precisely, to its central space intended for clients. Workspaces for the clerks, on the other hand, line the sides of the cashier's hall, facing the streets outside. The ground floor also houses a bank vault with treasury, essential ancillary spaces and a caretaker's apartment. It accommodates, in addition, an internal staircase, situated in the wing facing Petrićeva Street, which leads to the ancillary rooms on the mezzanine and serves as an internal connection for the bank clerks. The caretaker's apartment is accessed directly from the staircase on Petrićeva Street.

Entering via the main staircase on Ilica Street leads to the first floor and the central foyer, which in turn provides access to spaces used by the management of the bank – the conference room, the director's office, the bank's official representative and the bookkeeping department – which are all also directly connected with one another, thus forming an enfilade that faces the streets below. The very corner, as the most attractive position in the building, is taken up by the director's office, which is a rather unusual solution, because this attractive spot was more often used as a conference room.[22] The offices are also connected to the internal stairs and to the staircase facing Petrićeva Street, so a practical circular connection is productively established, connecting both major entrances.

22 Such was the case, for instance, at the First Croatian Savings Bank on the corner of Petar Preradović Square and Bogovićeva Street; the Serbian Bank at 4 Jurišićeva Street; or the Croatian-Slavonian National Central Savings Bank at 25 Ilica Street.

23 Electric lighting was mentioned in the description of the building in the *Wiener Bauindustrie-Zeitung*, al-

The mezzanine, which does not occupy the whole area of the building but just a part of it, is accessed via the entrance on Petriceva Street, and it contains a servant's apartment, a cloakroom for bank clerks and a space whose function was not recorded in the plans, with an opening overlooking the cashier's hall.

The second and third floors are intended for residence. Both floors have same spatial organisation, with two apartments per floor. The apartments accessed from Ilica Street have five rooms and were probably intended for bank employees, whereas those accessed from Petriceva Street have three rooms and were meant for rent. The apartments are organized according to the same principle – with rooms arranged in an enfilade along the street-facing walls, and with parallel communication through the interior corridor, which is also connected to the service spaces, namely the bathroom, kitchen, toilet and maid's room, overlooking the courtyard.

All of the main, sumptuously designed business- and main residential spaces overlook the two streets, while the service spaces face the courtyard. The only exception to this clear concept is the placement of the servants' apartments beside the entrance on Petriceva Street, which are street-oriented, both the one on the ground floor and the one in the mezzanine. However, the insertion of these service facilities on the mezzanine level resulted in a change in the height of the rooms and necessitated a change in the façade design. The façade facing Petriceva Street thus received an additional row of windows, set in alignment with the last three windows next to the staircase.

This logic of spatial organization is also reflected in the cross-section of the building, where the floor height gradually decreases from the ground to the third floor, i.e., from public spaces to the private sphere, together with the grandness of the design. The bank's public spaces were generously dimensioned, both in terms of floor area and height, as were the offices intended for the management.

The rooms were heated through a low-pressure steam-based system with a central furnace, and were lit by electric and gas lights.[23] For security reasons, the basement, ground floor and mezzanine had ceilings made of concrete, while the upper floors had wooden beams.

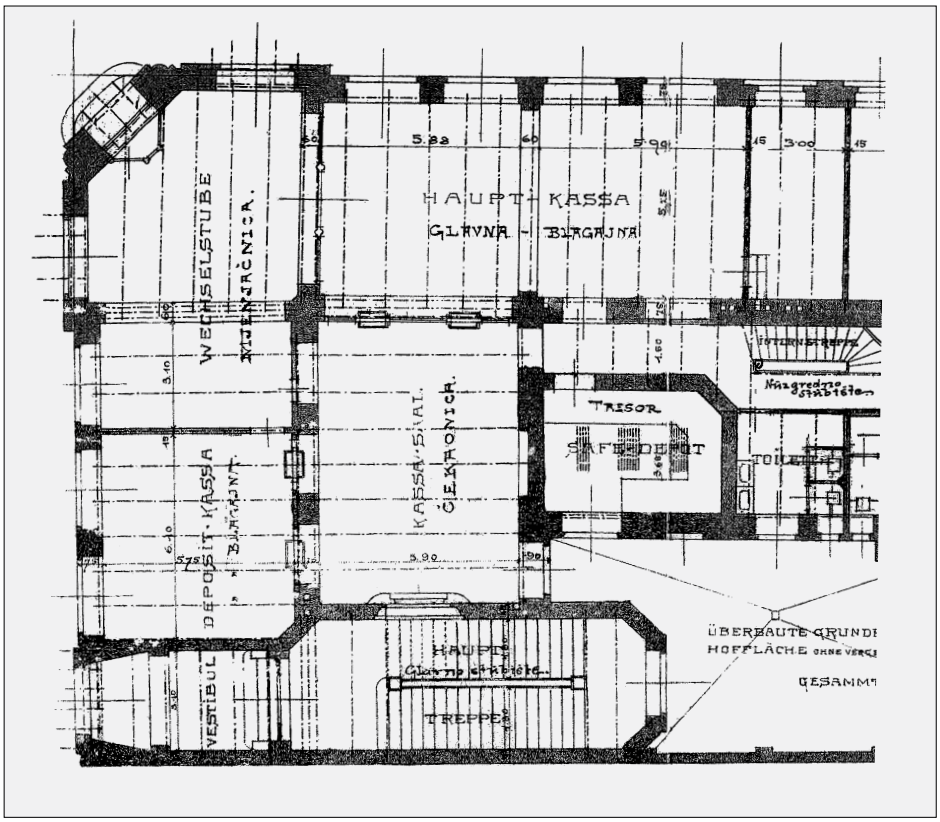


Fig. 6 The plan of the cashier's hall

• **The cashier's hall** is a large integral space on the ground floor, which includes the central area intended for clients and areas along the perimeter used by the cashiers. The space is 5.5 m high, richly lit laterally from both street façades and from the courtyard. Together with the exchange office, which is located in the building's chamfered corner, this space makes up more than half of the total ground floor area. The impression of its spatial integrity – i.e., the cohesiveness of the space for clients and the spaces for employees – was the result of a structural solution which used columns that alternated with the counters, with glazed partitions through which the clients could communicate with the cashiers of the deposit cashier's office (on Ilica Street) and the main cashier's office (on Petriceva Street) while simultaneously perceiving the spatial integrity of the hall. The cashiers' offices were physically linked to the exchange office in the corner, but the clients could not approach it this way; clients entered the exchange office directly from Ilica Street through a three-part, wind-proof entryway. In fact, the exchange office somewhat disrupted the spatial integrity of the cashier's hall, since the deposit cash register area, and a part of the hall for clients, were marked off

though it was still a novel thing at the time the Croatian Escompte Bank was constructed. Electric lighting in Zagreb was first presented at the Jubilee Exhibition of the Croatian-Slavonian Economic Society held from 15 August to 4 October 1891, but it was not until 1907 that electrification was first carried out in Zagreb. More in: Anic, 2019: 145.

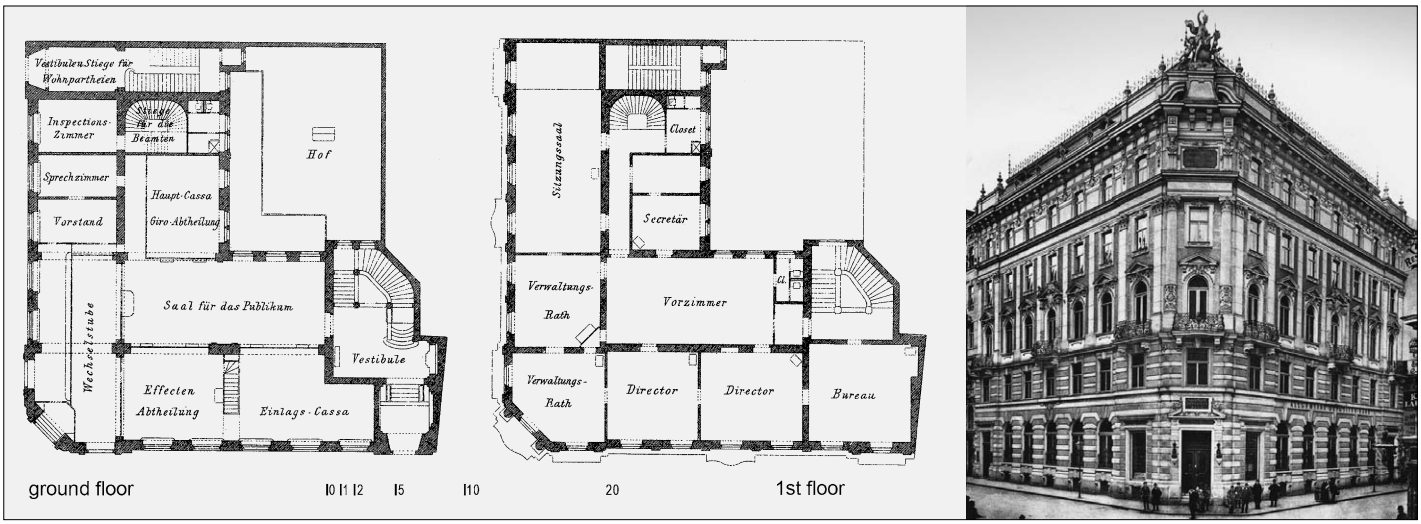


Fig. 7 The ground floor and first floor plans and the exterior view of the Allgemeine Depositenbank building, Schottengasse 1 / Teinfaltstrasse in Vienna, 1892-1894, architect Emil Förster

Fig. 8 Original floor tiling on the second floor

by a wooden partition with a door, while the main cash register was set apart by a thinner glazed partition. Nevertheless, the spatial unity could be clearly seen and experienced (Fig. 6).

As far as lighting is concerned, the cashier's hall was laterally lit, and did not have a skylight, which was otherwise a common element in monetary institution buildings abroad. Natural light, however, was not lacking given that the façade of the entire ground floor was lined with large windows set in quite a dense rhythm.

Regarding methods of illumination at that time, only the First Croatian Savings Bank at 5 Ilica Street was designed with a skylight, while other buildings belonging to the same bank (those on Ban Jelačić Square and in Radićeva Street), as well as the General Zagreb Savings Bank and Pawnshop on the corner of Zrinjski Square and present-day Praška Street, had standard lateral windows.[24] The same lighting principle was used in other projects by Fellner and Helmer, such as the Palazzo Modello in Rijeka and the cashier's hall in the branch office building of the Austro-Hungarian Bank in Lviv, built in 1897-1898.

The placement of the exchange office in a corner of the cashier's hall appears somewhat forced, invading as it does the building's clear integral volume; but it is far from incidental. Rather, this is what gives the exchange office its direct and visually strong access from the street. The exchange office, which was at the floor level of the cashier's hall, is reached via the exterior stairs. This layout was not uncommon at the time. The same design was used, for example, for the building of the Allgemeine Depositenbank in Vienna in 1892-1894 by the Viennese architect Emil Förster, who designed several buildings of this type in the Empire. Unfortunately, the interior of Förster's exchange office and the cashier's hall, just like this one in Zagreb, has neither been preserved in its original form nor adequately documented in photographs. Yet the plans for Förster's work in Vienna reveal numerous other common elements with Fellner and Helmer's bank in Zagreb: both are impressive corner buildings, with a cashier's hall positioned centrally on the ground floor and illuminated laterally; both have separate entrances for bank clients and employees via far side entrances; both contain management spaces on the first floor and apartments on the second and third. The similarities between the two buildings are indeed indicative (Fig. 7).

Despite the lack of photographs that could document the appearance of the Croatian Escompte Bank's interior, the text published in *Wiener Bauindustrie-Zeitung* after the completion of its construction in 1899 can nevertheless provide some evidence, since it records impressions of the original interior, which is today represented only by surviving details. The text mentions the "elegant main staircase whose windows are made in the Art Nouveau style" which were, as such, "particularly impressive", and describes the cashier's hall as "spacious" and "bright" (*** 1899: 57). In addition to the cashier's hall,

24 The use of a glass ceiling in earlier examples of savings bank buildings can be found only in the vestibule of the First Croatian Savings Bank in Radićeva Street, which was built according to Janko Josip Grahor's design in 1882.

25 Other banks in Zagreb and Croatia (for example the Serbian Bank at 4 Jurišićeva Street) also used vault equipment from the Berlin-based Arnheim company, founded in 1833.

26 This company existed under the name Bothe & Ehrmann Plc. in Zagreb from 1895, and later grew into the leading furniture factory in the Austro-Hungarian Empire. For more details, see: Brdar Mustapic, 2015: 291-301.

the text also mentions the "robust, armoured door of the bank vault, protected from fire and burglary" equipped by the Berlin-based J. S. Arnheim company[25], offering the clients a secure place to store their valuables (*** 1899: 58).

We do not possess any details about the interior design of the cashier's hall. Numerous later interventions and the subsequent lowering of the ceiling caused the cashier's hall to lose its spatial integrity and evidence of interior details. What is known is that the interior decoration was done mainly by local companies, such as Bothe & Ehrmann Plc.[26], which worked on the carpentry, upholstery and decoration of the entire interior; that mahogany was used for the business spaces; and that the ground floor windows, framed in English brass and executed in the Art Nouveau style, were of exceptional beauty (*** 1899: 58). The 1955 internal correspondence of the Central Bureau of Statistics[27], the future occupant of this space, reveals only that the existing ceramic sand tiles were replaced with parquet in the ground-floor areas that contained the counters. These tiles, with black-and-white or brown-and-ochre patterns and decorative strips, were possibly the same ones that can be found today on the upper floors (Fig. 8).

- **Furnishing and details** – The three rooms on the first floor used by the management – the conference room, the director's office and their foyer – were exceptionally lavishly furnished and were praised by *Wiener Bauindustrie-Zeitung* with claims that "their elegant furniture will probably remain unparalleled in Agram [Zagreb]" (*** 1899: 58). Two elements that have been preserved are a built-in cupboard and the doors to the offices of the bank's management. They offer an inkling of the original appearance and impressiveness of the conference room and the director's office (Figs. 9 and 10).

- **Façade design** – The façade was built predominantly in the Neo-Baroque style with several Art Nouveau details discernible in the design of the cashier's hall windows.[28] (Fig. 1) The façade is divided vertically into three zones: the ground floor zone, the first and second floor zone and the third floor and attic zone. The ground floor zone is of a large height and boasts a remarkable design, with tall windows that let abundant daylight into the cashier's hall. The plastered sections between the widows are patterned with pronounced horizontal joints, which create the impression of façade rustication.

In accordance with the building's position in the urban layout, particular emphasis is placed on its prominent, street-facing corner, which features an evocative design.

This chamfered corner created space for the entrance to the exchange office, and also led to the addition of three shallow avant-corps – one on the corner itself, and two lateral ones. Their design is characterised by the use of half-columns with Corinthian capitals that rise through the first and second floors. The diagonally placed entrance is accentuated by a balcony on the first floor with concave cantilever panels and railings – a detail that also appears on the edges of the building, above the entrances on Ilica and Petriceva Streets.

At the very corner, a pair of half-columns in the central avant-corps support symbolic sculptures representing trade and entrepreneurship[29], while the whole composition is topped by four obelisks that stand above the cornice. The corner of the building culminated in a slender lantern tower, which had a circular base and a domed roof crowned with an urn.

Fig. 9 A decorative corbel on the coffered ceiling in the director's office

Fig. 10 The inside of the conference room door, and the built-in cupboard with Art Nouveau details located in the first-floor hallway

27 The Central Bureau of Statistics has been using the building since 1947 (HR-DAZG-1122).

28 Information on the Art Nouveau details is given in a description made at the time that the construction of the building was nearing completion (*** 1899: 58). The only Art Nouveau details which have been preserved were those of the stained glass with floral motifs on the windows of the main staircase.

29 The stonemasonry and sculptures were the work of Ignjat Franz (*** 1899: 58). Ignjat Franz also made the decorative sculpture on the building of the Zagreb Theatre (Dobronić, 1983: 144).

From architectural spatial form to broader urban structure

The relationship between the hierarchy of the entrances, their positioning and design, and the disposition of the interior spaces and facilities is an intriguing one. The corner entrance is by far the most emphatic when it comes to its position and design, yet it does not lead to the main central space – the cashier's hall. Rather, it is the entrance to the exchange office only, and from this space visitors were given just the briefest glimpse of the large, central cashier's office via a glass partition. Nevertheless, the positioning of the exchange office suggests that it was frequently used and that there was a desire to ensure it was as readily accessible and open to visitors as possible. The cashier's office, meanwhile, was the heart of the bank and was the place where more complex business was carried out. Entering it required several slower and more controlled steps. Due to the placement of the cashier's hall deep in the building's interior without immediate access from the street, entering it is almost like passing along a kind of ceremonial route. It seems as though the intention was to create an impression of security, protection, and a kind of confidentiality by bringing visitors in via a representative interior entryway, a vestibule, and strategically directing them through the building. The same logic in terms of the layout of the main business spaces and movement trajectories can be seen in Förster's corner building in Vienna, constructed four years earlier, suggesting at once that these kinds of spatial solutions were tested and already accepted, as well as demonstrating a link with the Viennese models that Fellner and Helmer applied to their building in Zagreb.[30]

Overall, Fellner and Helmer accomplished here an elaborate work, which served well both its spatial and functional purpose, and a formal and urban one. They created a modern banking space that was functional and practical for its users and clients, while simultaneously managing to rhetorically signal desired message. The design features of the Croatian Escompte Bank building thus transformed it into a kind of model and inspiration for other Lower Town corner buildings.

For instance, shortly after its completion, in 1907, another building of the same type appeared on the corner of 25-27 Ilica and 2 Gunduliceva Streets. It was built for the Croatian-Slavonian National Central Savings Bank by the architects Vjekoslav Bastl, Ivan Štefan and Otto Goldscheider (working for the architecture studio Hönigsberg and Deutsch). Its façade was unquestionably created under the influence of the Croatian Escompte Bank. This notable new corner building differs primarily in the purpose of the ground floor, which was intended to house a café, and the rounded corner section with a dome on top, which gave it an even more impressive accentuation.

The new building type thus played a significant urban and town-shaping role, as can be seen in numerous later examples. The Croatian Escompte Bank was itself an important model. In addition to defining a new street in the Lower Town grid (Petriceva Street), along with the neighbouring First Croatian Savings Bank it in fact defined an entire new city block, as a key unit in the Lower Town block structure, thus clearly demonstrating its town-shaping role. The two banks were harmoniously brought together in a visually convincing block, creating an evocative and coherent formal whole. This block, with the First Croatian Savings Bank as its key component, would introduce another new urban element to Zagreb, which is, interestingly enough, once more tied to Fellner and Helmer. The First Croatian Savings Bank, namely, introduced to Zagreb's Lower Town the element of an urban passage. This passage is today popularly known as the Octagon, a name it probably owes precisely to Fellner and Helmer themselves. As mentioned above, at the competition for the building of the First Croatian Savings Bank in 1898, which was won by Josip Vancaš, the two Viennese architects likewise submitted an entry. It was their most ambitious project in Zagreb of this type, including a commercial passage, the savings bank with a two-storey cashier's hall, a branch of the Croatian Commercial Bank, a "beer hall" and a "people's casino", and apartments for rent on the upper floors. In contrast to Josip Vancaš's winning design, which featured a straight passage running through the block connecting Ilica Street with a new street (today Bogovićeva Street), Fell-

30 In their competition entry for the First Croatian Savings Bank at 5 Ilica Street (which was eventually adopted by Vancaš), the main entrance to the savings bank was located in the depths of a passage, while in the Palazzo Modello in Rijeka, the entrance to the savings bank is drawn back to the mezzanine level, with an additional entrance from a side street. The entryways on the main façade, meanwhile, were intended for more public and accessible facilities – the Caffé Grande on the northern side and the Theatre Restaurant on the southern (HR-DAZG; *** 1904).

31 It is not entirely clear whether the investor stipulated that such a passage must exist, or if the competitors suggested this novel feature themselves. In that, Fellner and Helmer were possibly inspired by the Viennese Ferstel Palace or other similar contemporary buildings.

32 The correspondence is kept in the Croatian State Archives (HR-HDA, PHŠ/Z, vol. 125/1/570).

33 For more on the construction of the First Croatian Savings Bank see: Vancaš, 1900: 76-79; Maruševski, 1997: 225; and Laslo, 2003: 25.

ner and Helmer's design proposed a passage whose linearity was broken by an octagonal space, and with its second part stretching diagonally through the block, to the corner of Petar Preradović Square.[31] The central octagonal space served as the entrance hall to the savings bank. From the preserved competition entries and the correspondence between the Savings Bank and Josip Vancaš[32], it is clear that the Savings Bank suggested that Vancaš use Fellner and Helmer's proposal for the final design.[33] The Viennese architects thus made indeed significant contributions to the establishment of the urban structure of Zagreb's Lower Town.

Epilogue: The life of the Croatian Escompte Bank Building after construction

• **The 1909 extension of the Bank according to Benedik and Baranyai's design** – The first decade of the 20th century witnessed the intensification of monetary activity and proliferation of monetary institutions. Zagreb had sixteen operating banks and savings banks, whose share capital and savings deposits multiplied in the period from 1890 to 1910, with the discounting of bills of exchange forming the main banking business at that time (Karaman, 1991, 271-273; Lajnert, 2008: 49-50). In such circumstances, it is understandable that the Croatian Escompte Bank operated successfully and that it planned on expansion or further investment. This occurred in 1909, when the bank chose the adjacent plot in Petrićeva Street for the extension of its building. The construction company commissioned to carry out the new project was "Benedik and Baranyai, Architect and Builder".[34] It is not known why the bank did not rehire Fellner and Helmer for the task. It is possible that at the time their studio was overstretched on other projects[35], although it

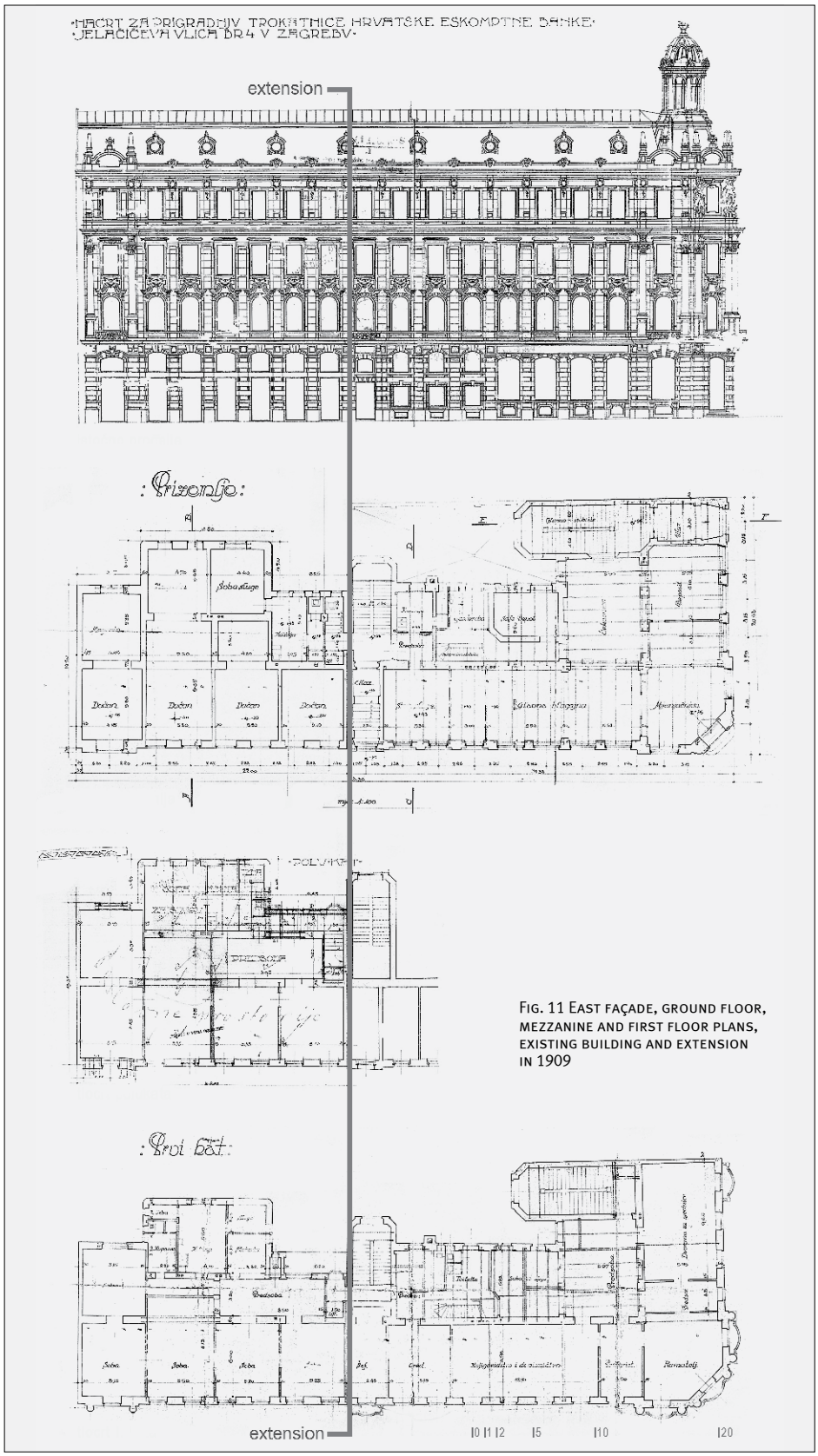


Fig. 11 East façade, ground floor, mezzanine and first floor plans, existing building and extension in 1909

34 Since its foundation in 1905, the construction company "Benedik & Baranyai, Architect and Builder" had designed a number of residential and residential-commercial buildings, and just before this project, the company was commissioned by another monetary institution, the Croatian Real Estate Bank, for which they built four residential buildings in Zagreb: at 32 Mihanoviceva / 61-63 Gunduliceva Streets in 1908-1909 and at 24 Hatzova Street in 1909. Somewhat later, in 1912-1914, they built the corner building at 4 Jurišićeva / 1 Petrinjska Streets, which housed a branch of the Serbian Bank. Moreover, directly prior to this they constructed the Hirśl residential and commercial building according to a project by Aladar Baranyai, from 1906 to 1907. It was located on the corner of 4 Petriceva and Bogoviceva Streets, and would also define the fourth corner of the block upon which the Croatian Escompte Bank was located. (Galjer, 1999: 113; plans in HR-DAZG, unsigned)

35 Fellner and Helmer were engaged in intensive building activities in Croatia in the 1890s (Bagaric, 2011: 12). A decade later, however, in 1909, they simultaneously worked on designs for four city theatres: in Baden, Klagenfurt, Těšín (Cieszyn) and Mlada Boleslav (*** 2001).

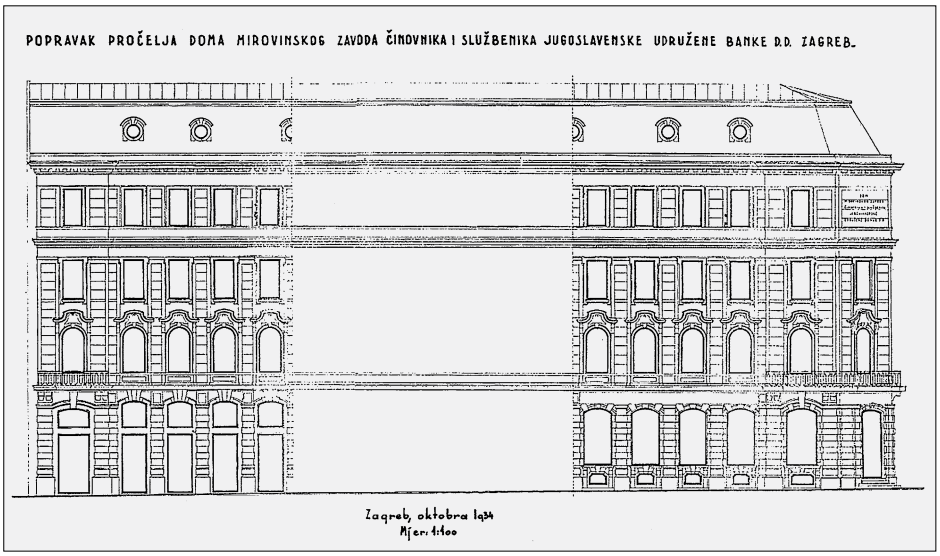


Fig. 12 Renovation of the façade in 1934

is also true that there was already a significant number of renowned local architects working in Zagreb in the period.

In 1909, Benedik and Baranyai finished the designs and carried out the extension of the bank building, relying on Fellner and Helmer's original design (Fig. 11). They more or less copied the spatial structure of the building, as well as the design of the façade. At the very edge of their extension, they copied the details from the corner avant-corps of the bank, with the balcony and half-columns rising through the first and second floors.

The extension utilises the existing staircase and the entrance on Petrićeva Street, though a lift and an internal staircase are added to the new mezzanine. The ground floor of the annex receives street-facing shops and storage facilities facing the courtyard, which introduces yet another new service and enhances the diversity of the building's functional structure. Keeping the same floor design principle along the entire length of the building, the architects use a mezzanine with windows in the extended section, although they give it a commercial purpose. The first, second and third floors contain apartments for rent, with one five-room apartment on each floor.

On the whole, Benedik and Baranyai's careful and clever addition did nothing to jeopardize the original appearance and integrity of the bank building. On the contrary, the new wing allowed the building's urban presence to come to the fore even more strongly.

• **Subsequent changes and occupants, and the 1934 façade renovation** – The Croatian Escompte Bank building later underwent a series of changes. The first intervention, in 1920, was made to the original part of the building. The development of the bank led to the need for an expansion of the treasury. The bank vault, which had originally been situated only on the ground floor, was expanded in 1920, according to the engineer Vladimir Balley's designs, into the basement space through an additional internal staircase that led from the ground-floor vault to the basement. The perimeter of the vault space was reinforced with a number of steel rods that form an impenetrable casing.

As has been mentioned earlier in the text, in 1928, the Croatian Escompte Bank merged with the Croatian-Slavonian National Mortgage Bank to form the Yugoslav United Bank Plc. The present-day façade owes its appearance to the architect Hugo Ehrlich, who redesigned it in 1934[36] (Fig. 12). The building was then used as the seat of the Pension Committee of Clerks and Officials of the Yugoslav United Bank Plc.

The second and third-floor façades were greatly simplified, and the Corinthian half-columns on the avant-corps were removed. The three separate corner balconies were merged into one. Other elements removed from the façade include the sculptures and obelisks from atop the two central half-columns, the lantern-topped tower and the urn-topped dome. The roof design underwent significant changes as well, while retaining its mansard form.

The last documented interventions were carried out in 1942, when the new occupant, the Croatian United Bank Plc., commissioned the engineer Veljko Petaj to design interventions for the attics of the buildings at 2 and 4 Petrićeva Street, according to which the attics were converted from service and storage spaces into residential ones.

Shortly after the Second World War, in 1947, the Statistics Institute of the People's Republic of Croatia, the present Central Bureau of Statistics, moved into the building, and it has remained there to this day. The largest part of the building was used by the institute, while the apartments on the upper floor of the extension in Petrićeva Street remained residential. Due to the new occupant's needs,

36 HR-HDA, Fond 535, box 101. Given that in 1931 Hugo Ehrlich had, immediately prior to this intervention, created a new building in Belgrade for the same client, he was the logical choice for the façade purification and redesign of the interior of the cashier's hall in Zagreb. Admittedly, the plans kept in the Croatian State Archives for the façade renovation are signed only by Adolf and Ernest Ehrlich, the architect's brothers. However, a significant number of plans for the adaptation of the Escompte Bank, which had by this point become the Yugoslav United Bank, were signed by Hugo Ehrlich himself. They are kept in the Croatian Academy of Sciences and Arts, in the Cabinet for Architecture and Urban Planning's 'Planoteka'.

the stairs leading to the exchange office were removed and the corner entrance closed, so today, it is a window designed to appear identical to the others. The same thing happened on the third floor, where a previous inscription was replaced by a matching window. On the first floor, the Central Bureau of Statistics was connected to the adjacent building at 5 Ilica Street. All of these changes have led to the preservation of the building's urban significance, but also to a noticeable decrease in its potential as a city corner building, and in the overall impression it conveys (Fig. 13). Or, as Đurđica Cvitanović argues in her text on monumental Historicism in Zagreb's urban planning, "The corner of this public palace, with its Baroque crowning feature, was shamefully destroyed, despite the fact that it was precisely this particular detail that inspired other Zagreb architects – many of whom studied under Fellner and Helmer – to design the corner zones in similar ways, giving Zagreb its unique stamp, much alike other European cities at that time." (Cvitanović, 1978: 144)

Fig. 13 The façade in 1912 and the present appearance of the building originally built for the Croatian Escompte Bank

Conclusion

As the previous sections show, the Croatian Escompte Bank building successfully confirmed and fortified the essential features of the new monetary institution building typology in Zagreb. With their skilful design, its creators, Fellner and Helmer, managed to inventively combine different facilities – public, business, service and residential – which were spatially intertwined and integrated within the structure, and which were later further expanded by the addition of commercial spaces. This was a prominent feature of this type of building, which would, in other examples, be still further elaborated and complemented by catering and entertainment facilities, allowing for harmonious and productive coexistence thanks to ingenious architectural designs.

Another quality of the Croatian Escompte Bank, which was an important feature of the new building typology, was its striking appearance and remarkable architecture. This was achieved by the targeted selection and expert use of an elaborate Neo-Baroque vocabulary seasoned with novel and attractive elements of Art Nouveau. The importance and significance of the bank as a new important financial institution was thereby visually communicated and formally emphasised, with suggestive signals that pointed to its business success, social reputation, stability and security.

Particularly important in this regard was the urban position of the Croatian Escompte Bank as a prominent corner building, easily visible from the main city square, with an inviting diagonally placed entrance. In other words, the building underlined the potential of the corner as a presentable location, and established a productive model for designing corner buildings in general. This three-storey corner structure helped to form the new Baron Jelačić Street (the present Petrićeva Street) and, together with the neighbouring building belonging to the First Croatian Savings Bank (5 Ilica Street), defined the entire city block, playing an important role in shaping that part of the city centre.

This prominent architectural and town-building role of the new type of monetary institutions was repeated and acknowledged in numerous later projects. Whether it defined an entire new city block (as the First Croatian Savings Bank did with its passage running through the building); or the beginning of a street as with Hugo Ehrlich's Slavic Bank in Vlaška Street (1921-1923); or the appearance of Ban Jelačić Square as Ignjat Fischer's City Savings Bank did (1923-1931), the position of new monetary institutions within the city fabric was frequently such that it strongly marked and shaped the city's main arteries, squares and urban development in general.

In this context, the Croatian Escompte Bank building was a successful and convincing model that heralded the further development of this building type in Croatia, in the whole scale of its architectural and urban potential and significance.

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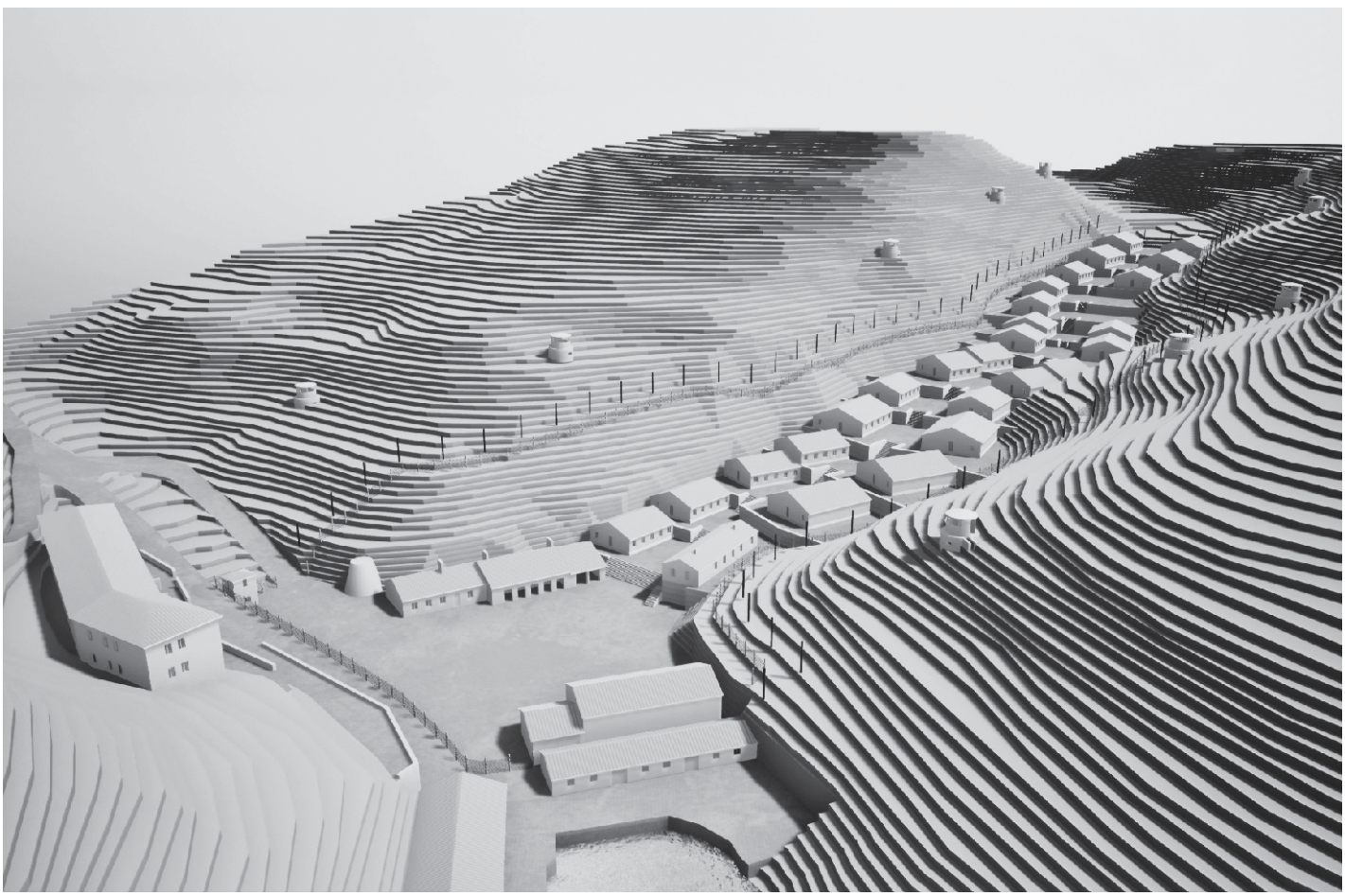
Fig. 1 Reconstruction of the reliefs and appearance of the "Velika žica" prison camp



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Anthropogenic Elements of the Cultural Landscape of the Island Goli Otok in Croatia

ANTHROPOGENIC ELEMENTS
CULTURAL LANDSCAPE
INFRASTRUCTURE SYSTEM
ISLAND GOLI OTOK, CROATIA
PRISON CAMP

The island Goli otok (north Adriatic, Croatia) cultural landscape is a complex system of interactions between people and nature, which has arisen through the anthropogenic use of this unique natural space with the aim of implementing ideas of the ideological re-education of political prisoners between 1949 and 1956, and the punishment of criminals and some political prisoners between 1956 and 1988. The most significant elements of the cultural landscape of the island are comprised of the anthropogenic structures of the political prison camp which deliberately used the natural features of the landscape in such a way as to enable methods of coercion of prisoners, which finally resulted in the unique identity of the space as a unit.

INTRODUCTION

This article is a synthesis of research on the genesis and characteristics of the anthropogenic structures of the Croatian island Goli otok in north Adriatic based on the methodological procedure of collecting, classifying and systematizing available source data – archives from the Croatian State Archives[1], aerial photogrammetric material[2], written and pictorial material[3], testimonies of former political prisoners[4] and geodetic and architectural measurements of preserved historic buildings[5], which has been carried out in order to define the basic criteria for evaluation and categorization, and the establishment of theoretical models of protection, use and/or presentation of the cultural landscape of Goli otok. The sudden construction of the anthropogenic structures of Goli otok was preceded by a turning point in the history of the former Yugoslavia (1945-1991) – the severance of ideological, political, economic, military and other relations with the USSR (*Union of Soviet Socialist Republics*) and the expulsion of Yugoslavia from the "Informbiro".[6] That same organisation on 28 June 1948 issued a Cominform Resolution with a series of charges accusing Yugoslavia of various deviations from Communist theory and practice, and finally calling on the members of the Communist Party of Yugoslavia to expel Tito. As it did not succeed in this, the USSR turned to ideological, political and economic pressure on Yugoslavia along with the constant threat of military invasion.

In that atmosphere Yugoslavia resisted Soviet pressure in a variety of ways and focused in particular on the so-called "IBs" ("Informbiros"), that is, actual or alleged supporters of the Cominform Resolution in Yugoslavia, mainly members of the Communist Party of Yugoslavia. In the period between 1948 and 1956, arrests of "IBs" reached the scale of a purge with 15,737 people arrested and imprisoned (Previšić, 2013: 173-193). The IBs were a heterogeneous group of supporters of the Cominform Resolution, sympathisers of Stalin, critics of the system and economic measures, and so on. When the Yugoslav Communist Party leadership realised that the conflict was going to intensify and would not end soon, a decision was made to create a place where the arrested IBs would be interned, and so in July 1949 a prison camp was opened on Goli otok, a small island in the north Adriatic which was part of the prison camp and prison system for the internment of IBs from 1949 to 1956. Three quarters of the arrested and sentenced IBs passed through this prison camp, and for this reason it deserves particular attention in research. Towards the end of 1956, the camp was restructured into a prison for criminals and certain political prisoners and was in service until 1988.

After 1992, when the guards left the island, there was a period of devastation of the landscape and anthropogenic structures, so today the island has abandoned (and partly damaged) buildings of political camps and prisons, neglected forested areas, quarries and components of the water and electricity supply infrastructure that are no longer in operation (water tanks, electric power substations, etc.). However, there are some active tourist facilities (a restaurant, an improvised cinema, a souvenir shop and a motor train for tourist tours of the island). The untouched natural landscape is spontaneously used for grazing sheep by the inhabitants of the nearby island of Lopar.

Considering that there are still functional docks in Tatinja bay and Melna bay, as well as a preserved camp road infrastructure, in the warmer part of the year, from mid-May to mid-October, a relatively large number of excursion tourists constantly arrives on the island, by tourist boat or by their own mode of transport for a tour of the island and the abandoned camp and prison structures. Visitors most often come from the nearby island Rab, but also from Krk and places on the mainland that have already developed accommodation and other tourist facilities.

In the former Yugoslavia the existence of a political prison camp (and the harsh conditions in it) were for a long time an open

secret, or taboo subject which gradually began to be considered publicly after Tito's death (1980), at first in cultural productions and later in memoirs and films of various credibility and documentary value, and were only methodologically researched in 2014 in the field of the humanities.[7] However, despite the island's landscape, as a creation of nature and of man, containing parts of an architectural complex of a political camp (and prison) strongly connected to a traumatic historical event of human suffering, the subject remained unexplored in the field of technical science – architecture and urbanism.

In such circumstances, without a complete inventory and evaluation of the architectural, urban and historical memorial elements of the landscape, a Spatial Plan of the Municipality of Lopar which allows for a new tourist zone with hotels, resorts and camps, accompanying harbours, beaches and recreation areas, was drafted in 2011. The tourist zone is planned on an area of 46 hectares, which largely overlaps with the area of the historic architectural complex (*** 2011).

THE CULTURAL LANDSCAPE

Humans have built the anthropogenic structures of political prison camps and prisons and created new systems for utilizing space on the natural foundation of the barren island Goli otok. In that way, through the dynamic interaction of nature and humans a unique, multi-layered cultural landscape was created in the wider environs, with a special diversity which has changed over time and adapted to human needs in keeping with the social and political circumstances. In this multi-layered landscape we can identify and classify the following interrelated and overlapping layers:

1. the political prison camp, connected to the historical event of the political conflict between Yugoslavia and Cominform and the use of violent methods of ideological re-education of political prisoners;

2. the prisons, connected to the historical event of the introduction of more modern and advanced methods for the resocialisation of criminal prisoners;

3. industry, connected to the complex of factories in the political prison camp and the prison (the political prison camp and the prison developed manufacturing facilities for the processing of stone, wood and metals and for the production of terracotta tiles, as well as exploiting the stone and wood on Goli otok and in the Velebit Mountains);

4. fortifications, connected to the political event of Cold War politics between the Eastern and Western Bloc and the phenomenon of political prison camps;

5. the potential archaeological layer, related to potential archaeological localities of the political prison camp (potential archaeological localities on Goli otok are archaeologically unexplored areas on the site of the first "Stara žica" *("Old wire")* prison camp, the fourth "Petrova rupa" *("Peter's hole")* prison camp and the prison graveyard).

6. the island and coastal landscape, related to the natural characteristics of Goli otok as one of the most northerly and windiest chalk islands in the Mediterranean.

The cultural landscape is researched through an analysis and evaluation of individual components of the landscape (natural, anthropological, environmental, sensory and others), but in keeping with contemporary theory, the cultural landscape should be studied as a complex and holistic spatial system in which individual components of the landscape are connected through powerful mutual influences (Dumbović Bilušić, 2012). In the example of Goli otok as an integral and multi-layered cultural landscape, the interrelations and mutual influences between the individual components can be clearly enumerated. The interactions of people and the natural environment arose with the sudden and intense biological presence of humans caused by a historical event in 1949, when on an island with significant natural characteristics first of all a political prison camp was built, and then, following the changed political circumstances in 1956, also a prison. The anthropogenic built structures influenced the environmental character (physiognomical and morphological) of the island, and with the passage of time became related to the sensory and other components of the locality which eventually contributed to the perception of Goli otok as a unique cultural landscape and a significant place of remembrance woven into the identity of the collective memory.

THE FACTORS OF THE IDENTITY OF THE GOLI OTOK CULTURAL LANDSCAPE

The natural features of the island, comprised of its relief, climate, geology, pedology, hydrology, vegetation and habitats, are an important factor in the integrated system of the identity of the cultural landscape of the island.

NATURAL FEATURES OF THE ISLAND

– Relief – The island Goli otok (227 m above sea level), with an area of 4.54 km^2 and a triangle-shaped coastline with a total length of 14.3 km (Duplančić Leder et al., 2004: 13) has a unique chalk relief of soluble rocks with in-

1 The Croatian State Archives keeps the documents of the fund 1560 Department / Service for Execution of Criminal and Misdemeanor Sanctions of the Republic Secretariat for Justice and Administration of the Socialist Republic of Croatia with the entire material of Rab – Goli otok Prison, consisting of, among other things, archival technical documentation (maps, plans, projects and drawings for the construction and reconstruction of prison buildings mostly dated from the late 1960s to the mid-1980s).

2 The aerial photogrammetric material of Goli otok, made until 1968, represents the basis for the analysis of individual buildings and areas of the original political camp (first, second and third camps "Stara žica", "Velika žica" and "Ženski logor", afforested areas, etc.).

3 Written and pictorial material contains descriptions, sketches and photographs of the political camp from various sources and private collections (books, letters, drawings, models, etc.).

4 The testimonies of former political prisoners Vladimir Bobinac, Vinko Bogdešic, Radovan Hrast, Alfred Pal, Ivan Ružić, Ante Zemljar and prisoner Beatrix Fixmann were collected using the *oral history* method.

5 Geodetic and architectural measurements of preserved buildings were undertaken by Vladi Bralic, Borko Zugan, Emil Jurcan, Arsen Čupev and Marko Nekic-Kamnikar on several occasions during 2009 on the area of the political camps "Stara žica", "Velika žica" and "Ženski kamp".

6 The "Informbiro" was the head organization of the communist parties of the "socialist camp" alongside two Western European ones (France and Italy), founded by the USSR in 1947 in order to consolidate countries under its influence (Eastern Europe / socialist camp) as post-war Europe was slowly gripped by the Cold War. The seat of this coordinating body was in Belgrade.

7 Although the subject of Goli otok has been dealt with in the field of the humanities before (in various general historical reviews and, for example, Ivo Banac's book *With Stalin against Tito: Informbureau splits,* from 1990), a detailed historical synthesis of the political camp on Goli otok was made in the doctoral dissertation of Martin Previšić (2014).

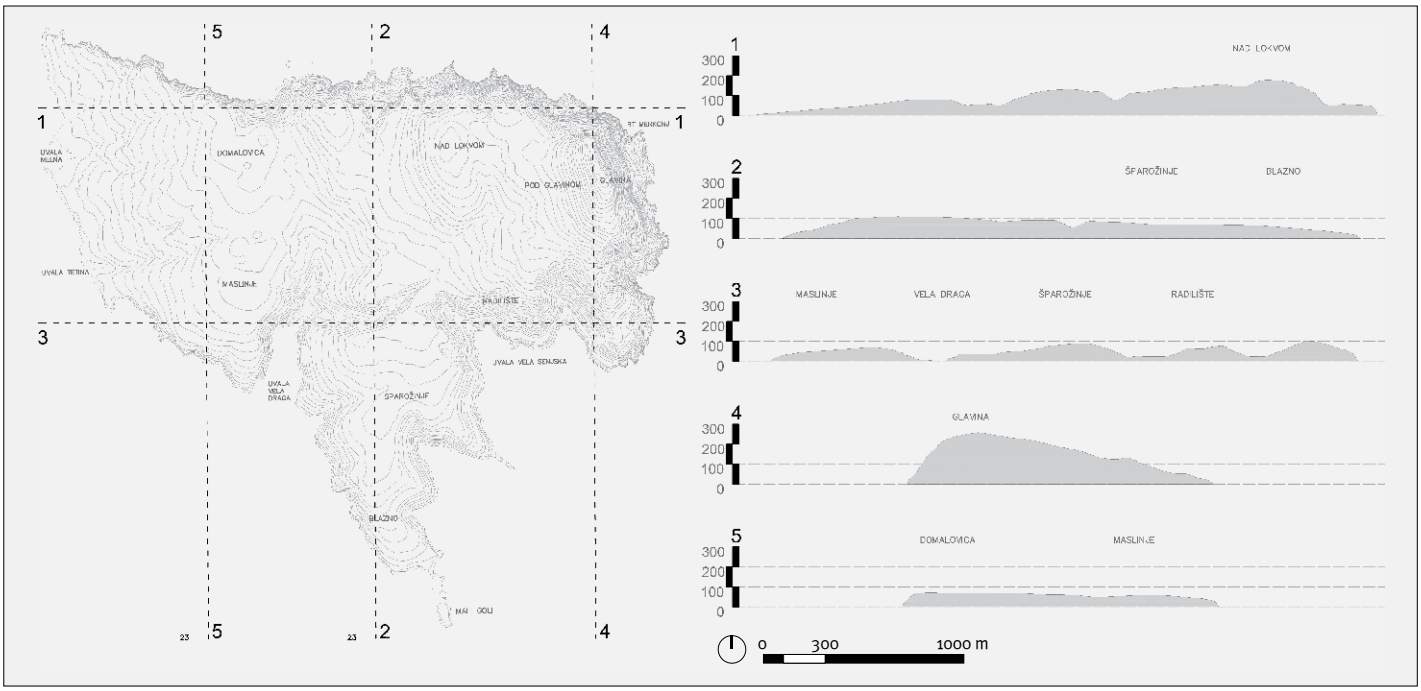


FIG. 2 GOLI OTOK, RELIEF

dented forms. The southern and south western coastline is gently shelving, highly indented and accessible from the sea, unlike the completely inaccessible and barren northern and eastern coastlines which are made up of a series of very steep cliff-faces around 4 km long and up to 220 m high. The sea directly in contact with the shoreline is moderately shallow and does not exceed a depth of 30 m, but along the eastern coastline there are very steep ravine-filled seabeds with a maximum depth of 102 m. The great majority of the island is dominated by rugged karst with typical karst plateaus (Domalovica), bays (Melna, Tatinja, Vela draga, Mala draga, Vela Senjska and Mala Senjska) and limestone pavements and sinkholes (Nad lokvom, Blazno). On the steep island slopes, the beds of ephemeral streams can be found, cut into the limestone mass through long-term erosion by intermittent copious flows of surface water (precipitation), as well as chemical erosion (above Tatinja, Vela draga, Mala Senjska and Vela Senjska coves) and rock creep (above Vela Senjska cove and the northern and eastern coasts) formed by the detachment and rolling of sections of rock faces (Fig. 2).

– Climate – The climate of the island is classified according to Köppen's scale as a moderately warm rainy Cfs's'a climate with hot summers without exceptionally dry periods. There is least rainfall in summer and most in winter (Seletković et al., 2011: 142-161). However, the climate of Goli otok has certain local peculiarities arising from the exposure of the stone mass of the island to heating during the summer and powerful gusts from the *bora* wind during the winter. In the summer months it is warm from the morning hours due to the almost direct exposure of the barren island to the sun's rays. On average it is warm throughout the whole summer, but in the middle of July, and in the first half of August it is very hot in the afternoons, so that during that part of the year the temperature frequently rises above 34 °C. In the winter months there are frequent and unexpected periods of storm-force cold *bora* winds which reach up to 150 km/h, when it is very cold on the island with temperatures falling to -8 °C. During harsher winters the northern and eastern coastlines of the island (as well as of nearby Prvić), unlike the other Adriatic islands, freeze, with layers of ice up to 1 m high.

– Geology – The island is a component of the Adriatic-Dinaric carbonate layers, probably created through tectonic folding following the sinking of the Dinaric lithospheric plate (the Velebit part) under the Adriatic lithospheric plate (the island part). Earlier geological explorations of Goli otok have confirmed that the island is mainly built from ru-

8 The classification number of the Ecological Network of the Republic of Croatia is HR3000022 (the sea surrounding the islands Sveti Grgur and Goli otok), while the protected habitats are the reefs, a rocky seabed from the supralittoral to the circalittoral zone, association with the species *Fucus virsoides* (a species of brown algae endemic to the Adriatic Sea).

9 Wood for the production facilities of Goli otok was obtained in the nearby Velebit Mountains.

dite limestone (Korolija, Borović, 1966), but new explorations on site (Krasnić, 2011) prove that there are various carbonite cliffs and breccia on the island as well as a variety of geological points of interest which are of significance for the composition and shape of the island and the source and nature of the processes which shaped the contemporary geological state of the island.

– Pedology – Detailed pedological information for the island has still not been obtained, but according to the Pedological Map of the Republic of Croatia (M 1:300 000) the island is mapped as Undeveloped ground (First class), type Karst terrain (Lithosol) with a percentage of chernozem, dolomitic limestone, rendzina and brown earth on limestone and *terra rossa*. The map also contains information on the suitability of the soil for agricultural cultivation, and on the basis of this data the greater part of the island, as a result of its steep and rocky nature, is classified as permanently unsuitable for cultivation, with only a small part, where changes to the karst terrain were made by humans importing fertile soil, classified as forest land.

– Hydrology – The limestone geological structure influences the hydrological characteristics of the island so that the island has no water at all, there are no permanent surface watercourses despite the moderately high level of precipitation (water from precipitation forms torrents or filters through the limestone bedrock towards the sea. The exception is an area of brackish lagoons exposed to strong salt-laden winds on the Domalovica plateau at an altitude of 140 m above sea level).

– Vegetation and habitats – The basic characteristic of the vegetation of Goli otok, which, after Prvić, is one of the saltiest islands in the Adriatic and the Mediterranean Sea, significantly describes the toponym of an island of Croatian origin in the shape of a descriptive (qualitative) adjective which expresses the natural characteristic of an island recognised in the wider area for its barren karst and scant Aeolian vegetation, since the greater part of the island is formed by bare hillsides with scant karst terrain and dry meadows. Contrary to first impressions of the paucity of the vegetation, scientific exploration to date bears witness to the fact that the flora of the island is moderately rich and diverse and comprises a total of 308 wild species and a number of endemic island species, while the island fauna is equally interesting (Lovrić et al., 1998: 109-122). The waters surrounding Goli otok (and Sveti Grgur) are part of the protected Ecological Network of the Republic of Croatia[8] and here highly diverse and well-preserved seabed communities and schools of fish have been documented (Zavodnik et al., 2005: 33-38).

It is necessary to emphasize the importance of the natural features of the island for a better understanding of the spatial and administrative organization of the political camp. For example, it is interesting to note that the security features of the strictly guarded political camp on isolated Goli otok were further enhanced by its particular relief, a prominent massif and inaccessible rocky hill that provide natural protection for much of the island to the north and east. The characteristics of the karst and sea landscape of the island with their unique type of Mediterranean relief (karst, desolate geological rock formations, complete lack of water, sparse Aeolian vegetation) and unique climate (exposure of the bare rocky mass of the island to insolation in summer and the *bora* wind in winter) which provided the conditions for various methods of ideological re-education, compelling prisoners to undertake hard physical labour on bare rock with cruel practices such as thirst torture, enduring harsh summer and winter climatic conditions.

Also, from the economic aspect, the natural features of the island met the conditions for the logical construction of the camp, and later the establishment of independent production facilities that would facilitate its sustainable development. There was an abundance of natural stone on the island, so it was possible to plan quarries for building materials for the construction of the camp, and then to organize production plants alongside it for processing stone and wood.[9]

Important factors in the integrated system of the identity of the cultural landscape are the environmental factors (measures, proportions, dominant aspects of the landscape, views etc.), sensory factors (perceptions of the landscape and of historical events, artistic expression), formal factors, legal and administrative factors, and other factors arising under the influence of anthropogenic (cultural) factors.

Anthropogenic factors and elements of the landscape

– **Political camps and prisons** – The anthropogenic remains of the political camp (1949-1956) are the most significant characteristics of the spatial identity of the cultural landscape of Goli otok. Suddenly and out of the blue, in 1949 anthropogenic structures were built for precisely determined complex social relations within the prison camp community and within just seven years the untouched natural landscape of the island was trans-

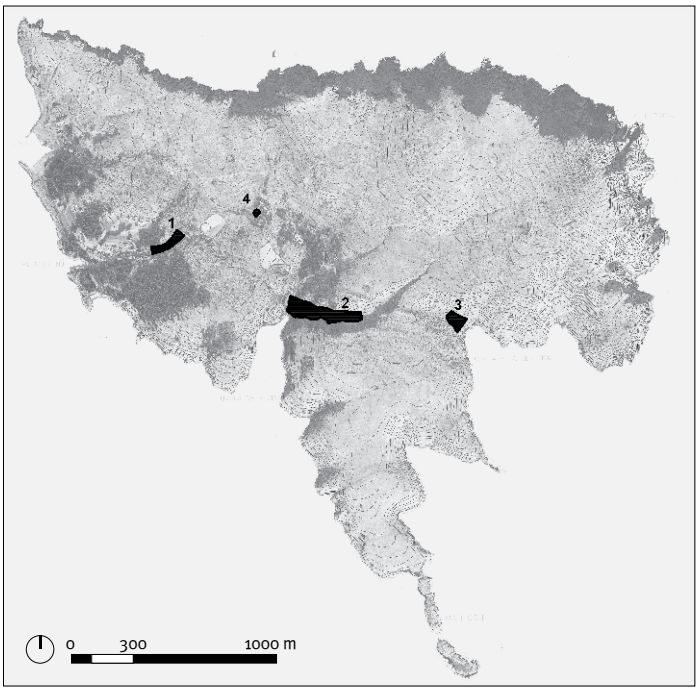


FIG. 3 TOPOLOGICAL POSITION OF THE PRISON CAMPS ON AN ORTHOMAP OF GOLI OTOK: 1 - THE FIRST CAMP, "STARA ŽICA"; 2 - THE SECOND CAMP, "VELIKA ŽICA"; 3 - THE THIRD CAMP, "ŽENSKI LOGOR"; 4 – THE FOURTH CAMP, "PETROVA RUPA" (FIRST SITE)

formed into a strictly purpose-built prison camp hidden from public view.

During the construction of the prison camp, the aim, in a planning sense, was the organisation of an almost ideal military camp, a quickly constructed artificial town which could be continually, flexibly adapted and reshaped to meet real needs, but also successfully monitored with the aim of implementing the *ideological re-education of the prisoners*. Using urban planning principles, which had long been in use in European urban planning to build working class neighbourhoods or institutional military, prison, educational or hospital complexes (Foucault, 1994: 177), four spatially separate prison camps were built on the island together with urban planning, institutional and administrative zoning, in other words clear spatial and territorial segregation of the inmates and interrogators.

The units for the accommodation of the prisoners were always grouped closely together and spatially and physically completely separated by barbed wire or high walls, while the units and buildings for the work and accommodation of the prison camp administration were as a rule sited in better positions with aesthetically arranged, sometimes even spacious surroundings and views over the land and sea, probably for sanitary and hygienic reasons as well as security and power, but also to enable a distanced view of the inmates so as to be able to establish and monitor within their fenced-off space a system of *apparent prisoner self-management*. In that sense the spatial arrangement of the prison camp was the functional, designed and executed expression of the ideology that gave rise to it.

From the spatial aspect the unique topography of each individual prison camp is interesting, bearing in mind that the usual arrangement of a military camp with a layout set in advance had to be modified in accordance with the real geomorphological environment of this karst island. The first prison camp, "Stara žica" *("Old wire"),* the second, "Velika žica" *("Big wire"),* and the third, "Ženski logor" (the *"Women's Camp*"), were sited above the Tatinja, Vela draga and Vela Senjska coves, amidst the bare stone morphology of the island and in particular in rocky valleys in between the island's ridges formed by the erosion of the karst landscape by ephemeral streams in a long-term geomorphological process of influence of precipitation on the rocky mass of the island.

It is well known that valleys, elongated depression in the Earth's crust, have always been, and still are today, a powerful geographical framework of the beginning and the development of the life of numerous rural and urban agglomerations. On Goli otok the sunken riverbed which forms a valley in the direction of the runoff of the rainfall is almost always completely dry, but unlike the rocky ridges has a covering of sparse vegetation. The riverbed is well defined in its upper and middle reaches, while towards the sea it loses its definition and broadens out into a cove. We can imagine that the topological position of the prison camp in the karst valley was selected for a number of well thought through reasons. From the aspect of camp security, the valley could easily be encircled by barbed wire and monitored by guards from elevated positions.

Moreover, although on Goli otok they are sited on significant slopes, they are still significantly more suitable for the erection of prison camp buildings than the surrounding rocky ridges, especially as they end in coves which are the most suitable spaces for access from the sea by boats and are connected with the inhabited parts of the mainland and the neighbouring islands. Conversely, the fourth of Goli otok's prison camps, "Petrova rupa" *("Peter's hole"),* was sited in the island's interior. However, that completely isolated prison camp shows even greater topological originality of its kind due to the fact that it

10 On Goli otok, prisoners used, in addition to standard and colloquial language, separate Goli otok jargon to ease communication. In the text that follows numerous lexemes of Goli otok jargon will be used which will be enclosed in inverted commas.

was hidden within a large abandoned quarry, conical in shape, which was created by human influence on the rocky mass of the island in the period between the First and Second World Wars when quarrying took place on the island in search of deposits of bauxite.

Apart from the unique topological site and the spatial arrangement of the prison camp (Fig. 3), the well-preserved camp buildings, mainly constructed from authentic Goli otok stone from the camp's quarries, a dense, sturdy and almost crystalline limestone in which individual grains of calcite can be seen by the naked eye, also possess a certain uniqueness and rarity of their kind.

Within the space for the accommodation of prisoners which was encircled by barbed wire, the first, the second and the third camps which the inmates called "Stara žica" (or "Mala žica"), "Velika žica" (or "Žica") and "Ženski logor" (or "Radilište R-5", *"Work area* R-5")[10], were sited in natural depressions pointing towards the shoreline occupying areas of 5,367 m², 21,600 m² and 4,900 m². The buildings for the accommodation of inmates, which held some 115 to 200 prisoners in very cramped conditions, were always sited on terraced, artificially constructed flat areas which followed the natural slopes of the valleys. The fourth camp, sited inside a quarried depression in the island's interior, which was called "Petrova rupa" by the inmates (or "Radilište 101" or "Manastir" */"the Monastery"/)* occupied a significantly smaller area of 700 m². The inmates were incarcerated here in a building sited at the bottom of the depression.

Inside what it is surmised to have been the fenced-off area of the first prison camp, "Stara žica" (1949-1950), there no longer exist any traces of prison camp buildings, but according to historical sources in the beginning that prison camp comprised 10 wooden barracks for the accommodation of inmates (as well as a kitchen and latrine block). With the arrival of new inmates the capacity was increased until there were finally 15 barracks erected (as well as a hospital building, a clinic and a laundry), but all of these buildings were dismantled in 1950 after the prisoners were moved to the second camp, "Velika žica". However, outside the fenced-off area, towards the sea and Tatinja cove as well as towards the island interior, there remain *in situ* preserved original prison camp structures which also belonged to this functional unit: the brick camp administration buildings (the buildings "Kamena", "Hotel", "Kuglana" */"Bowling Alley"/* and "Ljetni restoran" */"Summer Restaurant"/),* the first jetty, a quarry and manufacturing facilities, the first roads, paths and supporting walls, a sizeable cistern for the collection of rainwater and the first forested areas (Figs. 1, 4).

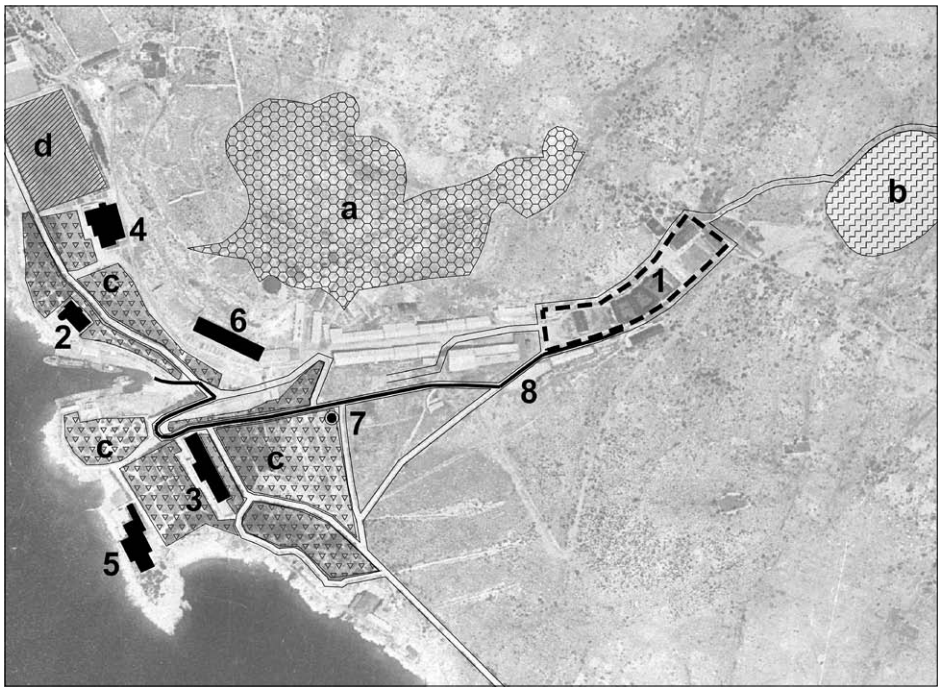


Fig. 4 Aerial photo of Tatinja Cove from 1968 marked with the plan of the contours of the fenced-off area of the first prison camp, "Stara Žica", and the preserved prison camp structures outside the fenced-off area: 1 - the fenced-off area of the "Stara žica" camp; 2 - the "Kamena" administrative quarters; 3 - the "Hotel" administrative quarters; 4 - the "Kuglana" administrative quarters; 5 - the "Ljetni restoran" administrative quarters; 6 - manufacturing facility; 7 - bunker; 8 - main prison camp road ("Bloody way"); a - quarry; b - water cistern; c - forested area; d - football pitch for administrative staff

Within the fenced-off area of the second camp, "Velika žica" (1950-1956), following a terraced, levelled rocky foundation with a significant longitudinal and lateral slope, initially 18 brick prison pavilions were erected (as well as two additional pavilions for the hospital and the "Centar" pavilion for privileged inmates), and then on the raised part of the camp six more prison pavilions. Around the prison camp "Square", a levelled space for the inmates' drills, there were further erected a kitchen block, a bakery and, a peculiarity – a theatre building. Although the later prison dismantled the prison camp buildings and built replacement buildings for a more contemporary prison complex, on the site of the first camp the ruins of around 39 original prison camp structures have been found which enables an almost perfect reconstruction of the form and appearance of that camp.

In the third prison camp, "Ženski logor" (1951-1952), which is more difficult to access from the island interior over the difficult karst terrain, there were four wooden barracks erected which were dismantled following the abandonment of the camp. However, on the space which had been occupied by the camp the administrative building, the warehouse, the shoreline water cisterns, the jetty and other objects have been preserved.

In the fourth prison camp, "Petrova rupa" (1950-1954), hidden in the island's interior at the bottom of an abandoned bauxite quarry,

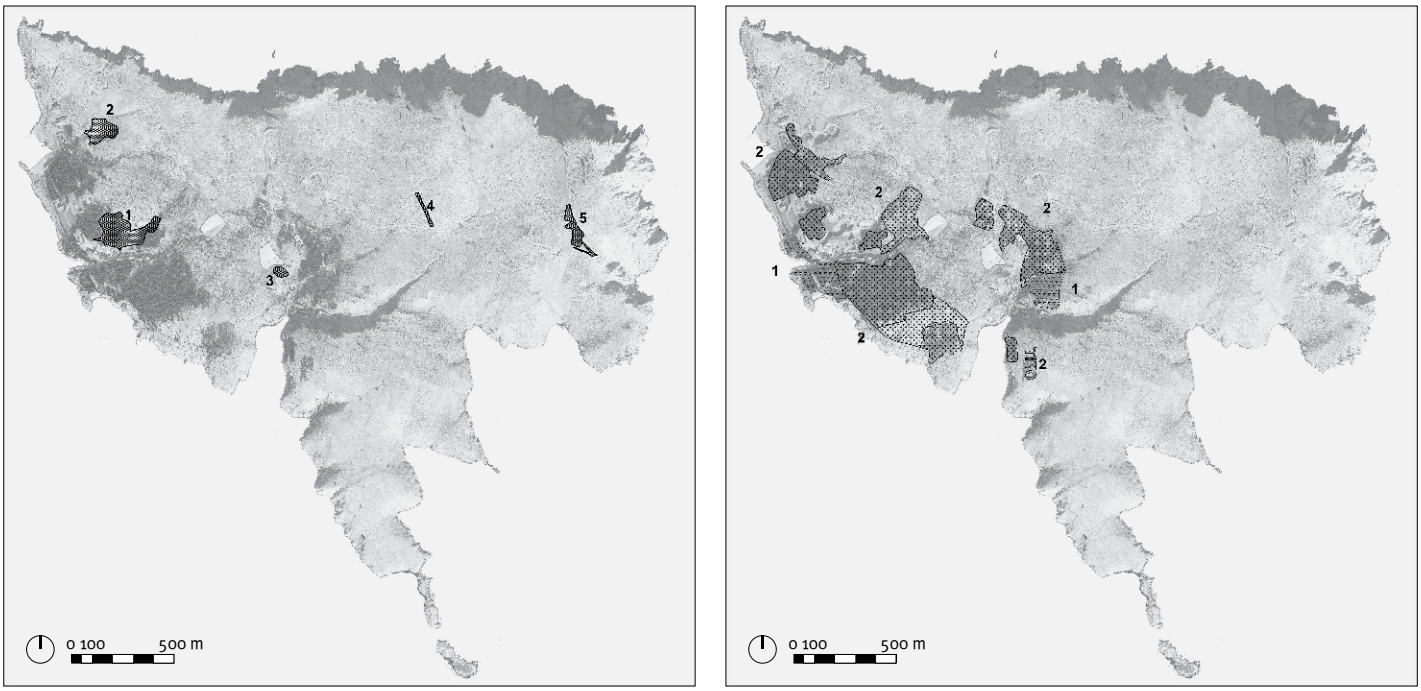


FIG. 5 SPATIAL ARRANGEMENT OF THE QUARRIES ON GOLI OTOK: 1 - FIRST QUARRY; 2 - SECOND QUARRY; 3 - THIRD QUARRY; 4 - FOURTH QUARRY; 5 - FIFTH QUARRY

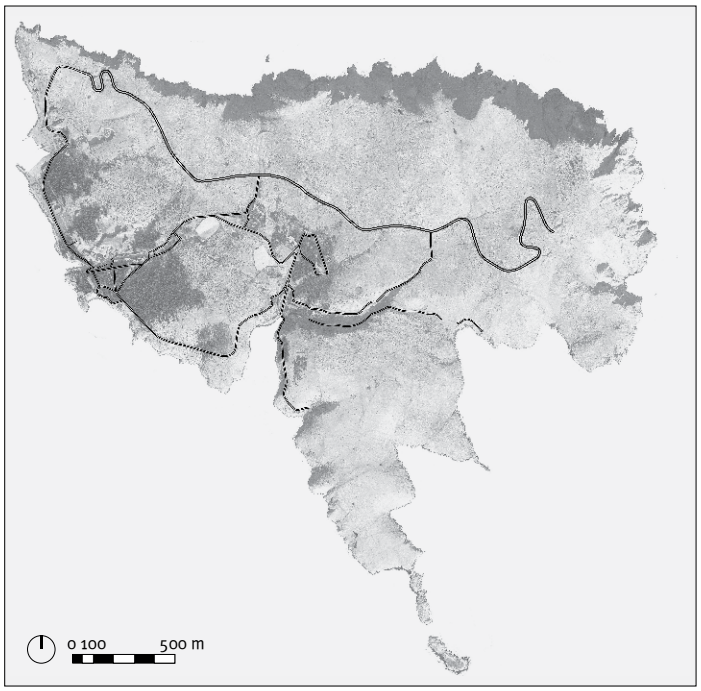
FIG. 6 FORESTED AREAS ON GOLI OTOK: 1 - FORESTED AREAS DURING THE TIME OF THE POLITICAL PRISON CAMP; 2 - FORESTED AREAS DURING THE TIME OF THE PRISON

a wooden barrack for the accommodation of prisoners was erected, alongside a kitchen block. Material traces of this camp are no longer visible *in situ*. One can imagine that the depression where the camp was sited after its removal to another location (and plot of land) in the summer of 1951 was filled in to approximately two thirds of its original depth, and during the period of the later prison was again remodelled into a relaxed sports pitch with stone stands. The prison camp is a rarity of its kind as we have no knowledge of examples in with prison camp inmates were incarcerated under ground level in abandoned quarries unsuitable for the accommodation of humans.

The prison which was established later (1956-1988) mainly used buildings and land inherited from the disused prison camp, but new development programmes for the continuation of manufacturing and agricultural activities, as well as new programmes for the resocialisation of criminals (organising their work, education, healthcare, free time and more) resulted in the removal of individual structures which were to be found there and the construction and equipment of new buildings and spaces. The first stage of development in the construction of the prison can be followed from 1957 (officially from 1953) to 1967, when the institution acted under the authority of the union, and the final phase from 1968 to 1988 when it acted under the authority of the then Republic of Yugoslavia. From the first phase we have inherited the ruins of a manufacturing and processing complex erected near the quarry close to the factory street, for which reason the area above Tatinja cove has taken on the appearance of an abandoned industrial complex, and in the second period changes following larger construction interventions on the site of the abandoned "Velika žica" camp and others.

– **Spaces for enforced labour** – During the period of the political prison camp, quarries were opened and spaces were set up for forestation which were intended for the enforced labour of the prisoners. Opening the quarries took place in step with the pace of the expansion of the camp, and 5 spatial complexes with a collective area of approximately 56,650 m² were dug into the karst landscape from which stone was obtained for architectural and construction purposes, as well as for processing for the domestic (Yugoslav) market and for export (Fig. 5). The establishment of new green spaces on the island was also initiated during the time of the political prison camp on an area of some 5,3 hectares and this continued on an even larger scale during the period of the later prison on an area of some 36 hectares in the period between 1960 to 1964. The processes of reforestation influenced great changes in the appearance of the natural landscape, as well as great changes in the environmental systems of the island which, in time, became a more pleasant place for people to reside (Fig. 6).

– **Transport and communications systems** – For the requirements of the first, second



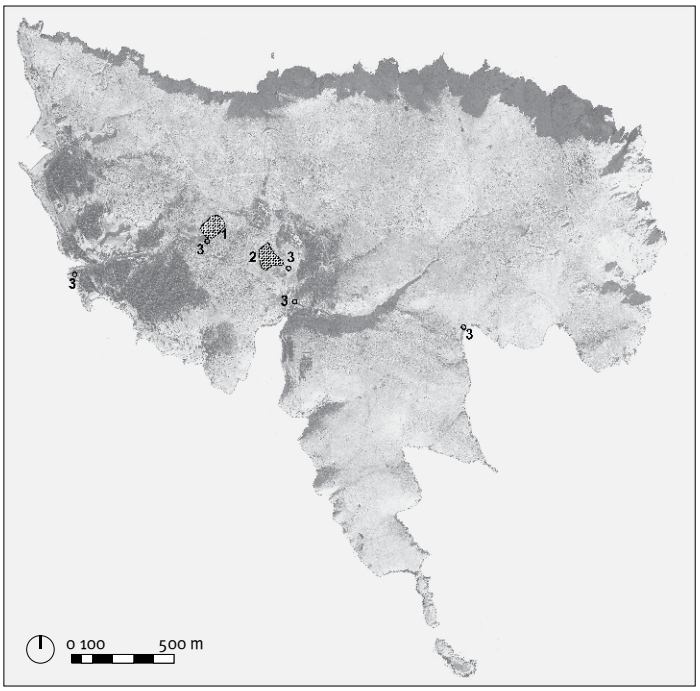


Fig. 7 Network of roads in the political prison camp

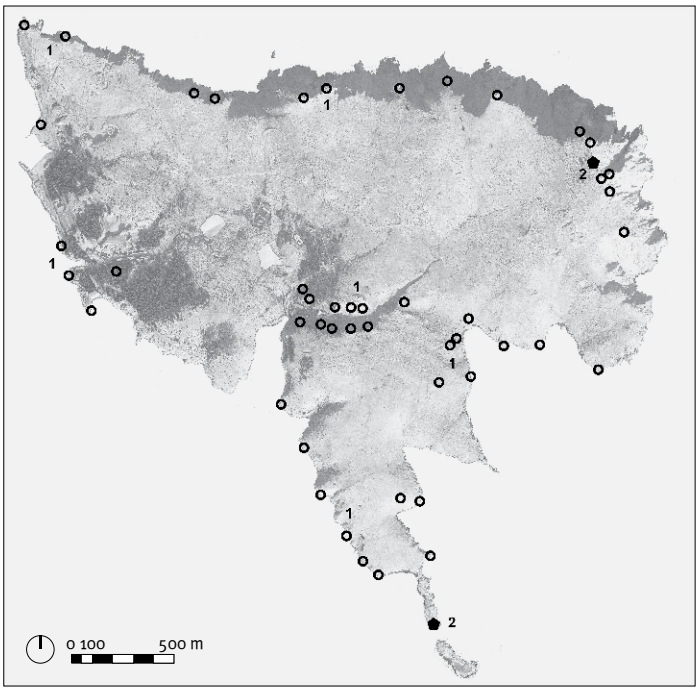
Fig. 8 Cisterns and rainwater collection tanks of the political prison camp: 1 - rainwater collection tank for the "Stara žica" prison camp; 2 - rainwater collection tank for the "Velika žica" prison camp; 3 - cisterns

and third political prison camps in the short period between 1949 and 1951, jetties were built in the Tatinja, Vela draga and Vela Senjska coves, and later, for the needs of a small renovation shipyard, a harbour was also built in Melna cove. The harbours built for the needs of the first prison camp in Tatinja cove and the shipyard in Melna cove were fully rebuilt in the period of the later prison and still today they have the function of docking boats, unlike the harbours for the second and third prison camps in Vela draga and Vela Senjska coves which are in ruins.

During the period of the political prison camp, through the forced labour of the prisoners the camp's roads were build (around 12 km in total length), which broke through the karst landscape, generally following its contours with equal height points in the natural terrain, but due to the uneven relief of the terrain in several places they had to build cuttings, make incisions, banks and sharp bends. Supporting walls and the roads' edgings were made from solid stone elements built using dry stone wall techniques with no cement, while the road surface was constructed very simply by setting down a layer of large pieces of crushed stone pressed onto a levelled stone base (Fig. 7).

– **Infrastructure** – In the first stage of the political prison camp in 1949, water was shipped to the island from the mainland on boats and stored in small cisterns and containers for collecting and storing water which are still preserved today in various locations of the former prison camp. With an increase in the number of inmates, the water stored in the cisterns was used up quickly and they were no longer able to fulfil requirements, and in 1950 and 1951 capacious underground rainwater collection tanks were built to store water and fulfil the requirements of the "Stara žica" and "Velika žica" camps. Their amphora-like curved surfaces with an area of approaching 8900 m^2 were fenced off with dry stone walls and still today dominate the landscape as prominent anthropogenic structures (Fig. 8). A number of derelict electric transformers are still to be found on the island, old abandoned purpose-built structures called "tornjici" *("little towers")*, which as component parts of the power transmission system maintained a connection between medium voltage and low voltage networks for the prison camp and later the prison. Of particular interest is the preserved building of the transformer for the "Velika žica" prison camp due to the fact that inside that building there was also a radio station which broadcast radio news and, from time to time, a special prison camp radio programme.

– **Fortification system** – The political prison camp on the island, during the Cold War period had to have military protection from potential Soviet attacks on Yugoslavia, and equally to secure it from potential escapes by inmates who were considered fifth columnists ready for betrayal and collaboration with the enemy. In order to fulfil the dual requirements for military defence and prevent-



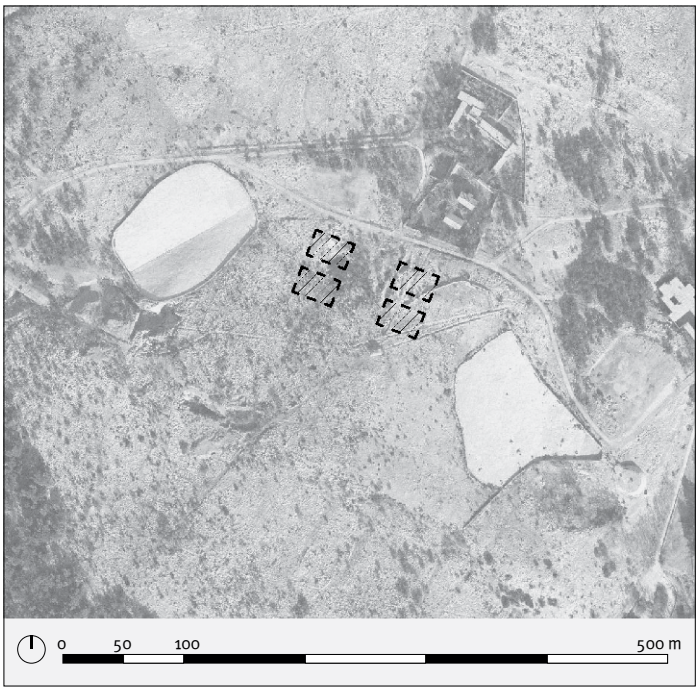


Fig. 9 Fortification system of the political camp: 1 - bunkers; 2 - bunker fortifications

Fig. 10 Approximate location of the graveyards of the political prison camp between two rainwater collection tanks

ing escape a special fortification system was built with sturdy defensive buildings constructed from concrete, iron and stone. The system was comprised of small and larger bunkers which could accommodate sizeable crews for coastal and air defence who were positioned at important strategic locations (the smaller bunkers were set along the perimeter of the entire island, while the larger bunkers were on the prominent ridge of the cliff Mali goli and the highest peak of the island, Glavina, at 227 m above sea level), as well as specially made bunkers which, apart from their military and defence function had to fulfil the function of surveillance of the inmates (Fig. 9).

– **Graveyards** – Many inmates remember that there were several places on Goli otok for the burial of prisoners who died. However, the graves on Goli otok were of a temporary nature due to the fact that in 1953 the remains of the inmates were removed to a communal grave on the mainland, usually in Zagreb or Rijeka's cemeteries, while after 1954 all the graves on the island were dug up so that there remain no traces of them (Bilić, 1998). Inmates who died were usually buried amidst the greatest secrecy at a hidden location, but some inmates nevertheless knew a certain amount about the location of the graves so we can surmise with some reliability that the graveyard was located between the two large rainwater collection tanks alongside the prison camp road which connected the "Stara žica" and "Velika žica" camps, on part of the Maslinje plateau (Fig. 10).

– **Ecohistorical aspect of Goli otok** – Processes that changed the original ecosystem of the island began from the very beginning of human interventions, initially through attempts to exploit bauxite ore (in the period between the two world wars), and then, after the construction of the political camp and prisons (in the period from 1949 to 1970) through the exploitation of natural stone from the island and wood from the mainland (forested) areas of the nearby Velebit Mountains.[11] However, in parallel with these processes, afforestation of the island was carried out, which initially began in the 1950s and continued intensively in the 1960s, so that 41.31 hectares of the rocky island have been afforested to date. In this way, human activities, catalysed by the activities of the political camp and prison, changed not only the ecosystem of Goli otok, which became a more pleasant place for people, but also the ecosystem of the nearby Velebit Mountains (Previšić, Prokić, 2016: 186-196).

11 Stone and wood, as raw material obtained from natural sources on-site or nearby, facilitated the development of processing plants (production of stone and wooden decorative or utility items), which later grew into larger industrial plants for the production of crushed stone and the serial production of terrazzo tiles and wooden furniture. The architectural structures of the abandoned manufacturing buildings and abandoned quarries in the landscape of the island have been preserved, as well as an abandoned cable car on the mainland for the transport of logs from the Velebit Mountains to the shore.

12 This paper is the result of the first author's ongoing research for a PhD thesis at the University of Zagreb, Faculty of Architecture.

Conclusion

The spatial and functional complex of the political prison camp and the prison, adapted to the natural environment of a Mediterranean island with a unique terrain and climate, a geological stone wilderness (karst landscape), a complete lack of water and sparse Aeolian vegetation, came into being under the influence of historical social and political circumstances which enabled methods of force to be used on political prisoners (as well as, in time, more contemporary methods of resocialisation of criminal inmates). The complex of the political camp contains structures and spaces with distinctive spatial arrangements and architectural frameworks which became a powerful weapon in the process of political re-education.

The position and architecture of the buildings for the accommodation and work of the camp administration, as well as the position and architecture of the dwellings for prisoners and the areas for forced labour were planned from the very beginning so that the camp administration provided an effective way of continuous spatial binding and *training* of prisoners in order to create a complex system of observation, interrogation and continuous political re-education in a double (reward – sanction) system of punishment. Exactly those factors ordain the identity and appearance (physiognomy) of Goli otok as a complex spatial entity with peculiarities and variances in relation to other spaces (and landscapes) in Croatia.

However, although in this case anthropogenic (cultural) factors comprise the most significant determinants of the identity of the cultural landscape of the island, with the aim of determining the theoretical model of its protection, use and/or presentation it is necessary to consider all the other characteristics of the island's identity – natural, environmental, sensory and other characteristics (economic, administrative and legal), so that the direction of future research is oriented towards insufficiently researched questions of mutual influences interwoven with the landscape's components, in order to conduct a multi-layered evaluation and categorisation of the cultural landscape with all of its unique characteristics on the basis of a series of criteria (general criteria, criteria of type of heritage, criteria of quality, unique/local criteria and others), as a potential monument of cultural heritage of national value as well as of potential for the cultural development of the island in the future.[12]

[Translated by
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Author's biographies and contributions

Vladi Bralić graduated from the Faculty of Architecture in Zagreb and is currently working on a doctoral dissertation titled *The Cultural Landscape of Goli Otok*.

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This work is a part of an ongoing research started by V.B. and further developed by V.B. and D.K.

Contributions of authors in this article are as follows: conceptualization, D.K. and V.B.; formal analysis, V.B.; investigation, V.B.; methodology, V.B. and D.K.; validation, D.K. and V.B.; writing – original draft, V.B.; writing – review and editing, D.K and V,B.; supervision, D.K. All authors have read and agreed to the published version of the manuscript.

Illustration Sources

Fig. 1, 5-10 Drawing on digital orthophoto map by Bralić, V. and Ilic, L., 2020

Fig. 2-4 Drawing on digital orthophoto map by Bralić, V. and Čupev, A., 2018

Fig. 1 Typical mid-rise RC buildings encountered within Turkey's urban pattern and the result of earthquake damage in the form of total or partial collapse

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Reconciling Architectural Design with Seismic Codes

A Comparative Architectural Analysis for Mid-Rise Reinforced Concrete Residential Buildings in Turkey

ARCHITECTURAL DESIGN
REINFORCED CONCRETE
RESIDENTIAL BUILDINGS
SEISMIC CODE
SEISMIC DESIGN

Seismic codes include strict requirements for the design and construction of mid-rise reinforced concrete residential buildings. These requirements call for the symmetric and regular arrangement of the structural system, increased cross-sections for columns, and the introduction of shear walls to counteract the effects of lateral seismic loads. It is challenging for architects to reconcile the demands of these codes with the spatial arrangement and commercial appeal of their designs.

This study argues that such reconciliation is possible through an architectural analysis. First, the effectiveness of applying the seismic design principles required by the codes is demonstrated with the comparative analysis of two finite element models. Then three pairs of architectural models, representing the most common floor plan arrangements for such buildings in Turkey, are architecturally analyzed before and after the application of seismic design principles in terms of floor area and access to view. The results demonstrate that within the context defined by the methodology of this study, considerable seismic achievement can be achieved in mid-rise reinforced concrete residential buildings by the application of relatively few, basic design features by the architects.

INTRODUCTION[1]

From the Dinaric Alps to the Taurus Range, countries like Croatia, Greece and Turkey face a common threat: the earthquake. The 2020 Zagreb and Petrinja earthquakes, of magnitude 5.5 and 6.4 respectively, caused serious damage and loss of life in Croatia. Tyrnavos in Greece was hit by a 6.3 magnitude tremor in 2021. In Turkey, Elazığ had a 6.7 magnitude shock and İzmir was quite heavily damaged by a 7.0 magnitude quake in 2020, which also took 116 lives. These countries are no stranger to earthquakes and their effect on the built environment. Eurocode 8 is in effect in Croatia. As part of the EU, Greece has also adopted Eurocode 8 but has its seismic design practice rooted in EAK 2000/2003 (Pitilakis, Riga and Roumelioti, 2016: 437). Turkey, on the other hand, has its own code, the 2018 Turkish Earthquake Code (TEC 2018).

While these codes are of critical interest to all stakeholders in the building sector, they are written and formulated by structural engineers for structural engineers. This is understandable because engineers are primarily responsible for ensuring the structural safety of buildings under seismic actions. Architects have a significant and often decisive role in the design of a building's structural system but are often relegated to a secondary role in seismic codes (Özmen and Ünay, 2011: 919). This does not prevent the seismic codes from having a significant impact on various aspects of architectural design ranging from spatial arrangement to commercial appeal for potential customers. This study focuses on problems faced by architects in reconciling the requirements of the seismic codes with the spatial arrangements and commercial aspects of their designs.

Turkey is the most populous country in the Mediterranean section of the Alp-Himalayan seismic belt. Furthermore, a large percentage of its urban and industrial centers are on either the north Anatolian fault zone or the Aegean horst-graben valleys. This, coupled with the rapid and uncontrolled urbanization rate, makes the country especially vulnerable to earthquakes (Özmen and Ünay, 2007: 1406). Despite the significant improvements in both technical and legislative aspects of seismic design after the devastating 1999 Gölcük-Adapazarı and Bolu earthquakes, the state of the existing building stock is far from being adequately resistant to possible future seismic events (İlki and Celep, 2012: 366). Mid-rise reinforced concrete [RC] residential buildings of three to eight storey's are by far the most common building type encountered in the urban and semi-urban areas of the aforementioned region (Oyguç, Oyguç and Tonuk, 2018: 3063). As a result of being the most common type of building, several RC residential buildings were either damaged or collapsed during earthquakes despite the heavy emphasis on ensuring the safety of these structures within the seismic codes (Tapan et al, 2013: 610). The scope of this study encompasses the earthquake-resistant architectural design aspects of the mid-rise reinforced concrete residential buildings in Turkey.

In the last twenty-five years, Turkey has brought into force three earthquake codes: in 1997, 2007 and 2018. These regulations incorporated the latest scientific knowledge and technological developments in earthquake-resistant design. However, it is not possible to completely solve the problems in the field with a seismic code. The shortcomings of seismic codes in solving the seismic resistance problem are numerous but two are closely related with the scope of this research. The first is the poor construction quality and workmanship, especially in reinforced concrete residential buildings. Turkey has vast technical knowledge, engineering infrastructure and experience in both rein-

1 The archival documents and models presented in this study are partially based on the unpublished thesis, titled *A Comparative Structural and Architectural Analysis of Earthquake Resistant Design Principles Applied in Reinforced Concrete Residential Buildings in Turkey* submitted to the Middle East Technical University by the author. The subject matter, the methodology and the bibliography are updated and adapted to the state of current developments in seismic design in Turkey.

forced concrete production and seismic design, but the scale and the clandestine nature of new building production means that many of these structures get neither adequate design services nor access to skilled labor. Despite the construction inspection law passed in 2001, this problem persists to this day (Yazgan et al, 2016: 595).

The second reason is economic. The resources required to transform the existing building stock into an earthquake-resistant one, either via retrofitting or by rebuilding, are simply beyond the budgetary means of the state. As a result, an urban transformation law was passed in 2012 to make use of the private sector's economic potential and inherent dynamism. This law allowed individual entrepreneurs to cooperate directly with property owners in the retrofitting and rebuilding of RC buildings (Daşkıran and Ak, 2015: 264). This process is slow and exacerbates the problems stemming from the sheer volume of ongoing construction projects. To compensate for the lack of adequate design services and ensure the safety of buildings, even when there are deficiencies in the construction and material quality, the codes have found no other remedy but to impose gradual but significant increases in the cross-sections of reinforced concrete structural elements (AFAD, 2018: 114). This is a problem for architects who have to ensure the earthquake safety of the buildings they design but also have to deliver the same spatial and commercial value to their clients within the same amount of space available to them.

Retrofitting and rebuilding are the two common choices available in the seismic improvement of the urban environment. The scope of this study is focused on the rebuilding option for two reasons. Firstly, the involvement of architects is much extensive when the rebuilding option is selected by the property owners, as this process requires a complete redesign of the building. Retrofitting option may include the increase of structural cross-sections, addition of new structural elements and minor alterations to the spatial layout of a building however it is mostly an engineering-intensive process because it involves seismic assessment processes and application of selected strengthening methods as described in earthquake codes. This is done by structural engineers. Secondly, although retrofitting is the cheaper solution and preserves the existing building stock with all inherent architectural and heritage values, rebuilding option is more widely promoted by the government and the private stakeholders in Turkey. The reason behind this tendency is also an economic one. Building industry is the primary sector driving the economic growth of the country. From a governmental point of view, removing an old building and replacing it with a new one stimulates the economy on a larger scale. For the private industry there is more money to be made and the property owners get to own a brand new earthquake proof building with a considerably higher real estate value. It must be stated that retrofitting is the more sustainable option with a lesser impact on the urban environment and the preservation of natural resources however in the case of Turkey economic factors are more dominant.

Methodology

The audience for this paper is architects, not structural engineers; therefore, the methodology of this study is formulated to make seismic design principles both simple and intelligible for architects as well as guide them in the earthquake-resistant design of mid-rise RC residential buildings. At first, a literature survey was conducted to determine the main reasons for the poor seismic performance of RC buildings in Turkey. Among the many reasons which contribute to the failure of RC buildings those that are most related with the architectural design decisions are selected for this study. These factors are the asymmetric and irregular arrangement of structural elements, the presence of torsion, the lack of shear walls and the exceeding of column capacities due to insufficient element cross-sections.

Second step includes the proof of concept. At this stage, the aim is to demonstrate to the architectural audience that regular and symmetrical arrangement of structural members; use of shear walls and increase in structural cross-sections significantly improves the seismic behavior of mid-rise RC buildings. In this demonstration a set of two finite element models representing a typical mid-rise RC building before and after the implementation of seismic improvements was analyzed. The seismically defective finite element model is simplified and adapted from a RC building destroyed during the 1999 Bolu-Düzce earthquake the structural plans of which are obtained from the local municipality. The original building did not survive the earthquake and no known photographs exists. The building possessed the general characteristics of the existing building stock in Turkey (Fig. 1). In order to make the results clear and simple, secondary architectural features that do not directly affect the seismic performance such as the staircase details are omitted in the model. The results of the finite element analysis prove that the architectural design improvements in the aforementioned areas greatly improve the seismic behavior of the modeled structure. Since this study focuses on the architectural discussion of seismic de-

sign principles, once this demonstration is made, the same architectural design principles can be applied to other buildings of comparable function and size without further need for structural analysis for each case. In this way the study can focus I detail on the architectural characteristics of typical mid-rise RC residential buildings rather than structural calculations.

In the third step, a comparative architectural analysis was conducted on three pairs of architectural models, representing RC buildings with two, three and four residential units on each floor. These are the most common type of plan arrangements in Turkey due to the typical size of building blocks in Turkish urban zoning. The first architectural model is intentionally selected as the same one modeled in the finite element analysis to better relate the structural discussion with the architectural one. The second and third architectural models are also simplified and adapted from RC buildings destroyed during the 1999 Bolu-Düzce earthquake. All of the models are purposefully selected to have at least one angled façade that introduces a certain level of asymmetry to the structure. The first models in each pair represent the architectural designs containing seismic design faults and the second models represent the same building redesigned according to earthquake-resistant design principles. The models in each pair will be comparatively analyzed in terms of architectural criteria such as the floor area of the residential units, the number of rooms and the orientation of rooms. These architectural criteria are selected because of the critical role they play in the purchasing decisions of the average house owner or new buyer in Turkey.

In each architectural model pair, while the usable spaces, the circulation spaces like corridors inside the residential units and buildings' general circulation spaces vary in terms of area, the total floor area of the buildings remains unchanged. The outer shape of the buildings is preserved except small changes in the locations of balconies and indentations. This ensures that the new design can be implemented in the site of the old building without any change in urban parameters.

The comparative analysis demonstrates that it is possible to obtain the same number of residential units with the same number of rooms and orientations while adhering to earthquake-resistant design principles. Based on the results, it can be argued that it is possible for architects to reconcile the demands of seismic codes and their clients by adhering to a set of simple structural design principles. The ability to fit the same number of residential units within the same building site may not appear as a significant achievement at first, however the urban transformation law in Turkey and the resulting rebuilding of mid-rise RC residential buildings was accompanied by ample debate and often legal action caused by property owners' discontent with the decreasing number of residential units, lesser floor areas, room numbers and room sizes of their homes before and after the reconstruction. This study aims to address this current and popular problematic in Turkey with a simple comparative demonstration showing that the preservation of the spatial quality is possible through the careful implementation of basic architectural design principles.

Structural principles of earthquake resistant architectural design

The reasons for seismic failures of RC structures are numerous and cannot be addressed in their entirety in this paper. The most common occurrence is a combination of deficiencies in strength, ductility and lateral rigidity caused by poor design and construction or by poor material quality. These deficiencies result in the loss of stability and the collapse of the entire structure (Özmen, Akan and Ünay, 2011: 449). Seismic codes offer several remedies to prevent such a failure mechanism. These include the selection of much larger reference earthquakes for design than many buildings would realistically face during their lifetime, bringing generous safety coefficients in the estimation of seismic loads and establishing stringent rules for the detailing of reinforcement bars (Ersoy, 2013: 1702). The responsibility for application of a large majority of these seismic design rules lies squarely within the domain of structural engineers. However, many of the precautions that ensure lateral stability and the prevention of torsional displacements fall within architects' design decisions in the form of symmetric and regular configuration of vertical structural members (Özmen and Katipoğlu, 2015: 15). This symmetry and regularity requirement is highly recommended but not strictly required by TEC 2018. The seismically improved versions of the finite element and architectural models in this study are configured to be as symmetrical and as regular as possible within the constraints of their site shapes.

Seismic code requirements often result in a significant increase in the number and cross-sections of vertical load-carrying members such as columns and shear walls as well as a mandate to design RC frames that are as symmetrical and as regular in plan as possible. Such an increase in the cross-sectional area of vertical members with an emphasis on symmetry and regularity directly impacts the architectural design of residential buildings (Ünay and Özmen, 2006: 260). The main

defense of RC buildings against the large shear forces created by earthquakes is the use of shear walls in each direction (Özkul et al, 2019: 74). An empirical value of shear wall area equal to 1% of the floor area in each cardinal direction, obtained from observations of RC buildings undamaged in past earthquakes is often mentioned in scientific literature (Burak and Çömlekçioğlu, 2013: 1928). This rule of thumb, however, does not exist in any of the Turkish earthquake codes past or present (Günel, 2013: 2). The use of shear walls is nevertheless a critical seismic design feature for mid-rise RC buildings because observations made during past earthquakes in Turkey demonstrate that columns often fail in resisting seismic shear forces due to the lack of ductile behavior even though ductility is a key requirement in TEC 2018 (Oyguç, 2016: 828). Shear wall inadequacy was a key observation in the case studies that were the basis of the aseismic versions of finite element and architectural models and therefore the improved models were designed with a large number of shear walls placed in both longitudinal and transverse directions.

Torsion is an undesirable effect in the seismic behavior of RC structures (Gökdemir et al, 2013: 714). Torsional displacements can occur due to eccentricities in the building's center of rigidity or they can be the result of a building's irregular plan shape. Eccentricities in the building's center of rigidity can stem from uneven or asymmetrical distribution of columns and shear walls. In this case, the direction and location of the shear walls become especially critical. A building can theoretically have enough shear walls to satisfy the "1% of the total floor area in each direction" rule of thumb but these walls may be arranged in such a way that the building still suffers from torsional eccentricity. In urban areas, irregularities in plan geometry may be unavoidable due to the shape of the building site. In this case, the responsibility falls to the architect to design a structural system that counteracts the resulting torsion by arranging the configuration of vertical load-carrying elements such as columns and shear walls. In the first finite element model the building suffers from both of the above-mentioned problems. The building sits on a site with an irregular shape and its columns and shear walls are arranged in a way that introduces eccentricity to its center of rigidity. In the improved version of the finite element model, the torsion problem is solved by the regular and symmetrical arrangement of vertical structural elements as well as the introduction of additional shear walls. The aseismic versions of the architectural models all exhibit the same problems in terms of torsional eccentricity. In the seismically improved versions structural configurations are arranged to counteract torsion based on the principles obtained from the finite element analysis.

In the seismic design of reinforced concrete buildings, making sure that the structural system remains stable during and after the shock is very important (Bikçe and Çelik, 2016: 71). In TEC 2018, RC buildings are allowed to have plastic deformations during large earthquakes. This is a precaution that ensures a high level of ductility in the entire system. The system is designed so that these deformations occur in pre-calculated locations. These locations are the supports of the RC beams where they are connected to columns. The columns, on the other hand, are not allowed to have plastic hinges under any circumstances. This is ensured by the increase in column cross-sections (Oyguç, Toros and Abdelnaby, 2018: 31). The interaction diagram between the columns' axial force and bending moment capacity is a simple and clear way of establishing an idea about their seismic behavior. In mid-rise RC residential buildings this interaction becomes critical in the lower supports of the columns where the vertical system is connected to the foundations (Korkmaz, Yakut and Bayraktar, 2019: 47). Another critical factor is the prevention of large lateral displacements (Arslan et al, 2018: 325). As a result, the two finite element models will be analyzed and evaluated according to the performance of selected columns at the ground floor before and after seismic design improvements and the amount of decrease in the maximum displacements on the top floor corners of the building. Material properties for reinforced concrete and reinforcement, as well as the detailing of reinforcements, are assumed to be in accord with TEC 2018 (Balun, Nemutlu and Sarı, 2020: 175).

Comparative analysis of the finite element models

In this section two architectural models (Model-A and Model-B) will be comparatively analyzed to evaluate their structural performances before and after seismic improvements. The first finite element model (Model A) represents a 6-storey RC residential building. Floor height is taken as 3 meters resulting in an 18-meter high mid-rise structure (Fig. 2). This is a typical building in urban and semi-urban areas in Turkey and the Balkans. An irregularity in the form of an angled front façade is introduced to its geometry due to the site shape. The structure contains a single shear wall located around the elevator shaft. The remainder of the columns is arranged in an asymmetric and irregular pattern to accommodate two residential units on each floor. These residential units consist of

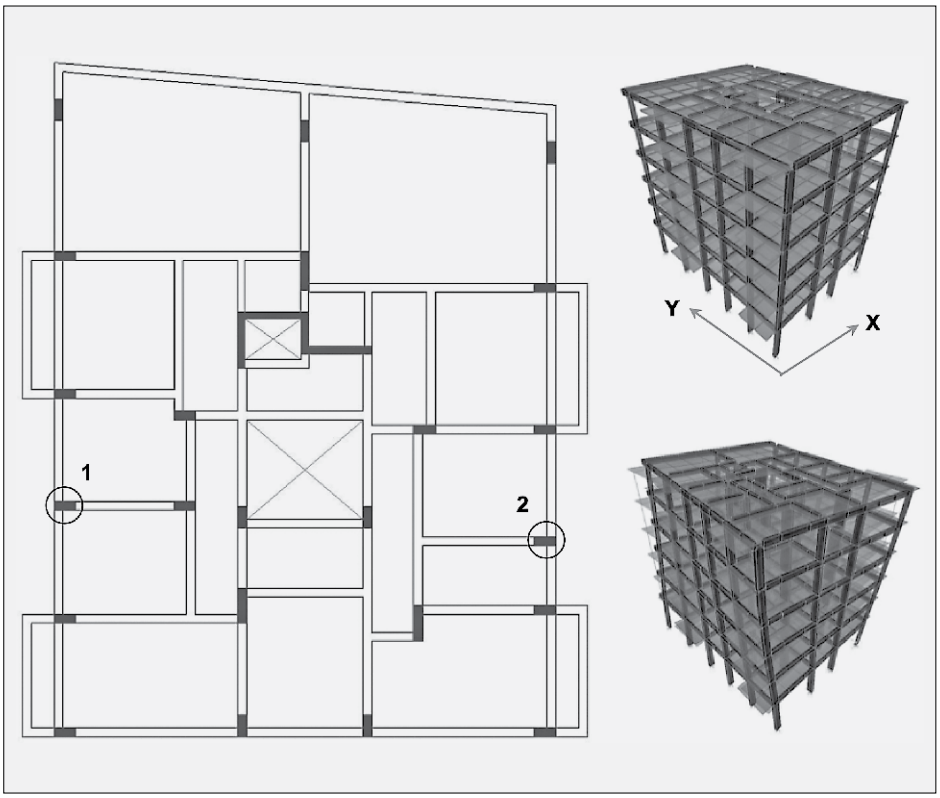
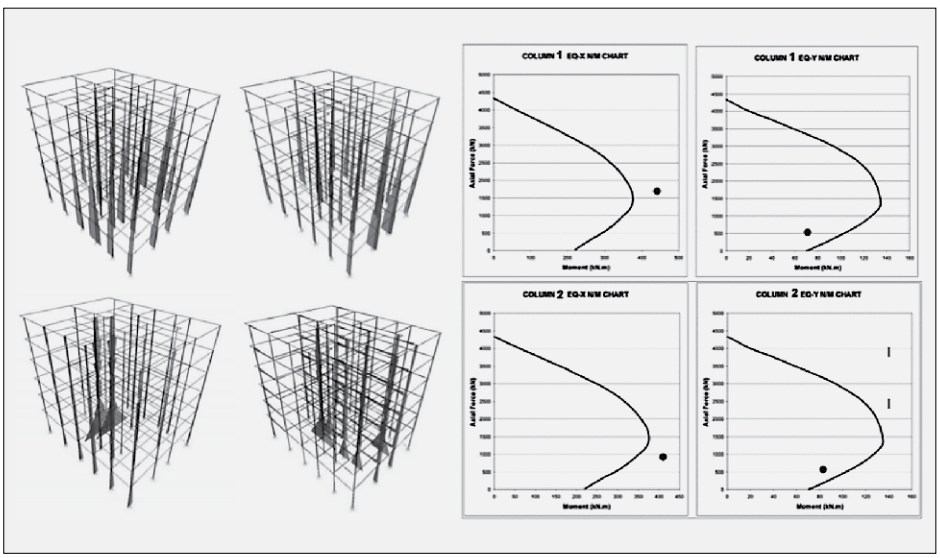


Fig. 2 The structural system of Model A. Plan configuration (left), undeformed shape (top-right corner), deformed shape (lower-right corner). Column capacities are measured for the columns marked 1 and 2 respectively.

Table I Dominant movement directions, periods and maximum displacements for Model A

	Model A		
Mode	**Movement**	**T (s)**	**d-max (m)**
1st Mode	Torsion	0.84	–
2nd Mode	Lateral (x-dir)	0.72	0.092
3rd Mode	Lateral (y-dir)	0.65	0.081

Fig. 3 Axial force diagrams in both earthquake directions for Model A (upper left corner), moment diagrams in both earthquake directions for Model A (lower left corner), column capacity diagrams for column 1 (upper right corner), column capacity diagrams for column 2 (lower right corner)



one master living room, three bedrooms, one kitchen, one bathroom and a guest toilet. The ground floor is allocated to commercial functions and the building's entrance. The model is subjected to seismic loading in both earthquake directions as described in TEC 2018.[2] A basic analysis is conducted to measure the structure's response to the first three oscillation modes, maximum lateral drifts and column capacities for axial force and bending moment.

In Model A, the asymmetric and irregular arrangement of columns results in torsional displacements. There is a single shear wall and the column cross-sections are small. This results in a structural system with very low lateral rigidity, which in turn causes relatively high periods for the first three modes. For a building of this height, the high periods are the indication of large and uneven displacements in both earthquake directions (Table I).

The internal force diagrams of Model A indicate that, in accordance with expectations, axial forces reach their highest levels at the lower ends of columns located on the outer periphery of the building. Similarly, bending moments become critical at the same locations but near the columns located at the center of the structure. Two columns, columns 1 and 2, were selected to represent the behavior of the slender vertical elements under seismic loading. These columns were selected among the outer periphery columns, which are more prone to failure due to torsional displacements. The analyses indicate that these two columns would pass into the failure zone in at least one of the two earthquake directions under the applied loads (Fig. 3).

The second finite element model (Model B) represents the same 6-storey RC residential

2 TEC 2018 is a 395 page document that incorporates seismic design principles inherited from the past Turkish seismic codes, EUROCODE 8 and ASCE 7-16 as well as other prominent seismic codes. Because TEC 2018 generally favors the most structurally demanding methods, it would be safe to assert that any mid-rise RC residenial building designed according to TEC 2018 would also be considered seismically safe according to the requirements of EUROCODE 8 and ASCE 7-16. TEC 2018 is used in conjunction with *The Interactive Turkish Earthquake Map* system which can only be accessed by Turkish citizens and authorized personnel through the "E-Devlet" governmental e-state web service. As the concept of "earthquake zones" are abolished by TEC 2018, this service provides official site-specific parameters to be used in the drawing of the vertical and horizontal elastic spectrum curves for each structure. These parameters include the regional ground acceleration values for the reference earthquake and the soil type among others. The elastic spectrum curves used for the finite element models analyzed in this study are drawn with the assumption that the structures are in a high-risk area with a reference earthquake occurence period of 475 years, subjected to ground acceleration levels near 0,4g and built on a medium-strength soil type that does not require special calculation methods.

building modeled in Model-A, however; the structure is redesigned with shear walls and columns with larger cross-sections, arranged in a regular and symmetrical configuration. Floor height and total building height remains unchanged (Fig. 4). The residential units also consist of one master living room, three bedrooms, one kitchen, one bathroom and a guest toilet. The ground floor is allocated to commercial functions and the building's entrance. The model is subjected to the same seismic loading as in Model-A in both earthquake directions as described in TEC 2018. Same basic analysis is conducted to measure the structure's response to the first three oscillation modes, maximum lateral drifts and column capacities.

In the second finite element model (Model B), the directionality of vertical structural elements is distributed equally for the two earthquake directions. This eliminates torsional displacement in the first mode. Lateral sway of the building is significantly less than in the first model, which indicates that vertical elements do not approach structural failure zones (Table II).

The internal force diagrams of Model B indicate that, like in to Model A, axial forces reach their highest levels at the lower ends of columns located on the outer periphery of the building. Bending moments also reach their highest values at the same locations but near the shear walls. Two columns, located at similar locations with Model A, were selected to represent the behavior of columns in the seismically improved version of the model. The analyses indicate that these two columns would remain safe in both earthquake directions under the applied loads. The safety margins are quite large for these columns. This is due to the existence of shear walls, which carry the major portion of the seismic effects and alleviate the structural strain on more slender elements like columns (Fig. 5).

The analyses conducted on the two finite element models demonstrate the effectiveness of the structural design principles in increasing the seismic performance of mid-rise RC residential buildings. The symmetric and regular arrangement of the structural system, larger cross-sections for columns and the existence of evenly distributed shear walls significantly increase the safety of RC buildings. Additionally, the building represented in the seismically improved Model B offers an equivalent architectural value in terms of usable floor area and directional orientation of rooms to Model A. This analytical demonstration of the increase in earthquake safety coupled with the preservation of architectural value forms the basis of the comparative architectural analysis in the following section.

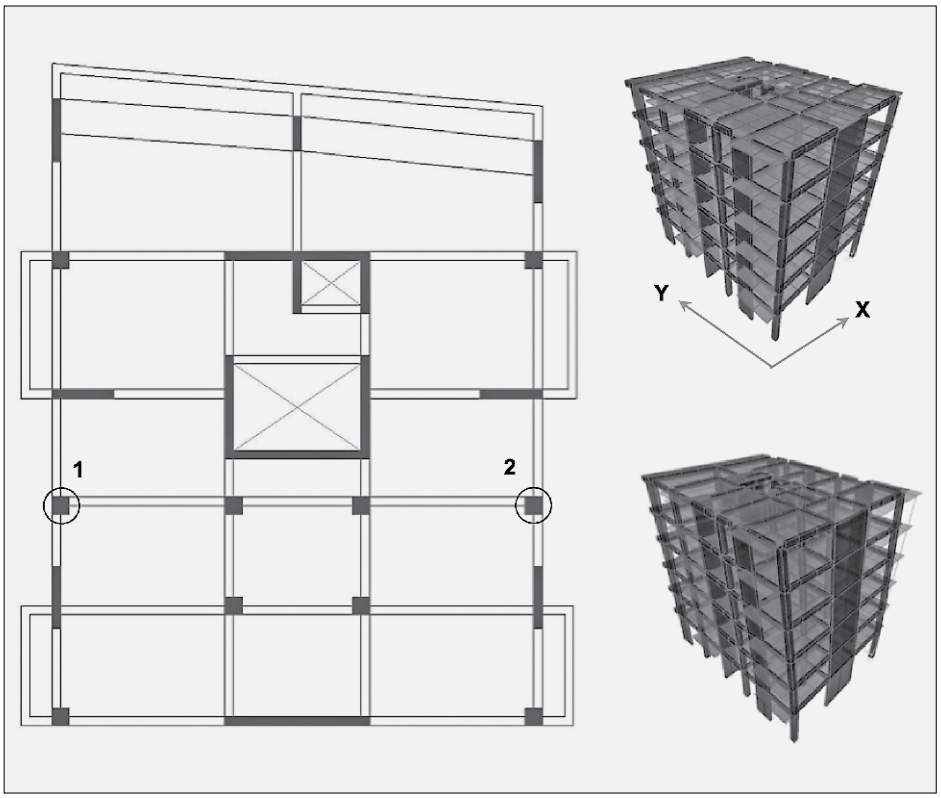


Fig. 4 The structural system of Model B. Plan configuration (left), undeformed shape (top-right corner), deformed shape (lower-right corner). Column capacities are measured for the columns marked 1 and 2 respectively.

Fig. 5 Axial force diagrams in both earthquake directions for Model B (upper left corner), moment diagrams in both earthquake directions for Model A (lower left corner), column capacity diagrams for column 1 (upper right corner), column capacity diagrams for column 2 (lower right corner)

Table II Dominant movement directions, periods and maximum displacements for Model B

	Model B		
Mode	**Movement**	**T (s)**	**d-max (m)**
1st Mode	Lateral (y-dir)	0.46	0.056
2nd Mode	Lateral (x-dir)	0.45	0.047
3rd Mode	Torsion	0.33	–

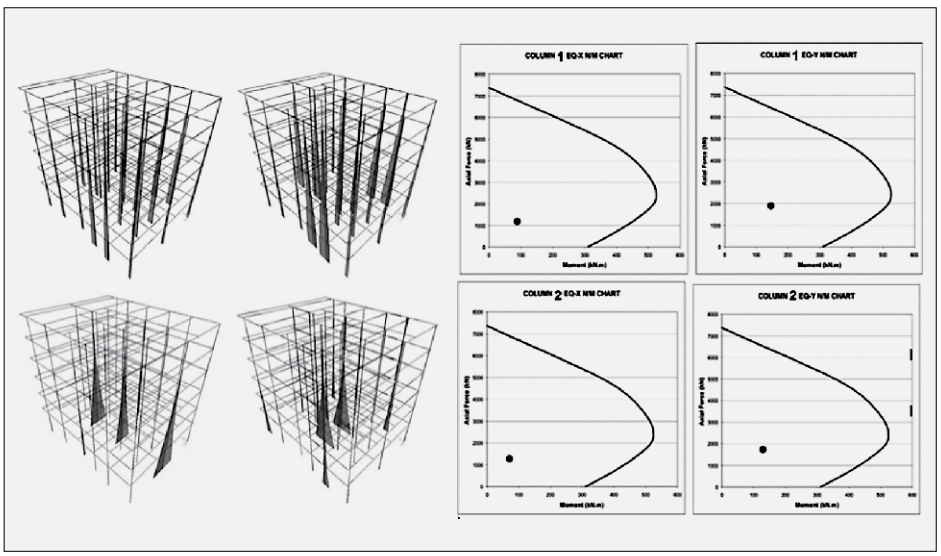


Table III Architectural evaluation of Set 1A-1B in terms of floor area and access to façade

Res-A	Set 1a		Set 1b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	36	Front	36	Front
Room	17	Side	16	Side
Room	13	Side	12.5	Side
Room	13	Side	12	Side
Dress room	–	–	9	N/A
Kitchen	13.5	Side	13	Side
Bathroom	7	–	7	N/A
WC	3	–	3	N/A
Usable Area	102,5		108,5	

Res-B	Set 1a		Set 1b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	38	Front	32	Front
Room	18	Side	16	Side
Room	15	Side	1.,5	Side
Room	13	Side	12	Side
Dress room	–	–	9	–
Kitchen	13.5	Side	13	Side
Bathroom	7	Side	7	–
WC	3	–	3	–
Usable Area	107,5		104,5	

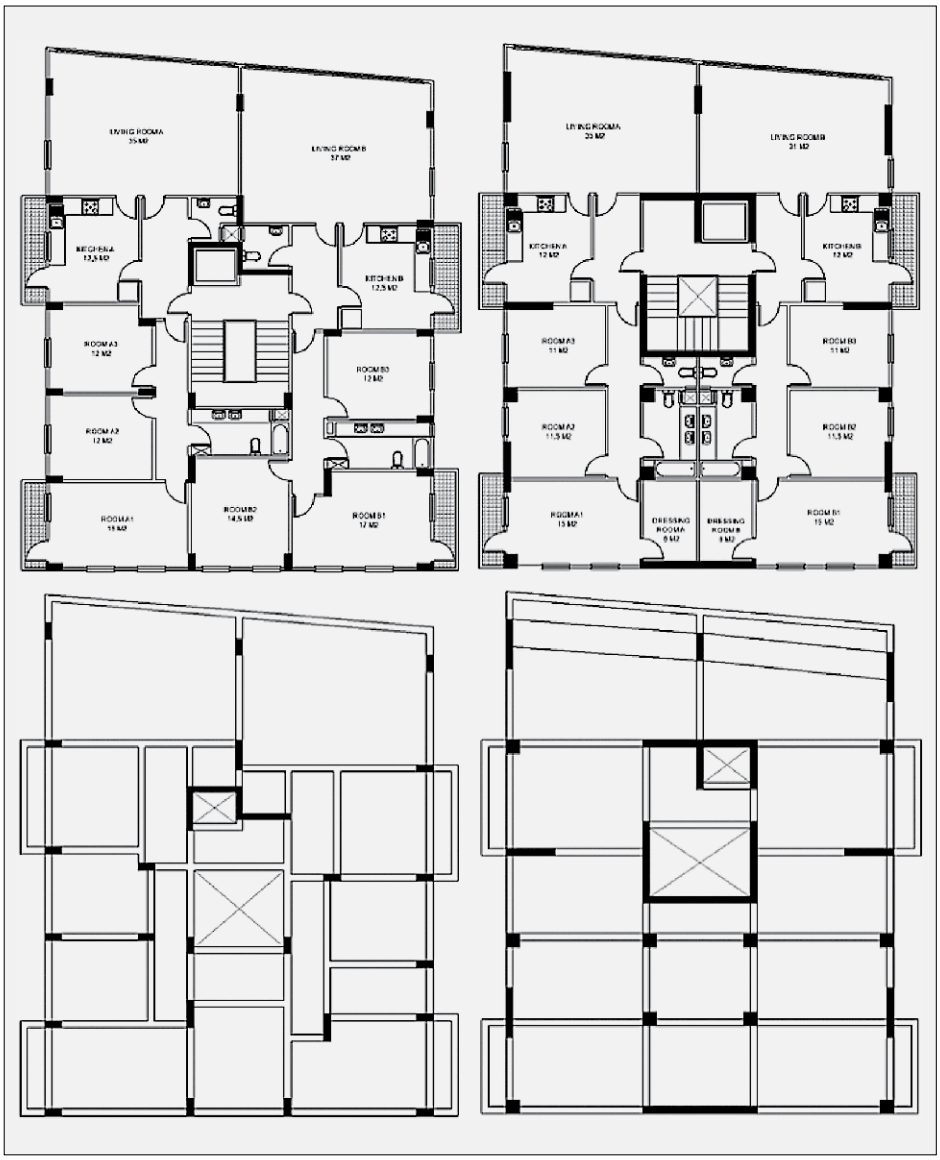


Fig. 6 On left: Set 1A, architectural plan (above) and structural system (below) with seismic design faults. On right: Set 1B, architectural plan (above) and structural system (below) are seismically improved.

Comparative Analysis of the Architectural Models

In this section three architectural model pairs (Set 1a-1b, Set 2a-2b, Set 3a-3b) will be comparatively analyzed to evaluate their architectural qualities before and after seismic improvements. These models represent the plan configurations of typical RC residential buildings from Turkey. They have two, three and four residential units on each floor respectively. It is assumed that all floors except the ground floor have the same floor plan.

• **Architectural model pair with two residential units on each floor (Set 1a-1b)** – Set 1a-1b is based on the previously analyzed finite element Models A and B. The two residential units will be called Res-A and Res-B. These residences are "three plus ones" as they are colloquially called in Turkey, meaning there is a master living room and three smaller rooms. There is also a kitchen, a bathroom and a guest toilet in the unit (Fig. 6).

The floor plan of Set 1a represents a typical approach to residential unit design in Turkey. The structural system's configuration is completely secondary to the spatial needs of the individual units. The master living rooms are as large as possible and equal in size to each other in accordance with the expectations of future customers. This attempt to have a large living room in the less spacious Res-B is the main reason behind the asymmetric and irregular arrangement of the structural system. The second reason is the effort to avoid visible overhanging beams in the ceilings of

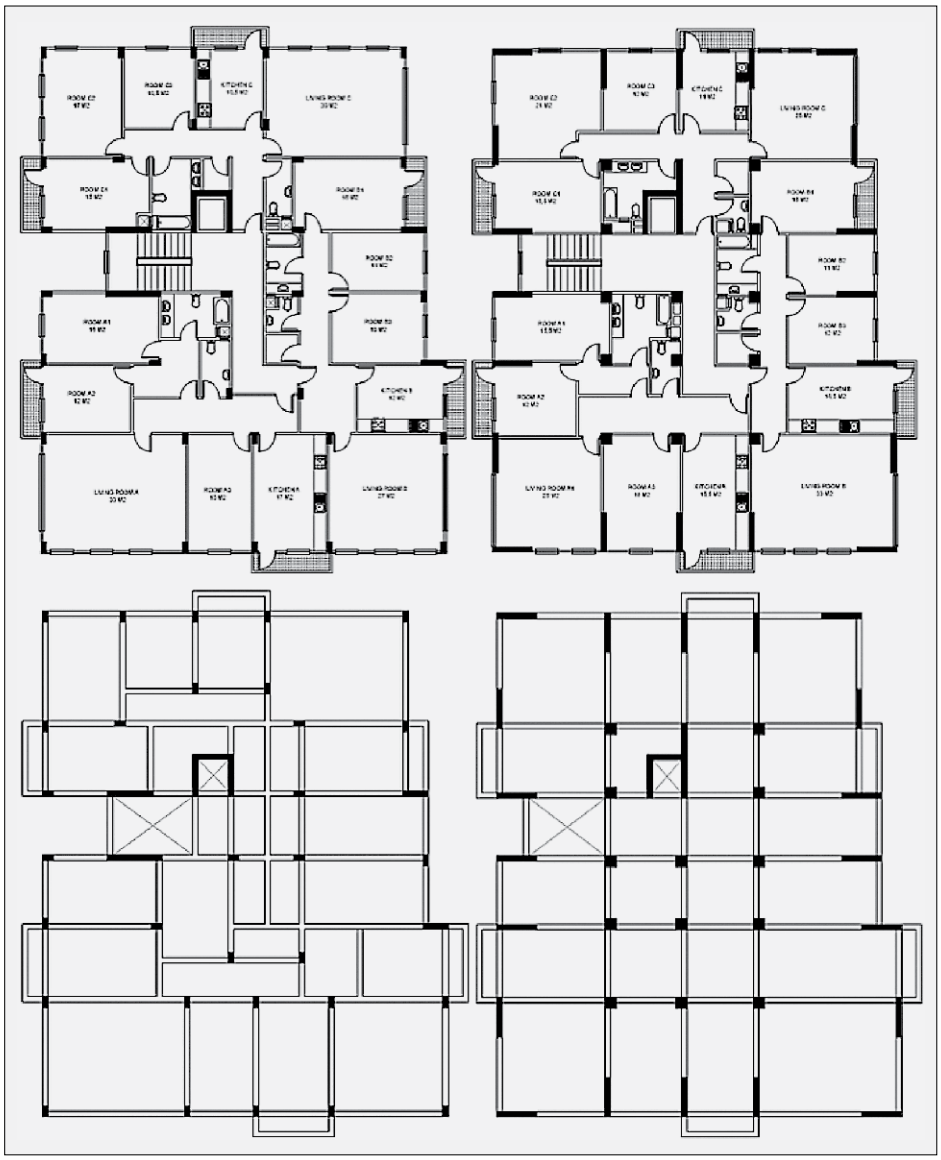


Table IV Architectural evaluation of Set 2a-2b in terms of floor area and access to façade

Res-A	Set 2a		Set 2b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	34	Rear	26	Rear
Room	17	Rear	16.5	Rear
Room	13	Rear	13	Rear
Room	16	Side	19	Side
Kitchen	18	Side	16.5	Side
Bathroom	7	–	8	–
WC	3.5	–	3.5	–
Storage	–	–	–	–
Usable Area	108.5		102.5	

Res-B	Set 2a		Set 2b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	28	Rear	34	Rear
Room	17	Rear	16	Rear
Room	12	Rear	12	Rear
Room	14	Side	13	Side
Kitchen	13	Side	15	Side
Bathroom	5.5	–	6.5	–
WC	2	–	3	–
Storage	3	–	3.5	–
Usable Area	94.5		103	

Res-C	Set 2a		Set 2b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	31	Front	26	Front
Room	16	Rear	16.5	Rear
Room	18	Rear	22	Rear
Room	11.5	Side	13	Side
Kitchen	11.5	Side	12	Side
Bathroom	7	N/A	7.5	N/A
WC	3	N/A	2	N/A
Storage	2.5	N/A	3	N/A
Usable Area	100.5		102	

Fig. 7 On left: Set 2a, architectural plan (above) and structural system (below) with seismic design faults. On right: Set 2b, architectural plan (above) and structural system (below) are seismically improved.

rooms and circulation spaces due to aesthetic concerns. The architectural plan of Res-B suffers further from the large space allocated for the master living room. The third room of Res-B is shifted to the rear façade of the building due to the shorter length of the side façade. In turn, the bathroom is shifted from the center of the plan to the side. As a result, the wet spaces of Res-A and Res-B are positioned away from each other, making the mechanical systems of the building more complicated and inefficient (Fig. 6).

In Set 1b, the main architectural compromise is having a smaller master living room for Res-B. This one compromise allows for the design of a symmetric and regular structural system. Column cross-sections become larger and shear walls are arranged in both earthquake directions. Structural axes are straight and unbroken in every direction. A shallow beam was added between the columns around the master living room to ensure structural connectivity in all frame members. The symmetric and regular structural system allows for similar arrangement of rooms for Res-A and Res-B and even creates enough space for a dressing room in the master bedrooms of both units. The wet spaces of Res-A and Res-B are arranged together, allowing them to share the same mechanical shafts and plumbing systems creating a more efficient design (Fig. 6).

The two architectural models of Set 1 are comparatively analyzed in terms of their usable floor areas and access to view. There are no significant changes in the spatial configu-

Table V Architectural evaluation of Set 3a-3b in terms of floor area and access to façade

Res-A	Set 3a		Set 3b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	28	Front	31	Front
Room	12	Front	15	Front
Room	16.5	Front	23.5	Front
Room	13.5	Side	14.5	Side
Kitchen	8.5	Side	9.5	Side
Bathroom	8.5	–	7	–
WC	3	–	2.5	–
Usable Area	90		103	

Res-B	Set 3a		Set 3b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	23	Rear	24	Rear
Room	12.5	Rear	13	Rear
Room	15	Rear	17	Rear
Room	14.5	Side	14.5	Side
Kitchen	8	Side	9.5	Side
Bathroom	8.5	–	8	–
WC	3	–	2.5	–
Usable Area	84.5		88.5	

Res-C	Set 1a		Set 1b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	30	Rear	26	Rear
Room	12	Rear	13	Rear
Room	16	Rear	16.5	Rear
Room	15	Side	17	Side
Kitchen	11	Rear	10.5	Side
Bathroom	8	–	8	–
WC	2.5	–	2.5	–
Usable Area	94.5		93.5	

Res-D	Set 1a		Set 1b	
Room	**m²**	**Façade**	**m²**	**Façade**
Living Room	32.5	Front	24	Front
Room	12	Front	15	Front
Room	16.5	Front	15	Front
Room	16	Side	17	Side
Kitchen	8	Side	10.5	Side
Bathroom	8	–	8	–
WC	2.5	–	2.5	–
Usable Area	95.5		92	

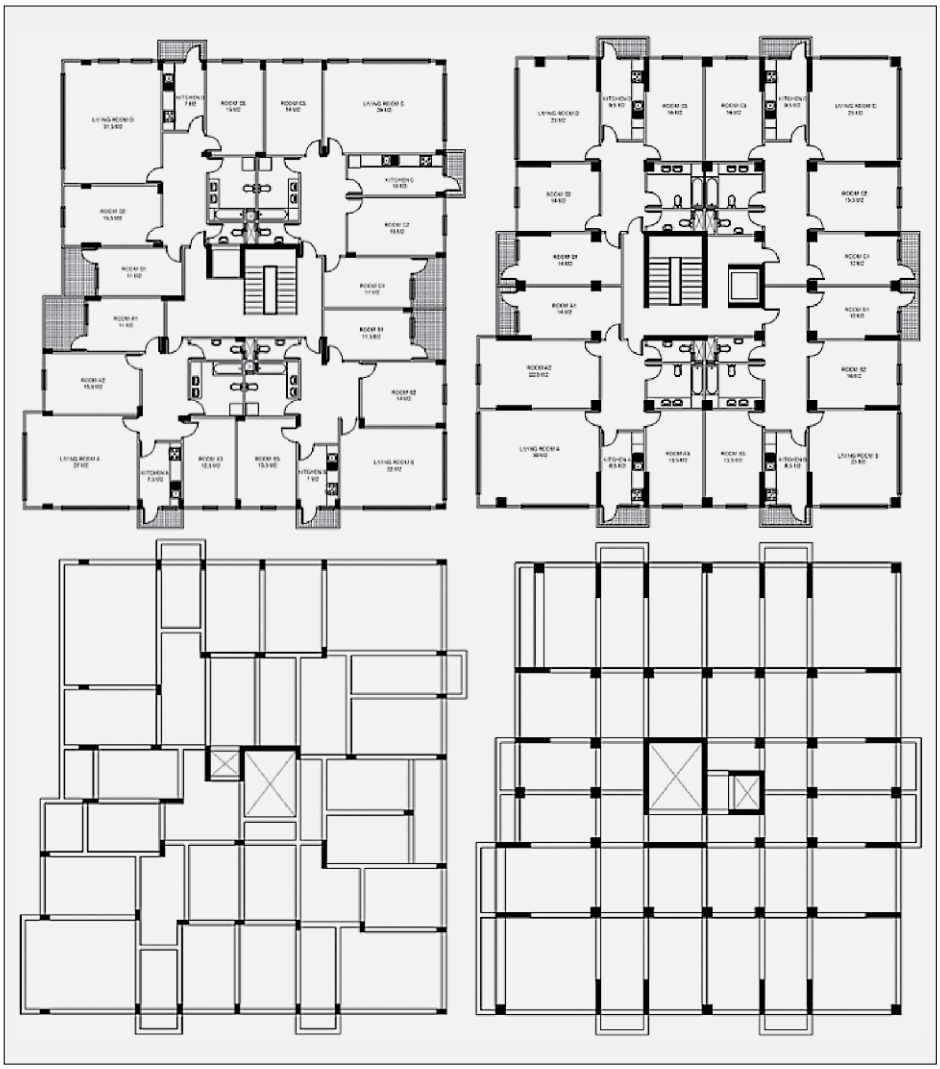


Fig. 8 On left: Set 3a, architectural plan (above) and structural system (below) with seismic design faults. On right: Set 3b, architectural plan (above) and structural system (below) are seismically improved.

ration of Res-A before and after the seismic improvements. There are small decreases in the sizes of the rooms due to the increasing sizes of structural elements. These variations would not negatively affect the use of these rooms. Both Res-A and Res-B gained a dressing room next to their master bedrooms. Spatial arrangement of Res-B is significantly improved after the redesign, which compensates for the loss in the size of the master living room (Table III).

• **Architectural model pair with three residential units on each floor (Set 2a-2b)** – Set 2a-2b has three residential units on each floor. These three residential units will be called Res-A, Res-B and Res-C. These residences are also "three plus ones" with a master living room and three smaller rooms. There is also a kitchen, a bathroom and a guest toilet in each residence. Res-B and Res-C have small storage rooms (Fig. 7).

The floor plan of Set 2a suffers from the same problems with the residential units from Set 1a. The master living rooms are again designed as large as possible and equal in size even though these units are separate and will be occupied by different users having different spatial needs. The structural system is asymmetric and irregular. The cross-sections of columns are small. There are two shear walls located on both sides of the building's main stairwell. These shear walls would have very little positive contribution to the seismic behavior of the building. In fact, the eccentric location of the shear walls would probably result in torsional displacements creating large bending moments and shear forces on the columns located on the opposite side of the building.

In Set 2b, a symmetric and regular structural system is designed to the extent that is allowed by the irregular shape of the building

site. Column cross-sections become larger and shear walls are arranged in both earthquake directions. Shear walls are located around the outer periphery of the structural system. This building will be subjected to torsion due to the site shape. This arrangement of shear walls on the outermost axes will allow them to counter the shear forces and bending moments resulting from the torsional displacements during the earthquakes. Structural axes are straight and unbroken in every direction (Fig. 7).

The two architectural models of Set 2 are comparatively analyzed in terms of their usable floor areas and access to view. The only significant change in the spatial configurations of Res-A and Res-C, before and after the seismic improvement, is in the floor area of the master living room. This is a necessary compromise to have an earthquake-resistant structural system. The decrease in the size of these spaces is not significant enough to upset their function as the primary living area of the residential units. In contrast, Res-B now has a larger master living room. There are small variations in the sizes of the rooms in all three units. These variations would not negatively affect the use of these rooms. Overall, the building represented in Set 2b offers the same three residential units with comparable floor areas and access to view with a much higher level of earthquake safety (Table IV).

• **Architectural model pair with four residential units on each floor (Set 3a-3b)** – Set 3a-3b has four residential units on each floor. These three residential units will be called Res-A, Res-B, Res-C and Res-D. These residences are also "three plus ones" with a master living room and three smaller rooms. There is also a kitchen, a bathroom and a guest toilet in each residence (Fig. 8).

The floor plan of Set 3a suffers from the same problems as the models Set 1a and Set 2a. The master living rooms are again designed as large as possible and equal in size. The structural system is asymmetric and irregular. A certain amount of asymmetry is present, however most of the irregularity arises from the effort to shape the building structure according to the spatial configuration. The continuity of structural axes was not prioritized. The cross-sections of columns are small and there are only two shear walls, one located on both sides of the elevator and one near the building's main stairwell. The eccentric location of the shear walls would result in torsional displacements (Fig. 8).

In Set 3b, the structural system is redesigned according to the seismic design principles. Symmetry, regularity, and the continuity of structural axes are provided in both earthquake directions. Column cross-sections became larger and shear walls are arranged in both earthquake directions. Shear walls are located around the outer periphery of the structural system. Like Set 2b, shear walls are arranged on the outermost axes to counteract the effects of the torsional displacements on the outermost columns of the building (Fig. 8).

The two architectural models of Set 3 are comparatively analyzed in terms of their usable floor areas and access to view. Res-A is the only unit that becomes significantly larger with respect to its original floor area. Res-B, Res-C and Res-D do not vary in terms of total floor area. The only significant change in the spatial configuration of Res-D, before and after the seismic improvement, is in the floor area of the master living room. This is an undesirable but necessary compromise to have an earthquake-resistant structural system. In contrast, Res-B now has a larger master living room. There are overall increases in the sizes of the rooms in all four units, which would make these residences more valuable in terms of customer evaluation. The building represented in Set 3b, while having somewhat more drastic design changes from its original design compared to the buildings represented in Set 2b and Set 1b, still offers an earthquake-resistant architectural solution containing the four residential units with commercially acceptable floor areas and access to view (Table V).

Conclusion

Mid-rise RC residential buildings are a common typology in Turkey and the wider Balkans region and as such the design of these buildings constitutes a sizable portion of almost every architect's portfolio. Unfortunately, the past seismic performance of these buildings was very poor, especially in Turkey. Seismic codes have continuously brought new and stricter requirements for the design and construction of these buildings. Many of these requirements such as the calculation methods, numerical modeling principles, and detailing of RC members were oriented towards the structural engineering domain, however these new requirements also resulted in some direct and indirect changes in the way architects design their buildings. This study has the aim of making the seismic design principles for mid-rise RC buildings clear and understandable for architects. In this context the following points can be stated about the strengths and limitations of the methodology and the main outcomes:

• The factors affecting the seismic performance of a RC building are numerous. Only a portion of these factors is directly related

with the architects' design decisions. A further prioritization can be made among these to determine the most influential parameters. Such an approach is necessary to render the propositions of the study understandable and applicable by a wider architectural audience. This study states that the symmetric and regular arrangement of structural elements, the avoidance of torsional irregularity, the use of shear walls and the increase in column cross-sections are the most influential parameters. This decision is soundly based on the existing seismic codes' requirements, scientific literature and the current state of the construction industry in Turkey. Since the topic of seismic design is multifaceted and interdisciplinary in nature the prioritization of the most critical seismic design factors can be done with other points of view in different contexts.

- The effectiveness of selected seismic design criteria is demonstrated via finite element modeling on a single building. This model was simplified and adapted from a building that did not survive a past earthquake. The simplifications included the omission of minor architectural details such as the non-structural components and the exclusion of staircase details from the model. In this regard the model can be considered a semi-idealized version. This adaptation and simplification is made to emphasize the effect of the aforementioned seismic design criteria on the structural performance of the structure and avoid the main discussion to be sidetracked minor details. Such an idealization approach may not be suitable for an engineering audience but it is critical to convey the desired message clearly to architects.

- The finite element analysis is conducted for a single case while the discussions on the other two models are kept at architectural comparison level. The reason for this limitation was to keep the discussion focused on the architectural design aspect of seismic design. The application of the selected seismic design criteria to the finite element model demonstrated the effectiveness of the proposed improvements. The structure represented in the finite element models is a typical example of the mid-rise RC residential buildings in Turkey. It does not include exceptional design features and formal characteristics that would introduce case specific seismic design considerations. Therefore, it is possible to generalize the results obtained from the comparative finite element analysis to other RC buildings of similar function, size and formal characteristics. This study does not state that case specific structural analyses are not needed for the design and construction of RC buildings in architectural practice but it argues that if the seismic design principles proposed here are implemented by architects from the beginning of the architectural design process it is highly probable that seismic analyses done by the engineers will prove that these buildings are firmly within the seismic safety limits. It must be stated here that mid-rise RC residential structures built on sites with specific topographic features or shapes that impose highly irregular formal characteristics to the building are excluded from the scope of this study.

- This study is conducted within the context of the built environment and the factors driving the urban policies and the construction industry in Turkey however the seismic design principles proposed here are context independent and can be implemented by architects within comparable contexts such as the Balkans and the wider Mediterranean regions.

- The comparison criteria selected for the architectural models are the floor area of the residential units, the number of rooms and the orientation of rooms. This study does not have a reductionist approach, which bases the architectural value of buildings on basic plan features and the amount of usable areas in residential units. The selection of these criteria is merely based on the decision-making habits of the property owners in Turkey, which is echoed by the typologies produced by the building industry.

- The findings of this study has be deemed successful in proving that, within the context defined by the methodology, considerable seismic improvement can be achieved in mid-rise RC residential buildings by the application of relatively few, basic design features by the architects. These design features are the symmetric and regular arrangement of structural elements, the avoidance of torsional irregularity, the use of shear walls and the increase in column cross-sections. Furthermore, the study demonstrates that the application of these features is possible through architects' design decisions.

- The findings of this study will contribute to the ongoing debates about the improvement of the existing aseismic building stock through urban transformation processes in the sense that designing a mid-rise RC residential building with a more robust structural system with somewhat restricting features in terms of plan arrangement is not an insurmountable obstacle in preserving the architectural expectations of the property owners from their new buildings. In short, this study demonstrates that architects who have an awareness of some basic but fundamental seismic design principles can design earthquake resistant homes for existing property owners on the site of their existing buildings without

any losses in the aforementioned architectural parameters.

As a final word, it must be acknowledged that, the scope of architects' involvement in alternative seismic improvement methods such as retrofitting can be explored and comparatively analyzed with respect to the rebuilding method. The economic and urban impact of more culturally sustainable approaches to urban transformation is also a valid direction for further studies, as the concern for the preservation of architectural heritage is an ever-increasing one in the rapidly transforming cities of 21st century.

[Proofread by Stephen Bryant]

Author's biography

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The conceptualization, establishment of methodology, literature review, data collection, structural analysis, architectural analysis, writing and visualization of this paper are done by the author.

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Illustrations source

Author

Fig. 1 Study and strategy of development of Sisak green infrastructure, 3E projekti

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Historical Development of Urban Green Infrastructure and Possibilities of its Implementation in the Republic of Croatia

HISTORICAL OVERVIEW
IMPLEMENTATION
SUSTAINABLE SPATIAL PLANNING
URBAN GREEN INFRASTRUCTURE
URBAN LANDSCAPE

Research has been motivated by a wide range of concepts of the term urban green infrastructure. As the aim was to indicate a clear basis for the term, an investigation of its development was a necessity, not only in the European, but also in a broader context.
Although green infrastructure is included in the 21st century policies of protection and development of EU landscapes, its foundations can be traced back to the models of ideal Renaissance towns and urbanist concepts mainly from the 19th and 20th century. In these historical periods used concepts meant urban landscapes as systems, a part of the environment, as seen in green corridors, green belts, green wedges, green networks and through the perception of urban green systems. As a modern concept the urban green infrastructure has been upgraded with developed roles, extending functions, scopes and scales from previous historical models. In that sense it maintains its social role of improving the quality of life in towns, while at the same time defining town texture with its urban morphological significance. At the same time it also develops ecological values and extends its scale to nonurban local, regional and international contexts.
Despite its benefits, spatial planning documents in the Republic of Croatia still lack measures and actions which would recognise the true benefit of green infrastructure in spatial development.

INTRODUCTION

The concept of green infrastructure, which has been in use in Europe since 2013 (European Commission, 2013) is a new way of looking at urban open spaces as a subsystem of the city. It is characterized by a meaningful layout of open public spaces with certain social, urban morphological and environmental roles which influence the economy of the city. The social and structural role of open spaces has been a subject of reflection in earlier historical periods while its ecological function has become a subject of recent research developed because of increasingly endangered ecological systems and the disappearance of ecological links between different habitats. Given this, urban landscapes are seen as potential holders of ecological roles and green urban infrastructures are increasingly becoming a subject of research within the concept of green infrastructures of the entire region, but also of wider spatial units. Taking into account its prominent ecological, but also other roles in the wider landscape context, there is a need for planned connection of open urban areas (especially green) in a sustainable system that is connected to the suburban landscape. At the same time, this aspect is closely related to human uses of space, which, due to climate change, often face new negative phenomena: "greenhouse effect", urban "heat islands", floods, soil erosion, landslides, fires, etc. Open urban areas remain the most important spaces for social contacts of city dwellers despite the time of technological progress and its impact on the social life of the individual (social networks, virtual reality, etc.) so their importance for cities is unquestionable (Ward Thompson, 2002). In this sense, in addition to the urban green infrastructure there are also "non-green" open areas, contributing to the preservation of the inherited tradition of historic cities whose main public spaces in the past were squares and city streets. Therefore, all open areas (those that do not occupy buildings) represent "nature" in a city that does not have to be only or exclusively "green" (Kienast D. cieted in Weilacher, 2006).

The research stems from the thesis that urban green infrastructure is a concept that finds its origin in history, when cities had a much simpler structure and similar basic roles as well as a relationship with open, public areas that defined urban structures and urban life. As a new concept, however, it has expanded the understanding and role of open public spaces in the city, as well as that of the wider landscape. Furthermore, the hypothesis is that green infrastructure is not sufficiently supported in Croatian legislation and planning processes, which consequently limits its implementation in the urban planning system.

METHODOLOGICAL FRAMEWORK

The extent to which historical urban concepts are comparable to the contemporary concept of green infrastructure is re-examined through comparative analysis and interpretation of urban plans and concepts of historic cities. The analysis includes theoretical, hypothetical and practical concepts (realizations), which basically represent open and green areas with a certain degree of systematization, networking or respect for open areas as a city-defining element.

The analysis was based on the interpretation of cartographic representations and / or textual descriptions of a set of criteria that examine compliance of historical concepts with today's definition and role of green infrastructure. The criteria include determining the basic role and purpose of the historical concept (social, ecological, economic or some other role), the category of open areas it covers (typology of open areas) and spatial features of the concept – systemicity of the concept (network, corridor, dispersion), degree and scale of area networking (the entire urban area, part of the city, suburban area), as well as the composition of the concept (representation of elements of green and blue infrastructure). The synthesis of data from the analysis identifies elements and items of green infrastructure that appear in earlier periods, as connected to the undeveloped tissue of the city, the open area of the city.

The paper analyzes and interprets today's planning and legal regulations of the Republic of Croatia[1] related to the implementation of the "Strategy on Green Infrastructure". Iti s what has determined the possibilities and the state of implementation of the concept of green infrastructure at the national and local level.

Defining the term green infrastructure

The European Commission (2013) defines green infrastructure as a strategically planned network of natural and semi-natural areas that includes all its ecological features and is designed and managed in a way that provides a wide range of benefits to the ecosystem. It includes "green" and "blue" areas (green areas and water corridors) and other physical features in inland, coastal and marine areas, be it rural or urban.

The network of "green" and "blue" urban and suburban areas brings natural, economic and social benefits, contributes to the health of citizens by expanding recreational opportunities and the general quality of life, supports "green" economy and increases biodiversity and the general state of the environment. Within the same document The European Commission advocates the protection, restoration, creation and improvement of green infrastructure. It is considered an integral part of spatial planning and territorial development in cases where green infrastructure is a better alternative to standard "gray" infrastructure systems and the importance of green infrastructure in protecting Europe's natural capital and its integration into EU sectoral policies and financial instruments is emphasized.

The British Landscape Institute defines green infrastructure as a network of natural, semi-natural spatial elements, green zones, rivers and lakes that stretch between villages and cities connecting green zones from local to interstate areas (Landscape Institute, 2013). This is one of the greatest contributions of green infrastructure to spatial planning today – the systematic perception of the landscape at all levels ('cross scale'), interconnecting different scales and presenting green infrastructure as part of a larger "picture" of the city, region, state and ultimately, the continent.

Table I Overview of different levels of green infrastructure application*

Level of application	Elements of green infrastructure
International level	Large natural elements that pass through several countries – international river basins, mountain ranges, forest areas, protected areas, Natura 2000 areas.
State level	Identification of important green areas at the state level – national parks, nature parks, important river basins, larger lakes, important forest habitats, mountain ranges, coastal areas, wetlands, flood zones and other locally specific areas.
Regional level	Regional protected natural areas and those of great importance for the region – lakes, river basins, mountain ranges, forests of high natural value, vast pastures, rural and agricultural areas, coastal areas, wetlands, floodplains.
Local level	Areas of meadows and forests, rivers, streams, ponds, lakes, local nature reserves or other forms of protected areas, urban parks, gardens, courtyards, green roofs, vertical gardens, but also bio purifiers, rain gardens, hedges, tree lines, pedestrian and bicycle trails, restored or abandoned industrial areas, sports fields, golf courses, children's playgrounds, squares, open spaces of schools and kindergartens, as well as public, business and industrial facilities/areas, cemeteries, nurseries, agricultural land, wildlife crossings.

* adapted and supplemented according to Landscape institute (2013)

In this sense, the level of implementation of green infrastructure can be international, national, regional and local (Table I).

Green infrastructure, as an urban practice and a possible approach to dealing with the problems of the contemporary city, can be understood as a "top down" method. According to the basic theoretical framework, it belongs to the concept of *Green Urbanism*, which takes the relationship between the city and nature as the main starting point.[2] According to its theoretical assumptions, it complies with *Ecological Urbanism*, based on the concept of ecological system, which consists of the inseparable connection of technological (infrastructural), natural (ecological in the narrower sense) and social (economic-political) system (Kostrenčić and Jukić, 2020); and *Landscape urbanism,* in which landscape is the defining element of contemporary urbanism, i.e. an important city-building medium (Bojanić Obad Šćitaroci and Matuhina, 2012; Steiner, 2011).

Origin of the term green infrastructure

The size of cities and the complexity of the processes and relations that take place in them impose the need for a holistic view of open urban areas due to a clearer perception of the causal relationship between individual elements. It is what calls for the study of

1 Nature Protection Act of the Republic of Croatia, OG 80/13; Law on Amendments to the Law on Nature Protection, OG 15/18; Act on Amendments to the Spatial Planning Act, OG 98/19; Spatial Development Strategy of the Republic of Croatia, 106/2017; Green Infrastructure Development Program in Urban Areas for the Period 2021 to 2030, Ministry of Physical Planning, Construction and State Property; Regional Development Strategy of the Republic of Croatia for the period until the end of 2020, Government of the Republic of Croatia, 2017; Low carbon development strategy of the Republic of Croatia until 2030 with a view to 2050, Ministry of Environmental and Nature Protection, 2020; Climate change adaptation strategy in the Republic of Croatia for the period until 2040. with a view to 2070, OG 46/20, Strategy and Action Plan for Nature Protection of the Republic of Croatia for the period from 2017 to 2025, OG 72/2017.

2 Kostrenčić and Jukić (2020) divide contemporary approaches to urbanism into six basic categories (according to J. Barnnett): system urbanisms, green urbanisms, traditional urbanisms, community urbanisms, socio-political urbanisms, front page urbanisms.

urban landscapes[3] as a system that operates and develops as one of urban subsystems. Until recently, the term "green system", which was predominantly used in national literature, sometimes functioned as a synonym with the term "green infrastructure". However, in recent times, the term green infrastructure has become more common, because its meaning is certainly more layered. It refers to several different systems and at the same time represents a "living" space that is sometimes difficult to systematize within a single-layer due to the causal relationship of many factors. The term urban green infrastructure represents all open urban areas that are not necessarily green[4], so this term can sometimes have a contradictory meaning if it excludes other, "non-green" open areas of the city (e.g. squares, streets and pedestrian zones). Furthermore, until recently the term infrastructure itself has been most often associated with technical systems and structures within the city (sewers, roads, etc.), so a literal understanding of the term can be counterproductive (not referring to technical determinants of the system but to its "systematicity"; interdependence to all parts of a particular system).

Urban green infrastructure, as a city system, has been researched by numerous authors using a variety of terminology that is not entirely synonymous but in some aspects coincides. For example, in addition to the terms green infrastructure, the terms *green system*, *greenway network*, and *ecological network* are used. The individual elements of these systems are *green corridors*, *green wedges*, *green belts*, *green fingers*, and *greenways*. The *greenways model* is one of the most frequent terms in the last decade of the 20th century (Maruani and Amit Cohen, 2007; Toccolini, 2004; Conine, 2004; Cawood and Somers Smith, 2006; Teng et al., 2011) while the terms *green network* (Teng et al., 2011; Mahmoud, El-sayed, 2011) and *green infrastructure* (Tzoulas et al., 2007; Sandström, 2002; Vandermeulen, 2011; Mell, 2010, Hostetler, 2011) are often mentioned at the beginning of the 21st century. It is considered that the original idea of green ways was developed into a network of green ways, which in many European countries is also called an ecological network (Hellmund and Somers Smith, 2006). In North America, the name green infrastructure is more common, while the introduction of this term to the European continent is related to the adoption of the European Strategy on Green Infrastructure in 2013. (European Commission, 2013). From that year onwards the term green infrastructure has become dominant in research of systems within urban and non-urban landscapes (Mat Nazir et al., 2015; Matthews et al., 2015; Connop et al., 2016; Mecrow and Newell, 2017; Serra-Llobet and Hermida, 2017; Navarrete-Hernandez et al., 2019; Pauleit et al., 2019; Buijs, 2019; Harrington, 2018; Shackeleton et al., 2019).

Green infrastructure is considered to be a term that enhances the definition of a green system. While the former green system of the city viewed urban space in the context of its open spaces and surrounding narrow zones, green infrastructure includes all natural, semi-natural and artificial networks of multifunctional ecological and other systems within, around and between urban spaces (Tzoulas et al., 2007). Thus, in addition to urban space, it also means the non urban area, so the city is seen in a broader spatial context. This approach was urgent due to the need to combine different aspects of understanding and inestigating. For instance, the emphasized ecological roles of green space often did not take into account other "non green" open urban and rural areas with important ecological but also significant social role for the urban population.

Given this, research in the first decade of the 21th century can be divided into two approaches: that dealing with environmental quality, which is often addressed by ecologists; and that dealing with human needs, most often addressed by urban planners and sociologists (Maruani and Cohen, 2007). Besides ecological and social roles, the morphological role of the green system is also important for the urban context. It is an extremely important aspect in forming the visual experience of the urban environment (Tyrväinen et al., 2007; Palmer, 2003; Steen Møller et al., 2019). Thus, in the first decade of the 21st century, there is a growing appreciation of the green system for the morphology of the city, which can become a dominant element of urban space and thus form a special model of the city (Moughtin and Shirely, 2005).

It is obvious that the concept of green infrastructure, i.e. its definition, was preceded by numerous pieces of research and theoretical discussions that dealt with the narrower and wider context of the city viewed from various perspectives.

HISTORICAL DEVELOPMENT OF THE URBAN GREEN INFRASTRUCTURE CONCEPT

With the disintegration of the built nucleus city form, which took place mostly during the nineteenth century, the open green urban areas became systematically organized elements of the urban fabric. Green spaces began emerging within urban areas, most often in the form of parks, which some authors de-

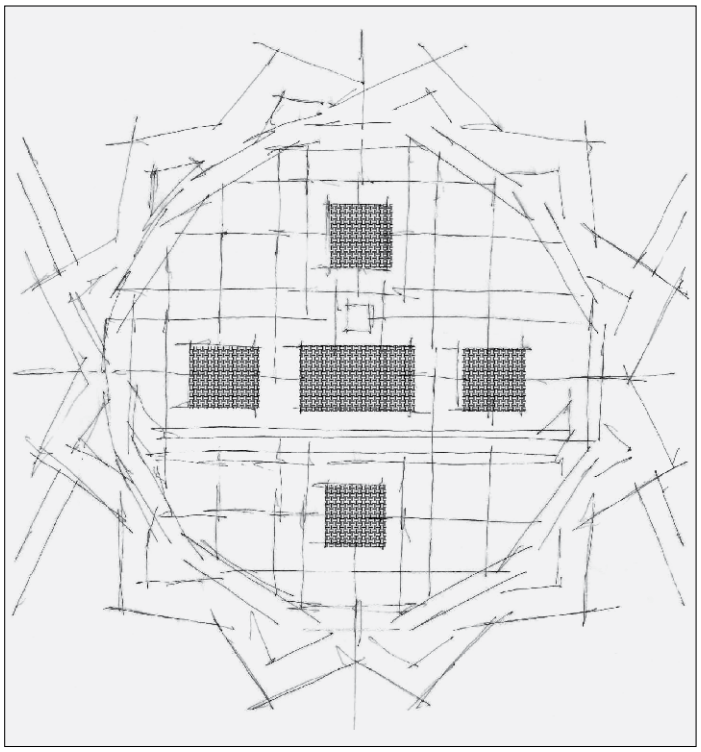


Fig. 2 Vicenzo Scamozzi, ideal city, 1615

Fig. 3 The green belt in Wagner's plan for the Ringstrasse

scribe as "bringing" landscapes into the city (Nicholson Lord, 2002). Whether created as an imitation of the lost landscapes around the city or as a developed idea of the already known forms of private or semi-private gardens (French, 1973), these landscapes can be associated with the Greek agora because in terms of their functionality they represented a social space in the form of a meeting point, a place for dwelling and companionship.

Systematic urban open areas are visible in theoretical urban models of ideal cities from the Renaissance period – P. Cataneo, 1507; Vasari di Giovane, 1598; V. Scamozzi, 1615 (French, 1973; Fig. 2). Open areas generate the urban morphology of the city and are not "leftovers" after construction, because they occupy the best quality spaces within the urban fabric. From an anthropocentric point of view, they posses their own environmental values because they consider the microclimate and ventilation of the city (Hrdalo, 2013).

These plans certainly had an impact on later considerations of systems of urban open spaces. Haussman's plan for Paris dates back to the middle of the 19th century (Fig. 4). The introduction of boulevards, connecting new or old, public, open urban areas, created a prudential system of open public spaces (Kostof, 1995; Giedion, 1977; Mumford, 1988; Choay, 1969; Hrdalo, 2013). This was the beginning of the development of a green network that included the integration of forest zones into the urban fabric of the city, but Haussman's plan defines the appearance of pointed green structures dispersed throughout the urban fabric. Derived from the existing urban morphology, this green linear element became an important link within the concept of today's green infrastructure of Paris. The transformation of forest areas on the outskirts of Paris into recreational spaces, which Haussmann intended to connect with a green belt around urban tissue, created the basis for later urban ideas.[5] The idea

3 The urban landscape is synonymous with open urban areas (Gazvoda, 1998; Ogrin, 2007). Also, Croatian terms *'krajobraz'*, *'pejzaž'* and *'krajolik'* are taken as synonyms because the terms are often used under the same definitions. For example, landscape is "the total space we can (visually) experience and is a result of the interaction of natural and anthropogenic factors" (Gašparović and Sopina, 2018); landscape is an area, perceived by the human eye, whose characteristics were created as a result of the (interaction) of nature and man (Lipovac, 2018, according to the European Landscape Convention, 2000); landscape is a specific area, seen by the human eye, the nature of which is a result of the interaction of natural and / or human factors (Act on the Ratification of the Convention on European Landscapes NN-MU 12/02)).

4 Perekovic and Miškic Domislic (2012) state that the term open urban spaces is sometimes identified with green areas or urban green areas without taking into account squares or other "non-green" open urban areas that should be viewed as part of the same system. In addition, a certain part of green areas remains illegible in the spatial planning documentation as it is classified for other priority purposes.

5 Despite the existence of these ideas, they were not implemented in Paris in later periods (Giedion, 1977).

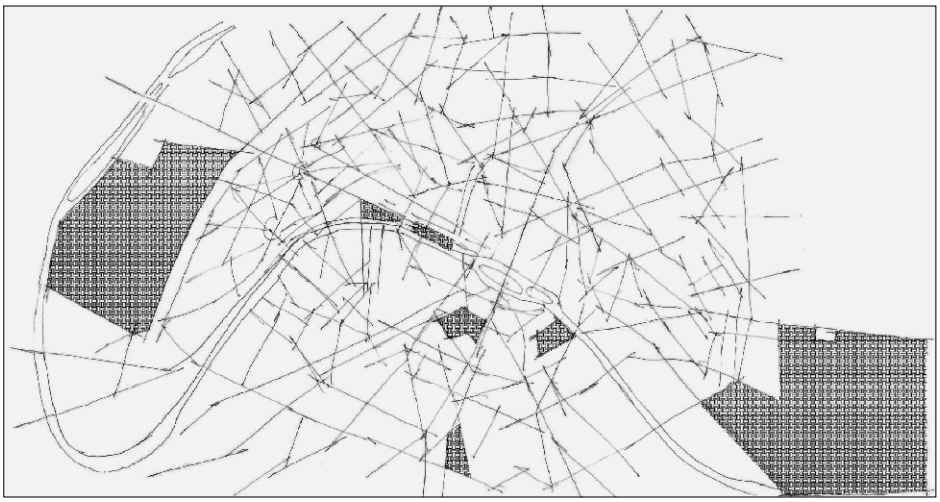


FIG. 4 GREEN ZONES IN THE HAUSSMANN'S PLAN FOR PARIS

of encircling cities with a green belt can also be linked to the mass process of demolishing city fortifications across Europe, as public parks were built in their place, creating a belt whose shape derives from the shape of the defense system. As the walls were circular, the newly created parks or other green areas created a green belt of circular character which was implemented in the form of a border between certain urban zones (Kostof, 1995; Giedion, 1977; Maksimović, 1976), as exemplified by Wagner's plan for the Vienna Ring (Fig. 3).

An essential example of thinking about green networking is visible in Howard's model of the "Garden City", whose diagram shows a scheme of systematic understanding and

FIG. 5 LONDON, GREEN BELT

planning of green spaces. The creation of ring-shaped concentric green belts that separate certain functions is a form that will later lead to the idea of a green belt as a green edge of the city (Fig. 5), not only typical for Anglo-Saxon cities, but also for the idea of connecting green areas within urban tissue (Moughtin, Shirley, 2005). Other theorists have improved Howard's idea by adding individual green elements to the urban area, in the form of parks (Maksimović, 1976; French, 1973). The idea of such "scattered" green areas within the urban fabric is also called the *'Swiss cheese system'* (French, 1973), penetrated from the periphery to the city center, connecting the suburban landscape with the urban center (Maksimović, 1976). Such a principle of green wedges is visible in the *"The Finger plan"* for Copenhagen from 1947th year (Fig. 6) and a similar principle emerged in the plans of Zagreb, Warsaw, Helsinki, Amsterdam and Freiburg (Košćak, 2000; Beatley, 2000). For example, the idea of "green fingers" or the green axis "Sljeme – Sava" appears in the Regulatory Basis of the City of Zagreb and the Directive Regulatory Basis of Zagreb from 1949/1953, as green corridors spread through the built-up fabric connecting the wooded slopes of Medvednica in the hinterland of the city and the river Sava (Fig. 7).

The concept of green urban infrastructure has certainly been influenced by the development of cities in North America. The emergence of green squares in the planned network as the basis of the cities of Savannah and Philadelphia from the 18th and 19th centuries (developed under the influence of the English Green Square) is considered to have influenced the development of the American Movement for City Parks (French, 1973). An important outcome of this movement is the development of *"corridor"* parks (Fig. 8), which were created by connecting parks, meadows, forests and waterways that are today an integral part of the green system of Boston, Philadelphia, Baltimore and Washington, as well as other cities outside the USA during the second half of the twentieth century. *"Corridor"* parks were important for the development of the concept of the green system of the city because the natural areas of linear character are implemented in the urban fabric (coastal edge, watercourses). Today, these elements are an important backbone for the implementation of urban green infrastructure as one of the most valuable, but also most sensitive parts of the urban landscape.

The development of the green system, i.e. urban green infrastructure, was also influenced by the idea of the need to create children's

playgrounds, implying their availability and even distribution within the urban fabric. This was the reason for the creation of a certain systematicity in the dispersion of elements in space, i.e. a system of dispersed ("pointed") green elements. The concept was originally applied in Chicago, where an initiative was launched to create a playground movement ('The Playground Movement'; Maksimović, 1976) and a similar idea was used by Berlage in Amsterdam to create a system of recreation and children's play zones (Giedion, 1977; Kostof, 1991).

The emergence of green belts as the edges of cities occurs after World War II in order to prevent their unsystematic expansion and growth. They can be considered a part of the urban fabric because they were often created as recreational areas and parks, and were most commonly implemented in England and other Anglo-Saxon countries (Gallion, 1993; Mandelker, 1962). At the same time, modernism created a completely new approach to the green spaces of the city. The Athens Charter brought a new understanding that supports the full integration of green and open urban areas into the urban fabric (Ogrin, 1985). Some authors associate this phenomenon with Howard's idea of a garden city as well as Sitte's thinking about the need to create a green urban space, expressed in the last chapter of his book "Green City" (Ogrin, 1985).

Awareness about the importance of green spaces in urban areas was probably influenced by Garnier's model 'Le Citte Industrielle'. However, the real quality of green spaces in functional settlements is usually limited due to insufficient functionality and design complexity of open urban areas. Nevertheless, functionalism has introduced changes in the comprehension of the relationship between open and built urban spaces, so in such circumstances, a green area is no longer an individual element within the city, but becomes a new, larger scale element which builds a network with its own system (Ogrin, 1985). Although such tendencies are visible in North American corridor parks, as well as in various theoretical models (previously mentioned), the modernist period signifies the historical moment when they were fully implemented. As modernism was the most widely accepted urban model, the system got implemented worldwide and thus probably contributed to the idea of green spaces as irreplaceable elements of the city. Since modernism did not deal with the square and the pedestrian street as a form of public urban space, postmodernism, as a reaction to the previous period, particularly emphasizes these spatial elements within the urban landscape. Therefore postmodernism, besides increased interest for tradition and history, is especially focused on the open spaces of the historic city (Velibeyoglu, 1999) and its sustainability.[6] In the postmodernist period, the city begins to be understood as part of a larger whole, and the awareness of its environmental role on Earth is growing (Hirt, 2005). Thus, the need for understanding of an urban space as a sustainable organism also grows. This implies a systematic consideration of the town, as well as the perception of the urban area as part of a wider system of non-urban spaces[7].

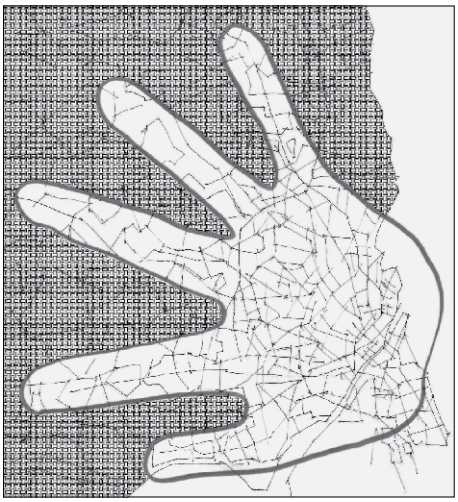
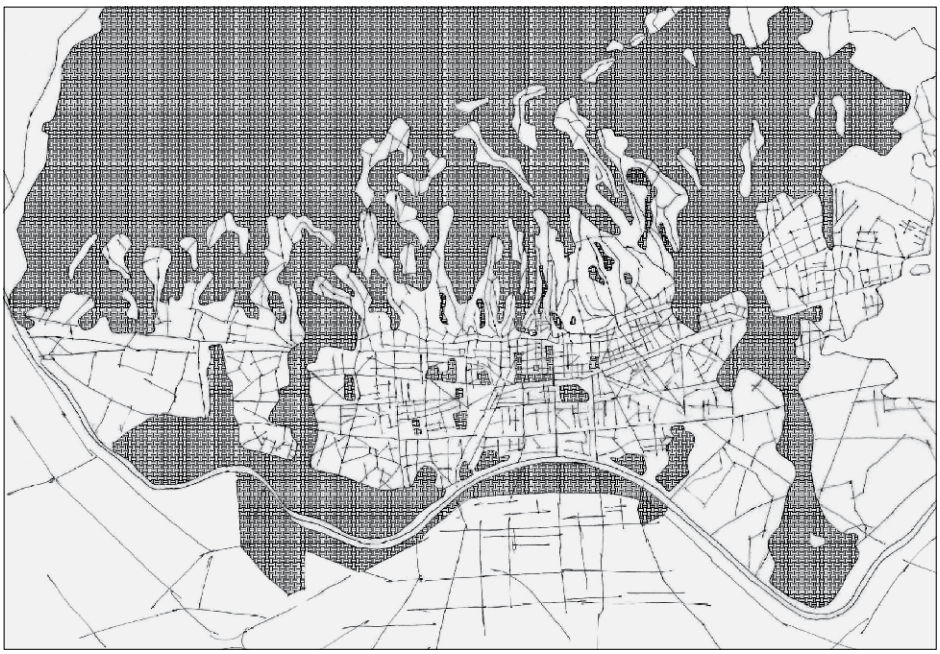


Fig. 6 Copenhagen, finger plan

Legal basis for the implementation of green infrastructure in the Republic of Croatia

In Croatia, as in other parts of the world, it is possible to single out examples of historical concepts and plans that posses an affiliation and compliance with today's concept of green infrastructure.[8] At the same time, through the example of the extinction of historical concepts[9], but also on examples of

Fig. 7 Green fingers of Zagreb which are connecting Medvednica and river Sava



6 In works of Jane Jacobs, Gordon Cullen, and Kevin Lynch.

7 This is a clear connection to the understanding of town in antiurban model of F.L. Wright in thirties in the 20th century.

8 For example, "Green Horseshoe", Regulatory Basis of the City of Zagreb, Directive Regulatory Basis of Zagreb 1949/1953 (so-called "Green Axis" Sljeme – Sava "or Antolovic's plan") and Green Dilatation (so-called "Blue Horseshoe" in Novi Zagreb).

9 For example, recent urban policies and plans have dismantled and fragmented much of the previously planned green links between Medvednica and the Sava River in Zagreb (Gašparovic and Sopina, 2018; Perekovic, Percic, Tomic Reljic, 2018).

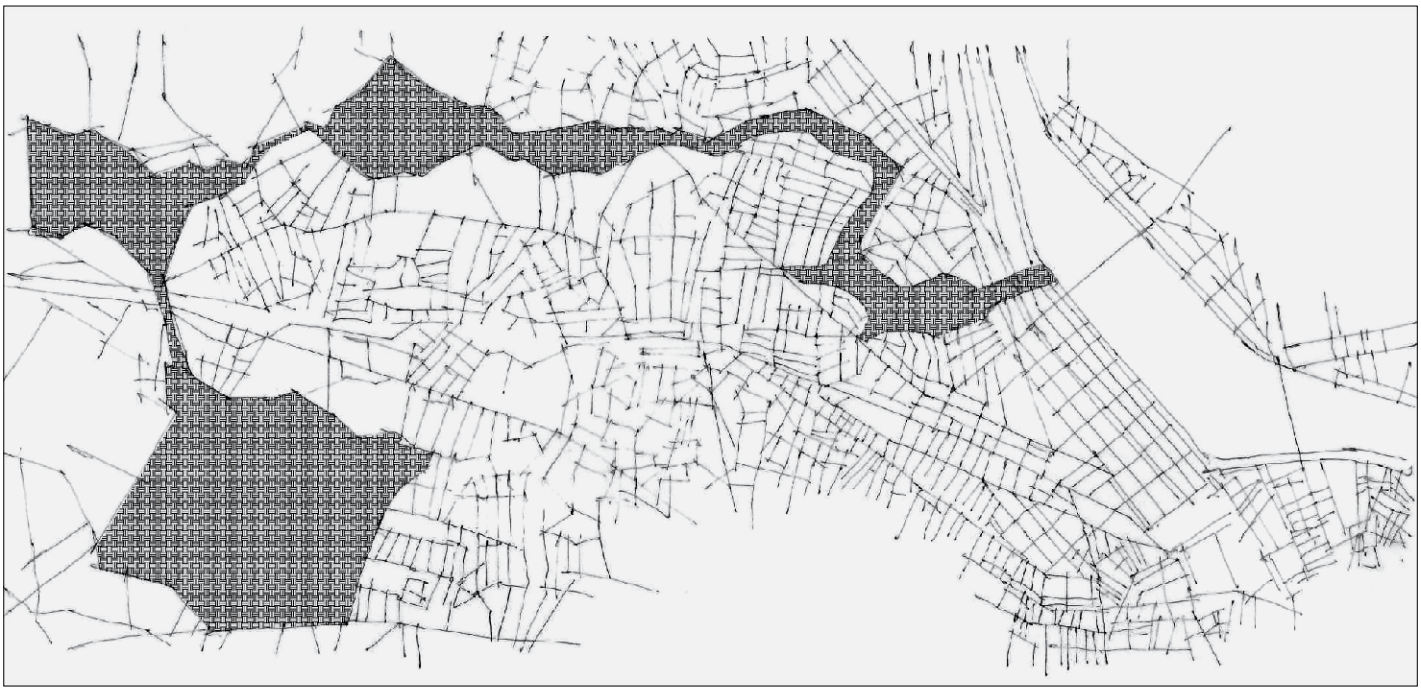


FIG. 8 BOSTON CORRIDOR PARKS – "THE EMERALD NECKLACE"

spatial planning decisions related to cultural, maritime and coastal landscapes of the Republic of Croatia, it is possible to point out the shortcomings of constructive thinking about green infrastructure as an important part of spatial planning and management.

In this sense, at the state level, Croatia does not have a well-designed and comprehensive policy that deals with the topic of green infrastructure, but this topic is approached mainly in fragments and indirectly through individual legal documents and strategies. Among them, perhaps the most important is the Spatial Development Strategy of the Republic of Croatia (OG 106/2017), which lays the foundation for the implementation of green infrastructure. In the priorities and strategic directions of spatial development of cities, it points to the need to establish new and preserve existing systems of urban green infrastructure because it contributes to "preservation, improvement and restoration of nature, natural functions and processes in cities" (OG 106/2017, p. 124). Furthermore, it states that in the process of making plans at all levels it is necessary to "promote the development of green infrastructure – a network of green areas, in which and with which natural functions and processes take place, with multiple benefits: improved efficiency of natural resources, climate change mitigation and adaptation to them, disaster prevention, water management, efficient land and soil management, conservation of habitat and species diversity and genetic diversity for future generations, multifunctional and resilient agriculture and forestry, low carbon transport and energy, health and well-being benefits, tourism development and recreation and, in general, ecosystem resilience".[10] Other Strategies (Table II) undoubtedly point to the importance of green infrastructure, but apart from emphasizing the benefits of green infrastructure and recommendations for its incorporation into spatial development processes and documents, there is no obligation to develop and implement them. In addition, Croatia is in the process developing a "Program for the Development of Green Infrastructure in Urban Areas for the period 2021 to 2030" (Ministry of Physical Planning, Construction and State Property, 2020) in accordance with the draft National Development Strategy of the Republic of Croatia until 2030, which is expected to be an umbrella strategic document if adopted, if it adopts clear guidelines applicable at all levels. In addition to the local level, guidelines should be adopted for regional and national levels.

Amendments to the Physical Planning Act (OG 98/19, Article 3) introduce the concept of green infrastructure, which the legislator defines as "planned green and water areas and other spatial solutions based on nature, which are applied within cities and municipalities, and which contribute to the conservation, improvement and restoration of nature, natural functions and processes in order to achieve the environmental, economic and social benefits of sustainable development". However, the law does not provide for the method of implementation, except

Table II Measures and recommendations related to green infrastructure in the strategic documents in the Republic of Croatia

Strategic documents	Measures and recommendations regarding green infrastructure
Spatial Development Strategy of the Republic of Croatia (OG 106/2017)	– priorities and strategic directions of spatial development indicate the need to establish new and preserve existing systems of urban green infrastructure – networks of green areas (preservation, improvement and restoration of nature, natural functions and processes in cities) – in the planning of green infrastructure, the solutions of urban and suburban green infrastructure, green infrastructure within the integrated planning of the sea and coastal area and green infrastructure as a procedure in the rehabilitation of degraded parts of space (during urban transformation, rehabilitation and temporary use) – responses to climate change in urban areas are linked to "green infrastructure construction"; planning the ratio of built structures and natural and green areas; landslide landscaping, etc.
Regional Development Strategy of the Republic of Croatia for the period until the end of 2020 (OG 75/2017)	– local and regional development based on the "green city" – "improvement of the urban environment and development towards healthy and sustainable living areas" – the strategic goal of increasing the quality of life encourages the revitalization of existing buildings and the planning of new social and sports buildings "as part of the green infrastructure of the city" – measures to improve the quality of life and development of urban areas encourage the development of urban green infrastructure – "through the establishment of green infrastructure of cities they enable landscaping, construction of roof gardens on large buildings and the establishment of green walls and roof gardens in parts of the city where green space is lacking"
Low Carbon Development Strategy of the Republic of Croatia until 2030 with a view to 2050 (OG 25/2020)[11]	– "The program for the development of green infrastructure in urban areas elaborates goals and measures for the development of green infrastructure which, among other things, increase the energy efficiency of buildings, reduce CO_2 emissions and reduce temperatures in the areas of thermal islands in urban areas."
Climate change adaptation strategy in the Republic of Croatia for the period up to 2040 with a view to 2070 (OG 46/20)	– proposed "implementation of the concept of green infrastructure in order to strengthen resilience to climate change in urban and rural areas" (measure of hih importance) – includes "certain technical interventions, such as the construction of protective dams and walls, construction of hydraulic structures, but also afforestation, construction of green infrastructure, strengthening the absorption capacity of land to receive excess water, etc." – it is proposed "to make an analysis of the existing network of green and water areas in urban and rural areas and the possibility of improving the links between individual elements of green and blue infrastructure of local and regional importance" – improve natural and anthropogenic ecosystems in order to increase biodiversity in order to better adapt to climate change (encouraging green architecture and green and blue infrastructure)
Strategy and action plan for nature protection of the Republic of Croatia for the period from 2017 to 2025 (OG 72/2017)[12]	– the inclusion of green infrastructure in spatial planning can significantly contribute to reducing habitat fragmentation – emphasizes measures for the preservation and restoration of green infrastructure

that the development of green infrastructure is set as one of the objectives of spatial planning (OG 153/13, 98/19, Article 6, paragraph 1). Given that there is an accepted definition at EU level (European Commission, 2013), it is unclear why it is not included in the Act in translated form. The "planned green and water areas and other solutions based on nature" can in no way be considered synonymous with "strategically planned network of natural and semi-natural areas". The first refers to human-shaped spaces based on nature, while the European Commission emphasizes natural and semi-natural areas. Given that Croatia is extremely rich in natural areas (European Environment Agency /EEA/, Copernicus Land Monitoring Service, 2018), even in highly urban areas, they represent the bearers of a multifunctional network of green infrastructure. This is especially important if these natural areas are also part of the Natura 2000 network, which is the backbone of the EU green infrastructure (European Commission, 2013). Therefore, we argue that neglecting natural areas and focusing on green infrastructure exclusively, as on planned green and water areas is not in line with the European practice.

In Croatian laws, in addition to the Physical Planning Act, the green infrastructure is mentioned in the Croatian Nature Protection Act (OG 80/13, Article 9), where it is defined as: "... a multifunctional network of protected and other natural and man-made areas and landscapes of high ecological and environmental value that enhance ecosystem services". The same paragraph was changed in the amendments to the Nature Protection Act (OG 15/18) in such a way that the point defining green infrastructure was completely removed. What is retained, however, is Article 7, paragraph (3), which states that landscape protection is "based" on the classification of landscapes according to their natural and/or created features into landscape types and the structuring of interconnected and multifunctional green / landscape infrastructure networks at the local, regional and national level". The problem in this definition is that at the same time they connect (1) landscape protection, which should refer to significant and characteristic features of the landscape that need to be preserved from changes and degradations regardless of their function in the green infrastructure system, and (2) landscape typology ("classification of landscapes according to their natural and/or created features into landscape types"), as a landscape management tool in the process of assessing the character of the landscape, whether urban or extra urban and (3) green infrastructure ("structuring interconnected and multifunctional green

10 Priority goal of the Strategy, 4.5.2 .; Strengthening natural capital by planning the development of green infrastructure, OG 106/2017, p. 162.

11 Guidelines for the implementation of measures to reduce emissions and increase outflows, Measure 'Improving the Sustainability of Urban Areas' (Ministry of Environmental Protection and Energy, 2020, p. 116).

12 Strategic goal 2: 'Reduce direct pressures on nature and encourage sustainable use of natural resources' (OG 72/2017); activity 2.5.2.

TABLE III OVERVIEW OF URBAN CONCEPTS AND MODELS WHICH HAVE CONTRIBUTED TO THE DEVELOPMENT OF THE URBAN GREEN INFRASTRUCTURE

Urban concept/ models through history	Criteria of the analysis			Impact on today's green infrastructure
	Categories of open surfaces	Basic role and purpose of the elements	Level and scale of networking, composition characteristics	
Models of ideal cities – Renaissance	central **square**	– center of the urban system – an open area that generates the urban morphology of the city (not the "residue" created after construction; occupies the qualities and target areas of the city) – open space is not typologically diverse, but numerous social functions take place on it because it is the central point of urban, public life (residence, children's play, sports activities, events ...) – ecological importance (microclimate)	high systematicity in the organization of squares, pedestrian streets and the perimeter wall	1. systematicity 2. the social role of the square 3. thinking about ecological values
	streets	– walk – environmntal importance of ventilation and microclimate		
	city walls	– space of walls and the immediate zone next to them (green) – walk		
Haussman's plan for Paris from the middle of the 19th century	the idea of a **green belt** 250 m wide around the city ("green belt")	– restricting the uncontrolled growth of the city – residential-recreational role	medium-high degree of systematization through the establishment and networking of open areas, including the background of the city	1. emergence of a green belt and a point system 2. green connections (alleys and boulevards) 3. emergence of planned recreational spaces within green areas 4. ecological value of forest integration in urban area
	pointed park structures distributed on the city fabric	– space of urban morphology – residential, recreational role		
	urban woodlands (Bois de Boulogne, Bois de Vincennes)	– recreational and dwelling		
	aleys/boulevars	– green connections through the city – communications		
Wagner's plan for Vienna – "*Ringstrasse*", from the middle of the 19th century	implementation of **a green belt or** ring ("green belt") created by the demolition of former fortification walls and other military fortifications around the old town, intended as a circular boulevard around the old part of the city	– morphological loosening of the urban structure because it separates the old from the new part of the city (inner green ring) – connecting open public urban spaces into a circular system – belt – a mixture of built and unbuilt (public buildings are important in it) – promenades are becoming an important part of citizens' lives	a medium-high degree of systematicity through the establishment of a green belt separating typologically different parts of the city	1. appearance of a green inner band 2. development of promenades
Garden city – E. Howard, end of the 19th century	implementation of a **green belt** on the edge of the city;	– limiting the uncontrolled growth of the city – productive role – recreational role	a medium-high degree of systematicity where open areas define the urban morphology of the city	1. green belt 2. radial green connections (connection between the center and the hinterland of the city) 3. ecological values – adapting the concept to local topographic conditions 4. bringing rural values to the city 5. development of the concept into a hierarchical system of garden cities separated by green areas
	central **park**	– defining the urban core – social center		
	radial connections of the central park with the green belt	– communication / connection – defining urban morphology		
Eberstadt, Mohring – Peterson, Berlin city scheme – competition work from 1910 (2nd prize)	idea of **green wedges**	– development of radial green connections in the form of a wedge by creating a connection between the city hinterland and the central part of the city – social functions are enriched due to the interconnection of green areas that ensure better connection of city residents with green zones – is a forerunner of the "*Finger Plan*" for Copenhagen	a medium-high degree of systematicity where the radial system of green areas defines urban morphology	1. appearance of green wedges (connections of the city center with the city hinterland)

/ landscape infrastructure networks"). In doing so, as already indicated, the term "landscape infrastructure" can not be considered synonymous with green infrastructure. Furthermore, in the strategic documents adopted in Croatia, green infrastructure is nominally mentioned and in certain segments its implementation is proposed, but the social and structural role of green areas in the city, which is the impetus for the development of green infrastructure, is not noticeable in all strategies, or are completely marginalized.

A positive step forward is that in Croatia several cities have decided to develop studies, strategies or action plans for green infrastructure and similar documents directly related to it. They are either in the development phase or have just been completed, so their implementation cannot be analyzed in this paper (example Sesvete, 2013; Zagreb, 2016 and 2018; Sisak, 2018; Križevci, 2020; Varaždin 2020; Rijeka, 2020; Petrinja, 2020; Lipik, 2020; Đakovo, 2020; Osijek, 2020; Obrovac, 2020). These studies, strategies and plans should serve as a basis for the development of spatial development plans of cities, general urban plans or detailed development plans. Despite the fact that there are no guidelines nor is the social aspect mentioned in national documents, in most of the studies made they are mostly included. The importance of social function is emphasized by Grădinara and Hersperger (2018) who are engaged in the research of green infrastructure in the strategic

Urban concept/ models through history	Criteria of the analysis			Impact on today's green infrastructure
	Categories of open surfaces	**Basic role and purpose of the elements**	**Level and scale of networking, composition characteristics**	
Corridor parks in North America – second half of the 19th century	**green corridors** ("linear parks")	– inclusion of watercourses as an important part of urban open space *(blue infrastructure)* – creation of a system of connected parks in the form of a corridor (e.g. 1878 "Emerald Necklace" in Boston, F.L. Olmstead, consisting of a series of connected open areas, mainly parks and water areas) – sequential appearance of programmatically different green areas – appearance of remedial green spaces along street corridors	a medium-high degree of systematicity established with the help of organic linear penetrations	1. emergence of green corridors 2. development of blue infrastructure (blue infrastructure) 3. emergence of the remedial role of the landscape
"The playground movement" – end of 19th century	**system of pointed** elements	– emergence of children's playgrounds – represents accessibility and even distribution within the city tissue in such a way that the maximum distance to them does not exceed half a mile (approx. 805 m) from the place of residence	a medium-high degree of systematicity created by means of evenly distributed point elements	1. emergence of a system of point elements 2. emergence of children's playgrounds
Copenhagen *"Finger plan"* – 1947	implementation of **green fingers** ("finger plan")	– plan for the expansion of urban traffic from the city center to the periphery and, accordingly, the establishment of a system of green areas ("wedges") separating residential areas – differentiation of the urban landscape by different functions – immediate availability of green recreational areas from residential areas – variety of functions (recreational, sports, agricultural) – becomes the basis for the development of a "green space system" of many cities	a high degree of systematicity implemented as a form of city expansion	
„London's Green Belt" – middle of the 20th century	implementation of a **green belt** on the edge of the city ("green belt")	– integration of the hinterland of the city as a space that is organically connected with the urban landscape with the purpose of urban expansion regulation, preservation of open areas between built-up areas – integration of production functions into the urban landscape – multifunctionality of the green belt (areas for different purposes – sports, recreation, agriculture, protective green areas)	a high degree of systematicity that defines the edge of the urban area	1. creation of a multifunctional landscape (integration of economic, recreational, residential role)
Green axis *„Sljeme – Sava"*; the Antolic plan (regulatory basis for Zagreb 1949/1953)	planning of the so-called **green axis** system "Sljeme – Sava"	– creation of a green network and corridor with the deepest possible penetrations of green areas from Sljeme towards the river Sava – understanding the corridor of open areas as an integral part of urban functions – recreation and protective role – zoning of open areas for various purposes (zones of green areas, sports and recreation) – influence on the microclimate of the city *"sunshine and ventilation of the city"*	a high degre of systematicity of organic structural natural features	1. creating a network emphasizing green fingers 2. protection of natural values of space (Medvednica, river Sava) 3. introduction of ecological values (mostly based on an anthropocentric view)
Functionalism (CIAM, Athens charter), 20th century	creation of a **green network** (made of areas and lines) through the city	– multifunctional green city network – diverse purpose of open spaces (typology of urban green areas and planning norms) – designed parks and green areas become the basic space between buildings with functions for all types of dwelling and recreation (green residential areas)	a high degree of systematicity that turn large areas into urban green spaces that spontaneously create a green urban network	1. Green spaces become an indispensable (necessary) elements of the city
Postmodernism	re-descovery of the **square** and the **street**	– reintegration of non-green parts of the system with its former values (square, street)	very high degree of systematization where spatial elements are viewed through various discourses (urban, social, ecological, economic)	1. developing environmental awareness 2. developing the systemic nature of the overall urban landscape 3. discovering the value of local characteristics and cultural heritage 4. high differentiation of open space functions, but also the development of their multifunctionality
	reinterpretation of **parks and other urban green areas**	– development of importance of adjustment to the local specific conditions – integration of cultural heritage as an landscape element – development of green spaces as sustainable system		

spatial plans of individual urban regions of the EU. Comparing planning approaches using hierarchical cluster analysis, the authors found that there are two different approaches to integrating green infrastructure into strategic documents; the integrated approach[13] and socio-cultural approach.[14] The authors did not notice a clear pattern of green infrastructure planning given the tradition of planning in a particular country, but they attribute this to the unique institutional context within which the plans are adopted. Many principles and related concepts of urban green infrastructure are present in part in the strategic planning of EU green areas, but Davies and Lafortezza (2017) indicate that there are differences in terms of content and level of consideration.

A positive example of the implementation of green infrastructure is the United Kingdom, which in the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019) indicates that plans at all levels must be strategically approached to conserve and improve the habitat network

13 This approach is considered comprehensive by Grădinar and Hersperger (2018) because the mutual influence of social and ecological systems

14 According to Grădinar and Hersperger (2018), urban regions have this approach for which green areas play an important role in urban aesthetics, preservation of the cultural landscape and preservation of historical heritage. However, as the authors point out, such regions have other instruments related to the planning of natural components, such as landscape plans in Germany or a regional land use plan in the Helsinki region.

and green infrastructure (paragraph 171). The Natural Environment Planning Practice Guidance (2019, in: Gregory, 2019) states that green infrastructure requirements must be considered at the earliest stages of planning and must be included in the making of development proposals. In addition to the national level, England and Scotland have adopted guidelines for green infrastructure; Natural England's Green Infrastructure Guidance (Natural England, 2011) and Green infrastructure: design and placemaking (The Scottish Government, 2011) which provide recommendations for all levels, from strategic and local plans, through residential, to individual housing. This has resulted in many examples not only of the development of strategies and plans for green infrastructure but also of the implementation of projects that contribute to environmental stability and social benefits for residents as well as to the sustainability of cities and adaptation to climate change.

Many positive examples can also be found in Germany; Leipzig, Mecklenburg-Vorpommern, Lenzener Elbtalaue, Emscher (European Commission, 2014). Namely, Germany has adopted the Federal Green Infrastructure Concept (Federal Agency for Nature Conservation /BfN/, 2017), which is envisaged as a basis for decision-making in plans adopted by the German Federation. As a backbone, the document sets out protected areas of nature, natural heritage, species and habitats, and ecosystem networks.

The Republic of Slovenia defines the green system in the Spatial Planning Act (Official Gazette of the RS, No. 61/17), which is expanded in the new draft Act, still under public discussion (Ministry of Environment and Spatial Planning, 2020), with definitions of green system settlements and the green system of the region, which also shows the initiative of implementation on all levels of planning. At the same time, for the purposes of drafting the Spatial Development Strategy of Slovenia 2050, they have been working on a professional background (Penko Seidl et al., 2017) related to green infrastructure, which provides detailed guidelines for its implementation, including the criteria for determining elements of green infrastructure at the national level.

Therefore, we believe that Croatia has an obligation to adapt the approach to the implementation of green infrastructure to its planning system, so that it is in accordance with the recommendations of the European Commission. It is proposed to adopt at the national level a document with detailed guidelines that counties, cities and municipalities can consider when planning development and later directly implement through targeted projects.

CONCLUSION

By reviewing the development of cities and urban concepts of historical periods, it can be concluded that the ideas of a systematic view of space existed before the twentieth century. Thus, the hypothesis that green infrastructure has its origin in historic cities is correct. The most obvious examples are models of ideal renaissance cities where the systematicity of open areas of the city in combination with anthropocentric ecological values is visible. Later it further developd through concepts such as "green corridors", "green belts", "green wedges", "green fingers", "green dotted elements", "urban green system and green networks".

However, through the concept of green infrastructure innovations, due to the perception of open areas, have been introduced on several levels. Thus, a certain open urban area is part of the urban green infrastructure, but also an element of regional and national green infrastructure. In this aspect, we find an important contribution of today's model of green infrastructure, which due to numerous environmental issues of today stands for "new" ecological values.

Although nowadays the contribution of green infrastructure is unquestionable, spatial planning documents of the Republic of Croatia are essentially of a theoretical nature without expressed real measures and activities that would achieve sustainable development of cities, including contributions to the concept of green infrastructure. Without a solid legal basis, as well as national guidelines, the implementation of green infrastructure remains at the level of the initiative of individual cities that understand green infrastructure as one of the imperatives of spatial development and sustainability. And therein lie today's best practices whose base should be regulated at the national level in the form of guidelines and instructions for the development of strategies, studies and plans for green infrastructure at all planning levels; from national to local, so that their development and application is comprehensive and mutually synchronised.

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Illustration sources

Fig. 1 Zavod za ukrasno bilje, krajobraznu arhitekturu i vrtnu umjetnost, Agronomski fakultet u Zagrebu, 2018

Fig. 2-8 (redrawed original plans), Pereković, 2021

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Fig. 1 Aerial image of Split from the west. Markings indicate the scope of Split 2 housing developments and areas planned from 1957 to 1968

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Split 2 Housing Developments Planned from 1957 to 1968

CONCENTRIC CONSTRUCTION SITES
HOUSING
HOUSING DEVELOPMENT
Split
Split 2

Split 2 is a significant part of urban and architectural heritage in Split and Croatia. This arises from the scope and reach of the rational urban planning and use of space, inventive architectural design focused on construction technologies, operations and materials which were mainly organized in concentric construction sites of housing developments and areas which predominantly featured standardized residential buildings and residential high-rises in the period from 1957 to 1968.

INTRODUCTION

Split is urbanistically and architecturally renowned for Diocletian's Palace, Poljud City Stadium and Split 3. Split 2 is a less known stage of urban and architectural development of the city which therefore merits integral and thematic analysis, valorization and presentation in a systematic manner (Fig. 1). In addition to the texts which had been written mainly by the protagonists and addressed the planning, design and development of Split 2, some scholarly and professional papers were published retrospectively. They mostly treated the urban and architectural development of Split 2 from 1945 to 1968 in a thematically fragmented manner.

Urbs magazine, number 6 from 1966 published a series of articles by the protagonists of Split 2, addressing certain housing developments of Split 2. Slavko Muljačić published the works "Development of Split 1944-1969" in Urbs magazine, number 8-9 from 1969 and "Development of Split 1944-1990" in the book "Split in Tito's time" published in 2002, discussing housing of Split 2 (Muljačić, 1969a; Muljačić, 1969b; Muljačić, 2002). Josip Vojnović, one of the protagonists of Split 2, in 1977 completed and in 1978 defended his doctoral dissertation "Rationalization and evolution of housing and communal construction in the planning process" which partially analyzed certain housing developments of Split 2 (Vojnović, 1977). Retrospectively, the books by Darovan Tušek stand out among the published work on Split 2. These include his books "Architectural competitions in Split 1945-1995" published in 1996, and "Lexicon of modern architecture in Split" from 2018 (Tušek, 1996; Tušek, 2018). He also edited „Split : Architecture of the 20th century : A Guide", published in 2011, and which contains reference texts authored by young scholars, on certain residential buildings and high-rises.[1] In 2011, Marina Majić published the book "Architecture of Split 1945-1960" which deals with some residential buildings of Split 2 (Majić, 2011). Sanja Matijević Barčot defended her 2014 doctoral dissertation "The Impact of Socially Organized Housing Strategies on the Architecture of Split 1945-1968" in which she touches on housing developments of Split 2 (Matijević Barčot, 2014). She deals with the topic in her paper "Housing Construction in Split in the Immediate Postwar Period (1945-1951)" published in Prostor scholarly journal in 2019 (Matijević Barčot, 2019: 71-75).

These works, in their scope and reach, together with other reference works, constitute the basis and impetus for this paper, which is a continuation of previous research on Split 2. It is methodologically and thematically focused on contributing to a systematic analysis, valorization and presentation of housing developments in Split in line with the 1951 Directive Regulatory Planning Guidelines of Split and which were constructed predominantly in concentric construction sites, following the establishment of the Department for the Organization of Construction and the Department for Analysis and Records at the Bureau for Urban Planning – Split 1957, up to the Competition for the Urban Planning Solution of the eastern part of Split – Split 3 in 1968. The research question, problem and subject matter of the paper are urban and architectural features and significance of Split 2 housing developments from 1957 to 1968 in the context of urban and architectural development of Split. The research discourse and the aim of the paper is to examine the thesis on the significance of the scope and reach of Split 2 housing developments from 1957 to 1968 for the urban and architectural heritage of Split and Croatia by applying systematic review method. The expected scholarly contribution of the research is to provide a uniform and clear overview of the housing developments planned in Split from 1957 to 1968. This topic has been mostly dealt with in a segmented and partial manner in the available reference literature, mostly within broader topics related to Split 2 or Split in general.

1 The authors of reference texts are Hrvoje Bartulović, Ana Grgić, Sanja Matijević Barčot and Vesna Perković Jović.

2 At the end of the 1960s, nearly 1,800 unplanned residential building were constructed. (Muljačić, 1969a: 33)

Planning and construction of Split 2

Split was, to a certain degree, demolished in the Second World War in the Allied air strikes carried out in 1943 and 1944 (Karakaš Obradov, 2008: 349). The ruins of the devastation were cleared out and the damaged infrastructure and buildings were rebuilt after the war (Družeić, 1957: 25; Muljačić, 1966: 33; Gamulin, 1989-1991: 29). Split soon grew into a regional administrative, economic and transport center of Dalmatia, affected by a significant housing shortage. The construction of new apartments in Split 2 was undertaken at a gradual pace disproportionate to the population growth. Split 2 spatially developed along the perimeter of the historic center in the city cassettes of the hitherto suburbs, which at the same time were experiencing unplanned construction of family houses (Bjelajac, 1970; Klempić, 2004: 112-114).[2]

Poljud, the inaugural housing development of Split 2, features six standardized residential buildings constructed in the period from 1947 to 1949. In 1948, a residential colony was developed in Put Brodarice, which typologically belongs to a residential hotel for singles and couples without children. Simultaneously throughout 1948 and 1949, colonies of single-family houses in Table, Špinut and along Mitnička Street were also constructed, while a housing development with small single-family houses and low-rise residential buildings was built in Bačvice. Due to low density housing typology of modest family houses, the City People's Committee decided that such development represented irrational use of the land in comparison with multi-storey residential buildings, which have since come to dominate housing in Split (Matijević Barčot, 2019: 71-74).

The reconstruction and development of Split until 1950 was carried out in line with the Regulatory Plan of Split, as envisaged by Werner Schürmann's competition entry from 1924 (Tušek, 1994: 35, 39; Piplović, 2006: 473), the 1940 Amendments to the Regulatory Plan and in a series of improvisations (Družeić, 1957: 25, 27). In 1949 a new Directive Regulatory Planning Guidelines of Split were drafted at the Urban Institute in Split by Milorad Družeić and Budimir Pervan with associates, which were subsequently adopted in 1950 (Čičin Šain, Pervan and Vekarić, 1951: 17-19; Pervan, 1966: 44; Piplović, 2011: 272).

The Directive Regulatory Planning Guidelines of Split represent the planning basis of Split 2 with theoretical origins in the Athens Charter, Functional City concept and CIAM guidelines, which organized the city into function-based zones – for residential, business, recreational and transport purposes. The network of pre-existing and planned main city roads defined the residential cassettes for future housing developments (Tušek, 1996: 115; Fig. 2). Housing was planned in 23 housing units or developments for a total of 164,000 dwellers across 687.5 hectares, mostly on the southern slopes of Split peninsula with beautiful vistas of the central Dalmatian islands, and protected from the wind and dust coming from the northern port-industrial zone. The housing developments were dimensioned and organized in accordance with the capacity of the primary school planned for each individual housing unit, including a kindergarten (one per every 100 apartments), children's and recreational playgrounds, sports and supply centers and service, as well as administrative and social facilities. The planned number of residents in the housing developments ranged from 3,000 to 6,000 (Čičin Šain, Pervan and Vekarić, 1951: 28), while the planned average housing density was 240 dwellers per hectare. A single-car garage unit was planned for one car per every ten residents (Kalogjera, 1966a: 49-50).

After 1952, partial infill of the vacant locations occurred within uncompleted city blocks, blocks which had been demolished in the Second World War or locations along continuously developing city structure. This was due to the decision of the City Department for Communal Affairs on infill of partially developed residential blocks (cassettes) with free-standing residential buildings because urban

Fig. 2 Directive Regulatory Planning Guidelines of Split from 1951. Black areas display the residential zones of Split 2 housing developments and areas planned from 1957 to 1968 are marked as follows: 1 – Housing development Špinut 1; 2 – Housing area Lučac – Gripe; 3 – Housing development along Osječka Street; 4 – Housing area Meje; 5 – Housing development along Solinska road; 6 – Housing development Škrape; 7 – Housing development Skalice – Glavićine; 8 – Housing development Špinut 2; 9 – Housing area Bol – Plokite; 10 – Housing area Bol I; 11 – Housing development Bol II; 12 – Housing development Gripe – Lokve; 13 – Housing development Plokite

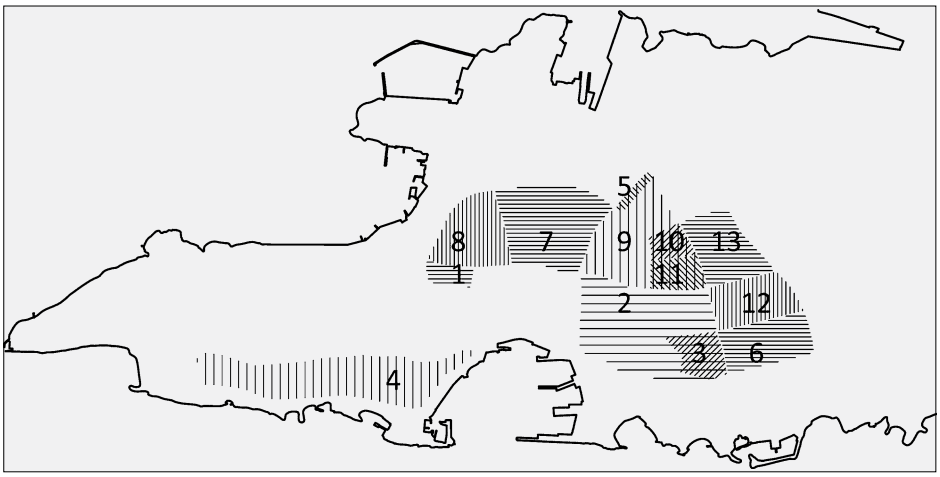

Fig. 3 A plan of Split displaying Split 2 housing and areas planned from 1957 to 1968: 1 – Housing development Špinut 1; 2 – Housing area Lučac – Gripe; 3 – Housing development along Osječka Street; 4 – Housing area Meje; 5 – Housing development along Solinska road; 6 – Housing development Škrape; 7 – Housing development Skalice – Glavičine; 8 – Housing development Špinut 2; 9 – Housing area Bol – Plokite; 10 – Housing area Bol I; 11 – Housing development Bol II; 12 – Housing development Gripe – Lokve; 13 – Housing development Plokite

planning was conditioned by the pre-existing structures and communal infrastructure. Partial infill of the city blocks with free-standing residential buildings is seen by experts as limiting for the development of Split, as it failed to provide ideal housing conditions aligned with functionalist criteria, i.e., it prevented orientation and disposition of apartments aimed at optimal sunlight, ventilation, and pollution protection (Pervan, 1950: 3; Čičin Šain, Pervan and Vekarić, 1951: 28). Residential building complexes were also developed throughout the 1950s, for example in Biokovska Street, as well as housing developments with standardized single-family houses in Brda, Kman, Sućidar, Križine and Visoka (*** 1959b: 2; Bombardelli, 1966b: 91; Matijević Barčot, 2014: 89). The housing crisis in Split peaked in 1957. With approximately 16,000 apartments and a population of 81,000, there was a shortage of almost 6,000 apartments. Annual construction rate stood at 400, meeting less than half the annual demand (Muljačić, 1969a: 17; Tušek, 1996: 80; Muljačić, 2002: 206).

An important incentive for the housing came from the establishment of the Department for the Organization of Construction and the Department for Analysis and Records at the Bureau for Urban Planning – Split 1957, when more extensive housing construction was initiated in concentric construction sites, which led to the further expansion of the Directive Regulatory Planning Guidelines of Split from 1951 (Pervan, 1957: 48; Pervan, 1966: 44). In 1958, the Urban Planning Council of Split adopted the idea of developing standardized residential buildings in concentric construction sites of housing developments in undeveloped city cassettes in order to rationalize and increase housing productivity (Matijević Barčot, 2014: 155), because the earlier model of infill in the partially developed city cassettes with residential buildings proved to be ineffective. A concentric construction site in Split, i.e., a location defined mainly by city roads, was assigned to one the construction companies operating in the city, which was then able to rationalize the number of construction elements and architectural details (Perković, 1957: 43, 45). That enabled more efficient use of resources, work force and mechanization and allowed for the construction of communal infrastructure and accompanying housing facilities within a certain project.

Housing development of Split 2 in concentric construction sites was designed and revised in 1958 pursuant to the Decision on the Direction and Rational Design of Housing in the Area of Split, and in line with Technical and Financial Guidelines of a Standard Apartment from 1962, drafted by Josip Vojnović and associates at the Municipal Fund for Social Housing. The 1958 Housing Contribution Act provided the administrative, organizational, and financial framework for systematic development of housing and introduced the imperative of rationalization and efficiency in construction.

The organization and implementation of housing construction of Split 2 was headed by the Department for the Organization of Construction and the Department for Analysis and Records, which were spun off from the Bureau for Urban Planning – Split into the newly established Housing Administration in 1959 and subsequently in 1961 set up as the Municipal Fund for Social Housing – Split (Pervan, 1957: 48; Muljačić, 1969a: 17; Klempić, 2004: 97; Matijević Barčot, 2014: 134-136). Split Construction Company was set up in 1965 following a merger of the Municipal Fund for Social Housing, the Institute for Land Preparation and part of the Institute for the Construction of Commercial Facilities. It played a key role in the management of the housing stock and in the organization and implementation of housing (*** 1965; Muljačić, 1969a: 31; Vojnović, 1977: 10; Matijević Barčot, 2014: 189). The efficiency of the housing model originated in Split which included standardized residential buildings and high-rises in concentric construction sites in the spirit of the so-called crane urbanism (Kovačić, 2016: 67), resulting in 300, 500 and finally 800 apartments, enabled every other family in Split to move into a new apartment by 1965. (Kukoč, 2010: 168; Matijević Barčot, 2014: 177).

Since 1957, a number of Split 2 housing developments and areas were planned and developed in Meje, Škrape, Skalice and Glavičine, Špinut, Bol and Plokite, Gripe, Lokve and in the former Sućidar. The construction of residential buildings and high-rises continued even after 1968 Split 3 competition (Fig. 3).[3]

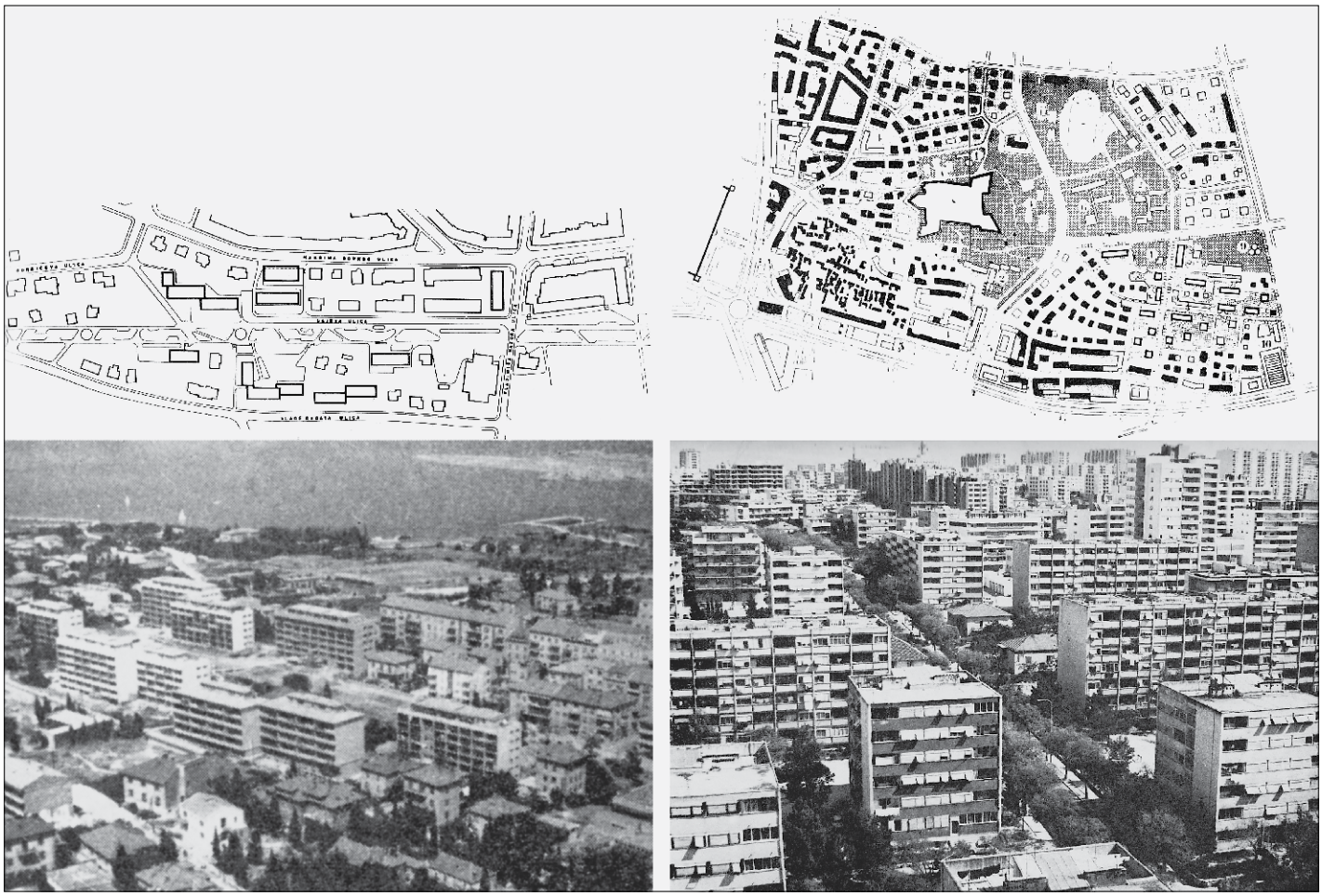

Fig. 4 Urban design project and image of Špinut 1 housing development [left] and preliminary urban design and image of Lučac – Gripe housing area [right]

Analysis of housing developments and areas in Split planned from 1957 to 1968

Špinut 1 housing development, formerly known as housing development in Ljudevita Gaja Street in Špinut[4], was designed in 1957 by Vuko Bombardelli and associates at the Design studio for urban planning and architecture Architect from Split (Fig. 4). The urban design project aimed to connect the northern slopes of Marjan peninsula and the park-forest with Špinut area and across Stari Plac to the city center with a wide park stretching along Ljudevita Gaja Street. The park was the backbone of the urban design project with orthogonally positioned residential buildings and single-family houses. The plans included mostly standardized residential buildings, with a total of 248 apartments for 1,017 occupants. Five E-57 residential buildings designed by Vuko Bombardelli and associates in the period from 1957 to 1959 are notable among the standardized residential buildings (*** 1959b: 2; Muljačić, 1969b: 66; Vojnović, 1977: 159; Grgić, 2011a: 76).[5] The construction of the first standardized residential building E-57 commenced in mid-1958 (*** 1958: 6; Matijević Barčot, 2014: 153; Tušek, 2018: 161).

The investors in the housing development in Ljudevita Gaja Street in Špinut from 1958 to 1962 (Muljačić, 1969b: 66; Grgić, 2011a: 76), were the Municipal Fund for Social Housing Split and Design studio for urban planning and architecture Architect from Split (Bombardelli, 1966a: 85), with the contractor was Tehnogradnja (Muljačić, 1969b: 66; Matijević Barčot, 2014: 153).

3 Housing developments are urbanistically and architecturally homogeneous parts of housing areas dimensioned in accordance with the planned capacity of the primary school and accompanying residential amenities, while housing areas are mostly larger areas which are urbanistically and architecturally heterogeneous with occasional urban amenities.

4 Housing development and area Špinut is also known as Spinut.

5 Slavica Bombardelli, Olga Pavlinović, Savka Sasunić and Mira Zupan collaborated on the urban design project for the housing development and the architectural design of the residential buildings E-57. (*** 1959a: 2)

Preliminary urban design for **Lučac – Gripe housing area,** formerly known as housing units VII and VIII, was prepared by Petar Mudnić at the Bureau for Urban Planning – Split in 1957 and 1958 (Mudnić, 1966b: 109; Vojnović, 1977: 16). It included the area next to the medieval settlement Lučac and Gripe fortress (Fig. 4). The urban design project retained, to a great extent, the pre-existing buildings, adding planned residential buildings, other residential amenities and educational and community facilities. Renovation and upgrades of the communal infrastructure were planned for the previously developed parts, with construction of standardized and block-type residential buildings. In total, 500 apartments for roughly 2,150 occupants were planned in the first phase, in order to distribute the dwellers in harmonized and diverse designed housing developments with approximately 130 apartments each. Among other residential buildings, the residential buildings URBS-1, URBS-4 and URBS-5 stand out, while E-247 designed by Ivo Radić and one residential complex on the slopes of Gripe featuring two residential buildings and one residential high-rise by Stanko Fabris should be highlighted as well (Tušek, 1996: 102-103, 125-133; Bartulović, Uchytil and Šerman, 2013: 251). The first phase of the housing area was constructed in the period 1958-1959, and the last residential buildings were completed in 1962 along the present-day Osječka Street (Mudnić, 1966b: 109-110; Vojnović, 1977: 158).

Housing development along Osječka Street, formerly XX. dalmatinske divizije Street, was designed by Petar Mudnić at the Bureau for Urban Planning – Split (Fig. 5). The preliminary urban design was aligned with the preliminary urban design for the Lučac – Gripe housing area. Standardized residential buildings[6] designed by Josip Vojnović and Lovro Perković in 1958 in the first concentric construction site, were added to the pre-existing single-family houses (Kalogjera, 1966a: 45; Muljačić, 1969a: 19; Muljačić, 1969b: 71; Vojnović, 1977: 9, 158; Gamulin, 1989-1991: 30; Žižić, 2011: 78-79; Uskoković, 2015: 193-202; Tušek, 2018: 163). Josip Vojnović designed the standardized residential building URBS-1, while Lovro Perković designed the standardized residential buildings URBS-4 and URBS-5.[7] The dynamic orthogonal layout of the standardized residential buildings and interspace with gardens and car parks is harmonized with the roads and the surrounding pre-existing family houses and residential buildings. The contractor of the residential buildings and the communal infrastructure and communal space was the Construction Company I.L. Lavčević. Preparatory work commenced at the end of 1958, the first standardized residential buildings were constructed at the beginning of 1959, and the first occupants moved in at the end of 1960 (Z.B., 1959: 8; Muljačić, 1969b: 71-72; Vojnović, 1977: 162-165; Matijević Barčot, 2014: 157, 159-160).

Meje housing area, was designed from 1958 and in line with the regulatory competition for Meje in 1959 and 1960. The urban design project was prepared by Petar Mudnić and his associate Zlata Šakić in 1961 and 1962 at the Bureau for Urban Planning – Split (Fig. 5). The urban design project for this attractive area was adopted in 1964 (Piplović, 2010: 176), and it was developed together with the urban planning study of the wider Marjan area (Tušek, 1996: 111-112; Matošić, 2012: 151). The urban design project encompassed the pre-existing residential buildings and single-family houses with a total of 2,700 occupants and provided for new residential buildings and single-family houses with a total of 580 apartments accommodating a total of 2,320 occupants on 52 hectares. Additional residential amenities and educational and community facilities were also planned. The urban design project aimed to both preserve the landscape of Marjan and vistas of the undeveloped areas by applying fragmented construction, and to improve the pre-existing standard of living. The construction of the first residential buildings commenced in December 1964 (Mudnić, 1966a: 77-80). The constructed residential buildings include two-storey buildings designed by Ivo Radić in 1965, standardized multi-storey buildings designed by Vuko Bombardelli in 1968 and 1969 and a residential and commercial building Lloyd's Register of Shipping designed by Neven Šegvić in 1961/1962 and built in 1963 (Muljačić, 1969b: 86, 89, 95; Odak, 1989-1991: 50; Tušek, 1996: 86, 150; Uchytil, Barišić Marenić and Kahrović, 2009: 207, 209; Bartulović, 2011a: 84; Bartulović, 2011b: 93; Popić, 2012: 109, 118-123; Tušek, 2018: 175).

Housing development along Solinska Road (formerly known as Žrtava fašizma Street) was planned by Berislav Kalogjera in 1959 at the Bureau for Urban Planning – Split. The development is positioned at the entrance to Split from the direction of Solin (at the time the only entrance of that kind) and in the part of the housing area Bol – Plokite between the present-day Domovinskog rata Street and Trsćanska Street (Popić, 2012: 114; Fig. 6).[8] The preliminary urban design of the elongated stretch of the city cassettes along one of the main roads in the city provides for standardized residential buildings corresponding to the pre-existing buildings, and four 12-storey residential high-rises, which dynamize

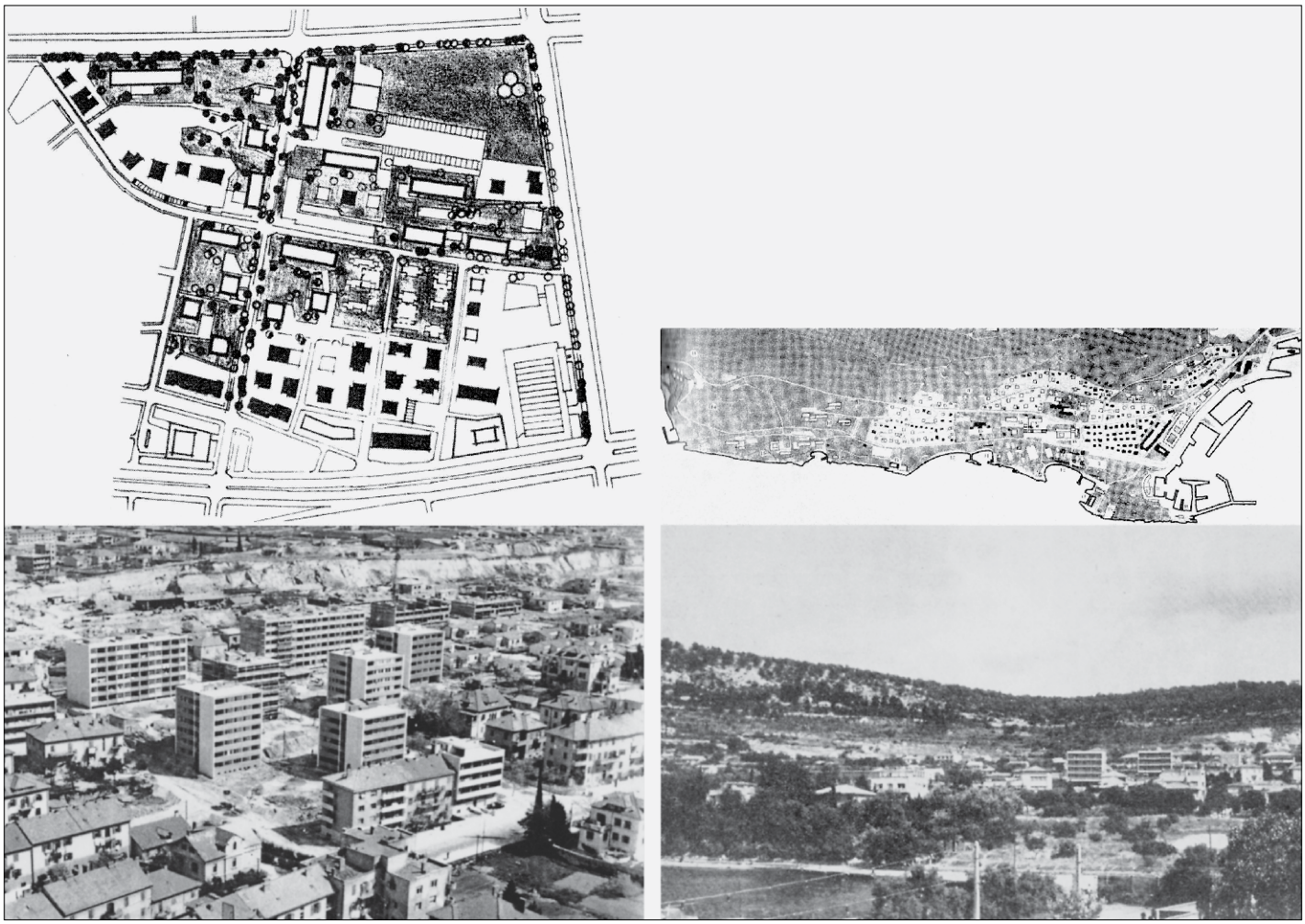

Fig. 5 Preliminary urban design and image of the housing development along Osječka Street (originally XX. dalmatinske divizije Street) [left] and urban design project and image of Meje housing area [right]

segmented city blocks with their height, rhythm and floor plan elusion. These predominantly standardized residential buildings and high-rises in the housing development, which mostly relies on the nearby residential amenities and facilities, were designed by Ivo Radić at the Bureau for Urban Planning – Split (Muljačić, 1969b: 82; Tušek, 2018: 170, 172; Matijević Barčot, 2011a: 81), one building was designed by Branko Franičević, and the investor in the 450 apartments was the Municipal Fund for Social Housing (*** 1965?: n.p.; Kalogjera, 1966e: 95; Mrkonjić, 1967: 1, 3; Popić, 2012: 109, 112-117, 126).

Škrape housing development was designed on the basis of the preliminary design from 1959 and the competition entry from 1962 by Čedomil Rendić[9], Ivo Kurtović and Luka Kovačević with associates at the Project Bureau of the Construction Company I.L. Lavčević (Piplović, 2011: 275; Fig. 6).[10] Communal area with single-family houses was planned in the northern part of the rectangular project area with a meandering segment-

6 The competition for the standardized residential buildings conducted in Split at the end of 1957 is significant as it stimulated the process of mass development of new housing in concentric construction sites and increased efforts in rationalization and efficiency in productivity. (Tušek, 1996: 80)

7 URBS standardized residential buildings were constructed along Osječka and Lovretska Streets, Mažuranićevo šetalište, Firule, Skalice and Glavičine. Apart from Split, they have also been constructed in Pula, Lovran, Šibenik, Knin, Trogir, Kaštel Gomilica, Omiš, Makarska, Ploče, Dubrovnik and Herceg Novi. (Muljačić, 1969b: 71, 75-76; Majić, 2011: 180; Matijević Barčot, 2014: 160; Uskoković, 2015: 199)

8 The available sources refer to this project as either Housing development along Solinska Road (Kalogjera, 1966e: 95) or Housing development in Žrtava fašizma Street (*** 1965?: n.p.; Mrkonjić, 1967: 1, 3; Muljačić, 1969b: 84-85). The housing development was constructed along the city road, which was initially called Solinska Road, later renamed to Žrtava fašizma Street and finally to Domovinskog rata Street as it is known today (Matijević Barčot, 2010: 338).

9 The available sources refer to Rendić as both Čedomir (Rendić, 1966a: 98; Rendić, 1966b: 106) or Čedomil Rendić (Tušek, 2018: 14, 184, 188, 193, 350). The authors have used Čedomil hereinafter.

10 Project associates were Ante Vukov and Jakov Vodanović. (Tušek, 1996: 116-119)

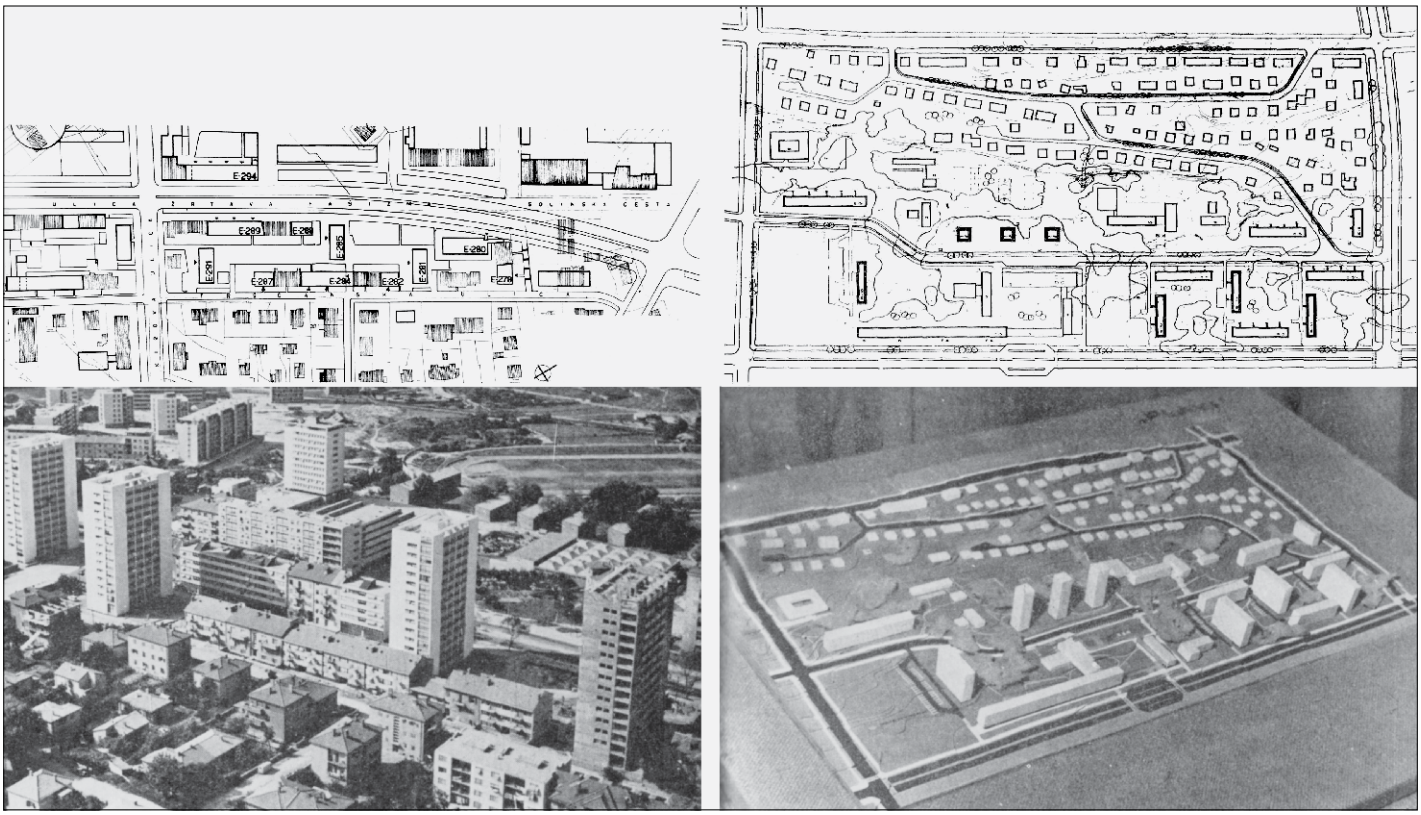

Fig. 6 Urban planning situation and image of the housing development along Solinska Road [left] and preliminary urban design and model for Škrape housing development [right] (Prepared from: Kalogjera, 1966e: 97, 96; Rendić, 1966b: 107)

ed block of residential buildings in the southern part with separate kindergarten units. Residential high-rises with residential amenities and educational and community facilities were envisaged in the central part. A total of 800 apartments were planned for approximately 3,200 occupants on the total surface area ranging from 11 to 20 hectares. The longitudinal collector street with connections to the ring roads was planned to extend in the direction east-west, with a connected system of residential streets adapted to single-family houses and slope configuration of the terrain. Because of the proximity of the Military hospital, the investor was the Administration for Military Construction. Although the construction of the housing development Škrape had been planned for the period from the end of 1966 through to the end of 1969 (Rendić, 1966b: 106-108), the Construction Company I.L. Lavčević built the standardized residential buildings and high-rises designed by Čedomil Rendić from 1968 to 1972, and those designed by Jakov Vodanović and Zdeslav Perković from 1968 and 1970 (Muljačić, 1969b: 96; Matijević Barčot, 2014: 208-209; Tušek, 2018: 195-196).

Skalice – Glavičine housing development was constructed in line with the urban planning study from 1961 and the urban design project from 1962 developed by Berislav Kalogjera and associates at the Bureau for Urban Planning in Split (Fig. 7).[11] The foundational urban settings were appropriated from the 1960 urban design project for the city center (also authored by Kalogjera) which envisaged that the southern part of the housing development next to the city center would be used for the purposes of the city center extension with predominantly public and social buildings and spaces running along the central part of the development (Kalogjera, 1959: 23; Kalogjera, 1966b: 71-72). The aim of the urban design project was to harmonize the layout, surface area and height of the buildings with the pre-existing structures in the southern part of the development, and to accentuate the northern part with six high-rises. Standardized residential buildings were designed by Josip Vojnović and Lovro Perković, one residential and commercial building was designed by Branimir Gruica (Tušek, 1996: 151, 155), and Vuko Bombardelli designed the first residential high-rise in Split, built from 1959 to 1962 (Muljačić, 1969b: 72; Grgić, 2011b: 77; Tušek, 2018: 162), while

11 The associates on the project design included Petar Mudnić, Srđan Baldasar and Stanislav Tedeschi. (Kalogjera, 1966c: 86)

12 The competition entry was authored by Žarko Turketo, Frane Gotovac, Mihovil Antičević and Boris Alujević. (Tušek, 1996: 142)

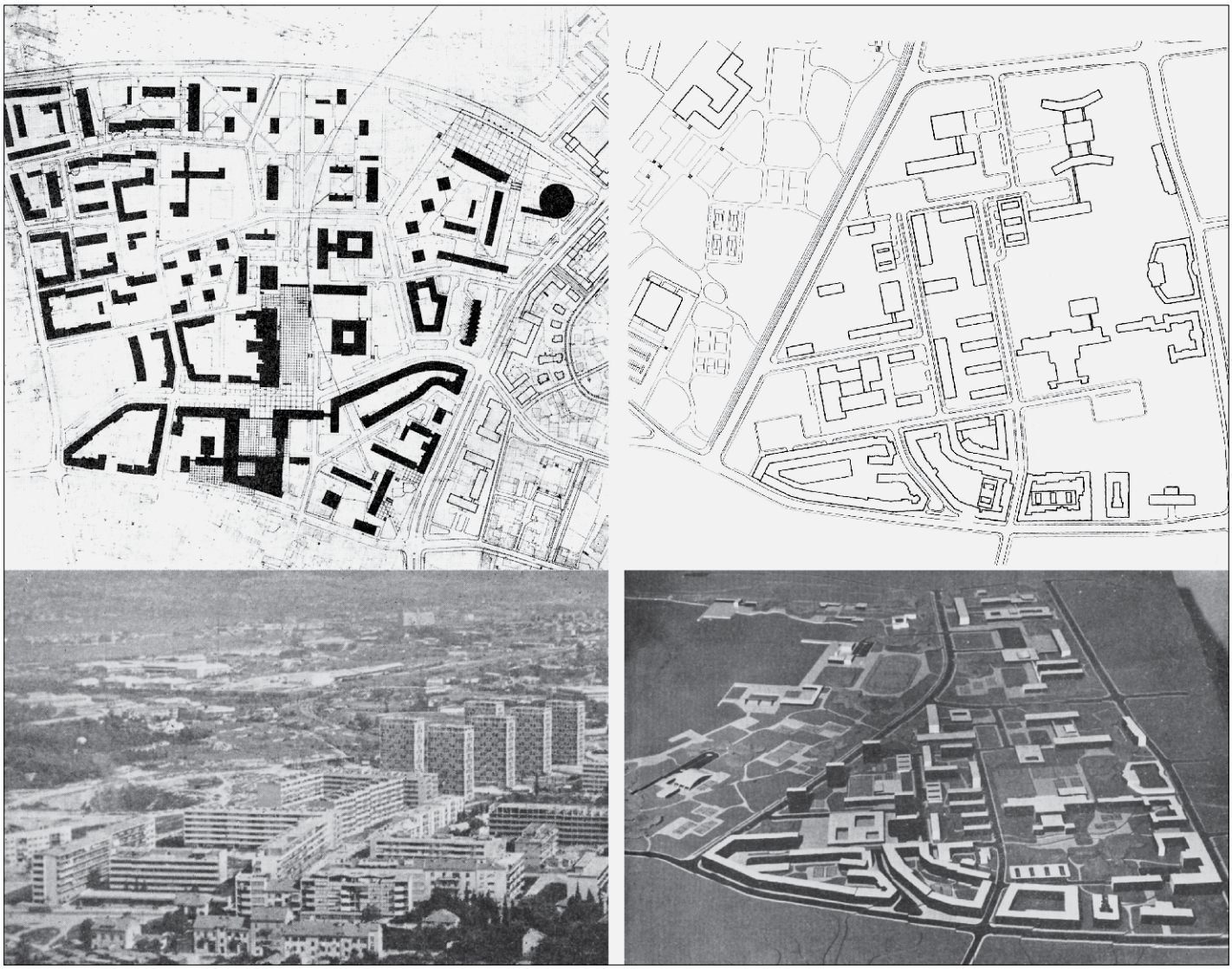

Fig. 7 Urban design project and image of Skalice – Glavćine housing development [left] and preliminary urban design and model for Špinut 2 housing development [right]

Stanko Fabris designed residential high-rises (Muljačić, 1969b: 82; Bačić, 1999: 99, 101; Uchytil, Barišić Marenić and Kahrović, 2009: 95, 97, 158; Perković Jović, 2011a: 86; Grgić, Matijević Barčot, 2013: 71; Tušek, 2018: 171), and a residential complex with one residential high-rise and a semi-detached residential building with commercial units on the ground floor in Žrtava fašizma Street (present-day Domovinskog rata Street; Muljačić, 1969b: 81-82; Bartulović, Uchytil and Šerman, 2013: 252-253; Tušek, 2018: 171). Prior to the construction of the newly designed residential buildings and high-rises, the 48-hectare project area housed 4,714 occupants, of which 4,100 remained occupying the pre-existing residential buildings of good quality. It was planned that newly constructed residential buildings and high-rises would contain 1,300 apartments for 5,900 occupants. Residential amenities and educational and community facilities were planned in the housing development, which was intensively constructed in the period from 1962 to 1964. The investors in the housing development were the Municipal Fund for Social Housing, the Yugoslav People's Army and a number of public companies and institutions. The contractor was, for the most part, Tehnogradnja (Kalogjera, 1966c: 86-88).

Špinut 2 housing development was designed and planned by Žarko Turketo and Mihovil Antičević with their associate Tomislav Dujmić at the Urban Planning Institute of Split District on the basis of an entry for the regulatory competition for Špinut – Poljud from 1963, which had divided the area of Špinut and Poljud into a recreational and sports zone to the west and an educational zone to the east of the housing zone (Fig. 7).[12] The

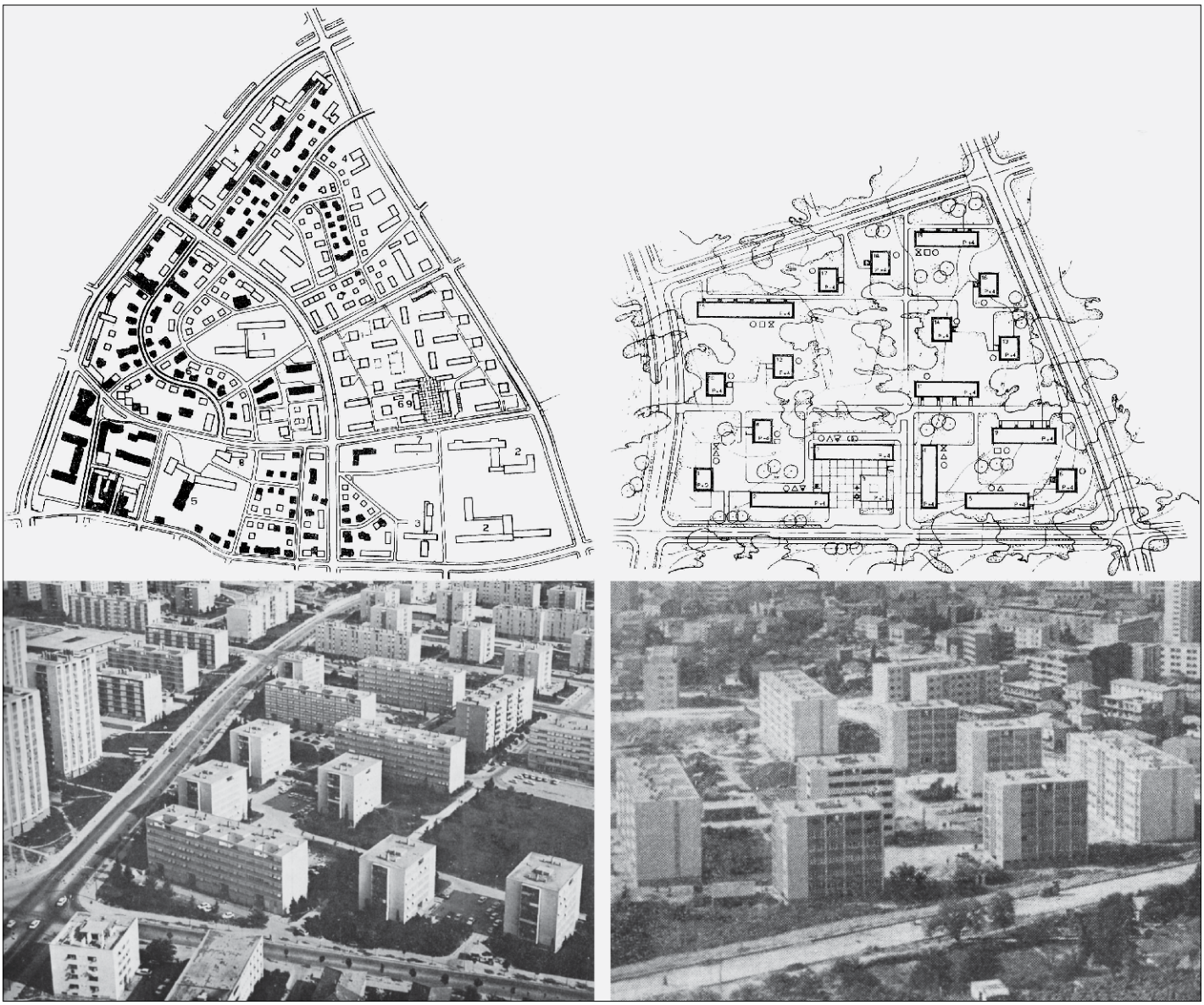

FIG. 8 URBAN DESIGN PROJECT AND IMAGE OF BOL – PLOKITE HOUSING AREA [LEFT] AND PRELIMINARY URBAN DESIGN AND IMAGE OF BOL I HOUSING DEVELOPMENT [RIGHT]

regulatory plan was drafted in 1963, and the urban design project in 1964 for a housing zone of 10.6 hectares envisaged for a total of 5,600 occupants between the old and the newly-planned Hajduk Stadiums. The plan also included the pre-existing residential buildings constructed into a block with approximately 2,500 occupants and provided for 41 new apartments in extensions or retrofits, as well as 769 apartments in new residential buildings and high-rises, with an emphasis on the compositional elements and residential amenities, for a total of 2,600 new residents. These mostly standardized residential buildings and high-rises were designed by Ivo Radić (Muljačić, 1969b: 93; Odak, 1989-1991: 53; Grgić, 2011d: 96; Popić, 2012: 110, 124-129), Ivan Vitić (Muljačić, 1969b: 93; Tušek, 1996: 158-159; *** 2005: 170; Grgić, 2011c: 95), Antun Šatara, Lovro Perković, Nikola Grabić and Frano Gotovac (Muljačić, 1969b: 93, 99; Gamulin, 1989-1991: 31-32; Odak, 1989-1991: 54; Perković Jović, 2010: 155; Perković Jović, 2011b: 99; Perković Jović, 2011c: 104-105; Kuzmanić, 2012: 196-209; Tušek, 2018: 201). Three residential high-rises designed by Ivo Radić and constructed from 1967 to 1969, and two high-rises designed by Ivan Vitić, constructed in 1967 and 1968 are exceptional architectural achievements (Muljačić, 1969b: 93; Tušek, 1996: 158-159; Tušek, 2018: 189-190). The investors in the development of Špinut 2, constructed until 1979, were the Yugoslav Peo-

ple's Army and the Municipal Fund for Social Housing (Turketo, 1966: 81-82; Muljačić, 1969b: 99; Perković Jović, 2011c: 104-105).

Bol – Plokite housing area, nowadays known Bol[13], was planned in 1960, 1961 and 1963 by Srđan Baldasar at the Bureau of Urban Planning – Split on a triangular area of approximately 43 hectares divided by three roads into five city cassettes of irregular shapes with the adjusted layout of the houses, buildings, and promenades (Fig. 8). The western and the southern parts of the area of approximately 15 hectares had been constructed prior to the Second World War. After 1951 the pre-existing residential buildings and single-family houses, which had been housing 3,100 occupants, were incorporated into the urban planning for a total of 9,300 residents. Residential amenities, educational and community facilities and urban public facilities were constructed in the housing area. Two south-eastern city cassettes were initially planned for secondary and higher education. However, an urban design project for the northern cassette of Bol I was completed in 1965 (i.e. formerly known as 26. listopada), while in the southern cassette the housing development Bol II was constructed starting from 1969 (Muljačić, 1969b: 99; Klempić, 2004: 98; Matijević Barčot, 2014: 206), and starting from 1959 Berislav Kalogjera prepared the urban design project for the northwestern edge of the area of the housing development along Solinska Road (Kalogjera, 1966d: 89-90; Rendić, 1966a: 98; Kalogjera, 1966e: 95; Vojnović, 1977: 66a). Standardized residential buildings and high-rises constructed in the Bol – Plokite housing area were designed by, among others, Vuko Bombardelli with associates at the Design studio for urban planning and architecture Architect from Split[14], Ivo Radić and Branko Franičević at the Bureau for Urban Planning – Split and Ivo Kurtović and Luka Kovačević at the Project Bureau of the Construction Company I.L. Lavčević (*** 1965?: n.p.; Kalogjera, 1966e: 95; Mrkonjić, 1967: 1, 3; Muljačić, 1969b: 87; Tušek, 1996: 86, 133).

Bol I housing development (formerly 26. listopada) was planned in 1964 and 1965 by Ivo Kurtović with associates at the Project Bureau of the Construction Company I.L. Lavčević (Fig. 8).[15] About fifty single-family houses were removed from the moderately sloping plateau of the surface area of seven hectares and 18 residential buildings with 784 apartments for nearly 3,000 occupants and residential amenities mostly positioned around the square along Mažuranić promenade were orthogonally planned. The investor in the housing development, which was mostly completed by 1967, was the Municipal Fund for Social Housing. The position on the plateau provided most of the apartments with plenty of sunlight and vistas over the Bay of Kaštela, Špinut or Marjan (Rendić, 1966a: 98-100; Muljačić, 1969b: 89). Standardized residential buildings were designed, in line with the Technical and Financial Guidelines of a Standard Apartment by Josip Vojnović and associates from 1966, Ivo Kurtović and Luka Kovačević at the Project Bureau of the Construction Company I.L. Lavčević which was also the lead contractor of the housing development. This marks the beginning of the practice of commissioning and recognizing design studios operating within local construction companies. In addition to the Project Bureau at the Construction Company I.L. Lavčević, design studios within construction companies Tehnogradnja and Konstruktor should also be mentioned (Muljačić, 1969b: 87; Tušek, 1996: 86).

Gripe – Lokve housing development was constructed from 1965 in accordance with the urban design project by Milorad Družeić and associates prepared in 1964 and 1965 at the Bureau for Urban Planning – Split (Fig. 9). The location of the housing development is in the suburbs, on the slopes of Gripe, Sućidar and Visoka hills. The surface of the rectangular project area covers approximately 18.75 hectares, and it is determined by the main ring roads. Three standardized residential high-rises were planned in the heart of the housing development, with standardized residential buildings along the edge of the development. The orthogonal composition of the housing development with a total of 1,660 apartments for nearly 6,640 occupants is dynamized by the curves of the collector street which connects the residential access points, car parks and garages with the main ring roads. 103-105; Piplović, 2011: 307). Franjo Buškariol from the design bureau at Tehnogradnja construction company designed the standardized residential buildings, including the first significant example of a prefabricated standardized residential building in Split. Dinko Kovačić designed three standardized residential high-rises and one residential building 87, 92, 99; Matijević Barčot, 2011b: 97; Kovačić, 2013: 14, 156, 160; Kovačić, 2014: 10, 188; Kovačić, 2016: 80; Tušek, 2018: 199). Tehnogradnja constructed

13 What was once housing area Bol – Plokite is today known as Bol, while the name Plokite is used for a housing development which had been planned and constructed under the name Sućidar, which is nowadays used for the former housing area Vrh Sucidra. (Klempić, 2004: 100, 115)

14 The sources occasionally list just Split as the location of two standardized residential buildings (Matijević Barčot, 2014: 153), which had been constructed in Špinut 1 housing development (Majić, 2011: 140; Grgić, 2011a: 76).

15 The associates included Čedomil Rendić and Luka Kovačević. (Rendić, 1966a: 98)

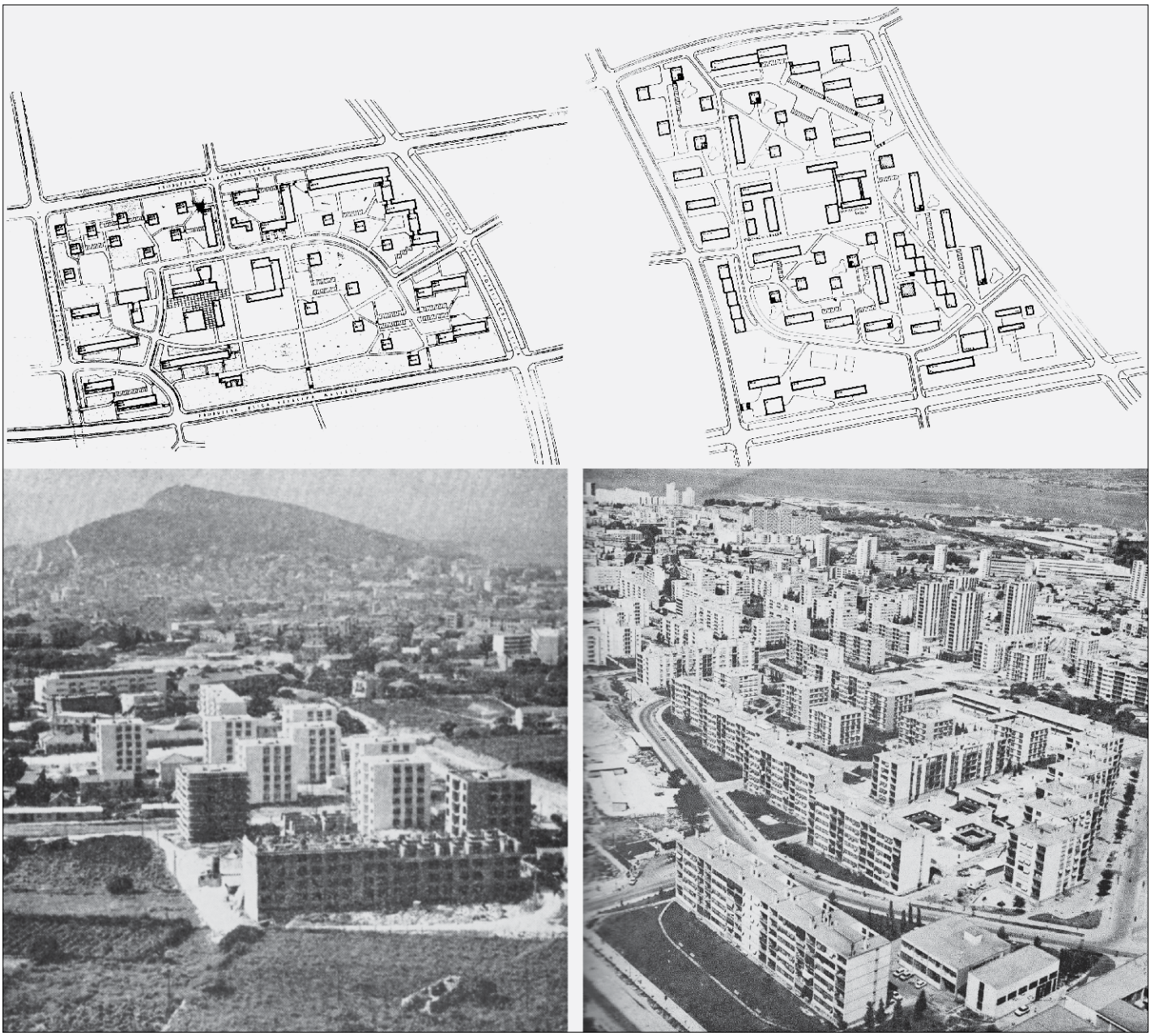

Fig. 9 Preliminary urban design and image of Gripe – Lokve housing development [left] and preliminary urban design and image of Plokite housing development (originally Sućidar) [right]

the majority of the residential buildings and high-rises, and other contractors include Melioracija and Konstruktor companies (Matijević Barčot, 2014: 206).

Plokite housing development was designed in 1965 under the name Sucidar by Berislav Kalogjera and associates at the Bureau for Urban Planning – Split as the last concentric construction site of Split 2 (Fig. 9).[16] The city cassette with surface area of 13 hectares of approximately rhomboid shape on a mild northeastern slope was planned with residential amenities in the center. Residential buildings and high-rises were orthogonally positioned around the center, along a comprehensive collector street connected to each of four ring roads. Standardized residential buildings featuring square floor plans

16 The associates included Srđan Baldasar, Stanislav Tedeschi and Josip Neveščanin. (Tušek, 1996: 163)

17 Construction of certain residential buildings and high-rises of Split 2 continued into the 1970s.

were constructed in the center of the development, while those along the edges had rectangular and segmented floor plans, in accordance with the designs by Čedomil Rendić, Josip Vojnović and Luka Kovačević. Standardized residential high-rises designed by Luka Kovačević were constructed along the northeast edge of the housing development in the period from 1968 to 1974 (Tušek, 2018: 197). A total of 2,011 apartments housing approximately 7,867 occupants were planned for the Plokite housing development. A neighboring recreational complex Sućidar was planned in the housing development and this reduced the area covered with gardens. Nine children's playgrounds were envisaged along separate unites for kindergartens on the ground floors of residential buildings and high-rises. Service and craft business facilities were planned along the edges of Plokite housing development, to serve the needs of the residents in the neighboring developments (Kalogjera, 1966f: 101-102). The residential buildings and high-rises were constructed by the Construction Company I.L. Lavčević starting from 1966 (Muljačić, 1969b: 92; Tušek, 1996: 169-174).

Conclusion

Split 2 was planned and constructed around the historical center of the City of Split in the period from 1945 to 1968[17], that is, from the beginning of the post-Second World War reconstruction and development up to the Competition for the Urban Planning Solution of the eastern part of Split – Split 3.

The planning basis of Split 2 were the Directive Regulatory Planning Guidelines of Split adopted in 1951 and the establishment of the Department for the Organization of Construction and the Department for Analysis and Records at the Bureau for Urban Planning – Split which were set up to intensify the housing efforts. Split 2 can be divided into three planning periods: the first planning period spanning from 1945 to 1951, the second planning period from 1951 to 1957 and the third planning period from 1957 up to 1968.

The first planning period of Split 2 was marked by the planned development of a small number of standardized residential buildings, one example of ideologically and substantively experimental residential typology of a hotel for singles and couples without children and colonies of modest single-family houses, which were demolished before the 1960s.

The second planning period of Split 2 is renowned by inventive free-standing residential buildings of exceptional architectural value, but modest in scope with regard to the housing needs of the booming population. A small number of economical standardized single-family houses on the outskirts of Split were constructed to accommodate these rising needs.

The third planning period of Split 2 was marked by intensive construction of housing developments and housing areas in concentric construction sites using cranes and formwork which allowed streamlining of construction technology used for standardized residential buildings and high-rises. Rapid, rational and economic housing construction enabled quality at a time of intensive immigration flow to Split. The city boasted an efficient system of urban planning, design and development since the late 1950s.

The analysis of the housing developments and areas of Split 2 planned from 1957 to 1968 has indicated that there was a high average of urban and architectural achievements which are aligned with local historical and modernist ideals, and surpass generalized criticism mainly focused on fragmentation, monofunctionality and schematism of the housing developments subordinated to the productivity and technology of the concentric construction concept, as well as uniformity and monotony of the standardized residential buildings and high-rises and hyper-standardization of apartments. Certain shortcomings of the housing developments and areas of Split 2 planned from 1957 to 1968 pertain to the uneven level of realization of the accompanying residential amenities and educational and community facilities, shortage of gardens and car parks, technical equipment of the standardized residential buildings and high-rises, and mainly to insufficient, underdeveloped and disorganized maintenance.

Appropriate, measured, and systematic protection, restoration and maintenance should also be directed to significant and exceptional modern buildings and urban and architectural units of Split 2 and not just limited to the valuable and exceptional historical buildings in such as Diocletian's Palace. The housing developments and areas planned from 1957 to 1968 in their scope and reach constitute a significant part of the urban and architectural cultural heritage of Split and Croatia.

[Translated by Sunčica Vukelić,
proofread by Petra Škarić]

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Illustration sources

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Fig. 5 Prepared from: Matijević Barčot, 2014: 170; Mudnić, 1966a: 77-78

Fig. 6 Prepared from: Kalogjera, 1966e: 96-97; Rendić, 1966b: 107

Fig. 7 Prepared from: Kalogjera, 1966c: 86-87; Turketo, 1966: 81-82

Fig. 8 Prepared from: Kalogjera, 1966d: 89; Vojnović, 1977: 66a; Rendic, 1966a: 98-99

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All authors have equally contributed to all segments of the paper.

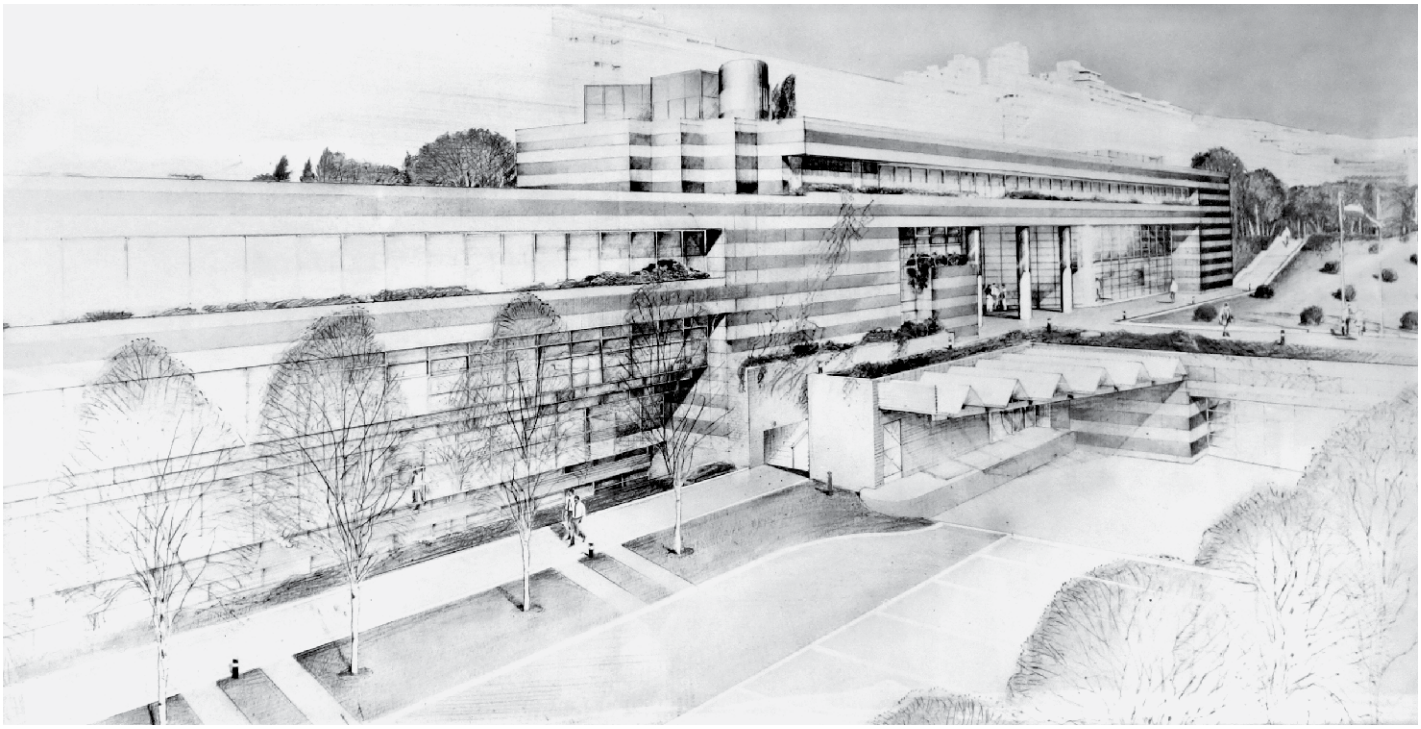

Fig. 1 Perspective drawing of the Office Building of the Brodomerkur Company, author Branka Kaminski

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Postmodern Brodomerkur Office Building in Split by the Architect Danko Colnago, 1985-1990

Brodomerkur Office Building
Colnago, Danko
office building
postmodern architecture
Split, Croatia

This paper is a contribution to the knowledge about the 1980s postmodern architecture in the city of Split. It is focused on the Brodomerkur Office Building as an outstanding example of postmodern office space at the urban heart of Split. The study analyses the building's urban and architectural features, which are evaluated in both the local and global context. Brodomerkur's unique design makes it an architectural gem worthy of landmark status and preservation.

INTRODUCTION

After the completion of multiple housing units in the city's quarter of Smrdećac from the 1970s to the 1980s – within the *Basic Urban Design Project for Split III* – construction of commercial and office buildings began in the remaining area of the urban matrix. The goal was to provide jobs for the local population, not only in the industrial zones around the city but also near its residential areas. The offices building of the Brodomerkur Company (today the *Faculty of Humanities and Social Sciences*, University of Split) is located among commercial and office buildings in Smrdećac. This article examines postmodern architectural features of an office building in a paradoxical situation. It is a building that resembles lavish headquarters of a large, capitalist multinational corporation when in fact it was conceived and built in what was at the time a socialist country. Compared to other buildings in the city's urban landscape, Brodomerkur stands out as an example of architectural creativity of the 1980s. Its presence in the *memory* of Split, with its numerous architectural associations, demands this building's preservation as a shining exemplar of the city's rich architectural heritage.

URBAN CONTEXT

After World War II, municipal planners of the small City of Split plotted its development through post-war production of social housing. During the industrialisation period between 1961 and 1971, the city's population doubled in size from 78 792 to 163 762 inhabitants. As the population grew, so did the demand for housing, transportation, and communal solutions. Subsequent scientific and professional studies resulted in the Conception of the General Urban Plan of the City of Split, adopted on April 15, 1974 (Kalogjera, 1977: 1, 7, 9, 11; Fig. 3).[1]

The polycentric scheme of city organisation on the Split peninsula showed the modernist division of zones: dwelling, recreation, work, and transportation. However, black squares mark four city centres as the Lynch's urban nodes with a concentration of public content (Lynch, 1960: 72-78): Split (west), Solin (north), Stobreč (east), as well as a new planned city centre in the central part of the Split peninsula.

The new city centre was planned for 50 210 inhabitants and 30 500 m2 intended for trade, service, catering, and business functions (Kalogjera, 1977: 14-16, 41-42). It was divided and organised *"along two heliothermal axes, northwest-southwest direction, and in parallel to the map of cardo of Diocletian's palace"* (Tušek, 1996: 188; Kukoč, 2010: 171).[2] The western axis forms a postmodern pedestrian "University Street" in the city quarter Smrdečac, which was planned south and north of Poljička Street (Kalogjera, 1977: 42; Fig. 3).

The part of the city centre at Smrdečac, located along the traffic corridor of Poljička Street

1 Work on the GUP of the City of Split began with the Decision of the Municipal Assembly of Split *(Skupština opcine Split)* on November 16, 1967; *Book 1: Documentation* was published in 1971; Book 2: Conception was published in 1972, *Book 3: Plan proposal* was published in 1977 and the Plan was finally authorized in 1978. *The Conception* assumed population growth – 324 000 inhabitants up to the year 2000.

2 The idea of the city centre grew out from different documents: the winning Competition Entry Žnjan from Slovenian team from Ljubljana (Vladimir Mušič, Marjan Bežan, and Nives Starc, Urban Institute of Slovenia, 1968/1969), the Action Plan for the development of Split III, second phase of development preparations (Company for the Construction of the City of Split / *Poduzece za izgradnju Splita,* April 1969) and the Basic Urban Design Project for the City of Split III (Marjan Bežan, with the collaboration of the Slovenian Urban Planning Institute from Ljubljana and Urban Planning Institute of Dalmatia / *Urbanisticki zavod Dalmacije* from City of Split, December 1969).

3 Poljička Street and the so-called Solinska Street once connected Aspálathos / Spalatum (today Split) with Epidaurum / Raúsion (today Stobreč) and Salona (today Solin), respectively. These were two main city streets for 17 centuries.

4 Danko Colnago (1952) graduated from the Faculty of Architecture, the University of Zagreb in 1976. He started working in the Construction Company Ivan Lučić Lavčević in 1977. Later he was the owner of the architectural bureau CD project d.o.o. founded in 1990. In more recent years, he designed yachts and speedboats in the company Pakleni otoci d.o.o. Today he is retired.

(one of the two main city roads; Fig. 3)[3], had remained undeveloped for a long time. The plan for the construction of one of several planned commercial buildings on this stretch of road was implemented in the mid-1980s. The existing postmodern urban pattern of "pedestrian streets" in the residential area of the city quarter of Smrdečac is set in the east-west direction, in parallel to the Poljička Street (the street is partly situated on the Roman *limitatio*; Suić, 1956: 13), and is connected to the central pedestrian street that links the University Campus with the business district (Ruđer Bošković Street). This position determined the plot for construction and, consequently, the longitudinal layout of the Brodomerkur building (Figs. 3 and 4).

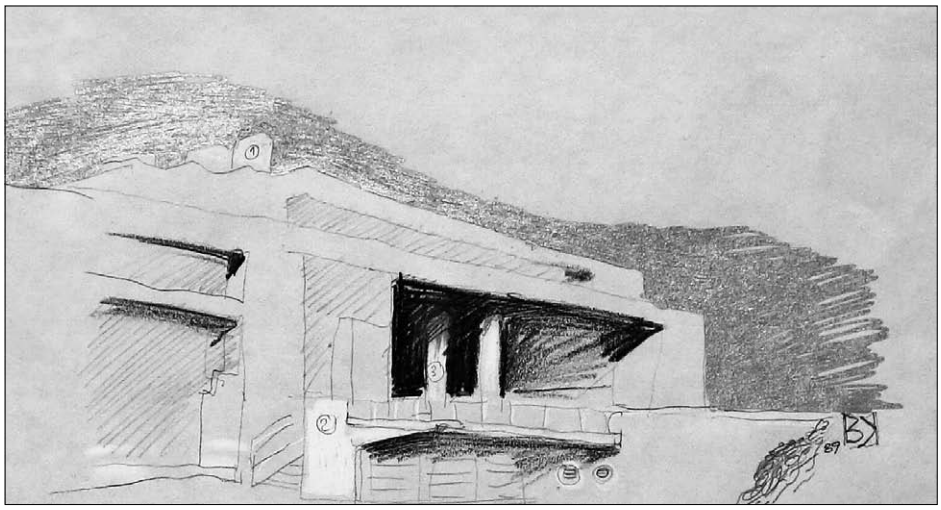

Fig. 2 Perspective drawing of the Brodomerkur Office Building, author Branka Kaminski

Design and construction

The author of the project, architect Danko Colnago[4], made the preliminary design for Brodomerkur for 500 employees in 1985, as one of the licensed architects at the company Ivan Lučić Lavčević – OOUR Design and Technology Bureau (Ivan Lučić Lavčević – OOUR Projektno tehnološki biro). Associate architect Branka Kaminski (1956- 2002) presented Colnago's design through a hand-drawn perspective (Figs. 1 and 2).

Terms for the building were issued by the Committee on Urbanism, Construction, Property Law, Housing and Communal Affairs, Directorate for Urbanism and Construction, Department for Terms of Construction (*Komitet za urbanizam, građevinarstvo, imovinsko pravne, stambene i komunalne poslove, Uprave za urbanizam i građevinarstvo, Odsjek za uvjete građenja građevina*) on April 7, 1986, for a building plot of 2700 m2 (cadastral parcels 1332/1 and 1336/1, Cadastral municipality Split; Danko Colnago Archive). They prescribe the building construction coefficient of 1 and a 6 m wide pedestrian passage through the building. The building permit was issued on May 25 and the amended building permit, with a reduction of the basement floor area, was issued on November 2, 1989 (the City of Split Archives). The supple-

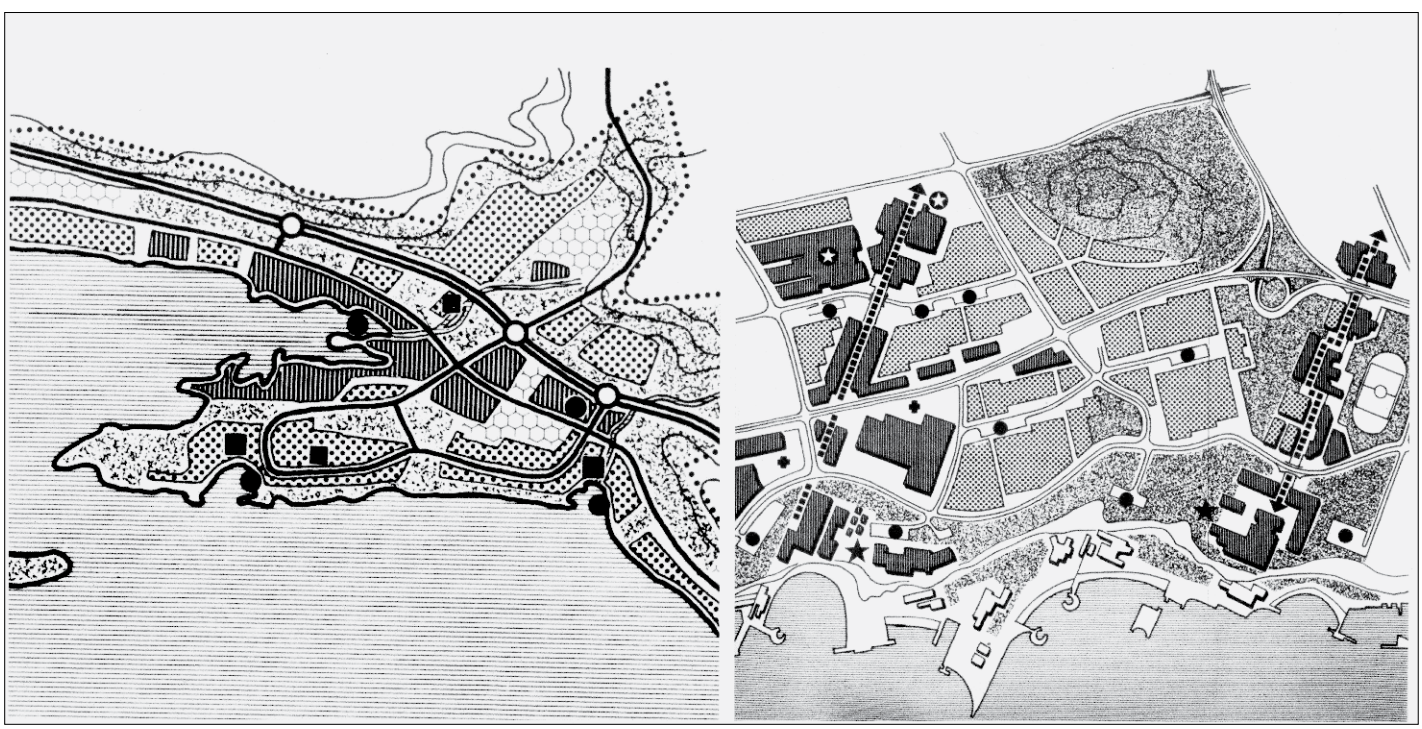

Fig. 3 Scheme of Split and the New City Centre of Split III (GUP, 1977)

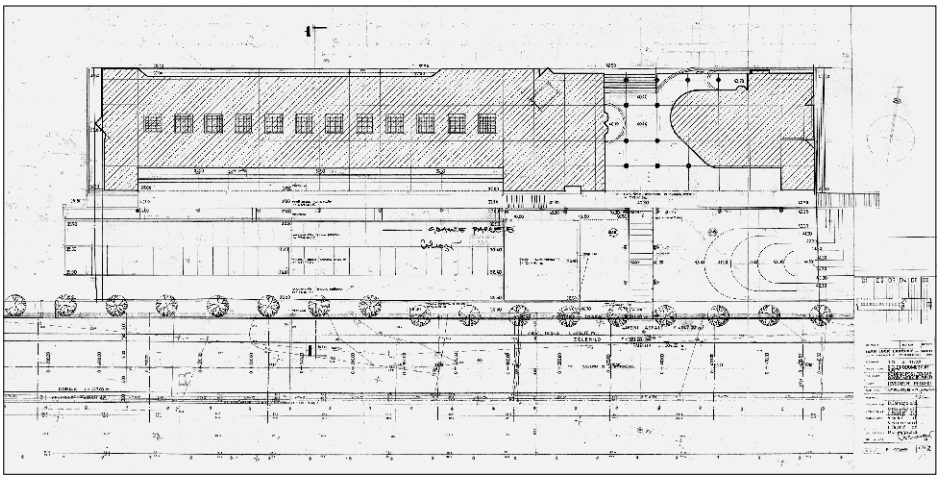

FIG. 4 SITE PLAN OF THE BRODOMERKUR OFFICE BUILDING, AUTHOR DANKO COLNAGO

ment to the building permit, with the project documentation for the elevators, was issued on June 5, 1990 (the City of Split Archives).

Preparations for the construction of the building lasted four years. This amount of time was needed not only for the design process but also for the purchase and consolidation of land (consolidating many smaller plots into one big plot) and the complete arrangement of the building plot, which was carried out for the Brodomerkur Labour Organization (Radna organizacija Brodomerkur) by the Company for the Construction of the City of Split (Poduzeće za izgradnju Splita). The construction site opened in 1988. During the construction of the building, in the period from 1989 to 1990, architect Colnago was "moved" from the design office to the construction site.

URBAN AND ARCHITECTURAL FEATURES

In the search for a different and more personal physical reality of the new spatial sign in relation to the external environment, the long and narrow belt of the building plot conditioned the concept of placing a "*limes*" – the volume of a building that appears as a "wall" defending the housing district from the Lynch's "edge" – strong six-lane road (Lynch, 1960: 62-66). The thickness of the "wall" is ambiguous, emphasizing at the same time the separation of the residential district from the main road and the separation of the inner space of the building from the outer (Figs. 5 and 6).

The "wall" is open lengthwise with two large openings, forming two "portals". The opening of the "wall" is ambiguous: it opens the inner space to the outside ("positive"), achieving either visual communication at breakthrough points or the opening of the passage through the house ("negative"; Giedion, 1969: 31-33). The sidewalls of the house are closed, for protection ("shelter") and for constructive demands.

The volume of the western "portal" is set lower than the eastern, due to the difference in the height of the natural terrain on the eastern and western part of the Brodomerkur building, and due to the requirement for the pedestrian access to the building from the slope of nearby Poljička Street (the ground floor of the eastern part of the building is the first floor of the western part of the building).[5] In addition to this difference in the terrain's / building's altitude, the partial burial of the northern façade for1.2 m down contributes to the experience of a lower volume seen from the 5 m wide pedestrian street separating the building from the front gardens of residential buildings (Fig. 6).

The eastern and western "portals" are both connected by a floor slab, which serves as a flat roof for the western side and the last floor for the eastern side. These portals close the "bridge construction" of the building, resting on "pillars" of the three reinforced concrete cores consisting of the staircases and toilets blocks, located along the east and west façades and in the middle of the building. The "bridge construction" enabled a significant opening of the façade by glazing, so the strength of the two prominent reinforced concrete "portals" alternates with the cascading retraction (southwest; Fig. 7) and/or a soft curve (southeast; Figs. 5 and 6) made of glass as the "curtain wall". Cascades form strokes/strips, which together with the pregnant volume of the "bridge/portal", serve to create a deep shadow that protects the windows and reduces the intensity of strong Mediterranean sunlight during the summer. The soft curve gently pulls towards the interior of the building, emphasizing the location of the pedestrian entrance and protecting the windows from the low western sun.

The glazed cascades at the southern façade of the western part of the building are paved with 48 horizontally placed glass panels, 10 rows high, where the two central rows are pulled towards the interior of the building forming a "cornice" at the mezzanine structure. The "cornice" also appears along the northern glass façade of the western part of the building (Fig. 6). The main vertical division of the glass façade into three parts arises from the functional requirement for two

5 Cascading fence wall, which follows the slopes of the naturally hilly terrain with the rhythm of horizontal jumps, is common in Split: along Vukovarska Street, on the Marjan Stairs, as well as on building plots from the 19th and the 20th century.

6 Due to the "typological determinants in the organisation of space (central covered atrium space and gallery)" Plejić claims that the building is "close" to the atrium

dilatations, while the denser vertical division of the façade arises from the modular division of the floor plan, which allows variable layouts for the office in the interior. By using surfaces made of grey-blue tinted thermoglass (platinum oxide produces a blue-grey tone), the building adapts to the weather conditions, the existing urban matrix, and the internal functions.

The building retains tectonics – a classic feature of durability (Vitruvius, 1990: 18) and a feature of power through size and weight (Ruskin, 1920: 72, 75, 77-78, 102) and, despite the postmodern "masking" of the main structure by stone cladding, it clearly shows the totality of its reinforced concrete structural origin. The alternating use of strips with the polished cladding of black granite from a site in Jablanica and White Dolit – beige limestone from the island Brač (stone slabs measuring 60×40 cm) – on the surface of the façade, emphasizes the importance of the material and gives the wall texture, simultaneously accentuates the force of the total mass (Ruskin, 1920: 80, 88 89).

The building is 141.05 m long and 24.235 m wide and ultimately covers the building plot of 3,450 m^2. The total area of the building is 9,711.97 m^2 (the City of Split Archives) according to the building permit. The three floors of the building, alighted by side openings as well as zenithal openings, represent a double-ranged standard office building (Figs. 7 and 8), organised and horizontally connected by galleries around the inner atrium, with vertical communication via freely suspended staircases in the inner atrium and via elevators in transparent envelope structures of steel and glass. The basement floor contains facilities: a restaurant and coffee bar, and server rooms, etc. In his interpretation, Plejić relates the building to several prominent administrative buildings in Split (Plejić, 1990: 12).[6]

The structural assembly of the Brodomerkur building is a simple system of reinforced concrete columns and beams (Figs. 8 and 9; DC Archive). The columns are laid out in a floor plan in a longitudinal direction at the axial distance of 6 meters (5.6 m of the light distance between columns which are 40 cm wide). The axial distance in transversal direction is different; the fields along the façades have columns at a distance of 5 meters, and the central field has columns at a distance of 7 meters. The three reinforced concrete cores (toilets and staircases) serve as a seismic reinforcement of the entire structure of the building.

Fig. 5 View of the southern façade of the Brodomerkur Office Building, author Danko Colnago

Evaluation of the architectural features

The Brodomerkur building did not receive any recognition in the form of professional awards. It was included in the competition for the Croatian annual Award Viktor Kovačić at the Zagreb Salon in 1990, at which the authors Đivo Dražić and Edvin Šmit were cited for the office building for the Customs Administration and Intereuropa – Koper located at the Zagreb Fair (Oštrić, 1991: 8-11). The building was also presented at the *Piran Days of Architecture* the same year, where it received critical praise.

According to his own words (Colnago, 2014), as an inspiration during the designing process the author used the works of Japanese architect Tadao Ando (1941), the British architect Norman Foster (1935), and in particular, the glazed façade of the Willis Faber and Dumas Headquarters in Ipswich (1970-1975) (Frampton, 1992: 325-329), as well as the works of Scottish architect James Stirling (1926-1992), specifically the canopy at the Neue Staatsgalerie in Stuttgart (1977-1984) (Frampton, 1992: 332-333; Jencks, 1986: 460, 466; Jencks, 2007: 137).

However, the whole project and various details of the Brodomerkur building are rich with references to the history of architecture, a few of which are analysed in this section. Also present are references to the work of other postmodern architects who were the author's contemporaries and active designers in the 1980s: Mario Botta (1943); Aldo Rossi (1931-1997), Robert Arthur Morton Stern (1939), and Thomas Beeby (1941).

The Brodomerkur building is perceived in the fabric of the city as a pure geometric form

building of the Banovina Palace (competition: Turina and Boltar, 1936-37; realisation: Turina, Despot and Vrbanic, 1938-40), and "according to the way how the building belongs to its environment, respects and enriches the defined context and partly according to the design register (selected materials and their interpretation)", he claims that the building is "a continuation of the direct line started by Šegvić's Office Building on the West Coast".

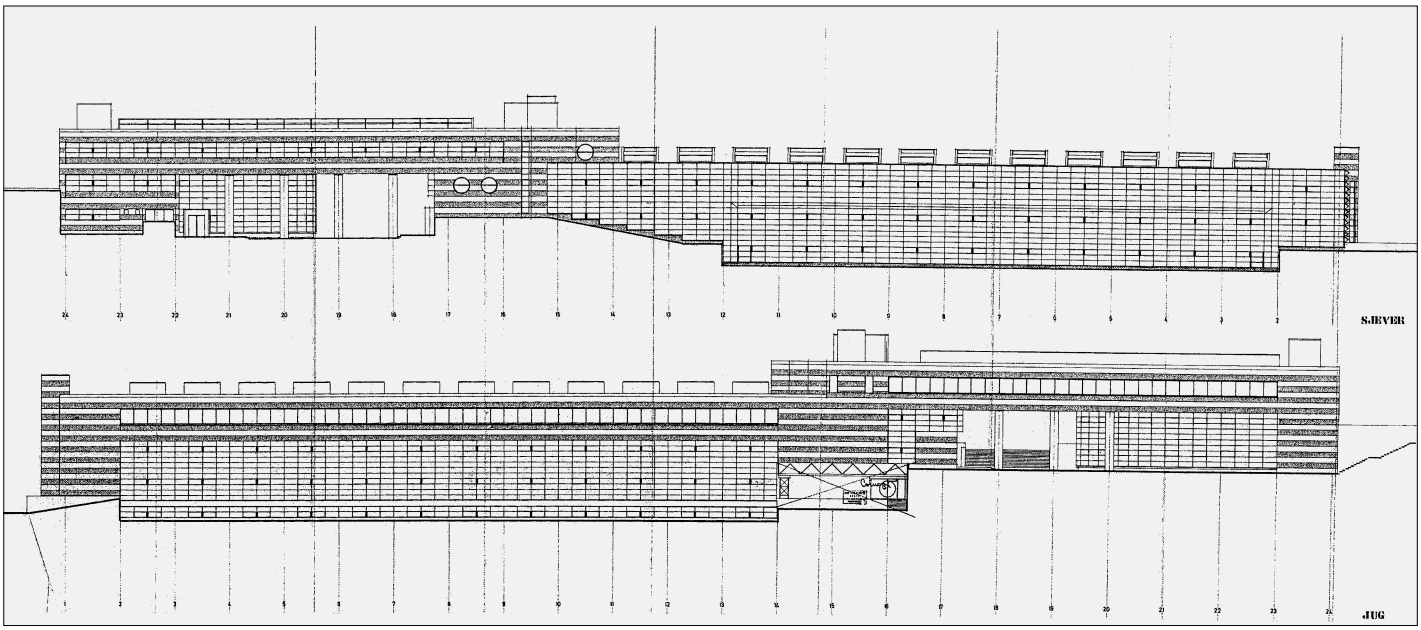

FIG. 6 NORTH AND SOUTH FAÇADES OF THE BRODOMERKUR OFFICE BUILDING, AUTHOR DANKO COLNAGO

of large scale (drawing on Enlightenment architecture and Ruskin's power of size and weight). These qualities of its form, size, and weight make a visual impact that is noticeable from the speeding cars on the six-lane city road that encircles the Split peninsula (Poljička Street).[7] The fundamental postmodern feature of the building as a spatial sign of the contemporary city is evident through the scale of a design that is meant to be enjoyed from a speeding car, not from the perspective of an itinerant pedestrian (Venturi, 1988: 13, 30-35).

The tectonics of the building's solid mass, as described in the manuscripts of the Swiss architect Botta on House Bianchi (Ligornetto, 1975-1976) and House Robbiani (Massagno, 1979-1981), has the role and appearance of a "defensive wall" that accords both with the rhythm and speed of the city road, and the "idea of the form and protection" (Coppa, 2009: 23), all of which are symbols of the historical role of the wall in the Split peninsula since antiquity.

The defensive wall perforated with two openings represents a "double portal" / "colonnade"; rich in meanings, metaphors, and linguistic messages consistent with Venturi's concepts of "*duality*" and the "*difficult whole*" (Venturi, 1989: 39-44, 186-188).The visual experience of the "portal" – there is only one actual passage through the building – represents a series of historical associations, the most prominent of which is a metaphor for the city gate from one of the city's two main roads. This passage is not just an opening of the building into the surrounding urban fabric that fits into the urban matrix – in Colnago's words – *"little cardo"* (Colnago, 2014), but it also marks the entrance to the building.

The graded access to the building that starts on Poljička Street (parking and/or pedestrian access/*promenade* lined with greenery), across the sort of "hypostyle hall" / "city loggia" and main entrance, and then through the inner atrium, is much like the one developed by Aldo Rossi on the matrix of the postmodern city and completely shaped, as a result of complex architectural education, on a project for the City Hall in Scandicci (1968; Braghieri, 1997: 38-41; Moneo, 2004: 114). At the same time, the public space of the entrance, with its columns and staircases, mirrors the urban themes integrated into Mediterranean cities such as Split (small public squares, town loggias / courts, and staircases/*scalinate*). This space is also what Colnago calls "an intuitive archetype" (Colnago, 2014), a product of the architect's habitus. The arrangement of elements in this public entrance space represents a postmodern sequence that creates a theatrical space, far from being a plain entrance without ambition, by which the act of entering a building is transformed into an event (Rossi, 1999: 143-144).

The postmodern pillars of the passage are lined with the longitudinally placed granite tiles resembling, in Colnago's words, the

7 The Brodomerkur Office Building establishes a relation to the highway and parking similar to the one appearing in Stern's Point West Place (Framingham, Massachusetts, 1983-1984) or Beeby's American Academy of Paediatrics (Chicago, Illinois, 1984).

8 This demonstrates the author's ambition to present the entrance like dramatic scenography.

"vertical fluting on Doric columns" (Colnago, 2014)[8]; which divide the surface into well-balanced rhythms, and each column absorbs an internal loadbearing reinforced concrete structure. The canopy of the basement service entrance below the eastern portal represents a literal quote of Stirling's canopy at the Neue Staatsgalerie in Stuttgart (Loos, 1952: 29; Ruskin, 1920: 158-159), where Constructivist's asymmetry and De Stijl's / Theo van Doesburg's triangular ornament emphasize the public entrance and protect visitors from rain (Jencks, 2007: 110).

The "bridge construction" / "double portal" of the Brodomerkur building rests on three reinforced concrete cores and a column-beamslab system; which, according to the author, derives from the logical construction of Foster's elegant "undecorated hangar" of the Willis Faber and Dumas Headquarters in Ipswich (Frampton, 1992: 325-326, 328, 331). This construction frees the interior space by creating pure geometric shapes without load-bearing structure, liberating the façade from heavy load-bearing walls while enabling the modernist flexible organisation of the floor. Looking from the inside, the building opens to the environment through a glass "curtain wall" which represents a modernist approach. However, looking from the outside, tinted reflecting glass acts in daylight as an opaque wall with windows, which is more baroque than the modernist concept of the opening to the landscape (Giedion, 1969: 110; Zevi, 2000: 83, 85). The application of the "curtain wall" echoes the approach

of the architect Botta and the Ticino school, where the theme is sculpture expressed through emphasizing "the depth and thickness of the curtain wall" as a model for creating light, where the goal is to turn "a static technical element into a spatial entity" (Coppa, 2009: 22). Simultaneously, the use of solid, massive walls as the dominant design is in stark contrast to the glass and transparency of the façade (Ruskin, 1920: 95, 97, 100, 102), which is another example of the postmodern paradox. The formative logic of the gradation of the suspended façade towards Poljicka Street can also be linked to earlier examples: Mies's expressionist vertically broken glass façade of a 1921 skyscraper at Friedrichstrasse in Berlin (Frampton, 1992: 176) and the cascading façade of the Biblioteca Civica Luigi Einaudi by Bruno Zevi and Studio A/Z (1962-1963) in Dogliana (Olivero, 2014: 1).

The façade's design demonstrates the modernist application of glazed elements rooted in industrial design, but, through cascades and roundness of the "curtain wall", it also achieves the postmodern sculptural individuality. This effort reflects the influence of Italian architects annoyed by glass envelopes encompassing the entire office buildings of American and British productivists which, *"until yesterday"*, were indicative of the "evolution of the building method and architecture resulting from the industrial economy", and, in the long run, restricted architects to interior design – from Paxton and the Cristal Palace to the present day (Santi, 2007: 26-27).

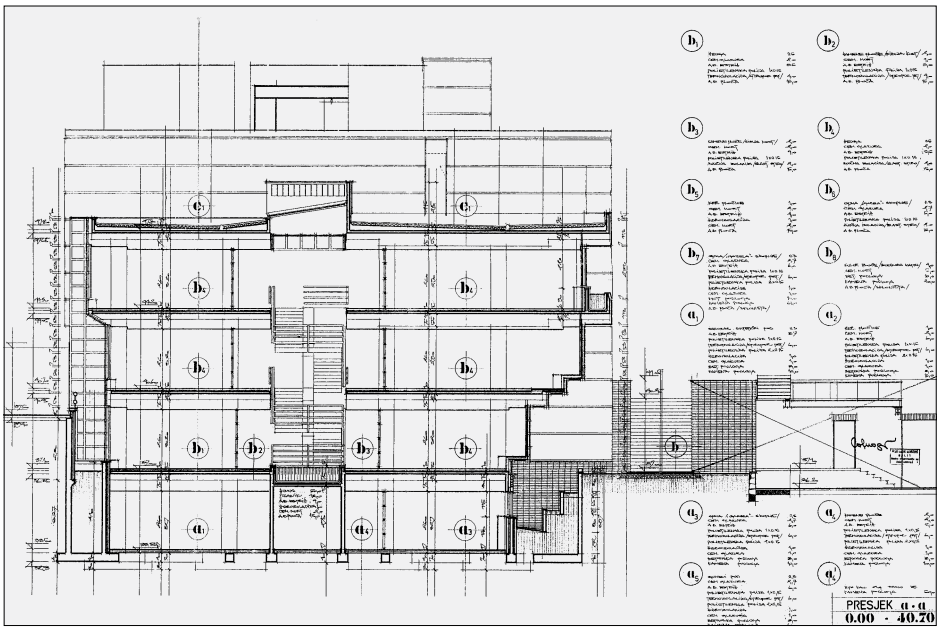

Fig. 7 Cross-section a-a through Brodomerkur Office Building, author Danko Colnago

The parallelepiped structure of the Brodomerkur building set on a rectangular floor plan does not show an intention to merge with the landscape, but rather to oppose it as an artificial element with prominent horizontal strips of cladding in contrast to the surrounding natural and built environment. The illusion of a "heavy stone mass" ("masks" of stone slabs) realises Venturi's "double unity" of a building that is simultaneously traditional and modernist (Venturi, 1989: 40, 43). The alternating application of black and white strips, 60 cm high, on the façade, has its historical basis in the area of Split and seemingly has a justified appearance. There are two nexuses worth mentioning: the nexus to the application of ancient masonry, and the nexus to the choice of black and white colour (stone cladding slabs measuring 60×40 cm). Examples of antique masonry, known in Dalmatia and Split, from the *opus isodomum* through the *opus quadratum* to the *opus mixtum* (Vitruvious, 1990: 41-43), indicate vernacular / Rossi's recognition of *loci* (Rossi, 1999: 139, 143, 145) in the harmony of a regular stone formation.

The choice of the black and white façade cladding stems not only from the antique

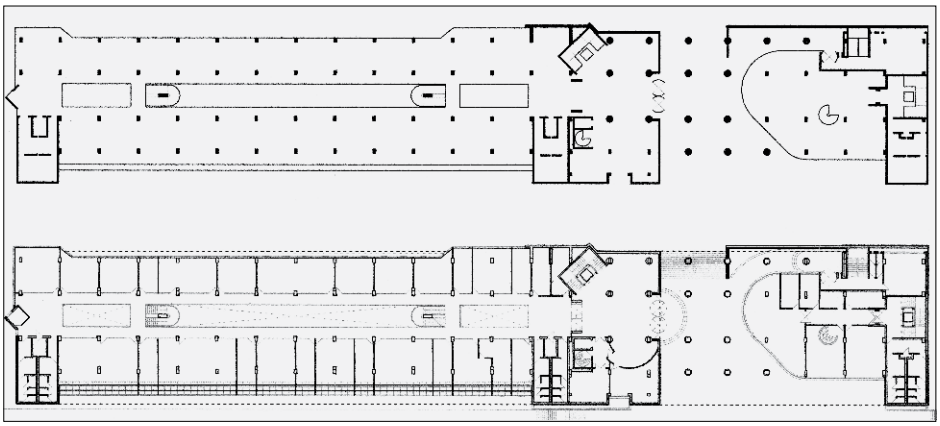

FIG. 8 GROUND FLOOR 2 OF THE BRODOMERKUR OFFICE BUILDING, AUTHOR DANKO COLNAGO

(Suić, 2003: 177-183; Kleiner, 2009; Lavan, 2018)[9], but also from the Tuscan medieval architectural tradition (Belloni, 2000: 14-17; Donati, 1999: 11-23, Guerra, 1993: 15-33; Janson, 303- 304; Paine, 2012: 6-8)[10] and modernity (Loos, 1952: 90).[11] This choice makes the spectator experience the difference through the perception of dark and light (Ruskin, 1920: 87-89, 95) and is the only possible choice in the effort to achieve the building's own strong identity in the background of the multi-coloured street through Smrdečac (formerly Mirko Kovačević Lala Street) by architect Frano Gotovac. Colnago cites Ruskin's monochrome design as shaping the interspace between painting and engraving (Ruskin, 1920: 148).

A two-tone stone cladding that underscores the tradition of a stone syllable in rows is ubiquitous in 1980s postmodern architecture that invokes historical styles: Botta uses it at the Watari Museum of Contemporary Art in Tokyo (1985-1990) and the Mediatheque in Villeurbanne, France (1984-1988; Jencks: 2007: 146)[12], Stirling and Wilford use it at the Neue Staatsgalerie quoting Wilhelma (Middleton, 1980: 237-238, 244, 246, 248; Toman, 2006: 164, 185, 191)[13], and American examples of its use appear at the Point West Place and the Academy of Paediatrics (Beeby, 1985: 78-81; Stern, 1985: 38-43).

Opposing the serious restraint and power of pure geometric volume with the two-tone stone-clad surfaces and the cascading drag or indentation of a curtain wall curve establishes a modernist modulor – a human scale in relation to the building – which, paradoxically, creates luxurious dignity which underlines the purpose of the building and expresses the image of the company mirroring its success and wealth.

The double-ranged Brodomerkur office building has the ground-floor plan divided into three fields which unfold in cross-section. This is the nexus with the architecture of the Roman public basilica, one of the early forms of administration and trade building, but with the central nave illuminated through multiple square zenithal openings in the roof slab resembling a clerestory (Figs. 4, 7 and 8). The dynamism of the entrance hall with a reception area and the elevator is achieved through the integration of Rossi-like volumes of the two cylinders of a revolving entrance door (Braghieri, 1997: 26-27, 42-43, 162-167, 176, 179, 182), which introduce the interior office space – a Foster-like modernist construction composed of columns and slabs, where distribution and partitioning are freely permitted as required. But, unlike Foster and again influenced by Italian neighbours, Colnago did not design the banal Bürolandshaft. Instead, he employed the use of spacious large offices to accommodate one or four people; where a common network of utilities (electricity, water, lighting, heating, ventilation) leaves the possibility of easy remodelling, thanks to raised floors and suspended ceilings.[14]

The design details of the offices and interior of the building are linked to Scandinavian design, deep-seated in Croatia since the 1960s and introduced through the work of architect Bernardo Bernardi (1921-1985). The cladding panels of interior walls and partitions, and the interior carpentry, aa well as the furniture made of light ash, are in contrast to the Parisian blue colour of the floor carpets (Aalto's Savoy restaurant in Helsinki, 1937). Executive offices differ only in furniture, which is mahogany, underscoring the hierarchy by the quality of material used.

The location of sanitary facilities and staircases with a glazed steel structure of elevators within reinforced concrete cores of the "portal pillars" further punctuates the design and expression of the building's structure and Kahn's principle of the "served and servant space". The clean minimalism of the floor plan stands in postmodern counterpoint to the installation of a Foster-like "pool with goldfish" on the ground floor and "jerulas" for plants, which are absent today.

9 According to Suić, by carving all sides of the stone block with paying special attention to joints in the 1st century AD, the wall canvas in Dalmatia got a prominent plastic (two plans: a recessed plan of the joints and a protruding plan of the carved stone) which give the spectator a difference in perceiving dark and light ("chiaroscuro"). According to Kleiner and Lavan, the marble revetment and pure geometrical *opus sectile* are continuous from 2nd to 4th century AD in Imperium Romanum.

10 Examples of a two stone cladding in medieval Tuscan (Italian) Romanesque Architecture include the Pisa Cathedral (1063) and the Pisa Baptistery of St. John (1153), the Florence Baptistery of St. John (11th century), and the lower portion of the façade of the Siena Cathedral (1284).

11 Adolf Loos also applied two-tone strips to the unrealised project of Josephine Baker's House in Paris in 1928.

12 The two-tone strips of stone cladding in Botta's works are interpreted differently: according to Joseph Rykwert

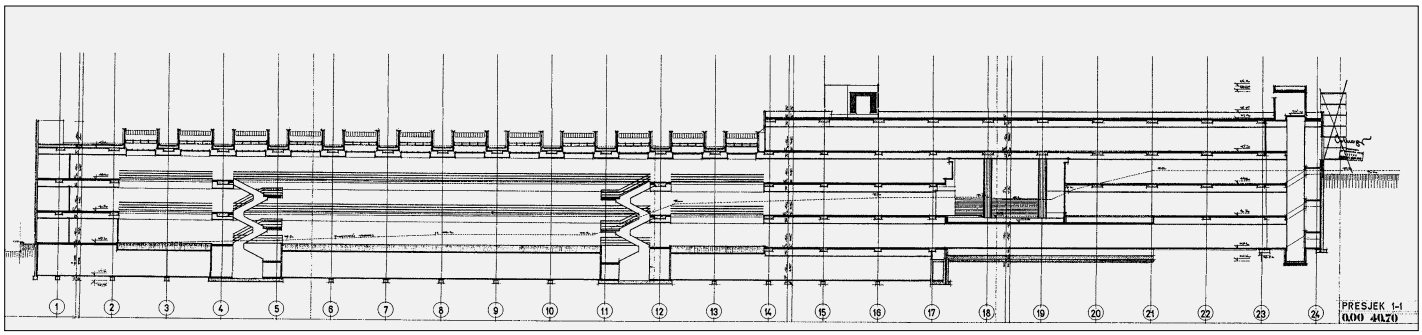

Fig. 9 Longitudinal section 1-1 through the Brodomerkur Office Building, author Danko Colnago

Discussion and conclusion

The Brodomerkur building is a "landmark" of political, economic, and social change in the City of Split in the 1980s. Designed and built in the socialist era with a postmodern appearance that resembles luxurious buildings of capitalist corporations, the building is simultaneously a postmodern paradox; it anticipates a new historical era and is a practical example of the transformation from socialist social ownership to the capitalist private property.

In the 1980s, before the digital era, professional journals were widely available to architects in the City of Split: *Domus* and *Abitare*; *L'Architecture d'Aujourd'Hui*, *Progressive Architecture*, *Architectural Record*, and *A.D.* This enabled architects to be fully involved in urban and architectural movements of the time despite the isolation caused by the so-called "Iron Curtain". Study trips to Berlin and/or weekends in Italy were also a common practice. Architect Colnago recognized the forces of his time and achieved their resonance in his creative opus. Speaking clearly and unambiguously about architectural role models (Ando, Foster, Stirling), he inquired about other people's recognition of the context. He posed the question of how to reinterpret the general scheme in his environment, with vernacular expression, simultaneously respecting the heritage.

Colnago critically studied Foster's glazed hangar as a model for an office building. While reflecting on an irregular total volume squeezed between traffic flows, he responded with a parallelepiped of the limes parallel to the antique *limitatio*, simultaneously reading his context. Thinking of Foster's modernist glass envelope in the context of the location, Colnago responded by protecting the glass envelope from the strong Mediterranean sun by gradual indentation.

In the same context, Colnago critically studied Ando's relationship between light and darkness through the complex rotations of communications that define the building. He responded with a double ranged office building, a transposed floor plan of the three-nave Roman civil basilica, where the communication system of galleries and multiple-style staircases are illuminated by lateral and zenithal light.

Here, we can talk about apprenticeship at an international level, immersion in one's habitus, and, as a result, the creation of new work. One can discuss how much of it came from the conscious and how much from the subconscious accumulation of images and experiences of space.

For example, the two-tone cladding of the "portals" would be a superficial populist scenography typical for postmodernism (a sailor shirt for a marine equipment store), if Colnago (like Botta in Ticino) had not grown up in the area with seventeen centuries of excellence in stone masonry – from antiquity until today. The entire building is the result of the realisation of the urban and architectural values of Colnago's environment. It is a kind of a materialized essay of the local dialect of his architectural manuscript.

The Brodomerkur building has lasting Vitruvian values: *utilitas* through a clear division of served and servant spaces; *firmitas* in the stability and strength of geometry of tectonics and the high quality of used materials; and *venustas* in the horizontal calmness achieved through the thoughtful combination of the traditional and the modernist.

they are *"a link to the medieval Italian tradition"*, according to Charles Jencks they are *"an abstract form of ancient rustication"*, and according to Kenneth Frampton they *are "a continuation of the traditional construction of the 19th century"* in Ticino.

13 The two-tone strips of the façade were common in the 19th century in the works of German and French architects: Friedrich Wilhelm von Zahnt at Wilhelma in Stuttgart (1837), Ludwig Persius at the Church of the Most Holy Redemption in Potsdam (1841) and the Pumping Station (1841-1843), Leon Vaudoyer at the Cathedral of Marseille (1845, 1852-1893), and Gabriel Jean Antoine Davioud at the Fountain of St. Michael in Paris (1858-1860).

14 The recent renovation of the building for a new function replaced inner glass walls between offices with gypsum walls, causing a loss of visibility through the building's western "portal".

Classical canons contribute to the rooting of the building, both in the foundations of architecture (pillar and beam of the portal structure that solve the problem of light penetration and weight control) and in the city's context through the reflection and celebration of materials (*limitatio* of Split ager and Roman *opus mixtum*).

The building is a complex postmodern achievement created in the period of the architect's style confirmation. It evokes Rossi's return of the "*city palace*" / "*building as a city*". The created architecture is both historical and new. It abounds in postmodern syntax ("*the place of concentrated quotations and references*"). In Venturi's terms, it is ambiguous. The abstract decomposition into horizontal planes and the repetition of two-tone postmodern ornament create a more pleasing background than the original strength of the modernist, engineering approach to the pregnant form of the bridge of the façade, supported by industrially designed glazed elements. The freedom to combine materials and approaches contributes to the experience of harmony, beauty, geometry, and spirit, emphasizing the postmodern mastery of Danko Colnago.

[Translated by Dina Ožić Bašić; proofread by Andrew Stambuk, Ph.D., and Boris Škvorc, Ph.D.]

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Illustration sources

Fig. 1 Kaminski, B. (1986?) *Perspective drawing*. Danko Colnago Archive. Photo: Dina Ožić Bašić (jpg file, 350 dpi)

Fig. 2 Kaminski, B. (1989) *Perspective drawing*. Danko Colnago Archive. Photo: Dina Ožić Bašić (jpg file, 350 dpi)

Fig. 3 Kalogjera, et al., 1977. Dina Ožić Bašić Archive, Split (jpg file, 350 dpi)

Fig. 4 Colnago, D. (1988) *Detailed design. Commercial & Business Centre Brodomerkur. Sheet 2*. Danko Colnago Archive (tiff file, 400 dpi)

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Fig. 6 Colnago, D. (1988) *Detailed design. Commercial & Business Centre Brodomerkur. Sheet 6*. Danko Colnago Archive (jpg file, 600 dpi)

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Fig. 8 Colnago, D. (1988) *Detailed design. Commercial & Business Centre Brodomerkur. Sheet 1.5*. Danko Colnago Archive. Auto CAD Drawing after Danko Colnago Archive: Dina Ožić Bašić (jpg file, 1200 dpi)

Fig. 9 Colnago, D. (1988) *Detailed design. Commercial & Business Centre Brodomerkur. Sheet 5*. Danko Colnago Archive (jpg file, 600 dpi)

Author's biography and contribution

Associate professor **Dina Ožić Bašić**, Ph.D., graduated in 1994, got a Master of Science degree in 2003 and Doctorate in 2006 at the Faculty of Architecture, University of Zagreb. Her early research was on public religious and cultural buildings. Her present research is about postmodern architecture and the architectural heritage of the 20th century, in particular postmodern urbanism and postmodern architecture in the 80s and 90s city of Split.

The author prepared the whole work.

Fig. 1 Location and photographs of the Nicosia Municipal Arts Centre in the walled city of Nicosia.

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Industrial Heritage Buildings in Cyprus
Spatial Experience of the Nicosia Municipal Arts Centre

adaptive reuse
Cyprus
industrial heritage
Nicosia Municipal Arts Centre
spatial experience

This study focuses on the Nicosia Municipal Arts Centre [NiMAC] in Nicosia, one of the prominent historical industrial buildings in Cyprus, which has been re-functionalized as an art centre. The overall goal of this study is to examine and clarify the human experience of the NiMAC building as part of one's lifeworld. The main argument of the research is that proposing an effective research design for examining how a person distinguishes the components of a re-used building is possible by human responses to architecture rather than focusing on the physical aesthetics of it. Hence, the purpose of the study is to make a multi-sensory analysis to grasp how a person develops an emotional attitude in the re-functioned space which can be the core assessment of the adaptive re-use purposes. In this context, this research basically explores the main research question which is about what spatial experiences the NiMAC building is offering to people after it is re-functioned when space is experienced in a multisensory approach. Methodologically, this research design is basically created by the hybrid use of first-person, existential, and hermeneutic tactics of the phenomenological approach.

INTRODUCTION

Historical buildings possess tangible and intangible qualities that link the past and the future. On the other hand, architecture assumes the role of reviving the historical buildings according to contemporary conditions. Functional changes also imply spatial changes. Hence, it is necessary to evaluate how users feel when they experience new designs that combine historical and contemporary textures. Each user may interpret the architect's existential experience and spatial reflections of selfdom differently. This is related to the fact that every user has different cultural values, experiences, knowledge, and memories. As Ludwig Wittgenstein stated in his article entitled "Culture and Value", both philosophical and architectural work interacts with self-image.[1]

Industrial heritage is important in terms of passing culture from the old to the new generations. It also helps to preserve and transfer traditional values (Golmakani, 2011: 28). With their magnificent chimneys, cooling tanks, and fuel units, they influence how the city is perceived. These buildings take people to the past and help them discover themselves and understand the old. The International Committee for the Conservation of the Industrial Heritage [TICCIH-1978] is the first foundation established for the conservation of industrial buildings. Industrial buildings differ from other buildings in terms of their architectural and structural characteristics, spatial organization, and functional properties. They are among the important types of structures that can be suitable for reuse.

Historical industrial buildings have a remarkable value throughout the world. When the island of Cyprus, which is the third-largest island in the Mediterranean, is examined, in addition to the industrial buildings which include transportation buildings, CMC mine, cement factory, textile factories, food processing factories such as tobacco, carob, wine, citrus, olive oil mills and warehouse, as well as furniture, plastics, metal-works, chemical, and pharmaceutical factories that are still in use or have been abandoned due to economic and political reasons, there are also some industrial structures that have been re-functionalized and they still serve their new functions. These buildings, whose construction started in the 1900s and were built until the 1980s, are generally located in coastal towns Famagusta, Limassol, and Larnaca.

The main interest of this research comprises the re-functioned industrial heritage buildings which have originally high ceilings, open plan typology, and mostly containing large-scale machinery under a single roof. These buildings are different from the other building categories such as health, educational, religious, or residential in terms of the structural systems and spatial organizations. Thus, it is potentially possible to assign a new function to the old industrial building without having any extremely negative effects of structural elements. In these regards, the scope of this study is predominantly limited to the industrial heritage buildings in Cyprus and specifically the Nicosia Municipal Arts Centre [NiMAC] building which researchers can access and analyze efficiently.

The number of the old industrial heritage buildings in Cyprus is quite high as seen in Table I and Table II which were created to specify the facts about the context. It is an indication of the significance of this study, so as an impact of it, this methodology can be

1 The interpretation of the environment and the object that is being viewed can differ significantly depending on the self-interpretation. In other words, people's perceptions may vary according to the things they observe (WITTGENSTEIN, 2002: 117).

2 Alberto Gomez (1994: 6) claimed that the political content of reality, the a priori of the world, which is the ultimate frame of reference for any truly meaningful architecture is hidden beneath, a thick layer of formal explanations. With a similar opinion, this phenomenological research is intended for collecting and interpreting data to understand the human aspects of the re-functioned structure ultimately as well as evaluating its physical characteristics. Thus, the question of how human behaviour and experiences define space as a lifeworld becomes the essential concentration of this inquiry while it seeks to comprehend the spatial experiences in NiMAC building that are adaptively reused with the help of all the senses.

repeated for another building after NiMAC. Table I has been prepared to provide information on abandoned industrial buildings across the island of Cyprus. These buildings constitute an important potential in terms of being re-used in the urban fabric where they are located. They are capable of responding to the development of the region and the usage needs of the people of the region by refunctioning. For these reasons, these structures are selected and shown in Table I. Table II shows the structures in the island of Cyprus that have been re-functionalized and made available for the benefit of the society and have also made positive contributions to the economic and social development of the region. These structures in Table II are expected to be examples of structures that will be re-functional in the future. Another reason for choosing the structures in these tables is that they are similar to the NiMAC building analyzed in the study context in terms of spatial and building size.

Usually, in the architectural design process, tangible values such as form, volume, size, height, colour, material type, structural system, construction method, and function are mostly considered; however, intangible values such as the emotions these qualities evoke in human beings are overlooked.

In order for an architectural design to be meaningful, not only tangible values but also intangible values should be considered, and the forms should be designed based on the senses.[2] The primary question of the study is "What spatial experiences do historical industrial NiMAC building offer to first-person after they have been re-functioned?" In addition to this main question, the study seeks an answer to the following questions: "What are the consequences of experiencing the space with the senses?" and "Do we obtain different conclusions when space is experienced in a multisensory approach?"

The purpose of the study is to document the historical industrial NiMAC building and to analyze the structural and spatial transformations. Furthermore, this study is stressing both the objective and the emotional perceptions of human beings through designs grounded in concrete experience. In normal daily life, people are usually involved in a position that they undertake daily life experiences as if they are inherent, and this is called the "natural attitude". The world of "natural attitude" is called as "lifeworld". Lifeworld, in another word, the world of lived experience, is inhabited by humans as conscious beings and incorporating the way in which phenomenon becomes a conscious experience, that is NiMAC building for this study. The prominent goal is to describe a lived experience, rather than to explain or quantify it in any way.

Concisely, the study adopts a phenomenological research design to investigate the tangible and intangible qualities of space. The quantitative techniques are used for the data presentation of tangible qualities such as plan layouts, spatial organization, façade

Table I The examples of the abandoned industrial heritage buildings in Cyprus

THE ABANDONED INDUSTRIAL HERITAGE BUILDINGS IN CYPRUS

1. The Sanayi Holding Turk-Teks Factory, Nicosia

2. The Alba Textile Factory, Nicosia

3. The Tek-Dok Polystyrene Foam Factory, Nicosia

4. The Old Sock Factory, Famagusta

5. The Vialco Washing Powder Factory, Larnaca

6. The Cleaning Products Factory, Famagusta

7. The Ece Flour Factory, Famagusta

8. The Othello Ice-Cream Factory, Famagusta

TABLE II THE EXAMPLES OF THE ADAPTIVE REUSE HISTORIC INDUSTRIAL BUILDINGS IN CYPRUS

THE ADAPTIVE REUSE HISTORIC INDUSTRIAL BUILDINGS IN CYPRUS

1. The Architecture Research Centre (Old Shoe Factory), Nicosia

2. The Centre of Visual Arts & Research (Old Flourmill), Nicosia

3. The Nicosia Municipal Arts Centre (Old Power Station), Nicosia

4. The Pharos Arts Foundation (Old Shoe Factory), Nicosia

5. The Bibliotheque Cafe (Old Carpenter's Workshop), Nicosia

6. The Private Ethnographic Museum, Nicosia

7. The Larnaca Municipal Cultural Centre (Old Warehouse), Larnaca

8. The Municipal Cultural Centre Panos Solomonides, Limassol

9. The Lanitis Carob Mill Museum (Old Carob Factory), Limassol

10. The TEPAK Mechanical Engineering Labs (Old Warehouse), Limassol

11. The Social and Commercial Centre (Old Warehouse), Famagusta

12. The Nicosia Parliament Building (British American Tobacco Factory), Nicosia

characteristics, the preparation of the materials lists, and the tabulation of the data obtained whereas the qualitative technique was used mainly to interpret the lived or multisensory experiences. Also, to get a vision of the future of industrial construction transformations is an expedition of the study.

In a methodical way, this study is conducted based on firstly Seamon's "first-person" experiences of individual who is an architect as well, secondly, the interpretations made by co-researchers in an existential way as von Eckartsberg suggested, and thirdly the archetypal dimension, which is related to individuals' spontaneous and unconscious reactions as Thiis Evensen practiced.

Literature review

Considering both the theoretical and the practical background of this research, current knowledge about historical heritage, industrial structures, phenomenology with its conceptions and methods in architecture, sense of a place, NiMAC building, and multi-sensorial experiences have been overviewed.

Historical buildings serve as a bridge that connects the social, cultural, economic, and architectural values of the past to the present. They play an important role in revealing the secrets of the cultural values of the past as well as ordinary and social-economic life. Adaptive reuse is the act of finding a new use for a building. Richard (1988: 47) described it as a "process by which structurally sound older buildings are developed for economically viable new uses". This economic approach creates a valuable concentration area for increasing the tangible and intangible values in today's world where added value is needed for any kind of product, service, and space.[3]

Unlike newly constructed buildings, historical buildings that are adaptively reused evoke different feelings. In other words, historical buildings incorporate a feeling of liveliness and real-life experiences. When entering a historical space, one may feel the smell of humidity on the old walls and observe the traditional construction materials. This evokes the memories of the past and the person begins to contemplate and dream about the real-life experiences that occurred in this place. In fact, historical buildings constitute the silent screams from the past. The three theorists who have important influences in the field of phenomenology in architecture, Peter Zumthor, Juhani Pallasmaa, and philosopher Maurice Merleau-Ponty dealt with these experiences.[4] Also, Thiis Evensen who applied the theory of phenomenology to architectural analysis also has a significant encounter to interpret the experienced qualities of architecture.

While our body may be in the present, our mind may live in the past. Juhani Pallasmaa explains this as follows: "Architecture connects us with the dead; through buildings, we are able to imagine the bustle of the medieval street, and picture a solemn procession approaching the cathedral" (Pallasma, 2005: 52). Zumthor, in *Thinking Architecture*, explains: "I frequently find myself sinking into old, half-forgotten memories" (Zumthor, 1998: 10). In his work, Thiis-Evensen acknowledges that architectural form and space both presuppose and contribute to various shared existential qualities insideness-outsideness, gravity-levity, coldness-warmth, and so forth – that mark the foundation of architecture as human beings experience it (Seamon, 1991: 5). Experiencing a space in a multisensory way may be explained as the perception and interpretation of it by using all five basic senses of sight, hearing, smelling, touching, and tasting. Juhani Pallasmaa adds the skeleton and muscles to the five senses for experiencing a space (Holl et al., 2006: 30).

People perceive the size, material, colour, and height of space by seeing with their eyes, while they perceive the voices, noises, or silences by hearing with the ears. They record the good or bad smells of live or lifeless objects and building materials by smelling the space. The scents integrate the people with

3 (TICCIH-1978), the International Committee for the Conservation of the Industrial Heritage (Nizhny Tagil Charter for the Industrial Heritage, 2003) defines industrial heritage as follows: "Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted, and used, transport and all its infrastructure, as well as places used for social activities related to the industry such as housing, religious worship or education".

4 Zumthor (1998: 10) approaches architecture and experience primarily through the first-hand exploration, using his own memory and encounters. Pallasmaa (2005: 32) declares that contemporary architecture is not responding to human existential questions. In contrast to Zumthor, Pallasmaa's approach combines existential and hermeneutic aspects: "The current over-emphasis on the intellectual and conceptual dimensions of architecture contributes to the disappearance of its physical, sensual and embodied essence. Contemporary architecture is mapping the possible marginal territories of the art than responding to human existential questions." (Pallasmaa, 2005: 32). Likewise, Maurice Merleau-Ponty (2010) believes that there is an ongoing dialogue between one's lived body and the world which it perceives, and the human body is the center of the experiential world. Merleau-Ponty's methodology is also a combination of existential and hermeneutic as similar to Juhanni Pallasmaa. As cited in Pallasmaa (2005: 40) Merleau-Ponty claims that "our own body keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly, and with it forms a system". Consistently, Pallasmaa (1996: 450) writes "The quality of architecture does not lie in the sense of reality that it expresses, but quite in reverse, in its capacity for awaking our imagination".

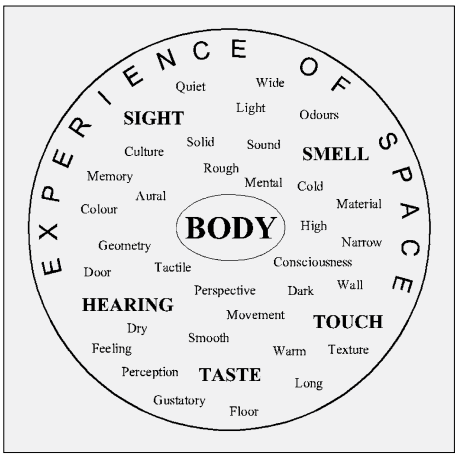


FIG. 2 GRAPHICAL EXPLANATION OF THE HUMAN EXPERIENCE IN SPACE

the space in which they are located.[5] As Bachelard writes, "memory and imagination remain associated" (Bachelard, 1969: 13).[6] Eyes are the most fundamental sense organ in the perception of space; people's sense of touch is as prominent as sight. For example, the eyes may understand whether a stone wall is rough, steel is cold and heavy or wood is hotter. People see the depth, the smoothness, the softness, and the hardness of objects. These situations reveal that sight constitutes an extension of the sense of touch. The vision reveals what the touch already knows. Or, people first smell the fire, then see where it is located when they check with our eyes. This again proves that the sense of sight constitutes an extension of the sense of touch. When it seems complicated to perceive space with the sense of taste, the fundamental concept here is the interaction between the senses of smell, touch, and taste. The sense of taste may be combined with meanings that are more metaphorical.

Each space has its own spirit. Therefore, analyzing a space with regard to its physical, spatial, and structural specifications is not enough to experience the building. The spirit of the building must be felt, and the building must be experienced in harmony with human senses and feelings.[7]

In the present study, as claimed, a sensorial and phenomenological approach which refers to "living by feeling" was used in experiencing the sense of space in the buildings. "Living by feeling" can be described as individuals perceive, experience, and interpret an event, space, or object by feelings. The phenomenological method involves the understanding and perception of an event or a place with senses, beyond existing and widely known facts and perceptions. "Awareness of space" or "consciousnesses of space" are among the important definitions of the phenomenological perspective. Awareness of space can occur in many different ways, including perception, memory, retention and pretention, signification, etc. (Rollinger, 1999: 130).

Phenomenology is the science of describing the individual experience, one's way of "being-in-the-world" (Cerbone, 2008: 31). "Phenomenology is not only a description, but it is also an interpretive process in which the researcher makes an interpretation of the meaning of the lived experiences" (Creswell, 2013: 80). Phenomenologically, the place can be defined as any environmental locus that gathers together human experiences, actions, and meanings spatially and temporally (Seamon, 2013: 150).

Edward Relph explains that phenomenology is a way of thinking that enables us to see what is "right before our eyes, yet somehow obscured" (Relph, 1976: 9).[8] To move toward understanding, such terms must be lived and entered, not merely classified or described (Seamon and Mugerauer, 2000: 209).

Briefly, the spirit of space is interpreted from a phenomenological perspective with the help of senses, perceptions, instinctions, subconscious, and experiences. The architecture enables people to find their place in the world for being for themselves. As Christian Norberg-Schulz puts it, "human identity presupposes the identity of place... the basic act of architecture is therefore to understand the vocation of the place" (Schulz, 1991: 22-23). The diverse and sometimes conflicting responses of people to the environment emphasize that the importance of the sense of place has more to do with the connections between the physical environment and the people's activities and memories than physical dimensions alone (Sancar and Macari, as cited in: Proctor, Sancar and Alanen, 1990: 85). The concept of genius loci has originated from civilization.[9] Today, the notion of "genius loci" usually refers to a location's characteristic atmosphere, or a "spirit of space", rather than necessarily a guardian spirit (Kurt, 2009: 2).

By their valuable methodological contribution to the phenomenological research, Seamon and von Eckartsberg created approaches that can be adopted describing architectural space in order to explore the sense of a place through individual experiences.

RESEARCH DESIGN AND METHODOLOGY

While both qualitative and quantitative techniques were used to collect data, this study

5 Even if the eyes were closed, one could guess his or her location based on the smell that is recorded in the memory. A particular smell makes people unknowingly re-enter a space completely forgotten by the retinal memory; the nostrils awaken a forgotten image, and people enticed to enter a vivid daydream. The nose makes the eyes remember.

6 Through the senses, people record their experiences in their memories. Therefore, they may perceive a space or a person again with the images that their senses recorded. Edward S. Casey, in his work on the place, memory, and imagination, explains the connection between the memory and the body's perception by saying, "The body is also part of our system of memory. Body memory is the natural center of any sensitive account of remembering." (CASEY, 2000: 148).

7 German philosopher Martin Heidegger adopts an integrative approach in understanding the human-place relationship. He defines people's perceptions of a building only as a "construction" and explains it as their "being-in-the-world" condition (HEIDEGGER, 1962). Heidegger claims that space must be understood before being described.

8 Relph argues that space is not a void or an isometric plane or a kind of container that holds places. According to him, the interpretation of space may vary based on the individual's own experiences. Although he states that there are countless types and intensities of spatial experience, he delineates a heuristic structure grounded in "a continuum that has direct experience at one extreme and abstract thought at the other..." (RELPH, 1976: 9). On the one

was designed as phenomenological research to investigate the tangible and intangible qualities of space. The experienced case is one of the historical industrial buildings that have been adaptively reused in Cyprus.[10] In this manner, the purpose of this phenomenological case study concerning a re-used industrial building is to illuminate the distinct characteristics of the reconstructed space and to identify the space based on how it is perceived in daily life. Eventually, this study aimed to comprehend the effective parameters for exploring successful design attitudes concerning first-person experiences in a refunctionalized industrial building.

Rolf von Eckartsberg (1998) presents two general methodologies in the phenomenological research approach: existential and hermeneutic. Moreover, David Seamon (2002) added a third methodology: the first-person, where the examination depends on the researcher's personal experience of the phenomenon. In line with their approaches, architect Thiis-Evensen (1989) associates the private mode of experience with personal taste and preferences in relation to a particular building or architectural style, and he calls this as the mode the archetypal dimension. Thus, this inquiry uses various techniques related to these approaches in data collection, analysis, and interpretation processes to evaluate the human experiences of the space being studied.

These theorists were selected because the phenomenological research method they use matches the research and study method of this inquiry. Seamon's studies regarding the person-environment relationship (Seamon, 1982; Bott, 2000: 18) are utilized in the procedure of this research. Similarly, von Eckartsberg's empirical existential-phenomenological approach which has a structural orientation that aims to reveal the essential general meaning structure of a given phenomenon in answer to the implicit research-guiding question of "what is it, essentially?" (von Eckartsberg, 1998a: 21) is employed for the goal of finding the essences described. Likewise, Thiis-Evensen's interpretive approach for hermeneutics of the language of architecture is conveniently developed for describing the individual experiences in this research.[11] Figure 1 shows human experience in the space with all senses and memory.

The first-person experiences are accomplished by participants defined as participant/co-researcher for this study throughout the research both for defining the physical characteristics of the space as implied in previously stated Relph's approach and for realizing the multi-sensory perception of the space. These experiences create a base for the semi-structured interviews. In this procedure, firstly the quantitative techniques such as collecting historical information from the published sources, documenting the space by photos, classifying and diagramming the tangible qualities of place are conducted in the data collection process. Then, adopting Evensen's approach, individual perceptions are communicated by qualitative research techniques which refer to the individual observations and the lived experiences on the research subject. The data collection procedure involves interviewing individuals by

Fig. 3 Old photos of the Nicosia Municipal Arts Centre before renovation

hand, he identifies modes of spatial experience that are instinctive, bodily, and immediate, what he calls pragmatic space, perceptual space, and existential space, or example. On the other hand, he identifies modes of spatial experience that are more cerebral, ideal, and intangible, including planning space, cognitive space, and abstract space (Relph, 1976: 44).

9 In Roman mythology, a "genius loci" was the protective spirit of a place, which was frequently described as a snake. According to the ancient Roman belief, every "independent" being has its genius or guardian spirit. This spirit gives life to people and places, accompanies them from birth to death, and determines their character or essence (Schulz, 1979: 45).

10 Thus, the main purpose of this study is to clarify the fundamental meaning of experiencing a renovated building's space. From the architectural point of view, the phenomenological inquiry for this case originated from the assumption that perception is directed toward the "reconstructed environment", which is linked to one's consciousness.

11 Thomas Thiis-Evensen aims to understand "the universality of architectural expression". His interpretive means is what he calls architectural archetypes "the most basic elements of architecture," which he identifies as floors, walls, and roofs. He proposes that the lived dimensions of a building can be clarified phenomenologically through what he calls the three existential expressions of architecture: motion, weight, and substance (Thiis-Evensen, 1989: 8-21).

1 Entrance hall	6, 7, 10, 14, 15, 17 Exhibition hall and circulation
2, 3, 8, 9, 13 Movie room	11 Circulation
4 Library	12 Living room
5 Auditorium	16 Services areas

FIG. 4 SPATIAL ORGANIZATIONS AND CIRCULATIONS DIAGRAM OF THE NIMAC (ABOVE AND RIGHT)

managing the semi-structured interview technique. The interviewees are architects who have never been in the NiMAC building before. Including one of the researchers, there are 7 interviewees who experienced the NiMAC building as a phenomenon.[12] Furthermore, emotionally experienced intangible values by the participant/co-researchers are narrated in text, afterward, the interviews are done. The researchers have abstracted these narrations using qualitative analysis techniques such as bracketing and explication, for the hermeneutic revisiting of data as von Eckartsberg suggested in his existential-phenomenological research.[13]

Phenomenology in architecture is based on the experience of building materials and their sensory properties. It can be understood as an aspect of philosophy related to research into the experience of built space, and as shorthand for architectural phenomenology or a historical architectural movement. A sensorial and phenomenological approach was used during the realization of the spatial experiences of selected buildings throughout the study. In this context, the study was conducted as follows:

Literature review: Data investigation related to the subject of the study is done and the buildings to be included in the study are defined.[14]

Field research and selection of buildings: Firstly, industrial zones located throughout Cyprus were explored and field trips were organized, which enabled industrial buildings with historical and architectural heritage value to be listed (Table I and II). The buildings were photographed and grouped by region. By documenting these buildings, the study aims to provide an insight for future studies. The selected historical industrial NiMAC building will be examined in detail within the scope of the study.

Building descriptions and findings (Case Study): The process is designed for experiencing the selected building as a case study, in line with the hybrid use of various tactics of the phenomenological approach. The coding of this research includes personal bracketing, significant statements, meaning units, textural description, and structural description to comprehend the essence of the phenomenon.

The researchers collected data to interpret the perceived qualities of space in the following phases:

a) The static physical setting of the selected building is documented in a quantitative way, and the components are stated to go in-depth analysis.

b) Participant/co-researchers perceived the space as a first-person. Before experiencing spaces with the sensorial approach, the studies of architectural theorists on spatial experiences have been examined. Observations and spatial experiences are done individually.

c) To develop an understanding of the space the Thiis Evensen's hermeneutic approach is followed. This approach, advocating that space is experienced using all the senses, investigates the tangible effects of the buildings on the perceptions of the first person.

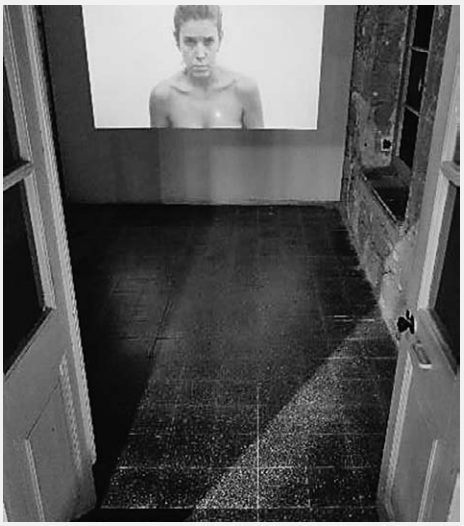
d) Lived experiences are narrated in-text in an experiential manner. Then the interviews are done.

12 In the phenomenological research "a heterogeneous group is identified that may vary in size from 3 to 4 individuals to 10 to 15". (CRESWELL, 2013: 78)

13 Existential Phenomenological research includes: 1) Problem and Question Formulation / The Phenomenon, 2) Data-Generating Situation / Protocol Life-Text, 3) Data Analysis / Explication and Interpretation, 4) The presentation of findings / Presenting results. (VON ECKARTSBERG, 1998a: 22-23)

14 In the literature research, oral information as well as written, printed, and visual documents such as books, articles, theses, reports, journals, newspapers, maps, drawings, and photographs were researched. The documents were collected from university libraries, national and personal archives, relevant municipalities, the City Planning and Land Registry Office, architectural offices, and internet sources. The qualitative research method was used to investigate the industrial buildings that have been adaptively reused in Cyprus, the definition of industrial heritage, conservation charters, the spirit of space, sensorial approach, multisensory architecture, spatial experience, and architectural theorists.


Space 1


Space 2


Space 3


Space 4


Space 5


Space 6

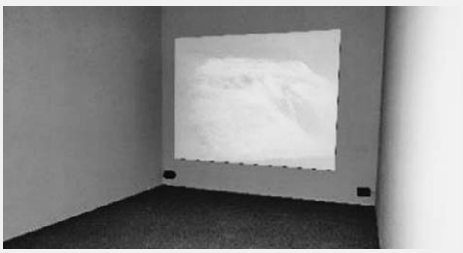

Space 7


Space 8


Space 10


Space 11


Space 12


Space 13

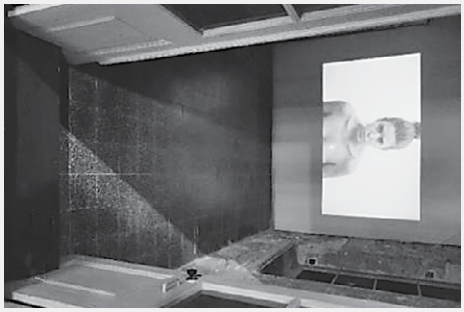

Space 16


Space 17


Space 18

VISUAL EXPERIENCE (SIGHT-EYES)

1. Projected exhibition room: small, peaceful, dim



9. Arched passage: intimate, long, spacious

10. Exhibition area: coloured, passages, high walls

5. Exhibition area: high, big, old-new, artificial-natural, minimal

11. Complex: bright, neutral, old materials

12. Ceiling of the entrance hall: high, rusty, historic

Results and Discussion: The co-researchers interpreted the acquired data by using Eckartberg's methodological tactics. Descriptive protocols, explication, bracketing techniques are practiced to get the meaning of the essences in the space.

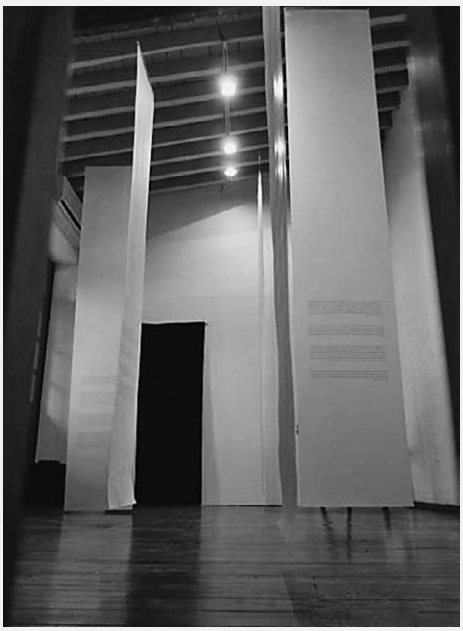
Conclusion: Presentation of closing reflections about the selected case by evaluating the lived experiences from the perspective of the co-researchers.This section of the study, constituting the core of the work, is based on spatial experiences. The experiences felt and perceived by the senses of the first person in the space have presented and described from a phenomenological perspective in Chapter: Case Study. For the purposes of the field study, the location of the building in the

VISUAL EXPERIENCE (SIGHT-EYES)

2. Entrance hall's roof:
high, spacious, historic

3. View from the library to auditorium:
old-new, high ceiling

4. Long, narrow corridor:
bright, spacious



6. View from two storied building:
hot, small, loving

7. Exhibition area:
high ceiling, coloured wall painting, spacious

8. Exhibition area:
high ceiling, corridors, spacious, passages

city texture was firstly mapped (Fig. 2). The historical background of the building was researched, a planning scheme of the building was created, and a number was then assigned to the building (Fig. 4). In the field study, the building was measured by analytical methods, sketches were drawn, and diagrams and tables were prepared. At the same time, spatial organizations and circulations were observed, and an analysis of the old-new combination was conducted. Comparative methods were implemented to compare the old and new plan characteristics of the buildings (Fig. 4). Old yellow stone walls have been represented of the original plan of the NiMAC. Furthermore, the architectural and structural characteristics of the building were analyzed.

Fig. 5 Visual experience of space with a sensorial approach

FIG. 6 OLFACTORY EXPERIENCE OF SPACE WITH A SENSORIAL APPROACH

CASE STUDY: THE NICOSIA MUNICIPAL ARTS CENTRE [NiMAC], NICOSIA

Nicosia Municipal Arts Centre [NiMAC] is located in the walled city of Nicosia on Pentadaktylou Street (Fig. 2). The old electricity power station building is one of the finest examples of industrial architecture in Cyprus (Fig. 3). It was built in the late 1920s and corresponds to the principles of the Bauhaus movement. This building was the first Power Generating Station in Nicosia. The intention of the architects was to restore the building to its original state with very few alterations as well as to meet all the needs of a contemporary cultural centre. The centre covers ap-

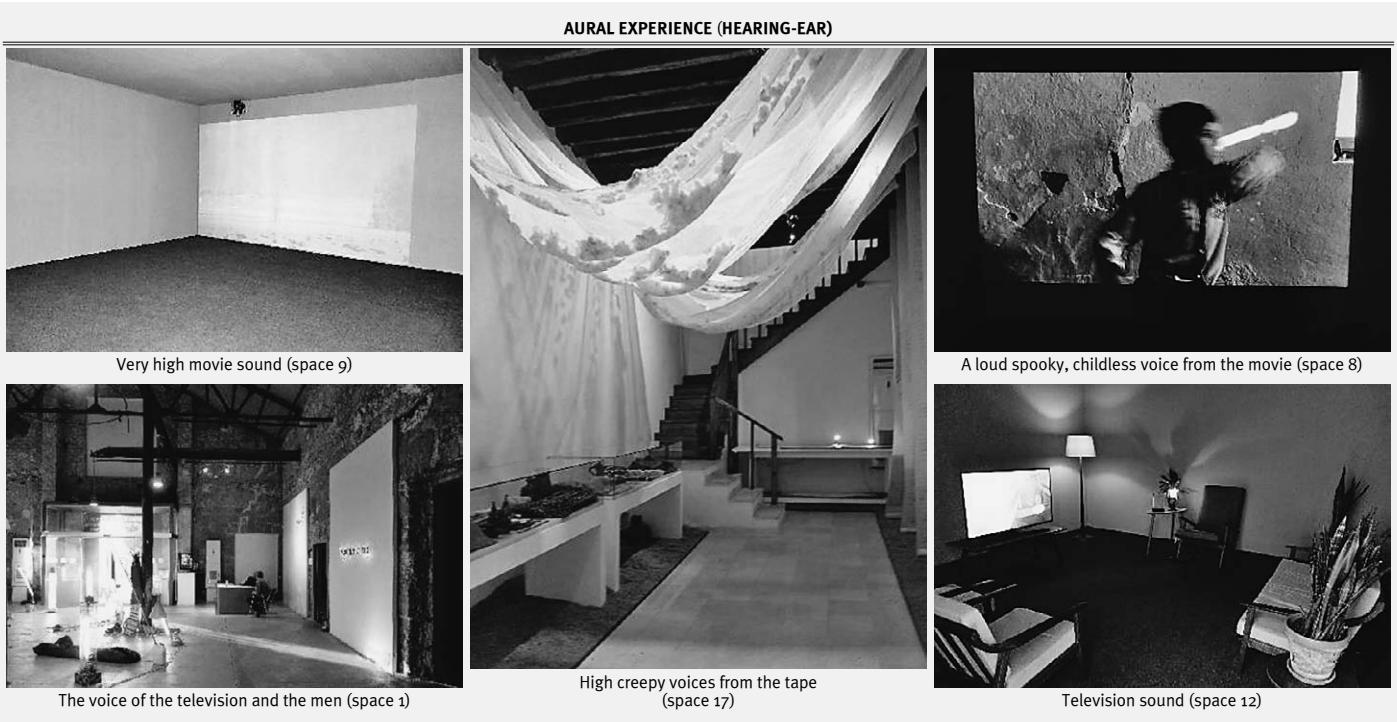


Fig. 7 Aural experience of space with a sensorial approach

proximately 3,000 m², and it is the first in a series of projects implemented by the Municipality to upgrade and regenerate this part of old Nicosia (Nicosia Municipality – The Nicosia Municipal Arts Centre, 2021). Its architectural restoration was awarded the Europe Nostra Award in 1994. The centre, which is one of its kind in Cyprus, aims to promote contemporary creation at the highest level. Its policy is to organize important and prestigious exhibitions, thematic, retrospective events, or others, from home and abroad (NiMAC – Nicosia Municipal Arts Centre, 2021).

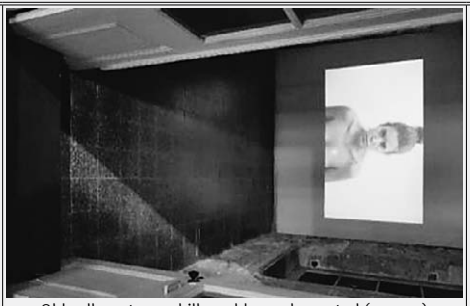
The physical settings of the NiMAC building: Architectural and structural characteristics of the building are quantitatively examined and diagrammatized in Fig. 4. The spatial organization, the plan layout, functions of the spaces, circulation network, façade characteristics, building elements, characteristics of the doors, windows, and structural systems, etc. are described both in diagrams and in-text (Fig. 4). The single-storey NiMAC building, which has an open plan typology in its original use, is seen as a divided space in today's use. The walls of the buildings were built using a load-bearing construction system with traditional yellow stone materials. The height of the ceiling in the main building is approximately 10 meters. The roof is a gable roof, which is covered with an aluminium cover material consisting of cast iron truss bearings. There are rectangular glass windows that are positioned horizontally and vertically on the facades of the building, which protects the original texture. On the east side, there is a rounded roof window. Since plywood partition wall panels have been used in front of the existing stonewalls inside the building, the lights reflected from these windows are not experienced within the space. On the drawing in Fig. 4, it is possible to observe the original bearing walls as well as the partition walls that were added later. The places are numbered and photographed.

Experiences of the space as a first-person: Spaces were experienced by individual observations before experiencing the building in a multisensory way. As mentioned in the previous sections, the building was first experienced without using all senses, sight, touch, smell, and hearing (Fig. 4). The participant / co-researchers visit the building very rapidly without stopping at any point. They only see their front to walk. Their ears and noses were covered. They haven't touched anywhere; they haven't tasted anything.

This research accepts the researchers as participants of the research as existential phenomenology stated. Therefore, together with one of the researchers, participant/co-researchers individually experience the space and describe this experience in a hermeneutic text. Afterward, the researchers coded and explicated the text in a qualitative way for the process of phenomenological reduction. Then both researchers' data are compared,

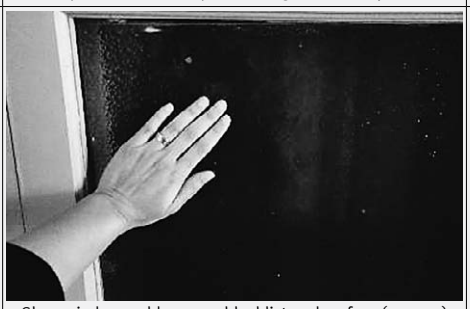
TACTILE EXPERIENCE (TOUCH-SKIN)


Concrete floor: linear texture, cold, hard, artificial (space 1)


Old yellow stone: chilly, cold, rough, neutral (space 1)

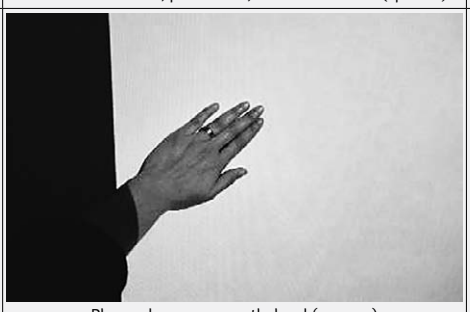

Rusted iron machine: hesitation, cold, industrial, static (space 1)

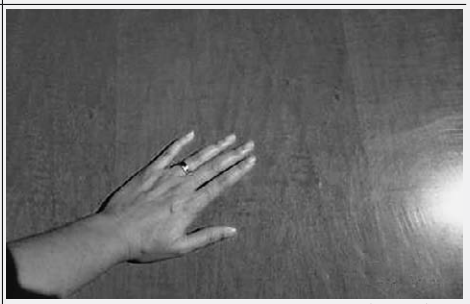

Gypsum plastered stone wall: rough, warm, natural (space 2)


Glass window: cold, permeable, blistered surface (space 2)

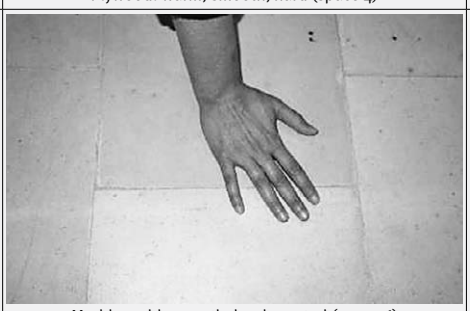

Windowsill: cold, rough (space 2)


Black curtain: soft, hot, dry, porous, light (space 3)


Plywood: warm, smooth, hard (space 4)


Wooden table: hot, smooth, slippery, neutral (space 4)


Iron chains: cold, heavy, industrial, static, porous (space 5)


Marble: cold, smooth, hard, neutral (space 6)


Plaster surface: rough, cold, artificial (space 9)


Carpet covering: hot, textured, artificial (space 9)


Tracing papers: hot, thin, transparent, light (space 17)


Wooden ladder scare: warm, smooth, natural, hard (space 17)

and the common points are outlined as seen in Table III.

Comprehending the space by Thiis Evensen's hermeneutic approach: Thomas Thiis-Evensen's main interests are the questions of how people experience architecture and whether people can develop a language to describe the architectural experience. He attempted to identify architectural archetypes as "the most basic elements of architecture". What spatial experiences the NiMAC building is offering to people after it is re-functioned when space is experienced in a multisensory approach, the key question of this research is alike to Thiis-Evensen's basic questions of "How does architecture convey meaning", "What is the building saying", "How do people experience the building", "What feelings does the building convey?" In this stage, the bracketing conducted without any preset judgment is used to collect data by individual experiences. The co-researchers rely on their intuition and imagination to uncover the essential qualities of the case. As to reveal the meaning of experiences explication of the collected data is also done. Figures 5, 6, 7 and 8 is related to the experience of space with a sensorial approach.

Lived experiences are narrated in-text in an experiential manner: At this stage, the co-researchers described their experiences in text format which includes decrypting the recordings and detailed field notes about their observation. These descriptive manuscripts are very comprehensive and quite long. Afterward, the co-researchers evaluate each other's transcript by using reduction, searching for essences, and focusing on the intentionality.

Results and discussion

The examination of the descriptive transcripts is summarized in Table IV. Regarding the data presented, the spaces described in the text are not sufficiently referring to all spaces in Figure 4. Likewise, it is significant that there is a qualitative and quantitative difference between the multi-sensory experience of the space and the previous lived experience by comparison between Table III and Table IV. Multi-sensory experiences made it possible to perceive many factors at the same time. Furthermore, perceiving space in a multi-sensory way allows feeling the space fully, to internalize and interpret the meaning it conveys. Thus, meanings from essences in the context of the lived experiences in spaces can be easily conceptualized.

Meanings derived from lived experience: By clarification of the collected data, the following results emerged as a description of the essence of the lived experiences of participant / co-researchers:

– Recognizing one's awareness of the spirit of space (in all spaces).

– Consciousness of internal meaning of the building components (in all spaces).

– Being in many different moods in different spaces (Space 1: thinking about the past time; Space 2: peaceful; Space 3: in a silent mood; Space 4: relaxing; Space 5: seriousness; Space 6 and 16: unrestfulness; Space 7: frustrating; Space 8, 9, 13 and 14: threatened; Space 15: relaxed; Space 17: mixed and opposite moods).

– Feeling of different emotions (Space 1: confidence; Space 2: feel safe; Space 3: fear and concern; Space 4: restful; Space 5: distressful; Space 6 and 16: spaciousness; Space 7: annoyed; Space 8, 9, 13 and 14: the feeling of being in an old movie theatre; Space 10: feeling of warmth; Space 11: enjoying; Space 12: a sense of a place attachment; Space 15: tranquillity; Space 17: various feelings at the same time such as warming, caring, exciting, coldness, creepy feeling, and so on).

– Experiencing the taste of historical values.

– Experiencing both alienation and a sense of belonging.

– Nostalgia.

– Feeling the significant effect of the building materials for developing an attachment to space.

– The broad perception of the space by multi-sensory examination.

As a closing reflection on these results, it can be stated as the designed phenomenological process enables to describe lived experience of re-functioned NiMAC building and it is possible to understand the human behaviour aspect of the design. As seen in Table III, which is about spatial experiences without using all senses, a perception not described very detailed way compared to Table IV which uses a multi-sensory approach. Although this re-

Table III Explication of the descriptive text of the spatial experiences without using all senses

Space	Spatial experiences without using all senses
The Nicosia Municipal Arts Centre	at the corner, grand in scale, the traces of its history, restored, reused, traditional materials, contemporary additions, original stone walls, plywood partition wall, natural materials cannot be seen from interior, various exhibition halls, a small library room
The entrance hall (to the south) – space 1	office desk, access to the other rooms, passage to exhibition halls and library, a small auditorium from the library
The small auditorium	small-sized, no difference in elevation, used for meetings
The entrance hall (to the north) – space 6	other exhibition halls, the courtyard, high walls, coloured with wall paintings, two dark rooms, short films and documentaries
End of the building – space 10	old maps, books, newspapers, displayed on the walls, a glass table, small door, a narrow corridor, small rooms, tables, armchairs, lamps, flowers, a television, a small living room, resting room, a building model is hanging from the ceiling, flowerpot is positioned below the model, access to the main exhibition hall, small door
The courtyard – space 17	access to the other building, door

Fig. 8 Tactile experience of space with a sensorial approach (left)

TABLE IV THE REPRESENTATION OF THE DESCRIPTIVE PROTOCOLS OF MULTI-SENSORY EXPERIENCES.

Space 1	– the smell of rust and dust – the voices of the men chatting, the sound of the television, and the recording sounds coming from the exhibition rooms – yellow stone walls: coldness, creeps, rough texture, think about the past time – iron machine mechanism: thought about the efforts of the workers in power station, bitter taste, great force, confidence – concrete slab: cold surface, linear texture – iron-trussed roof: preserved well the history, industrial structure
Space 2	– the smell of humidity, plaster, cement, and dust remembered old building – silence – low and flat ceiling, yellow stone walls: feel safe – dim lights: peaceful – small wood-frame, glass-winged window: it would lead to a magnificent view – concrete sill in front of the window was cracked in the middle; it was coloured in cement colour in half while the other half was green; it is like the junction point of the past and future; cracked in the middle, but side-by-side today...
Space 3	– the smell of humidity, plaster – silence – low-ceilinged, gloomy and cold room, darkness: fear, concern, sense of being followed
Space 4	– the smell of old books and lacquer, dust spreading from the carpet – light music: restful, relieve – gable roof ceiling, square wood rafter, enlighten with dim lights: relaxing – wooden work tables and bookshelves: warmth
Space 5	– frowsty, silence – darkness: seriousness – old sitting chairs: such as old courtroom, distressful – original rolls and chains: old power station
Space 6 and 16	– the smell of toilet from courtyard – mix music form record, courtyard, people: annoying – high ceiling: unrestful – bright room: spaciousness
Space 7	– the smell of paint – the voices of music, record, courtyard, people: annoying, mix – bright room: contemporary area, new period, moving with times – colourful paintings on the high walls: intriguing and attracted the users
Space 8, 9, 13 and 14	– the smell of dust, carpet and curtain: hard to breathe – record voice: annoying – dark movie rooms: threatening, feeling of being in an old movie theatre
Space 10	– the smell of old books, papers: felt like in an abandoned printing house – silence – bright room: freedom – old books: feel the warmth and the knowledge
Space 11	– fresh smell, silence – narrow, long corridor and artificial lighting: it seemed like users will overcome difficulties and eventually we will eventually begin to enjoy prosperity – iron sliding gate: cold – the smell of wall oil paintings: helped the user to commune with space
Space 12	– the smell of obsoleteness mixing with the smell of the flowers was fighting against time – old chairs and wooden tables: blissfulness, peaceful, like grandmother's adobe house – light music: restful, relieve
Space 15	– fresh smell, silence – small, spacious and luminous space: relaxing
Space 17	– the smell of barley and varnish: itchy and cold experience – high voice recordings: disturbing – duvet cotton on the wooden rafters in the ceiling: old villager lifestyle – marbles and wood staircase: felt the coldness and warmth – the transparent tracing papers, painted in cream and hung in the wood rafters: remembered architecture students – squeaking wooden floor: warm and caring experience to combine body with the history – In a nutshell, this building is intriguing, creepy, spacious, gloomy, exciting. In fact, it was a unique example of using the oppositions together. When it was dark and gloomy, it could be bright and spacious. Despite the cold and creepy areas, there was also a warm and caring spirit. While it was able to feel the obsoleteness and life experiences of the building, it could establish a connection with the contemporary life.

search is conducted only in one case, this approach can be adapted to describe the other buildings as well for involving human behaviour in architecture.

CONCLUSION

Historical buildings play an important role in preserving and sustaining both the experiences of the past and as well as cultural, social, and architectural values. In addition, re-functionalizing and repairing the existing building stocks for continued use contributes to the economic development of communities. Many religious, commercial, industrial, and educational buildings worldwide have been adaptively reused for the benefit of societies. In the 1900s in particular, many industrial structures were built across Cyprus, but due to political reasons, they lost their function and were abandoned over time. The re-functionalizing of industrial buildings, several of which have been included in the scope of this study, has allowed the societies to increase their awareness of conservation and the architectural values to survive until the present day.

The re-transformation of these high-roof and open-plan industrial structures which that contain major manufacturing machinery, with their new users, lead to both functional and spatial variables. While walking through the large manufacturing machinery in these factories, one cannot help contemplating among the walls redolent of with history, about the workers who worked there and, their experiences in the old days. Architectural space cannot be interpreted properly without multisensory perception. Reading the spirit of space by experiencing it, feeling, and interpreting it by touching, smelling, hearing, and seeing is quite important in terms of spatial perception. This study aims to draw attention to the presence and re-usability of existing historical industrial structures on the island of Cyprus and includes the results obtained from multi-sensory analysis of the Nicosia Municipal Arts Centre building.

Future re-functionalization studies may focus on how to interpret the spatial perceptions of architectural designs. It has been revealed once again with architectural observations and analysis that social development can be achieved by preserving the existing values and transferring these values to the future. As a result, each user, in fact, feels and perceives space with multiple senses.

This study, with its distinctive methodology, targets to enable people to be aware of and perceive a space once again in more depth by feeling the presence of the smells, textures, and experiences hidden behind what authors see and sense in the first instance. It also indicates that the meanings can be derived from the lived experiences. Definitively, the main outcome of the research is to create a dynamic framework for stating and analyzing how an individual or a group of individuals perceive the components of a re-used building. This is possible by acknowledging the human responses to architecture for deriving meanings of the essence rather than focusing purely on the physical aspect of the structures.

[Translated by Yasemin Mesda; proofread by Simon Thompson, Centre for Applied Linguistics (RCAL), Nicosia, Cyprus]

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NiMAC | NiMAC – Nicosia Municipal Arts Centre (2021), (in text) NiMAC. 2021. *NiMAC | NiMAC – Nicosia Municipal Arts Centre* [online]. Available at: ‹http://nimac.org.cy/nimac› [Accessed: 5 April 2021].

Sources of illustrations and tables

Fig. 1	Mesda, 2020
Fig. 2	Mesda, 2018
Fig. 3	NiMAC, 2021
Fig. 4-8	authors
Table I, II	Mesda, 2021
Table III, IV	authors

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Yasemin Mesda, graduated and master degree from Cyprus International University, Department of Architecture. She is a lecturer in the Faculty of Fine Arts, Design and Architecture at Cyprus International University in Cyprus. Research area: restoration, conservation, history of architecture and traditional architecture.

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Conceptualization, Y.M. and S.K.; methodology, S.K.; software, Y.M.; validation, Y.M. and S.K.; formal analysis, Y.M. and S.K.; investigation, Y.M. and S.K.; resources, Y.M. and S.K.; data curation, Y.M. and S.K.; writing – original draft preparation, Y.M. and S.K.; writing – review and editing, Y.M. and S.K.; visualization, Y.M.; supervision, Y.M. and S.K.; project administration, Y.M. and S.K.; funding acquisition, Y.M. All authors have read and agreed to the published version of the manuscript.

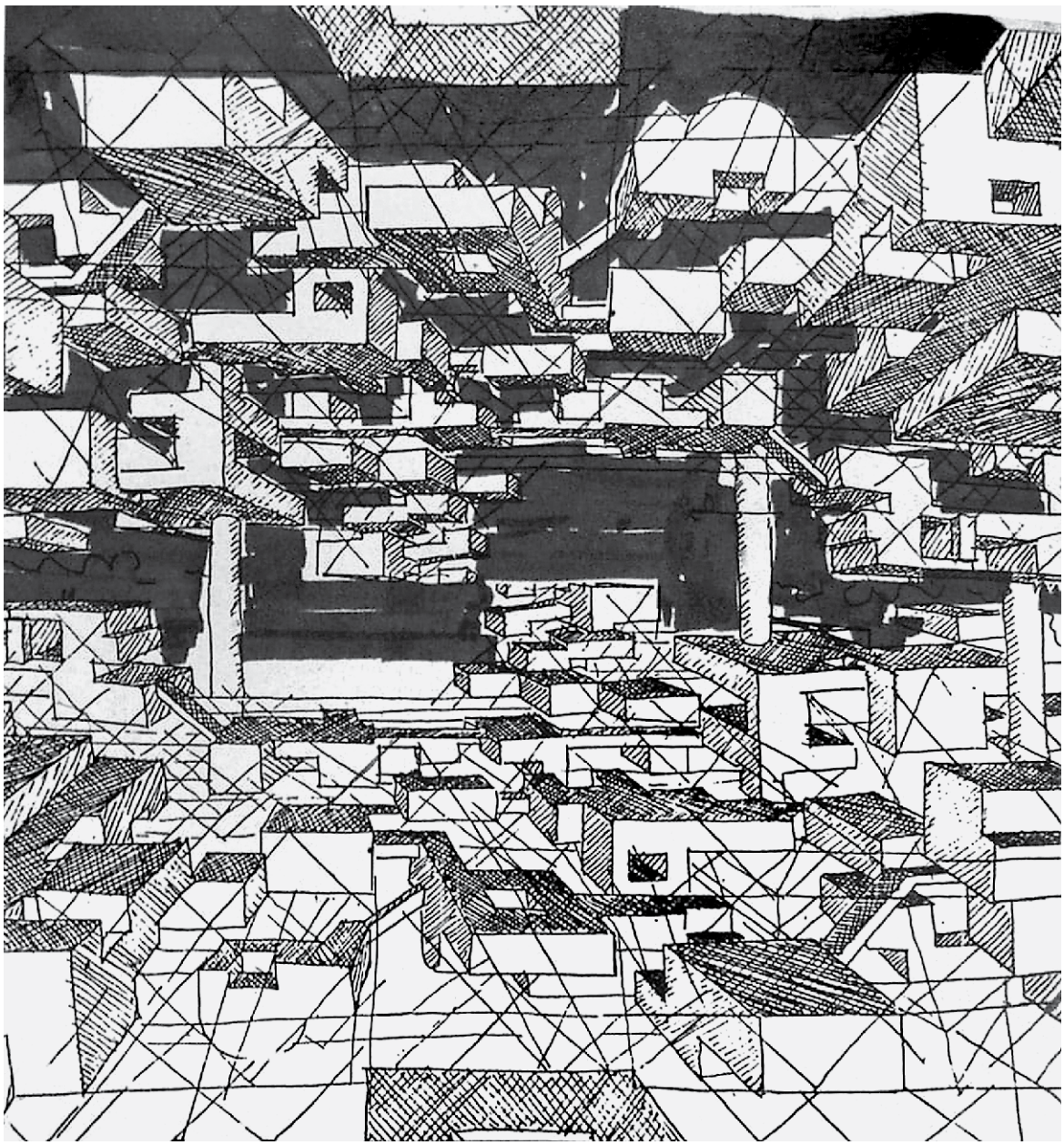

Fig. 1 Drawings of La Ville Spatiale by Yona Friedman, 1958; Courtesy Yona Friedman Archives, Paris

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Influence of Technology on Socio-spatial City Development

Reflections on some 20th Century Ideas

CITY DEVELOPMENT
DIGITALIZATION
INFORMATIONAL CITY
SOCIO-SPATIAL ASPECT
TECHNOLOGICAL INFLUENCE

This paper explores the influence of new technologies on city development with an accent on the socio-spatial dimension. The primary goal of the paper is to point out the reflections of earlier ideas in the context of modern technological processes in cities. All social, technical and technological components of a community, and finally civilization, are reflected within the space of the city. Although it has remained the greatest consumer of many material goods, the city has also become a "producer" of many technical-technological and spiritual values of civilization. Taking into account the acceleration of the development of phenomena in the world of technology and technology featuring modernity, it is reasonable to broach the question of the realistic chance of the prediction of their further course and related social changes that are about to cause it. In many scenarios of urban future, one can sense the idea of the city as a result of high technological achievements of civilization. Special attention is paid to the information city which, connecting a lot of people into systems of interactive information technology, change the way of their mutual communication, as well as their social life and culture of behaviour. The measure of the organization and function of a city is set by telecommunication technologies, information, and computers. If the city is a "print of a society in space", the contemporary moment then refers to the "digitalization" of human beings and their interactions, new aesthetics, value and other criteria. The tendency of this paper is to contribute to the understanding of new technologies on 21st century cities interpreted primarily through the prism of certain theoretical and experimental ideas and concepts of the 20th century.

Introduction

The city, as a feature of a certain civilization, is an expression of its material and spiritual achievements and potentials. In regards to many phenomena and processes trying to be perceived in the future, it seems that this one regarding city is the most complex one. Not only is it the most complex social phenomenon, but it is at the same time both a technical and a spatial system excluding the possibility to observe its phenomenon as a set of different processes and functions. That raises the question: which elements of its future should be seen? Social frames of development, especially political ones, population, technical possibilities of construction, technological progress of civilization or spatial? Or altogether? Although the city has remained a consumer of many material goods, at the same time it has also become a "producer" of many technical-technological, spiritual values of civilization.

The modern society and the city as the biggest consumers constantly look for more sophisticated technologies and accordingly, there is more and more need for a more precise and narrowed specialization of jobs. The influence of new technologies on the development of cities in the future will be undoubtedly great, as well as the social consequences following it. Electric energy, elevators, skyscrapers, the car, the phone, the underground – all achievements of the 20th century which have radically changed the way of organization, construction, and functioning of the city. All of them, as well as many other technologies had a great influence on the whole precomposition of traditional, preindustrial life in the city, as well as the social organization, place and role of an individual and social groups and classes. During just one century there were radical changes caused by technical-technological progress.

However, it shouldn't be concluded that changes of the social being of the city appear exclusively as a consequence of technological changes. The need to build as much as possible, faster, cheaper, is a result of, among other things, the demographic explosion and pressure of population on cities, regardless of whether it comes to flats, the communal infrastructure or environment pollution. In the second indirect circle, new technological solutions are needed in order to prevent or repair the consequences (the polluted environment, for example) caused by excessive construction or the excessive concentration of people. In other words, technology appears as an operative regulator of the needs which appeared in another sphere or as a response to urban changes.[1] Therefore, for example, the imaginary telematic city represents an expression of technology's influence in pre-industrial age. It means that the measure of the city organization and functioning has been set by telecommunication technologies, information, and computers. Advocates of such a city find that the primary effects of the above-mentioned technologies are already reflected on the functioning, structure and organization of the city.[2]

At the moment, the issue of informational, smart cities, i.e. advanced conceptual visions for the city of the future, has been additionally strengthened due to the global dominance of the covid-19 virus pandemic. This moment requires the need for a better understanding of earlier, technologically advanced, urban concepts and theoretical discourse in the context of contemporary spatio-social transformation. New forms of networking and the parallel search for humane concepts of cities have once again become the main focus of interest in cities all around the world.

1 In many scenarios of urban future, the idea of a city as a result of high technological achievements of civilzation could be sensed.

2 New kinds of jobs, fading of old jobs from industrial age, "changes in the way of work, place and the way of living, social live, the way and quality of communication among people, changes in family life, forms of social segregation and spatial differentiation, greater isolation of an individual or maybe new quality and forms of neighbourhood, the way of using free time, influence of mass media – they are all consequences brought by telematic future into which, as it is considered, the cities of developed part of the world have already stepped" (Pusic, 1997: 419).

3 A pamphlet Manifesto de l'Architecture Mobile of Yona Friedman, Congrès International d'Architecture Moderne nr. 10 (CIAM X) in Dubrovnik, 1956. Available at: http://www.yonafriedman.nl/?page_id=225 [Accessed: 15 April 2021].

Networking

The need for alternative concepts of cities has always existed while technologically advanced visions have come to the fore in the 20th century and stem from the need to develop alternatives to the industrial city. Responses to the early industrial revolution were recognized in the works of Howard, Gropius, Garnier, and others. From the middle of the 20th century, experimental concepts of cities such as *Mobile architecture* being adjusted to the user[3] and *Vile Saptiale* (Figs. 1 and 2) by Yona Friedman (Friedman and Orazi, 2015), *Walking city* (Fig. 3) and *Plug-in city* by the avant-garde group Archigram (Sadler, 2005) and others have referred to the need for development of new spatial structures of high technology and interaction. Those were dominantly reactions on the industrial society, the industrial city, using principles of parameter architecture, modular technologies and robotics in the search for new, more advanced forms of life in the community. At that time, there already existed hints to the appearance of a new revolution that would later empower tendencies from the fifth and sixth decade of the 20th century.

In the 1920s Castells (1989, 2009) made the claim that the information age brings primacy to the so called "space of flows" (Castells, 2008: 314-321) over traditional physical space as the most important aspects of human action have the tendency to be organized through networks. The logic of nets, according to Castells, also forms social morphology, and its open structure, defined by a series of linked hubs, has an ability of unlimited expansion and integration of new spots capable of achieving communication with network-mainstream. Networks are a reality today, but their significance, role and nature are multiple.

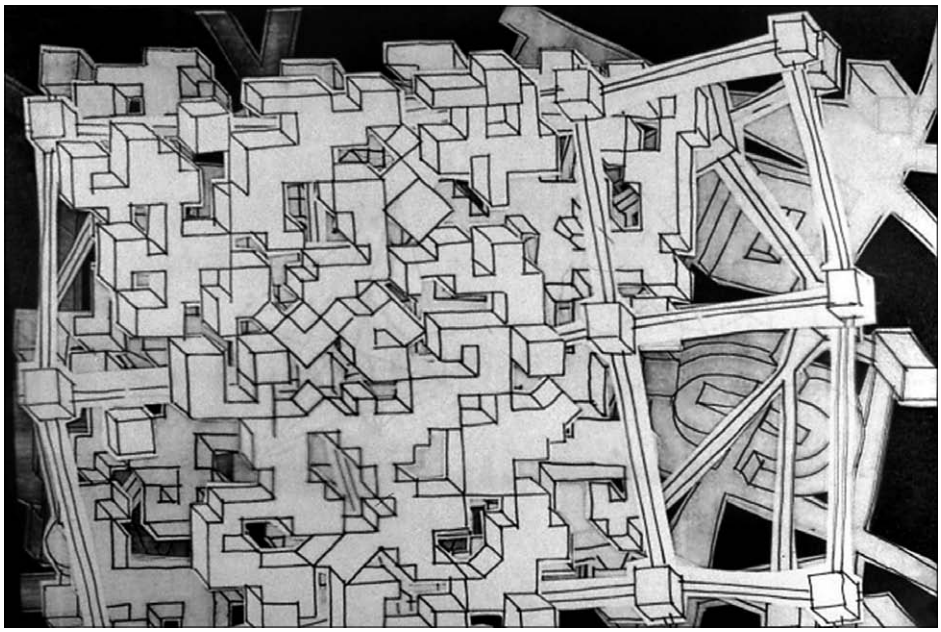
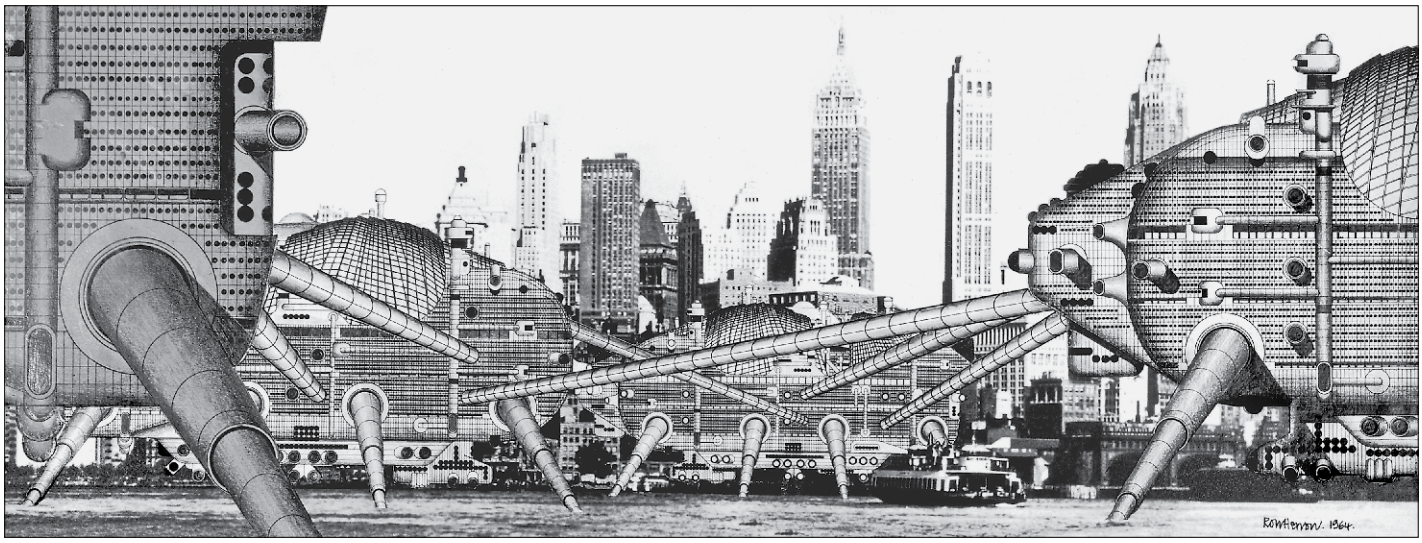


Fig. 2 Ville Spatiale: Details of the concept, 1958-1962

Seen through the prism of electronics, networks provide increased speed, productivity and reduced expenses, reaching a desired level of efficacy. These basic determinants are largely followed by principles of globalization which successfully define them as one of its imperatives, elevating them to the level of myth. In accordance with the indisputable value ever more gained by the concept of network, the phenomenon also takes more and more space in analyses and research attempting to penetrate its true nature and its influence on society and space. Observing the networking trend, Batten (1995: 313-327) made a comparison of central spots systems and network systems. That way, the quality of network systems is reflected in the existence of

Fig. 3 The Walking City concept by Ron Herron in 1964



several node points, neutrality about size, tendency to flexibility and complementarity. At the same time, the dominant heterogeneity of goods and services, as well as bidirectionality of flows is emphasized. Horizontal attainability has been opposed to vertical attainability of the central concept, the importance of transport expenses has been replaced with information expenses, as imperfect competitiveness and price discrimination has been emphasized.

The development of new information and communication technologies has brought to formation a completely different type of infrastructure, enabled to support the development of urban economy and bring the city closer to the global scene, providing it with a privileged status. Smith and Timberlake (1995: 287-302), emphasizing multilayered global networks, recognize four key functions that modern inter- urban flows rest on (economic, political, cultural and social reproduction), as well as three basic types of flows-human, material and informational. They all simultaneously cover not only local, but also metropolitan and intercity levels that the global range has. However, telecommunication networks also require support of other networks – from transport and security, to a symbolic one, manifested at the virtual, as well as the physical level.

The distribution of power isn't equal even in this case so, besides the most important world centres-hubs in the global telecommunication networks, polycentric formations of complementary networked city, which overcome individual shortcomings that way, also have their role. Unfortunately, such a structure leaves space for the so-called technological gaps and black holes, i.e. spaces that haven't been included in the world systems of information exchange yet. Thus, they are excluded from the race for one of the competitive positions on the global hierarchical scale. Therefore, the basic information structure of cities (telematics) becomes one of the important investments for the future, although some authors (Graham and Marvin, 1996) find that its implementation inevitably leads to disruption and disintegration of city economy sucking in global telematic networks. Anyway, connecting local branches into numerous international systems becomes inevitable in the spirit of globalization, and the importance of networking, i.e. connectivity and availability, is also noticed in the field of local (self) government, civil participation, in the case of isolated groups or when grouping on the basis of common interests. Virtual communities formed in that way can get a chance to exercise their right. The final outcome, however, could be the exact opposite and could bring to their spatial isolation and polarization.

One of the important networks is related to air traffic as well, which is, at the same time, a rare field in which there are available data measuring the level of global connection. Besides telecommunication, air traffic has significantly contributed to expansion of world economic activities, thereby retaining the possibility of personal contact. As the most important point of this kind of network, London stands out, followed by Paris, Frankfurt, Tokyo and New York, according to centrality and connection. However, these positions are relative and they change over time. The expansion of the global social network during the last two decades of the 20th century was a reflection of urban globalization. However, the drastic decrease after 11 September 2011 revealed the other face of this process – terrorism becomes a global category in it, and modern networks become its most common target. Observing the cultural dimension of networking and its basic instrument – electronic media, we can define five basic variants of global cultural flows as stated by Appadurai (1996). The first type would be "ethnoscapes" creating movement of tourists, immigrants, manpower and refugees. "Mediascapes" would be the world distribution of information in all manifestations, as technologies distribution would be represented in "tachoscapes". According to this classification, capital flows would be embedded into "finansscapes", and flows of spreading political ideas and values into "ideascapes".[4]

From the semantic point of view, networks are also brought in connection with distribution, connection, communication, the society and fencing. Therefore, the fact that expert attention is paid to the relation network-city space-identity is not surprising, as it is certain that the networked society changes our personal and global perception. Thereby, attention is diverted from the traditional backbone of society (for example family and state) to new forms of connecting individuals and their multiple identities. Modern networks represent a complex combination of decentralized and centralized acting, physical and electronic flows, as they embody completely new relations between cities, basic space-time matrices and the question of power. Their functioning causes many contradictory effects, enables much greater operability of different systems, as well as very sophisticated methods of control and manipulation. One of the paradoxes of the networking myth lies in a more and more conspicuous feeling

4 Using a suffix landscape, Appadurai (1996) wants to say that those processes have a fluid, volatile and fickle form. Individuals and groups shape and direct those landscapes based on their own interpretation. In other words, they are imaginary worlds, and those imagining them could be those who control them, those who live in them, even those who pass through them.

of disorder and chaos of the world opposing the basic network concept-its order. At the same time, the growing possibilities of different kinds of integration fall into the shadows of an individual's isolation and society fragmentation, which are all effects that could be caused by modern technologies. The myth of networks is ambivalent in relation to the globalization process itself and its real effects cannot be fully seen yet. Only from a greater historical distance should it be possible to say how big is its real share in the expansion and functioning of the new world order. It is very possible that global sharing, instead of one of the strongest globalization weapons, shall become its weakest point. The vulnerability of networks is their biggest flaw and the intertwining and possible interruptions might lead to (un)expected consequences.

Multilayers and ambiguity of city space

Although the city has always been a multidimensional product of social processes, its modern nature is growing into hitherto known patterns. Just because of that, the new form of urban existence is synchronized with the needs imposed by globalization, and memorized artefacts are interpreted in terms of getting a new character and meaning. Numerous identities connected and confronted in cities, as well as dynamics of diverse expenses crossed in them and functioning simultaneously, lead to a new level of urban metamorphosis. New urbanism based on the ontology of expenses, flow, mobility and complexity is trying to deal with a new space-time character of world cities. Foucault (1986: 69-83) thinks that the future lies in the world personified in the spatial metamorphosis of the network, a concept questioning categories such as local and global, near and far. Flows of such networks open possibilities of non-linear experiences which are simultaneously connected, free from concrete and abstract proportions. The economic driver of the city, placed in the business zones of national and international significance, is developed on networks made by lines and points of telecommunications, services and business space. Their role is the transmittance and exchange of information and knowledge used to get control of economic flows, in order to provide capital accumulation and set up a new system of power, decision making and managing.

Changed economic, technological and social frames lead to feedbacks in space attempting to adjust to an un(expected) acceleration of modern life and a different understanding of the urban regime role. Many studies of global centres indicate that the most important groups of activities are financial-business groups, activities of political power and influence i.e. international commands and tourism. Together, they carry a very synergic effect based on the benefits of new information technological systems, but also the need for the location near the source and the exchange of information. However, a reduction of communication expenses also brings to their relocation to suburbs and/or towns, which is a trend especially referring to finances, operating and management (la Défence, Paris; Craydon and Redding, London; Greenwich and New Jersey, New York; Omiya and Kawasaki, Tokyo).

Visionary urbanism suggests cities-objects located above the ground, underground, under the sea, releasing Earth surface, denaturalized, of miraculous shapes and dimensions for use of the most modern technical achievements. Boundless faith in technics and technology often leads into technicism and technolatery. Settlements turn into an instrument or a facility and lose the peculiarity of an urban type of settlement. Francoise Choay, rightly names this concept technotopia (Fig. 4), not technopolis place or a city of technics (Šoe, 1978).

The so-called information economy alternatively sets its focal points along the road lines and routes at airports, which gives a boost to the development of different kinds of tourism, and especially to business development. Thanks to these locations, which allow the possibility of mobile jobs and easy traffic availability of all categories, there is an open perspective of historical centres preservation, which could provide similar services only with huge expenses. Outskirts remain intended for mass media production (film, TV studios), entertainment (stadiums, amusement and theme parks, for instance, Disneyland in Paris), as well as science and business (technological parks, exhibition space, conference complexes, etc.), so we can say that urban space is no longer removed from the city towards the outskirts, but on the contrary, it moves – from the outskirts to the centre.

The complexity of urban space subject to capitalist principles was originally manifested in the intensive vertical use of land, as underground parts were intended for garages, commercial activities, public and private transport, as well as installations. Big zones are also a consequence of maximizing economic value and forced consumption culture requiring a lot of accompanying content. Such spatio-economic concept, as a symbol of expansive global capital, leads to parcels increasing, which in turn improves economic efficacy of the investor (in the reduction of expenses) and strengthens its competitiveness on the market. However, monumental buildings meeting economic requirements of the investor do not offer an adequate level of

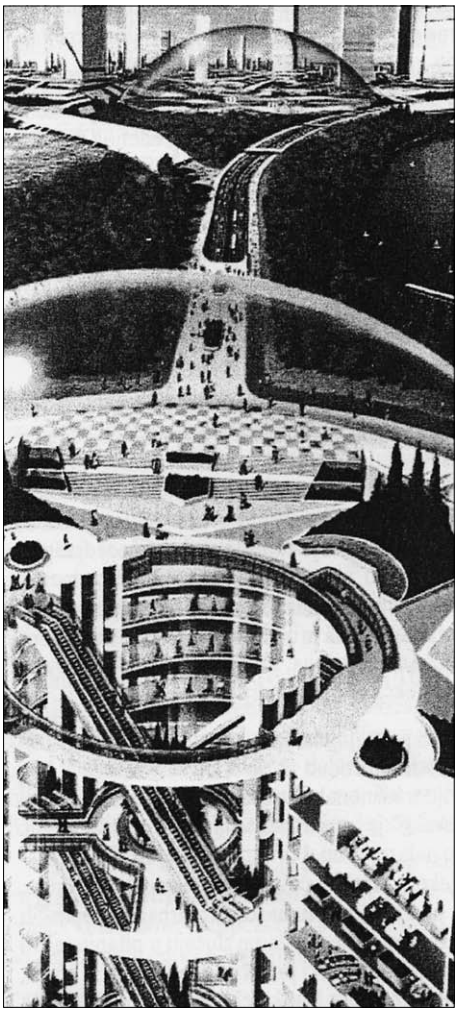


Fig. 4 City of the future technotopia

physical perception to the users, unable to fully view neither megalomania forms, nor an emerging, complex urban image.

Although the main characteristics of the new urban incarnation become, first of all, imperative for competitiveness, specialization, increase of spatial dimension, as well as the processes of deconcentrating and reconstruction, they can also be unexpected catalysts for farther changes whose result would be acceptable to all.

Lines of movement and communication

As the material world nowadays is not interpreted as a thing, but just as information or an idea, urban space, as the most complex human artefact, becomes a real image of a constant process of space-time aggregation. Just because of that, lines of movement and communication provide greater urban and global efficiency, becoming an important characteristic of urban centres ready to accept the new dynamics and logic. Although the initial conditions of urban genesis are related to the local level, the system of urban organism owes its sustainability to the incorporation into a wider, global scale in the scope of which it functions itself. This way, the city connects in itself many simultaneities realized through various expenses. Their movement enables communication on the physical, information and symbolic level, and the way in which local and global proportions relate to each other defines the essence of (desirable) urbanity.

Each moving path in the urban system "has three basic elements-the beginning, the end (destination) and a series of spaces passed through to the final goal. This pattern is even kept in the case of electronic expenses treating space in a different way, whether as a bundle of cables, a direction of telecommunication signal or an ambient of virtual reality" (Stupar, 2009: 96). The new term of the so-called "economy of movement" i.e. reciprocity of space and movement effects, at the same time means multiplying effects of activities distribution and pollution density, all under the influence of the relation between space and movement. This interdependence gives the city a recognizable structure in accordance with actual social-economic patterns.

Research on urban configuration enables the defining of the most favourable model of the physically functional structure which would balance economic, social and ecologic factors, indicative for the effects of new urban space and predicting the distribution of integration points and lines. At the same time, models that have appeared this way could reveal us the data on multidimensional dynamics of cities which become more and more important in the encouragement and preservation of all kinds of urban sustainability and their synchronization. The key of successful city space existence does not only lie in the reinterpretation of traditional historical urban environment but first of all in defining principles of its functioning. Considering that space does not direct events, but offers many possibilities, more and more attention is paid to the shaping that allows for an opening of strategic visual fields.

The idea is that spaces can be analysed as "networks of choices" along with other principles of space syntax (Hillier et al., 1976: 147-185) which represents a good platform for understanding the relation between society and space. A good example of this new understanding of the city structure shaping represents a series of urban development projects realized in the space syntax laboratory.[5] The new regeneration techniques of urban areas that they use are focused on the creation of physical relations that have accomplished a permeation of people and places. Factors such as connectivity, integration and permeability are processed and objectively measured on the basis of multidisciplinary analyses installed in a new software computer. With it, it is possible to move factors graphically so that the urban context and its potentials are explained, regeneration possibilities are identified and potential solutions are tested. The system of public transport, systems intended for business movement (airlines, routes of fast intercity railways, highways), as well as those intended for the exchange of information (telecommunication connections) open new possibilities of urban regeneration.

Informational city infrastructure, with its connection lines, currently represents the most expansive way of communication at all levels, providing intensified circulation of knowledge, symbols and signs. Thereby, equipment of cities with information-communication technologies becomes an important element of competitiveness on the global market as it enables a simultaneous process of messages (information) centralization and decentralization of their reception (Castells, 1993: 247-257). The implementation of these systems supported by growing globalization also affects the disintegration of urban space and its functions in the simple set of units of different importance. At the same time, economic and political importance of all types of connection is visible at local as well as at regional and global level. Their role in increasing necessary urban connectivity is growing, and therefore the solutions combining different ways of communication are resorted to.

5 Space syntax laboratory. Available at: https://www.ucl.ac.uk/bartlett/architecture/research/space-syntax-laboratory [Accessed: 15 April 2021].

The connection of air traffic systems, railway and road networks with new information-technological flows, enables more efficient organization and control of this complex mechanism, as well as a constant improvement of its components. Each of these subsystems has its own operating range and represents a key physical, functional and symbolic connection to the urban power organism with global life impulses (Fig. 5).

Mankind has always functioned in two parallel kinds of reality: the first one representing a continuous world of objects and the space where we move, and the second one, equally important, making a discontinuous world of expressive forms, signs and symbols. Their synthesis, as a complex web of rational and irrational fragments, gets its maximum cognitive importance just in the urban space. However, in order to make this essential value of urban environment an active part of the global screen, it is necessary to create, transmit and receive information which does not even exist without connection lines.

Modern technologies greatly facilitate this task, disregarding the kind of movement and communication. Therefore, it is not just a phrase to say that the world is really getting smaller, and the hypothesis by American psychologist Milgram that there are only six degrees separating us from any person in the world, nowadays gets its confirmation (Milgram, 1977). Namely, research at Columbia University focused on social connections (networking) has shown that it is possible to send a message on the Internet to a completely unknown (given) person over six persons in a chain in which we know only the first one. However, direct encounter still holds its importance in the world of communication, and through movement different configuration get formed on the route airport-highway (railway) – car park (metro station) -office building (hotel) flat. This series becomes an image of the new lifestyle and a symbol of a different view on time and space, one which leave enough space for differences, sustainability and continuity regardless of doubts and contradictions.

Although every city tends to emphasize their peculiarities and extrication from the conception, it is necessary to provide a complex economic, technological and cultural base for the global race. It represents the starting point of an uncertain way of urban development in which positions of winners and losers are quite easily changed and therefore, there is a tendency to raise attractiveness. Global network hubs are competing for the presence of command functions as well as the organization of world spectacular events bringing recognisability, opening the possibility for business progress, increased inflow of investments, as well as psychical and symbolic flywheel to urban development.

Fig. 5 Narita International Airport, Tokyo, Japan: the space of the future, a picture of reality or an architectural pseudo-heterotopia

Informational city

The modern society has been greatly adjusted to the information age and network operation system taking over autonomous connections. The urban society, due to the global availability of information, emphasizes the space of virtual reality, which is no longer an alternative to the physical and material, but it's an equal social product to material. That way, space as a social product (Lefebvre, 1991) is radically transformed, as Castells states from the "space of place", which functions in physical terms and interprets local processes, into a "space of flows" with the concept of interactive, network and electronic functioning (Castells, 2008: 314-321). The overlapping of virtual and real space generates new patterns. Stock talks about the informational city as a prototype of a complex phenomenon "knowledge society" (Stock, 2011: 963-986). There are many world cities labelled as "knowledge society", which build competitiveness on the principles of intellectual capital (Carillo, 2011). The authors indicate that the perspective based on knowledge is crucial in the process of economic, social, cultural competitiveness. The informational city questions the term "user" pointing out the need for redefining its role. It could be assumed that the cities of next generation will have features of dominantly intel-

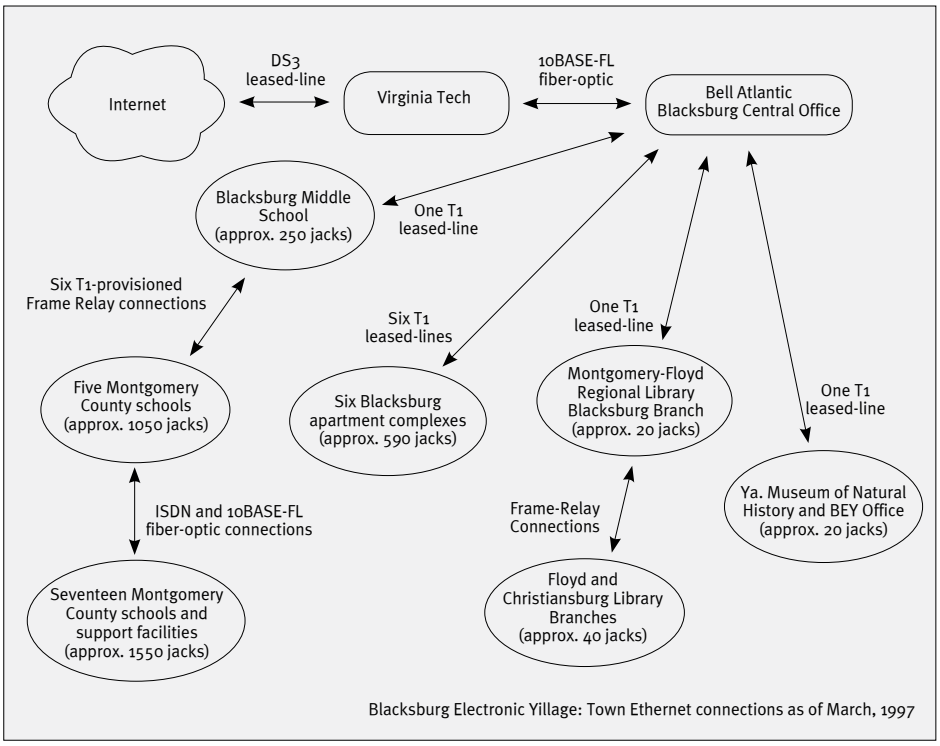


Fig. 6 Blacksburg electronic village: Network topology

ligent centres and innovation centres (Raj and Raman, 2015). Maybe Hilier's pointing out of the need for a new space science, in order to better understand the interaction between local and global scale (Hillier, 2008: 292-295), is completely justified, especially if we consider these new phenomena related to the term of the city of the future.[6]

It seems that today there are successful attempts at designing an informational city. In 1993, with a collaboration of the city of Blacksburg in Virginia, the Virginia Polytechnic Institute and State University of Blacksburg, the Blacksburg electronic village with about 35 000 inhabitants came to life. Connecting many people into systems of interactive informatics technology, an attempt was made to change from the root the way of their mutual communication, social life and behavioural culture (Fig. 6). As much as 60% of the population in this community have emails, 40% of them are involved in the "Internet", shopping and business arrangements are done exclusively over the Internet. This way, local issues are discussed, from the way of organizing and giving a counter-proposal to the government about planned action or finding the best solution to remove some city slums, to reducing some mutual expenses for city community functioning (Carroll and Rosson, 1996: 69- 74). Such projects obviously lead to the "digitalization" of human beings, digitalization of their interrelationships, a new aesthetic and other phenomena.

Smart city in the light of pandemic (Covid-19)

Throughout history mankind has been faced with many epidemics which left lasting consequences on societies and cities. At the same time, these situations often served to reconsider the existing and develop new spatial moments of evolutionary reach. In the light of the Covid-19 virus pandemic, some key issues in the context of the sustainability of existing urban systems have been further focused on, such as resilience, urban health, socio-economic inequality, security, transport, and others. Research has shown that the new challenge to the Covid-19 virus pandemic has further popularized concepts from the 1980s, such as 'cybercities', informational cities', 'digital cities', 'wired cities', 'virtual cities', with the concept 'intelligent ', 'smart cities' being the most dominant one. (Abusaada and Elshater, 2020: 417-424).

In his paper, Batty poses the question of what cities shall look like after the pandemic, giving directions to finding a solution for them (Batty, 2020: 547-552). A new reality, that society on the global level has found itself in, has additionally strengthened the need for questioning conventional concepts of the cities on whose principles urban spaces still dominantly function. Continuous evolution of the city followed by revolutionary changes and many challenges suggests the need for continuous research and the questioning of urban concepts in the evolution and development process of the city. Despite hundreds of recent scientific studies and papers dealing with the issue of "smart city", in the conceptual vision of the city of the 21st century, based on the network infrastructure (Joss et al., 2019: 3-34), the widespread prevalence subject discourse in cities all around the world (Stübinger and Schneider, 2020: 8460) continues to focus on the transformative management versus issues of sustainability, humanity, etc. Nevertheless, the ideas of the smart city have been made official as

6 Mutual permeation of global and local, which in different geographic areas results in unique outcomes, is recognized as a globalization process.

7 Doxiadis defines ekistics as a synthetic science which establishes basic relations between economy, sociology, engineering, architecture, geography, political sciences, mathematics and other sciences and disciplines towards a unique insight into problem solving of all kinds of human habitats.

8 "City as a whole will be a result of good programming and good planning, based on very detailed examination of human needs on one side, and possibilities offered by technology on the other side. Universal city of the future should be, both as a whole and as a framework, a product of creativity of every capable mind enable to understand and define (shape) overall human habitat on Earth. Human community represents a whole in which an ordinary human being will find a chance to express themselves in the best possible way." (Doksijadis, 1982: 307).

strategic in the context of the development of the digital urban society and the discourse of the global urban future. Networking, the synergy of new theories, methods and applications of design in smart cities, through interdisciplinary and transdisciplinary integration of architectural, technological, information and other possibilities, can become a new paradigm of planning and regeneration of post-pandemic cities of the 21st century. In the actual moment of information-communication technologies domination, it is quite certain that they will take over the primary role in all aspects of future socio-spatial transformations.

Is there an alternative to spatial neomodernism of the city?

An answer to this question could be sensed in the ideas of the most influential theorists and architects of the 20th century such as Doxiadis, Alexander, etc. Doxiadis, founder of ekistics[7], defines ecumenopolis as a concept for the city of the future (Doxiadis, 1968: 16). In the method building Doxiadis's thought arc there is a reflection of the general principle implemented in most research on the future. Searching for an answer to many economic, environmental, social and spatial issues of the urban present, Doxiadis reached out for familiar ways of historical experience on the one hand, and scientific analytics about the modern phenomena on the other. In communicating with past ideas, however, there are many traps that even Doxiadis falls into at times. Therefore, for example, among the main reasons for better living in cities, he sees, among other things, their smaller population, and concludes that cities are therefore "tailored to men".

In the part of the analytical approach linking the contemporary to the future, Doxiadis decided to follow the magnitude of changes. His main idea is that in the 20th century we experience the historical ending in which the traditional city definitely disappears and ecumenopolis appears as an imprint of the future. In accordance with the complex system of settlements and the model of antropocosmos, Doxiadis names ecumenopolis the last stadium in the development of human communities, a big agglomeration that will network the country with its population and physical structures. Summing up the data on people and space that will look for their own habitats, Doxiadis concludes that there is no place for optimism and says that the world city being born will be suffocated in its own birthplace. To these quantitative changes, Doxiadis also adds the qualitative ones which arise from an increase in the national income and technical-technological development, but which are not able to replace negative consequences of expected growth of overall and especially urban population. If such a future could be believed in, then it is not difficult to agree with Doxiadis that the evolution, whose contemporaries we are, leads the city and civilization to ruin. In general, social changes that will follow in the case of this scenario will be the dark side of the inability to control many processes, i.e. the city gets turned into a tyrannopolis. Solutions between pessimistic variants of uncontrollable growth and utopian concepts of returning to the idyll of the rural way of life are found in the rational decisions on the development direction in the future, as well as their human principles. Insisting on the need for preserving values of the past, the path towards survival and making new civilization and urban values is seen by Doxiadis in the radical change of the philosophy of trends and a redefinition of mankind's goals. According to Doxiadis, with the maximum of technology being in service of food production, and with good resources use, mankind shall enter a new long-term phase of urban development resulting in the general world static ecumenical city.

The depth of social changes is still something this technical, rather than social, concept of city development in the future does not grasp. Doxiadis himself is aware of it, so he says that man in ecumenopolis is "the biggest problem that people responsible for construction of the future city shall have to face" (Doksijadis, 1982: 303). In the sense of organization, there is no other option than to make the ecumenic city consist of "cells of human communities whose dimensions will be determined by man himself" (Doksijadis, 1982: 304), and which will be modified by each succeeding generation. Doxiadis closes his thought circle believing that the future of homo urbanit relies on real values of Hellenistic type, its democratic heritage and the Hellenistic ideal of man.[8]

Searching for the new concept of cities for a high technology information society means new patterns, a new paradigm recognized by Alexander in its works as well (Alexander et al., 1977; Alexander et al., 1987). There is a recognized need for new space science which shall be based on interdisciplinary scientific principles. The way to making a balance between order and chaos, simplicity and complexity is seen by Alexander in the theory of wholeness (Alexander, 2002). The logic of space reflection must be reassessed, because the city cannot be interpreted according to the principle of tree structure, as the author states in his work (Alexander, 1965: 58-61). A system is an open network, consisting of patterns containing information on the

forces that created them. In spite of criticizing conventional use of technology and "technological civilization", for Alexander, technological abstraction and software engineering have an important role in designing advanced spatial patterns, as well as interpreting concepts of physical universe "new cosmology". According to this author, a new approach to technology is needed, close to man and the complexity of urban processes, with respecting biology, aesthetics, and order. And finally, we should not neglect the "generative process" new concept developed by the author (Alexander et al., 1987), which could serve in the search for a new space science that will adequately respond to complex issues of cities and the information age civilization, as indicated by Hilier in his work (Hilier, 2008: 292-295).

Discussion and conclusion

Thanks to huge technological progress which enabled easier space mastering and its extraordinary media mobility, the urban way of life has gradually separated from all original urban frameworks, becoming available to everyone reached by global currents. Understood in such an open and independent way, it forms a new, parallel matrix which does not fully correspond to the physical character of space. Before the technological-information revolution, urban lifestyle was considered to be a direct consequence of its physical-functional framework largely defining relationships between people as well. The city as a specific human creation possesses great heterogeneity, a complex, narrowly specialized division of labour, as well as developed economy, finances and social control. City space also offers a high level of freedom of choice, and a strong, multilayered, internal and external connection increase even more the possibility of interaction and operation. Facilitated communications lead to the establishment of new and various networks over which a continuous "regrouping" of society takes place, ever more conditioned by interactions, and less by physical frameworks. Such an absolute and relative pattern of our existence allows us to simultaneously operate and participate on several different communication levels, making us citizens of the global society, ever more dominated by urban values.

New information technologies lead to possibilities for closer cooperation of cities in different parts of the world according to the principle of horizontal networking. Reaching supranational position of the city, the position achieved by the city itself and on the basis of the national state and its institutions, is an effect of the active grab in global flows circulation (capital, information, goods, people; Hočevar, 2005: 691-721). Actually, the concept of network connection opposes a potential logic of the hub (depending on the connection of resource circulation which means their dynamic diffusion), with a more dominant logic of mediocrity (based on fixed resources availability, meaning their constant concentration). Castells talks about a new spatial logic of information society, pointing to the potential of space flows and a network connection of cities, but also about further importance of the (state) policy of space, because flows have spatial materiality (directional centres; infrastructural assumptions of knowledge and information economy) located in the most developed, informational cities (Castells, 1993: 247-257).

Contrary to the wide-spread belief that means of modern telecommunication enable maximal spatial dispersion (decentralization) of economic activities, the historical role of some cities as centres of specific knowledge, information and power has been strengthened, just because the decentralization of activities enabled by well developed telecommunication system requires better central control and coordination (Sassen, 2001). The cities which can afford it, create on their own their global image hoping to attract multinational corporations and global investors. Local authorities invest significant funds in infrastructure development which would be compatible with world networks, and the airport, as a new city gate, is modernized and expanded. At the same time, a series of new zones gets formed and they should provide enough space and technological support to banking, services, entertainment and tourism all over the world.

Anyway, cities all around the world face a number of challenges, such as currently the pandemic, but also the heightened issues of cities' vulnerability, security, resilience, resistance, urban health, humanity, socio-economic inequality. Information and communication technologies and networking have been additionally strengthened in the efforts to find solutions for the 21st century cities. The paper identifies some reflections on the authors' ideas about the 20th century in the context of the impact of technology on the modern city, networking and development of digital urban society. Anyway, cities all around the world continuously search for new development concepts through the use of new information-communication technologies, at which they face many challenges in the process of sustainability and improving their own competitiveness on the global scale.

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Illustration sources

Fig. 1 Bianchini, 2016 (adapted by authors) [Accessed: 15 April 2021]
Fig. 2 https://www.yonafriedman.nl [Accessed: 15 April 2021]
Fig. 3 Banham, 1994 (adapted by authors)
Fig. 4 Pušić, 1997: 412
Fig. 5 Stupar, 2009: 171 (adapted by authors)
Fig. 6 http://www.bev.net [Accessed: 5 June 2021]

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Conceptualization, Lj.V. and S.K.P.; software, Lj.V. and S.K.P; validation, Lj.V. and S.K.P.; investigation, Lj.V. and S.K.P.; resources, Lj.V. and S.K.P.; writing – original draft preparation, LJ.V. and S.K.P.; writing – review and editing, Lj.V. and S.K.P.; supervision, S.K.P.

Fig. 1 Three regions of Montenegro

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Montenegrin Rural Settlement Attributes, Problems, and Possibilities for Development According to Their Regional Affiliation

Montenegrin settlements
rural development
rural settlements
settlements attributes
vernacular architecture

The rural areas cover a significant part of the Montenegrin territory and play an essential role in its development potential. These areas have been exposed to various (more spontaneous and less planned) transformations throughout history, which has been reflected in their particular characteristics.
The three settlements, one from each region, were treated by analyzing identity attributes and complex issues of development and degradation of rural areas. This research aims to determine the reasons for the extinction of rural settlements and propose measures for preserving the existing and restoration of the missing values of their natural and cultural heritage. The planning procedures for recognizing and determining the criteria for the detection (today visible ones) and assessing the lost values of rural settlements are proposed at the end of this paper. Future planning and design processes could acquire the gained knowledge about these values and be employed through future development, through creating new planning and economic models for the rural settlements' revival, protection, and improvement.

Introduction

The paper deals with rural settlements in Montenegro, their historical origin, development, appearance, and position within the nowadays Montenegro settlement system. It is followed by the research of possibilities for their further development. The primary stimuli for this research came from the lack of scientific research on this topic. Up to nowadays, previous research in Montenegro has been more professional than scientific, even though problems of these areas are complex: insufficient focus on rural settlements and rural heritage through spatial planning documentation and legislation, inadequate construction of the new ones, and interventions on the existing traditional buildings, demographic depopulation, etc., so their solution must be scientifically based.

This research reveals the main drivers and conditions of the emergence and development of rural settlements in Montenegro, related to their location, environment, and history. The paper detects the reasons for the extinction and decay of these areas, their cultural and natural values, and future development possibilities. After analyzing and determining the identity attributes of each of the observed rural settlements, the authors will try to propose guidelines for preserving their existing values, restoration of the lost ones, and further steps for their improvement, their self-sustainability, and recognizability within the economic development system of Montenegro. Later, the proposed improvement steps can be used in defining the new directions for the amendments and changes of the existing legal documents and current planning methods.

Theoretical background

If a Place is a term that generally covers the part of Space where people reside, live for a part, or the whole life, we come to the point when we must name the Place differently – a Settlement (Lipovac, 2019). This term (settlement) is a very general one and is not connected to the area occupied size, population, or its importance. Speaking of its size, today, we are aware of additional names or terms used to define them: a city, town, village, hamlet. On the other hand, depending on the settlement region, we can distinguish two major types: urbanized settlements and rural settlements. Whichever approach we take, spatially and structurally, a settlement (besides residential buildings) should consist of some public buildings, public and private places (land) that are in function of it (Lipovac, 2019).

The term rural settlement is closely connected to another term – the rural area, which covers many issues, like natural and cultural landscapes, farmland, and other cultivated landscapes, forests, and wilderness, orchards and back gardens used for growing vegetables, along with parts of the land where they keep the livestock. The methodical thinking must also encompass all economic and social structures, in which farming, and forestry, handicraft, and small production create significant characteristics of living in rural areas and settlements (Dorrel, 2018).

The other term to be discussed is the rural settlement pattern. A simple definition could result from how the community arranges the houses for a living and other buildings. There is a considerable number of factors that determine the type and the pattern of a rural settlement. They can be recognized as the physical attributes: relief, quality of the land in the vicinity, nearness of water, availability of construction material, and cultural attributes: a social way of living and farming, need for protection, transportation, etc. (Lipovac, 2018). Scholars worldwide have tried to state many different attributes that might help in differing and grouping rural settlement patterns, highly connected with the public road approach and street network.

1 Both are professors at the Philosophy Faculty, Department of Geography, University of Montenegro. In their research, they have been covering topics ranging from demography, socio-economy, and planning of settlements in Montenegro.

Fig. 2 Bošnjaci, Slavonia, Croatia

Fig. 3 Beram, Istria, Croatia

Speaking of physical appearance and following most of these factors, the authors have focused on the three major rural settlement patterns distinguished as linear, condensed, and dispersed in this paper.

The **linear pattern** of a rural settlement is typical in a valley, rarely in a hilly region. The first type covers the cases when a rural settlement is a collection of buildings built along the existing (transit) road following the river, coastline, or just winding among the hills and other topographic/natural features. Examples of this pattern are Vitojevci in Serbia, Miljevac in Bosnia and Herzegovina or Bošnjaci, Vukovarsko-Srijemska County in Croatia (Fig. 2) with cultivated land areas (gardens and agricultural fields for everyday usage) at the back of family buildings belt with pastureland or woodland, further away from that settlement.

The condensed or clustered pattern can be observed in a hilly and mountain-like region, a region with a very demanding topography and not such a large flat area of land. Throughout history, condensed settlements were built due to defense reasons on the hilltops or hilltop mesas like Petrijevo in Serbia or Lukomir in Bosnia and Herzegovina. There is a center with several public buildings (church, shop, community house), surrounded by family buildings built on small plots with small gardens next to the buildings. They are all connected with the center by several streets, for pedestrian usage only. There are two general sub-types of condensed pattern rural settlement: organic type like Oprtalj and geometric or radial one like Beram (Fig. 3), both in Istria, Croatia.

The dispersed pattern has houses that are spread around the landscape with no set pattern. This rural settlement type is characteristic of very remote rural areas, primarily mountains, or in the vast farmland areas, like Sirogojno in Serbia, Zahum in Bosnia and Herzegovina, or like the ones in Gorski Kotar, Croatia. These groups of houses can be separated from each other by several kilometers. The road network is also unique: the roads are winding or zigzagging through the landscape like a village in Marija Bistrica municipality in Krapinsko-zagorska County, Croatia (Fig. 4).

Literature review

In this scholarly paper, the authors will focus on the rural settlement types of Montenegro. Previously, this topic was partly covered by academic research performed by two Montenegrin professors[1]: Bakić R. and Doderović M. On the other hand, two other Montenegrin scholars, Pasinović M. (natural and cultural heritage of Boka Kotorska Bay) and Škatarić G. (sustainable development), were performing their research on Montenegrin rural settlements, too. Several scientific meetings were organized in Montenegro with the same topic, with presentations published as pro-

Fig. 4 A village near Marija Bistrica, Croatia

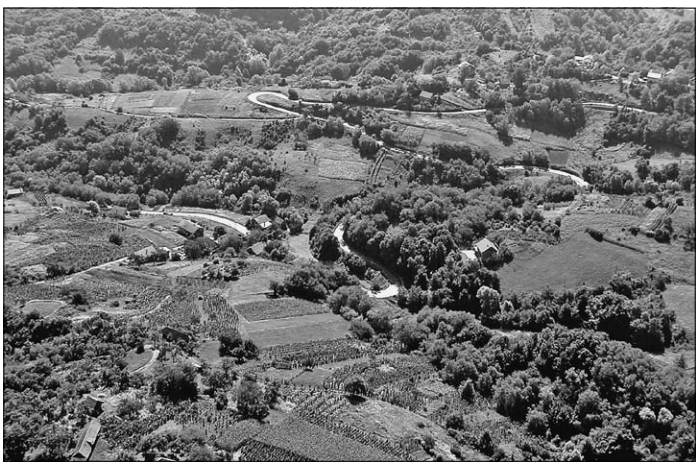

Fig. 5 Municipalities of Southern Region, with positions of Gornja Lastva, Gošići and Krašići rural settlements

ceedings[2], by the Montenegrin Academy of Science and Art. Besides, the University of Montenegro has also contributed to this topic by accepting several student master theses[3] to be prepared and presented. Although all these researchers were investigating the Montenegro rural settlement, each one within his field of interest, there is no comprehensive analysis concerning typology, attributes, and contemporary rural settlement problems. That kind of approach is proposed by researchers of Serbian settlements (Kojić, Simonović, 1975).[4]

Due to the very small number of scientific papers on this topic, the analysis of the Montenegro rural area started from the European criteria for delimitation and definition of urban and rural areas (Lukić, 2010: 49). However, applying these methods to the subject area, it was revealed that internationally accepted methods for delimitation of settlements are not appropriate for the area of Montenegro. According to this method, areas with less than 150 inhabitants per km^2 are considered rural. Peri-urban areas, with more or less developed agriculture elements, should also be considered (Vresk, 1997).[5]

The study of the rural settlements typology, their evaluation, and planning of the sustainable development (Lukić, 2012: 282) was helpful for the comparison of the Montenegrin settlements types with the examples from the region. The genesis of the expansion of rural settlements was studied through a review of physical planning documents and their restoration (Kranjčević, 2005). The perception of the complex rural settlement problems in the region is based on Studies for physical planning documentation, legal regulations, and noticing gaps in their adoption and implementation (Petrić, Obad Šćitaroci, 2015).

Criteria and models for preserving, improving, and revitalizing rural areas (Gligorić, 2002: 565; Kasalica, 2002: 523; Mrvaljević, 2002: 167) were the starting point for defining the guidelines for their future development. From the aspect of tourism, the sustainability of rural settlements is gaining more and more attention in nowadays research so that numerous studies have developed sustainability indicators, including social, economic, and environmental aspects. Based on the international experiences in rural protection as a successful model for its revitalization (Gao, Wu, 2017: 223), guidelines for rural tourism development are given. Among the recommendations for the overall rural development, the following measures were of particular interest for the investigation: the participation of local communities, their actions, and activities, and quality partnership between the inhabitants of rural settlements and institutions. (Hwang, Steward, 2012: 328).

Montenegrin rural settlement attributes

According to the Territorial Organization of Montenegro Act [TOMN], adopted for the first time in 2011 and all additional Amendments, the entire territory of Montenegro has been divided into three regions and 20 Municipalities.[6] The mentioned Act has entirely accepted the division of Monte Negro territory, as stated in the first Physical Plan of Montenegro – PPCG, from 1986 (amended in 1991 and 1997). That PPCG had divided Montenegro's territory into three different spatial units[7]: Southern (Coastal) Region, Central Region, and Northern Region (Fig. 1).

This delineation is based on the following attributes: natural features, zoning and spatial development, economic activities, and some other different comparative advantages for their independent development. In most cases, the region borderlines were following the borderlines of the Municipalities or cadastral municipalities. According to the basic PPCG, the Southern Region included the entire coastal area of the Adriatic coast, the second – Central Region covered the Zeta-Bjelopavlići valley.

The area of high mountains and river valleys was named the Northern Region. The TOMN Act amendments (2014-2018) have enlarged the number of municipalities in the Central and Northern Region, by one each. That means that, by January 2020, Montenegro had 23 Municipalities plus Podgorica as a capital. Unfortunately, these changes of the municipality number were not elaborated by the appropriate amendments to the PPCG[8] after its adoption in 2008 (as the development

2 In 2002, the Montenegrin Academy of Sciences and Arts (CANU) organized a scientific conference covering the topic "*Selo u Crnoj Gori – Rural Settlements in Montenegro*", (2004), book 66.

3 The title of the Master Thesis, prepared by one of the authors of this paper, was: "Historical and Urban Conditions for Shaping Orja Luka in Bjelopavlici Valley" presented at the Faculty of Architecture, the University of Montenegro in 2015. It covered the results of the search for historical and natural attributes that had influenced the occurrence of this rural settlement, its development through time, and its traditional architectural elements. The author has offered some critical guideline proposals for settlement improvement and historical and natural values protection through future planning documents.

4 Branislav Kojić, architect, ruralist, professor, and Academy of Arts and Sciences member, focused his scientific research on observing the village in a broader social, spatial and institutional context. He also gave his scientific contribution to the field of protection of traditional architecture and the heritage of rural architecture while advocating establishing a unique science that would deal with rural issues. His studies of the village relied not only on history but also on anthropogeography.

5 Milan Vresk, a scientist and honored member of the Croatian Geographical Society, expanded the scale of indicators and distinguished between independent urban settlements, more urbanized settlements, less urbanized

projections were planned up to the year 2020). In Montenegrin legal and professional settlement system, there is no firm definition for a rural settlement. Therefore in this paper, the authors will use the following definition: dispersed settlements characterized by agricultural and allied activities outside major urban areas as stated in the Multilingual Glossary of Human Settlements Terms (Lipovac, 2018: 164, term 0896), followed by the definition of the "rural area" defined as the open country or village not part of an urban area, with limited population and rural character, i.e., pertaining to agriculture or farming and of simple, quiet living (Lipovac, 2018: 24, term 0072) in the same Multilingual glossary.

Geographic and socio-economic issues have mainly influenced the development of the Montenegrin rural settlements throughout history. Furthermore, the settlement position within three regions has caused different ambient values, spatial layout, traditional building construction, etc. Therefore, the same criteria for rural settlements analyzed in this paper could not be applied within these regions.

Fig. 6 Layout of Gornja Lastva rural settlement

Southern (coastal) region

The Southern (Coastal) Region covers roughly 1590 km^2 and six municipalities: Herceg Novi, Tivat, Kotor, Budva, Bar, and Ulcinj (Fig. 5). It is the most densely populated region of Montenegro, with 91.8 residents per km^2. Its 293.5 km long coast stretches from the Kotor Bay entrance to the mouth of river Bojana into Skadar Lake.

According to the previously adopted definition, this region contains 160 rural settlements, but following the data from the PPCG, there are 244 of them. This settlement number difference – 84 indicates the existence of so-called transitional settlements (from rural to urban settlements).

The coastal region settlements are nested mainly along with two altitude levels: by the coast – with urban and rural characteristics, and in the hinterland – with rural features. The dominant structure of rural coastal settlements is a compact type – a group of houses located close to each other. The slope of the terrain conditioned the development of two types of housing: rows of houses parallel to the landlines and /or perpendicular to the landlines. The function of coastal settlements is very diverse. It varies from maritime, trade, administrative, art-and-craft, tourist, and health resort. Simultaneously, the settlement function in the hinterland is dominated by livestock and agriculture, which makes them the rural ones.[9]

Almost all hinterland rural settlements had a very similar development course. Therefore, in terms of development, population, and architectural heritage, the current situation of rural settlements can be considered very similar. Special attention is given to one rural settlement – ***Gornja Lastva***, a part of the Tivat Municipality (Fig. 5), and it is a typical representative of a condensed settlement. It is nested atop the Vrmac Hill, a hill that separates Tivat from the Kotor Bay and is 3 km from the Adriatic Highway. The built-up settlement area covers 3.26 ha, having only five permanent residents. According to geograph-

settlements, and rural settlements. This approach in classification was applied in the 1981 Census in the Republic of Croatia.

6 The territories are: Podgorica as the capital, the territory of Golubovci as a municipality within the capital, and the territory of the ex-capital Cetinje.

7 The Southern Region had six urban centers or municipalities with a total of 244 settlements. The Central Region had four municipalities with 423 settlements, while the Northern Region is the largest one and had 11 municipalities with 568 settlements: a total of 21 municipalities (urban centers) and 1,235 settlements. Each municipality has one settlement of an urban character (usually having the same name as the municipality). Some of the settlements within these municipalities are recognized as rural settlements.

8 The PPCG, adopted in 2008, was published in the *Official Gazette of Montenegro* no. 24/08. The collaborating institutions on preparing the PPCG were from three different states: "Montenegro inženjering", Podgorica, Institut za arhitekturu i urbanizam Srbije, Beograd, and Urbanistički institut Republike Slovenije.

9 Coastal rural settlements are not to be observed in this research. They are at a higher development stage and with less articulated problems than rural settlements in the hinterland. The reason for that could be their close connection to the nearest urban centers and their inclusion in contemporary life.

Fig. 7 Municipalities of Central Region with positions of Orja Luka, Kujava and Liješnje rural settlements

ic attributes, this settlement is classified as a hilltop settlement at an altitude of 300 m a.s.l. The terrain configuration and rational usage of arable land have conditioned the settlement form – condensed pattern (Fig. 6), with densely concentrated residential and complementary buildings and the main square with a church as a gathering place for residents throughout history. The dominant residents' activity was cattle breeding and farming. Gornja Lastva is an example of a rural settlement with a clearly expressed architectural structure. It represents a traditional set of 55 buildings entirely preserved from all the negative influences derived from contemporary construction. Some of the buildings are public, sacral, and educational ones, with several unique vernacular buildings as olive mills, *guvna*[10], watermills, and wells. For Gornja Lastva, no contemporary physical planning document has been prepared in the past 30 years.[11] The settlement has numerous abandoned residential houses – since the 1970s, there is a constant decline of residents, houses are abandoned, and historic functions are forgotten. One of the reasons could be the poor transportation and communal infrastructure, along with no interest of the state for investing. Fortunately, the authenticity of the traditional building system and the overall environment is still present, which could serve as the impetus for the return of life.

When discussing other settlement pattern types in this region, Gošići in Tivat Municipality could be an excellent example of a dispersed pattern. However, some extended linear settlement elements may be observed – having houses built along several local roads. Opposite to Gošići, rural settlement, Krašići can serve as an example of a settlement with a nearly single linear pattern. But even here, due to the topographic features, a distinctive form of a linear settlement can be observed – several rows of building plots parallel to the main road, which are served with very steep horse-cart passes. Both settlements are in Tivat Municipality (Fig. 5).

Central region

Central region – Zeta and Bjelopavlići plain and Nikšić field have a very pronounced morphological structure. It is declining and expanding from NW towards SE, open to the Adriatic Sea, which causes powerful Mediterranean climate influence to penetrate. It covers an area of sized over 4,900 km^2, with four municipalities: Podgorica, Cetinje, Danilovgrad, and Nikšić (Fig. 7), and an average population density of 56.8 res/km^2. According to the definition of a rural settlement, the region has more than 350 rural settlements nested on the hilltops or foothills. But following the data from the PPCG, there are 423 of them. Today, they are fast spreading, owing to the enhanced construction of residential and other buildings on the fertile farmland that becomes neglected. Some of these settlements spatially merge with towns nearby, becoming their comfortable green zone for different uses. Thus, these settlements represent a special spatial appearance in Montenegro, as they permeate the rural-urban and urban-rural way of life, creating the first conurbation in Montenegro along the route Nikšić – Danilovgrad – Podgorica.

Orja Luka is a rural settlement within the Danilovgrad municipality (Fig. 7), only 3 km away from this municipality's central settlement. The building area covers 7.50 hectares, with 248 residents. It is a hilltop settlement, although some parts are spread downhill. It belongs to the condensed settlement type with densely concentrated buildings and arable land nearby (Fig. 8). The dominant activity of the residents has been cattle-breeding. The distinctive architectural accent is a residential building Knjažev dvorac – Duke's manor with its square as the prominent residents gathering place, the St. Nicolaus church with a cemetery, and several residential buildings that belonged to famous historical persons. It was meant to become the capital of Montenegro (during some historical periods) but never succeeded in that, although it had excellent traffic and communal infrastructure along with good defense features. Nevertheless, this settlement never played an essential role in the process of preparing the legally relevant PPD.[12] Today a significant number of valuable traditional buildings are abandoned while many new buildings have been constructed nearby. This could be a final call to properly evaluate the architectural heritage, including the building material and construction details, to achieve the new values to use in future attractivity and development of this settlement. Previously mentioned vicinity and good transportation connections with nearby towns would undoubtedly enhance the values. But *Orja Luka* needs a proper evaluation of the entire heri-

10 *Guvno (or gumno) is a traditional place for grain threshing – flat, smooth, and circular in its form. It can be found in karst areas, paved with stone slabs and surrounded by a low stone wall. On the threshing floor, the grain is threshed by hand (with a sledgehammer or a mallet) or using cattle (horses, oxen, mules, etc.), tied to a pole in the middle of the threshing floor (pivot). In rural settlements of the Adriatic hinterland, guvno was also a place for social gatherings and was used for dancing.*

11 The last PP document was prepared by the Center for Urban Planning Development from Belgrade, in the 1990s, as part of the Urban Project for the Revitalization of Rural Settlements in the Tivat Bay. This PP document proposed low-density residential areas next to the farmland with additional recreational and tourism sites and areas for weekend housing. All that speaks about the planner's intention

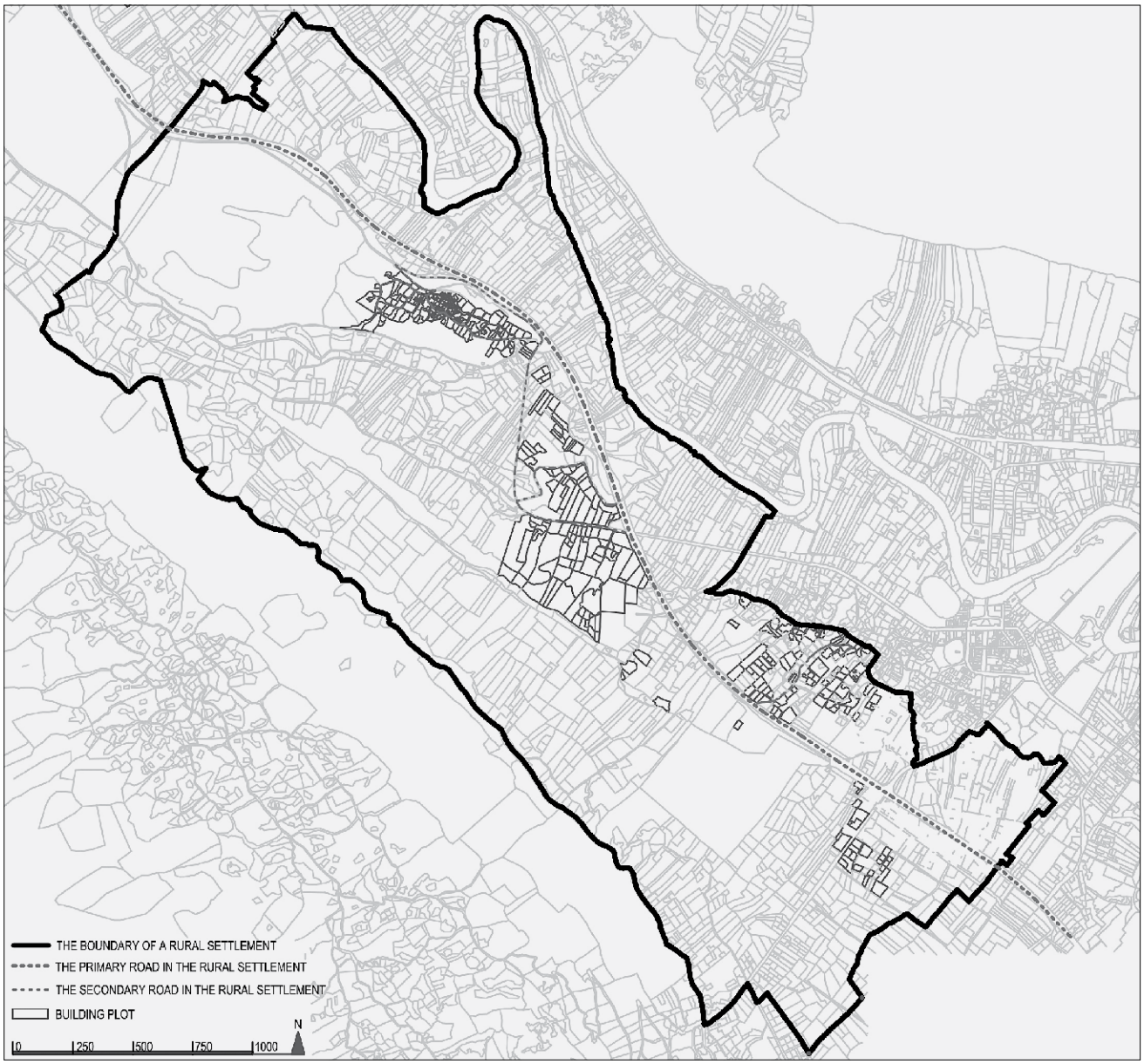

Fig. 8 Layout of Orja Luka rural settlement

tage with clear conditions for future development, which can be achieved only through the appropriate physical planning process and PPDs.

As mentioned before, in the Central Region, there are over 450 settlements, and nearly two-thirds are rural. Most of them are of a condensed pattern. However, there are remarkable examples for a linear pattern – ***Kujava*** in Danilovgrad municipality (Fig. 7), which has very few building plots along the main road but is divided with fertile land and wood lots. On the other hand, rural settlement ***Liješnje*** in Podgorica municipality (Fig. 7) is an excellent example of a dispersed settlement. It has some sixty buildings connected with a set of narrow dead-end roads that wind between the hilly landscape.

to activate the settlement life by introducing new tourism functions through architectural and environmental heritage protection.

12 The PP for Danilovgrad Municipality is the only valid PPD that addresses the rural areas through the goals and guidelines for spatial development, emphasizing improvement of agriculture, modest investments, and slow down the rural de-farming settlements. One of the planning goals for rural settlements is the decentralization of public services to bring services closer to rural settlements and create the living conditions for the population recovery, infrastructure reconstruction, and the reconstruction of destroyed and abandoned residential houses and other farm buildings, recultivation of neglected farmland. But one of the most important rules is, undoubtedly, the exact delineation of the building area and defining the usage of once-to-be public land.

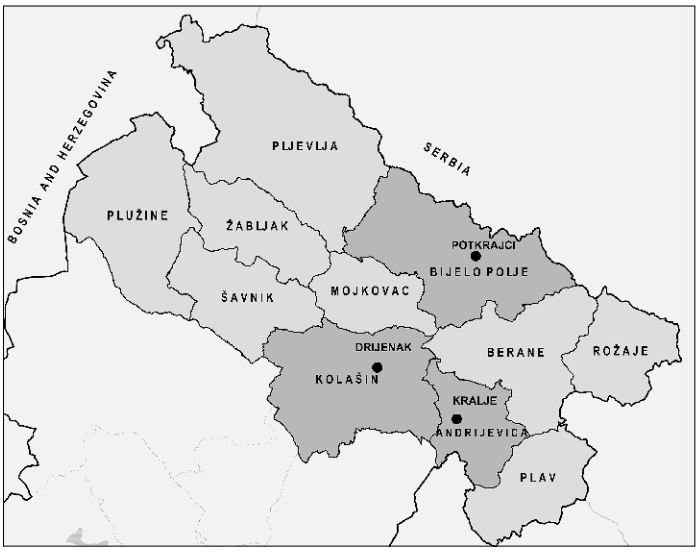

FIG. 9 MUNICIPALITIES OF NORTHERN REGION WITH POSITIONS OF KRALJE, POTKRAJCI AND DRIJENAK SETTLEMENTS

NORTHERN REGION

The Northern Region (covers the Montenegrin mountain area) is the largest of the three regions – over 7,300 km^2, has eleven municipalities: Kolašin, Mojkovac, Plav, Andrijevica, Berane, Rožaje, Bijelo Polje, Pljevlja, Žabljak, Plužine, Šavnik (Fig. 9) and population density of 26.6 res/km^2. According to the adopted definition for a rural settlement, the number of rural settlements in this region is about 500. On the other hand, according to the PPCG, their number is 568. The stated difference between these data sources may represent a new phenomenon in the settlement system of Montenegro.

The rural settlement of ***Kralje*** is located within the Andrijevica municipality area (Fig. 9), some 3.0 km far from the central municipality settlement. The settlement building area covers 5.5 ha, having just 228 permanent residents. It is spread along the hillslope and by the foothill, at 952 m a.s.l. Its shape belongs to a dispersed settlement type (Fig. 10), as most of the rural settlements in this region. The most common residents' activity is mainly cattle-breeding and agriculture. The church of the *Holy Ascension of the Lord* (the end of the 19th century) stands as the dominant architectural landmark, with a cemetery nearby. The *Youth Home Building*, along with a *School Building* from the 19th century, indicates that *Kralje* served as a significant educational center for the entire area. Like most rural settlements in this region, it has a deficient infrastructure and communal support level. The insufficient investments into *Kralje* have affected frequent migrations to nearby urban centers.[13] The high age of the population is another reason for the lack of new developments, resulting in economic backwardness and poor usage of natural resources (Table I).

This region has all three types of previously mentioned settlement types. Among the *linear pattern* ones, the most representative rural settlement, by no doubt, is ***Potkrajci*** in Bijelo Polje Municipality (Fig. 9). On the other hand, rural settlement ***Drijenak*** in Kolašin Municipality (Fig. 9) is an example of a condensed settlement type, a sub-type with several *nuclei* of building plots.

POSSIBILITIES FOR FURTHER DEVELOPMENT OF RURAL SETTLEMENTS

Montenegrin rural settlement development problems have been increased throughout history. As a result of an all-about neglection, a general de-farming and depopulation of many rural settlements occurred in the 20th century. Parallel to these processes, the excessive population and economic concentration in urban settlements occurred, which negatively affected the economic, social, spatial, and environmental issues.

As it is well known, to provide the survival of villages, it is necessary to stimulate the development of their primary economic activities (agriculture, livestock, or fishing). In addition, acting on spatial structures can also positively influence the overall development of the village, which is the topic of this paper.

One of the critical reasons for the extinction and deterioration of rural settlements is the insufficient road and communal infrastructure network, especially in the Northern Region. The shape of rural settlements and their dispersion within the environment also aggravates infrastructure and communal equipped.

Finally, the existing Physical planning legislation does not regulate or prescribe the liability in preparing and adopting PPDs for rural settlements. Besides, the PPDs dating from 1986, 1991, and 2008 have a very similar approach to the rural settlement problems – very weak proposals for their future development and protection. In the last chapter of the PPCG – Basic Principles of the Physical Plan for long-term spatial development and

13 Montenegro had 29 rural settlements with no permanent residents, 260 with less than 25 residents, and 659 with less than 100 residents. Besides, demographic aging is also a significant problem caused by mass migrations of young people from rural to urban areas and their transfer from agricultural to non-agricultural activities offered in urban centers. This process had a negative impact on urban areas because it created an inevitable "urban" sprawl and the increase in social costs and lack of proper housing in urban centers, which resulted that the outer urban neighborhoods look more like rural.

14 Physical Plan for Montenegro up-to 2020, part 3, section 1.3.2 *(Specific Physical Planning Principles and Goals)*, p. 101

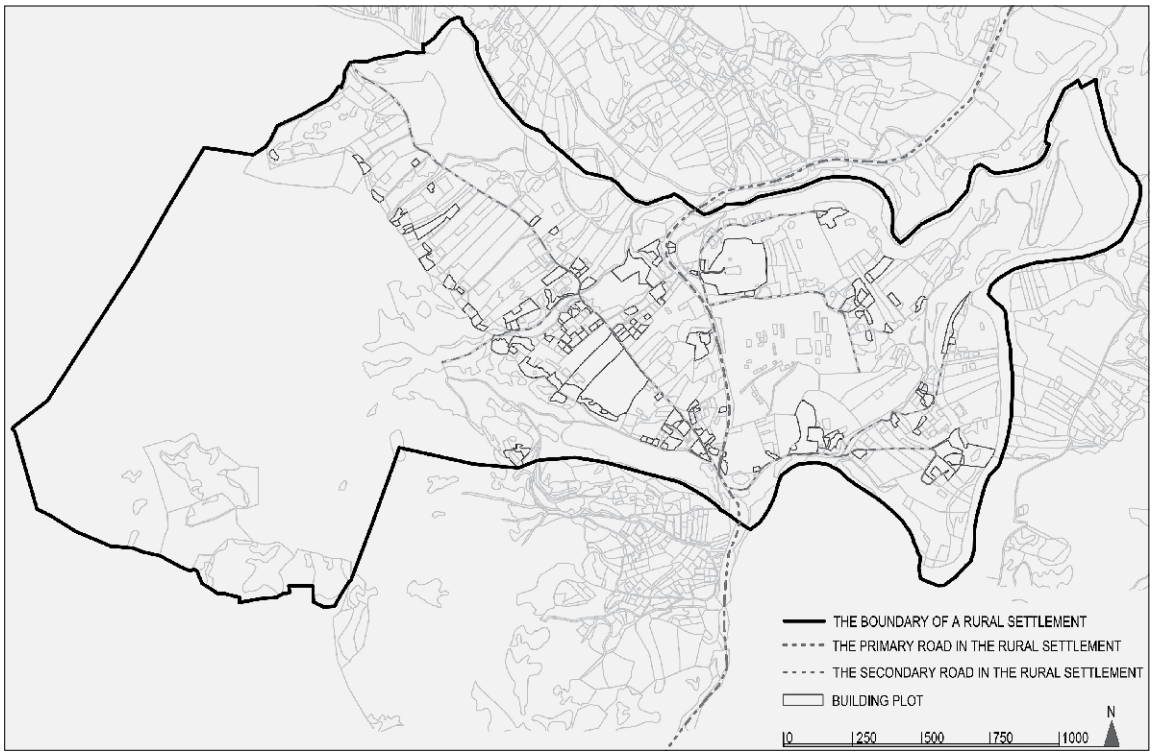

Fig. 10 Layout of Kralje rural settlement

organization[14], the following principles should be assigned to rural settlements:

– Tourism within the (rural) settlements should be planned following their capacities and sustainable development principles and goals.

– Rural settlements' functions should be supplemented through urban usage of their spatial possibilities for specific economic development.

– In rural areas and settlements, the construction should be allowed only within its historic building boundaries with the betterment of their residing conditions and enforcement of agricultural and similar activities.

– In rural settlements, it is necessary to preserve the existing architectural identity, which comes from the current values, spatial organization, and built heritage.

Finally, the existing Physical planning legislation does not regulate or prescribe the liability in preparing and adopting PPDs for rural settlements. Besides, the PPDs dating from 1986, 1991, and 2008 have a very similar approach to the rural settlement problems – very weak proposals for their future development and protection. In the last chapter of the PPCG – Basic Principles of the Physical Plan for long-term spatial. The cited principles and goals are supposed to protect rural settlements from further deterioration. Among other principles, there is a suggestion that, besides native residents, the migration and residing of other people (working in urban places by the coast) within these settlements. One way to encourage people to come and live is to improve road and communal infrastructure. This improvement would undoubtedly enhance tourism based on ecological food, healthy living, but they do need to have a certain infrastructural standard to offer all that. One way to pave the road towards such goals is to prepare and adopt the physical planning documents that would serve as a tool for all that, previously mentioned. But there is no legal support for that.

CONCLUSION

The role of rural areas in the overall country development is significant, and no one cannot view contemporary life separately from them. Hence, their deliberate planning is a crucial key. The paper reviews the possibilities of improving spatial structures to strengthen primary economic activities, considering that their development is a necessary condition for the village's survival.

The Physical Planning Act and Cultural Values Protection Act should be changed to obligate the preparation and adoption of detailed PPDs, which must be very comprehensive, protective, and promising due to the mentioned complexity and problems. During the process of their preparation, it is of utmost importance to do the proper evaluation of the spatial and architectural aspects for each of

TABLE I NUMBER OF INHABITANTS IN RURAL SETTLEMENTS IN 1948 AND 2003

category of rural settlement	number of inhabitants	1948.		2003.	
		number of rural settlements	participation in the number of settlements	number of rural settlements	participation in the number of settlements
1.	0-25	7	0.6	260	21.4
2.	26-50	31	2.6	165	13.6
3.	51-100	174	14.5	234	19.3
4.	101-200	400	33.3	236	19.4
5.	201-300	260	21.7	112	9.2
6.	301-500	219	18.2	102	8.4
7.	501-1000	105	8.8	76	6.2
8.	over 1000	4	0.3	31	2.5
Total		**1200**		**1216**	

them, considering their significant differences that are derived from their historical, geographic, and traditional causes.

The possibilities for developing and improving ecological, rural, and cultural tourism in Montenegro rural areas are very significant. They are mirrored through the existing natural and anthropogenic values within three Montenegrin regions. This has led to the appearance of a new type of a settlement – ethno-village, with a very affirmative effect on future rural development. Therefore, we have an increased need for a new generation of PPDs – Preservation Development Plans [PPPs], the plans that would evaluate the existing values, restore those close to disappearing, and use all that to present the cultural and historical values to the World.

The existing Cultural Heritage Protection Act (2019) defines the types and categories of cultural properties, the ways of their protection establishing, and the rights and obligations of the cultural property owners. However, the shortcoming of the law is in proposing insufficiently effective protection mechanisms. But the Act does not have fully and clearly proposed solutions to numerous issues in the overall protection cycle, which makes the existing protection system inert, inefficient, and in specific segments impotent to respond to various contemporary challenges. A minimal number of PPDs treat the traditional architecture, but only through providing foggy guidelines for reintegrating into modern life, without any significant interdisciplinary research results based upon recognized, systematized, and adequately evaluated heritage values.

Following the observed and discussed problems of rural settlements in Montenegro, the authors would like to outline the following conclusions:

– The data collected from the General Census (2011) represent their condition during the past decade. Therefore, they cannot be used for any serious and in-depth scientific research, definition, and classification.

– The decline of residents' numbers within these settlements can relate to different reasons.

– The architectural and traditional values are numerous. Still, it is needed to prepare a very comprehended study for their proper evaluation to preserve them and enable their exposure to new groups of people and attract them to move in as steady residents.

– The enhancement of the road network and other infrastructural and communal equipped within the settlements.

– Preparation and adoption of new generation plans would provide not only the planning ordinances on how to restore, reconstruct or preserve the existing architectural and spatial values of a rural settlement, but give unambiguous proposals connected with their future economic and sustainable development.

The last one is undoubtedly calling for a much wider web of professionals and scholars that would be part of a planning team. This planning team will propose preservation or conservation methods and offer new steps towards sustainable planning and life.

[Translated by Nenad Lipovac]

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Illustration sources

Fig. 1, 5, 7, 9	Montenegro Physical Plan, up-to 2020, adapted by the authors
Fig. 2-4	photo by N. Lipovac
Fig. 6, 8, 10	State cadastre plan from 2008, adapted by authors
Table I	authors

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Nevena Mašanović (1987) Ph.D. candidate at the Faculty of Architecture, University of Zagreb, with doctoral research focused on physical and urban planning issues of rural settlements and their future development.

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Concept: N.M., N.L. and M.J.; methodology: N.M., N.L. and M.J.; formal analysis: N.M., N.L. and M.J.; research: N.M., N.L. and M.J.; resources: N.M., N.L. and M.J.; writing – original draft preparation: N.M., N.L. and M.J.; writing – review and editing: N.M., N.L. and M.J.; visualization: N.M., M.J.; supervision: N.L. All authors have read and agreed to the published version of the manuscript.

Book reviews

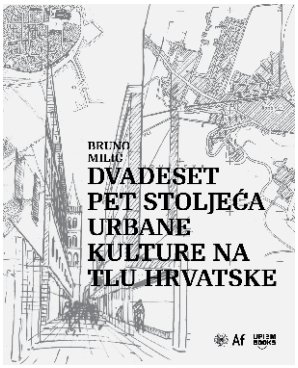
Summaries of
doctoral dissertations

Nikša Božić

Twenty-Five Centuries of Urban Culture in Croatia

Dvadeset pet stoljeća urbane kulture na tlu Hrvatske

Bruno Milić



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440 pages, Croatian, preface, afterword, literature, index of localities, about the author
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Reviewers: Sonja Jurković, Snješka Knežević, Mladen Obad Šćitaroci
Editor: Ariana Štulhofer
Preface: Zlatko Karač
Text editing and afterword: Lada Milić Demarin
Design: Saša Stubičar

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CIP 001068443 [NSK Zagreb]

Professor emeritus Bruno Milić (1917-2009) was one of the most prominent figures in Croatian architecture and urbanism in the second half of the 20th century. His long academic work at the Faculty of Architecture in Zagreb has left an unavoidable mark on generations of architects, urban planners and spatial planners, even for those who have not had the chance to personally attend his lectures. His three major books "Urban Development Through the Centuries I-III", created in the 1990s after the professor's retirement, marked the crown of his academic work. Originally conceived as university textbooks, these books have outgrown their scientific and educational function and become an indispensable read for a cultural analysis of urban development throughout history. With these books professor Milić not only filled the gap that existed until then in the Croatian professional and academic literature, but also set high standards for a systematic and comprehensive scientific analysis of urban planning. The books were written in an appealing and simple language, arranged as an intriguing collage of graphic contributions and accompanying cultural links, bringing the topic of urban development closer to a wider interested audience.

Even at the time of the creation of the books "Urban Development through the Centuries", it was known that professor Milić was preparing the fourth book dedicated exclusively to the urban development of the territory of Croatia. The manuscript that the author was working on until his death at the age of 92 remained largely defined, but unfinished, and in some parts only in notes and with missing references and graphic sources. Eleven years after the author's death, this major work is published in an unusual publishing venture in which the professor's daughter worked with his former associates from the Department of Urban Planning of the Faculty of Architecture in Zagreb. Therefore, it is worth mentioning the names of the people most deserving of this endeavour. First of all, it is the professor's long-term assistant at the faculty Zlatko Karač and the author's daughter Lada Milić Demarin who reconstructed, systematized and supplemented the rich textual and graphic material that remained unfinished after the author's death. The leader of the scientific project within which the manuscript was created, academician Mladen Obad Šćitaroci, is responsible for the fact that immediately after the author's death the decision was made to complete and publish the book. This enabled the participation of a number of technical associates who worked on the technical preparation of the materials. Among them, the author's longtime collaborator, typist Ljiljana Loina Hohnjec, deserves a mention. She had preserved all versions of the manuscript files and enabled them to be reconstructed. Finally, the roles of the book editor Ariana Štulhofer and the reviewers Sonja Jurković, Snješka Knežević and Mladen Obad Šćitaroci went beyond the usual framework of the publishing process in such an unusual publishing venture.

It is important to emphasize that despite this posthumous preparation, the book Twenty-Five Centuries of Urban Culture in Croatia remains a visible piece of work by professor Milić. The parts of the material that make up the book were created successively, since the early 1980s, during systematic research into the history of world and Croatian urbanism. Professor Milić left a conceptually completely defined book, even with the main graphic determinants. The book bears the undoubted author's signature in a style of writing that is at the same time comprehensive, factually accurate, and with lucid links to broader cultural themes. The text is written in an essay-like style, which is why the book successfully moves away from classical university textbooks and brings the topic closer to a wider readership interested in the culture of space as an important segment of national culture.

The book also bears the recognizable author's signature in the graphic layout, which was masterfully done by designer Saša Stubičar. It was professor Milić who as an architect and primarily a visual person created his manuscripts as richly illustrated collages. The graphic material in his books does not remain an accompanying material to the text, but instead the book becomes a complex system of text and graphic elements, descriptions and accompanying framed text that provides links to broader cultural topics. The author used to create all his manuscripts from their earliest stages as collages of numerous photocopied materials, which he meticulously arranged, paying attention to their interrelationships and position on the pages. The finished book, richly illustrated with more than 800 illustrations, exclusively in black and white, bears that recognizable author's signature. It certainly took a lot of skill and self-imposed modesty of the editor and author of graphic design to achieve this.

The book has 15 chapters and linearly follows the development of urban culture in today's Croatia from prehistory to the 21st century. The author points out the diversity, number and quality of urban areas of Croatian cities and emphasizes the inherited high level of urban culture that characterizes the area of today's Croatia. It is especially interesting that the author, who mainly dealt with the historical development of cities, deals in great detail with the dynamic development of Croatian cities in the 20th century, from explosive growth and development of our cities to the phenomenon of tourist urbanization in the Adriatic.

The book "Twenty-Five Centuries of Urban Culture in Croatia" looks like a fascinating masterfully restored mosaic. The very history of the cultural and historic development of our cities is fragmented, which is a consequence of turbulent historical facts. The author managed to combine such fragments into a comprehensive ensemble that for the first time brings a systematic overview of the urban development of our cities and indicates the longevity and continuity of urban culture in Croatia. The team that completed the book performed a masterful job of restoring the existing mosaic of unfinished materials, while their work remains a concealed dedication to the work of professor Milić.

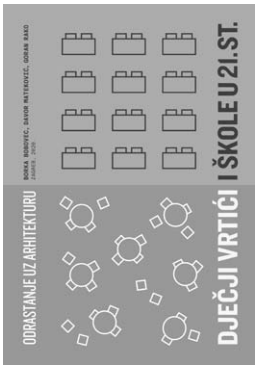
The book is an indispensable read not only for students but for all who in their work need an understanding of the broader cultural context of development of our historic urban areas.

Nikola Bašić

Growing up With Architecture
Kindergartens and Schools of the 21st century

Odrastanje uz arhitekturu
Dječji vrtići i škole u 21. stoljeću

Borka Bobovec, Davor Mateković, Goran Rako



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Zagreb, 2020

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Foreword: Maroje Mrduljaś
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At a time of social debate on the educational system, here comes the monograph *Growing up With Architecture: Kindergartens and Schools of the 21st century* by Bobovec, Mateković and Rako. With or without intent, the book corresponds to Croatia's painstaking attempts to shape the educational curriculum within a network of complex interests, worldviews and political crosswords. At the same time, one does not want to admit that no one can actually predict what shall happen in the education system in schools in the next ten years, let alone in half a century. That is why today, in this accelerated world, all school system reforms (and this is not just the Croatian experience) are most akin to the race of Achilles and the turtle.

As much as the book *Growing up With Architecture: Kindergartens and Schools of the 21st Century* emphasizes the necessity of achieving the spatial and structural properties of a school building that will leave it open to the most capricious and unpredictable educational methods in the increasingly uncertain future, its special dimension presents a reflex of Croatia's specific educational necessity, which boils down to two words: *the culture of space*. It is this book that tells us why it is important for Croatian society and its future to develop the culture of space and how this can be achieved through architecture. The awareness that the inherited space, after the people, is the greatest Croatian treasure, thus becomes the prevailing social thought. However, in order to be promoted from the accidental heirs of this God's *particella* to its authentic heirs, we shall also have to accept the legacy of the *culture* of space.

That is to say that only those who are able to also understand what is above the material value of the inherited can be considered credible heirs – and the first knowledge about space and the culture of space get acquired as early as in the kindergarten. When a kindergarten or school, as an organized, conceived and shaped architectural space become teachers of the culture of space by themselves, then we can hope that we shall succeed in making involuntary heirs credible heirs. Only then will we – through culture, not through punitive laws – truly be able to also successfully manage the treasures of our space. Because, it is well known, every inheritance without heirs is doomed to failure.

Although the book addresses stakeholders who directly influence the building of schools – namely architects, clients and users – it moves away from a template of a manual that would like to interpret norms, standards and preferred typologies of schools. Instead, this book contains sample reflections and selectively presented information for an interactive scholarly, professional and social discourse in which the school emerges as a work of architecture.

The book has an original structure and its multiple authors have not resulted in an obstacle to a linguistically and stylistically coherent text. The foreword is followed by a brief historical overview of kindergartens and schools, from the first examples created in the tradition of modernity, all the way to more recent architectural achievements. The correlation between education and architecture is established, and education is emphasized by architecture itself. In the most comprehensive chapter *Indirect and Direct Influences on Quality*, it is stated that there is no ideal prototype of a school. It stems from the fate of an architecture that, like Ahasuerus, is doomed to an eternal pursuit. Also, the spatial and organizational structure of the school building must never be predetermined. In other words, neither the educational nor its cultural function is ever its basic constant. If educational processes are transformed, social and cultural policies must be a constant.

When considering the problem of school construction, schooling standards, the efficiency of the school network, the issue of work in shifts, as well as other things, have been put into focus. Furthermore, there is the issue of inequality between schools in urban centers and rural areas, where construction is approached with less ambition in terms of investment and architectural design, as well as the survival of schools in areas with an evident decline in demographic vitality, a problem to which potential solutions are offered through selected examples. The final part of the book provides an overview of systematically selected instances of successful architecture of kindergartens and schools. For easier and simpler understanding and the possibility of adopting and applying quality elements that are already present in modern architecture of kindergartens and schools around the world and in our country, various models executed after the year 2000 have been selected. A total of forty-four kindergartens and schools, of which twenty-seven foreign ones from fifteen countries on four continents and seventeen that were built locally. The special value of the book, which is an exceptional and commendable achievement, are the personal descriptions and explanations of domestic and foreign realizations of their authors–architects, skillfully merged with the authorial text of the book.

Graphic and pictorial overviews refer to an exhaustive list of literature, but more importantly, to the Internet sources through which readers can get acquainted with particular architectural work in accordance with the depth and breadth of their interest. Through this process, the scope and reach of this book literally step out of its cover and turn it into a thematic system of information about the architecture of kindergartens and schools today.

The book is an exceptionally valuable and largely innovative scientific and professional experiment with a strong focus on the architecture of modern kindergartens and schools as educational and cultural mediums. It is of great value to know that it is a medium that also develops the culture and awareness of space, which in Croatian proportions gives it special onus. The book is an instructive and effective handbook for all those who build Croatian schools, maintain them, or study and work in them. However, it is also an interesting reading for all who intentionally or accidentally come across this important social topic, especially for those who share the belief that the paradigm shift in the care of the most precious Croatian treasure, namely people and inherited space, begins in a beautiful, pleasant, harmonious and playful space of any Croatian kindergarten.

Mia Roth-Čerina

Types of Standardized Houses in Post-Earthquake Reconstruction

Projekti tipskih kuća za obnovu nakon potresa

Publisher: Faculty of Architecture,
University of Zagreb, Zagreb, 2021
183 pages, Croatian, introduction, catalog of projects – 36 authors, conclusion
[21×30 cm, color, paperback]
Authors: teachers of the Faculty of Architecture with associates
Reviewers: Tihomir Jukić, Lenko Pleština
Editor in chief: Bojan Baletić
Managing editor: Luka Korlaet
Spatial representations: David Penzar
Design: Filip Ivaniček, Ana Krapec
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Two major earthquakes of 2020 have dramatically impacted the goals and concerns of the architectural community in Croatia – the first one happened on March 20th with its epicentre near Zagreb, the other on December 29th with an epicentre near Petrinja. The aftermath of the damage prompted an introspective look into the way we protect and renew buildings erected before (or not adhering to) contemporary codes, but also gave a devastating insight into dismal living conditions and poor construction in many communities. While the first earthquake ignited discussions beyond mere safety and renewal of existing structures and expanded them into burning topics of planning and protection, the second one made bruises of a fundamentally existentialist nature, with hundreds of people left homeless overnight.

The Faculty of Architecture at the University of Zagreb immediately became involved with all issues related to these disastrous events – from its staff participating in the outpour of volunteer work, assessing damage, collecting and publishing archival documentation and research which could benefit renewal, becoming involved in bodies on all levels, contributing to planning, documenting, designing for reconstruction and renewal, and also producing new research, openly sharing knowledge, and reacting profoundly architecturally – by design. This book is a collection of a segment in these efforts, offering an open source of models justified in existing and possible technological and industrial resources, aimed particularly at those affected by the second earthquake in the County of Sisak and Moslavina, therefore looking into traditional patterns and local lifestyles to propose applicable, grounded solutions. While the activities preceding this collection of standardized, modular homes came from a collective series of engagements by professors, engineers and industry representatives, the initiative of the collection presented in this book came from the Dean of the Faculty, professor Bojan Baletić, and the Section of Housing lead by its chair, associate professor Luka Korlaet, who brought together architects from all departments and acted as the book's editors.

The introduction by the Dean Bojan Baletić is followed by conclusions of a round table held at the Faculty on January 8th, initiated by professor Karin Šerman and joined by professors Mateo Biluš, Mladen Jošić, Josip Galić and Krunoslav Šmit, as well as a list of points for continued action, focusing on a series of issues, scales and temporal steps, but also identifying crucial partners. These conclusions resulted in fundaments of actions spanning the direct and current engagement of architects and engineers, the political and procedural aspect, the legal and financial ones, the sociological and economic aspects of scenarios and perspectives of possible futures for areas which were in dire need of revising a sound strategy even before the earthquake struck.

Luka Korlaet contributed with a chapter chronicling the earthquakes' aftermath: the long-term changes they left in the soil, requiring a revision of geomechanical data for the whole area; the devastating percentage of damage to structures acquired through the ArcGIS Collector and coordinated by the Croatian Centre for Earthquake Engineering; the short-term and long-term solutions to lodgings, first as provisional containers and then as a system of dwelling types observed as an opportunity to improve living conditions which, in many of the affected areas, were of low quality to begin with.

Mateo Biluš, Dunja Mandić, Zorana Protić and Darko Užarević provided a comparative analysis of possible structural systems and materials to be utilized in these standardized dwellings, both erected in-situ and prefabricated, establishing a useful overview whose use exceeds the immediate need of this collection, with an appendix of companies currently present in the Croatian construction market. This chapter is followed by an introduction to zero-energy building and its translation into concrete measures in individual housing, from materials, insulation, thermo-technical systems and requirements resulting from current legislation, authored by Zoran Veršić, Marin Binički and Davor Prodan Abramović. Finally, Mladen Jošić laid out the design standards for these replacement dwellings based on various family sizes or co-housing arrangements, requirements for modular articulation, spatial and technical standards, and finally, design guidelines.

Based on these precise inputs, an overwhelming outpour of responses by architects teaching at the Faculty (as well as their collaborators and partners) produced a collection of designs reflecting on traditional domestic rituals, vernacular patterns, specific dwellers (which in some cases include humans, animals and agricultural vehicles) and fast construction needs, channelling them into contemporary interpretations of flexible and sustainable homes enriching rural futures. Each design is laid out following an analogous structure: its concept and adaptability to various needs and contexts, architectural design, structural detailing as well as a unified table marking possibility of material use in relation to available industries. Contributions in this major segment of the volume have been made by teachers of the Faculty Vjera Bakić (with Matthias Kulstrunk), Bojan Baletić (with Zora Salopek Baletić and Davor Salopek), Alenka Delić (with Davor Delić), Vedran Duplančić, Ivana Ergić, Sanja Filep, Tin Sven Franić, Jana Horvat, Mladen Jošić (with Minja Jošić), Siniša Justić, Vladimir Kasun (with Ian Kruezi and Ivan Mimica), Luka Korlaet, Rene Lisac, Dunja Mandić, Iva Martinis, Ljubomir Miščević (with Mark Miščević), Petar Mišković, Lea Pelivan (with Studio UP), Ivica Plavec, Branimir Rajčić, Tamara Relić, Vanja Rister, Krunoslav Šmit (with Nataša Ivanišević, Katarina Kozlović and Ivan Matorić) and Nino Virag.

Both earthquakes prompted all involved – architects, planners, politicians, lawmakers, communities – to take a deep look into gaps existing in all steps of caring for the built environment which contributed to the damage being so vast and the reconstruction still moving at a slow pace. Apart from providing needed, targeted help for a region devastated by a natural disaster, this book, with its introductory and broad-but-concise approach to all actions and actors involved, provides a textbook of steps to be taken should another, hopefully less catastrophic, yet acute need, occur. The book is, finally, a testament to one of the fundamental callings of an architect: one of outreach, one of care.

Marin Duić

Castle Studies

Anti-Turkish Castles in Banovina at the End of the 15th and the Beginning of the 16th Century

Kaštelologija

Protuturski kašteli na Banovini krajem 15. i početkom 16. stoljeća

Zorislav Horvat

Publishers: UPI-2M PLUS and the Faculty of Architecture, University of Zagreb, Zagreb, 2020

181 pages, preface, catalogue, literature, about the author
[26×21 cm, b/w, paperback, Croatian]

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At the end of the 15th century, due to the appearance of gunpowder and artillery, the previous ways of warfare with cold weapons were abandoned. New types of fortifications, now designed for active defence against invaders, were built. The fall of the Kingdom of Bosnia in 1463, and the impending Ottoman aggression on Croatian lands coincided with new fortification needs and constructions, especially between Velebit, Una and Kupa. The Hundred Year's Croatian-Ottoman War, beginning with the defeat in the Battle of Krbava Field in 1493 and ending with the victory at the Battle of Sisak in 1593, marked a period when the Croatian nobility was building a series of new or remodelling old fortifications to defend their estates. The lower nobility built numerous lost wooden castles or masonry pseudo-castles intended primarily for defence against smaller *martolos* troops, while the higher nobility built larger and better-equipped castles or improved older *burgs* (medieval noble towns) to protect and defend from major Ottoman attacks. In the middle of the 16th century, the Military Frontier defence system was consolidated. The War Council in Graz sent Captain Ivan Lenković on a tour of the new castles and old *burgs* in the Croatian Military Frontier. Based on military logic, Lenkovic concluded that some smaller *burgs* and castles should be abandoned and demolished in order not to fall into Ottoman hands and be used in further warfare. The new fortifications had to be built in strategically important places and be large enough for the concentration of military force. That is why, for example, the renaissance fortifications of Sisak and Karlovac were built. The Croatian Parliament opposed the abandonment and destruction of smaller fortifications because that would leave the local population without any protection.

All these circumstances led to the dynamic architectural changes in the Croatian border areas facing the Ottoman Empire. In a relatively short period of time, from the end of the 15th and during the 16th century, a large number of fortifications were built and improved. Those fortifications are mostly neglected today, but they still convey the identity of previously mentioned border areas.

All these changes in fortification buildings are described in Zorislav Horvat's new book called "Castle studies - Anti-Turkish Castles in Banovina at the End of the 15th and the Beginning of the 16th Century". This book is the sixth authors' book and can be seen as a direct temporal continuation of the previous "Burg Studies" (2014) in which the author analysed a period from the 13th to the end of the 15th century, i.e. the period of cold weapons and the construction of *burgs*. "Castle Studies", as well as its literary predecessor, makes systematic presentation of the theme of fortification architecture, only this time from the end of the 15th and the beginning of the 16th century and, once again, provides excellent graphic design and presentation of the theme thanks to designer Saša Stubičar and editor Ariana Štulhofer.

The introductory chapter of "Castle Studies" provides a synthetic insight into the peculiarities of castles. An overview of architectural models in Italy and Central Europe, and an overview of the first appearances in Croatian regions are provided. Defense specifics, which now place emphasis on active defence with the development of long-range combat and the defence of the building from the security of towers and walls, are thoroughly analysed. Defenders from the safety of the castle secure the surrounding terrain with crossbows or firearms so that each point of the surrounding terrain is defended from at least two openings of the castle. An overview of the building elements of the castle is given, and a typological classification is provided.

The foundation of the book lays in the following seven chapters, which are structured according to the previously published scientific articles by the same author. The articles were published continuously from 1993 to 2014, and were supplemented and adapted for the purposes of this publication. In those seven chapters, the author thematically deals with individual sites (such as Hrastovica and castles on the northern slopes of Zrinska gora or castles of the Zrinski family in the late 15th and 16th centuries in the Pounje region), people (such as the fortifications of Bernardin Frankopan), or types of building (such as pseudo-castles). In the last chapter, a catalogue of twelve castles not mentioned in earlier chapters is given. The castles of the author's interest are located in the areas of Banovina, Kordun, Pokuplje and Lika. Each chapter is well equipped with historical maps, field photographs and architectural drawings (which sums up to the total of 191 illustrations in the book). The author's decades-long field research of the presented sites is of exceptional value, which is reflected in the author's architectural documentation presented in the book.

"Castle Studies", like the author's previous publications, shows an immense architectural erudition based on a lifelong study of the feudal fortification architecture of the Middle Ages and the early Renaissance. The defensive structures presented in the book provide a view of the materialization of ideas from an important part of Croatian history when Croatia was the *Antemurale Christianitatis*. Castles and other fortifications are a testament to the spirit and perseverance of builders and defenders on the border between the two worlds. The book targets, not only architects, but also art historians, archaeologists, general historians, conservators, and also students and the general cultural public.

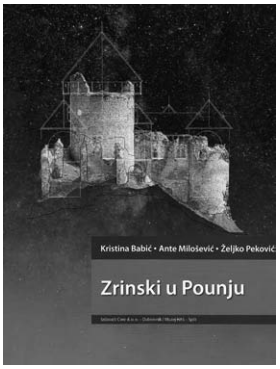
Castle Studies makes an exceptional contribution to the potential reconstruction of the Banovina region which was hit by the recent earthquake. Numerous castles analysed in the book have been rapidly deteriorating even though they represent an immeasurable cultural, economic and tourist development potential. May this book lead the light to uncover their full potential.

Dubravko Bačić

The Croatian Noble House of Zrinski in the Region of Pounje

Zrinski u Pounju

Kristina Babić, Ante Milošević, Željko Peković



Core d.o.o. – Dubrovnik i Muzej HAS – Split
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Dubrovnik / Split, 2020

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Reviewers: Dubravko Bačić, Danijel Džino
Proofreading: Kristina Babić
Design: Neven Marin

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"The Croatian Noble House of Zrinski in the Region of Pounje" *(Zrinski u Pounju)* is a monographic presentation of the findings from a new piece of research conducted under "The Zrinski Family Heritage – the Future of Banovina" project from the year 2019 and the subsequent projects of restoration of several historic monuments in the Croatian part of Pounje and Banovina: the old town of Zrin, the Gvozdansko Castle, the ruins of St. Mary Magdalene's Church in Zrin and the building complex with a blast furnace in Beślinec (Rujevac). On some three hundred pages, the book consists of 13 chapters of the main text, with 417 illustrations (historical and contemporary photographs of the sites and individual buildings, photographs of artefacts and archaeological finds, maps, tables, architectural drawings, etc.), and 629 footnotes.

The introductory chapter provides a summary of the four investigated sites under the scope of the restoration projects (the old town of Zrin, the Gvozdansko Castle, St. Mary Magdalene's Church in Zrin and the building complex with the blast furnace in Beślinac – Rujevac), followed by six synthetic chapters with topics covering geography, culture and history, presenting the rich natural and cultural heritage of Banovina and the Croatian part of Pounje. Relying on historical sources, literature and previously published research, the authors offer their interpretation of a complete and monographic survey of the political, military, economic, cultural, historical and social development of Banovina and the Croatian part of Pounje from prehistory through antiquity to the Middle Ages and the emergence of the Zrinskis in the area. Two chapters are dedicated to this renowned Croatian noble family, their origin, genealogy and rise, the expansion of their power and acquisition of possessions, their mint, the Zrinski predicate and coat of arms – Zrinskis in Pounje from 1347 to 1578 *(Zrinski u Pounju od 1347. do 1578. godine)*, and Zrinskis' Fortresses and Settlements in Pounje *(Utvrde i naselja Zrinskih u Pounju)*.

Chapters 8, 9 and 10 successively cover the Zrin and Pedalj burgs, and the Gvozdansko Castle. In the analysis of the spatial and historical development of these fortifications, the authors utilise all available cartographic, graphic and written historical sources, architectural surveys of the existing condition, photographic records and graphic reconstructions, as well as comparative analyses and a scientifically based interpretive apparatus. The newly published research findings significantly contribute to the current knowledge of medieval Croatian continental fortification architecture, and general political, social, economic, cultural and historical circumstances in Banovina and Pounje during the time of the Zrinski dukes.

Chapters 11 and 12 are dedicated to the poorly preserved, mostly unexplored and insufficiently known sacral heritage of Banovina and Pounje. These two chapters offer a review of the churches and monasteries of Zrin (11), and the late Gothic church of St. Mary Magdalene (12), thoroughly researched and investigated under the project. After an exhaustive critical analysis of the previously published literature on St. Mary Magdalene in Zrin, and a chronological overview of prior conservation, restoration and archaeological research, the authors present the results and conclusions of their own research conducted during 2019, with a proposed reconstruction of the church and a presentation of all valuable findings.

Chapter 13 covers the building complex with the blast furnace in Beślinac – the only surviving example of a blast furnace structure intended for iron ore processing in Croatia, and a complex of registered historical, cultural, architectural and ambiental value. The authors rigorously explored all aspects of the Beślinac complex history with almost forensic precision – from its building phases and historical-architectural features, archaeological research and interpretation of finds, to the economic significance and understanding of metallurgical-technological aspects of iron ore processing. Substantial, well selected and extensive illustrative material finely complements the text as more accessible addition to the specialised professional discourse.

Taking into account the geographical and chronological breadth of the opus, the abundance of collected and interpreted cultural, historical, archaeological, architectural and topographical information, and the synthetic-encyclopaedic character of all chapters, the work is intended for a truly wide range of readers – from the general public in Banovina and Pounje, through educated travellers wishing to learn more about this part of Croatia, to the interested professionals of various expert levels (students, doctoral candidates, researchers, scientists, conservators, local government authorities, educationalists and museologists, tourism experts, general cultural public, etc.) and profiles (political and economic history, history of architecture and art, archaeology, metallurgy, etc.).

"The Croatian Noble House of Zrinski in the Region of Pounje" is an exemplary scholarly work, which also belongs to the genre of historical and artistic topography. The scientific and professional relevance of the book is primarily reflected in the presented original new knowledge and conclusions as a result of interdisciplinary research conducted during 2019 under "The Zrinskis in Pounje" project, which covers four valuable examples of architectural heritage, but also in the integral interpretation of new information about the fortification, sacral and palaeoindustrial heritage of Banovina and the Croatian part of Pounje.

The four important examples of architectural heritage (Zrin, Gvozdansko, St. Mary Magdalene in Zrin and Beślinac), included in the project and covered in the book, together with the supporting chapters that diachronically and synchronically provide a general historical, cultural and political context, make up a kind of Zrinski tetralogy that allows a comprehensive overview of the valuable, significant and layered cultural, historical and architectural heritage of Banovina and Croatian Pounje. Lastly, this work is an exemplary model of scientific research combined with the professional standard of publishing the findings of field research and its resulting new insights promptly and expeditiously in a monograph, all thanks to the experienced and dedicated interdisciplinary team of renowned authors.

Aneta Mudronja Pletenac

Spreading Culture – How People Create Space

Rasprostiranje kulture – Kako ljudi stvaraju prostor

Jadran Kale

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In the introductory part of the book, the averment and plan of the book, the author presents us with a phenomenological framework for his relationship with the concept of space as defined by cultural geography from mid-20th century onwards. Referring to a number of authors in the field of "socio-spatial dialectics", but unfortunately without any deeper elaborations and insights, he builds a context in which space, as it is being constructed, simultaneously also constructs. His exploration as such, as he explains, stems from his profession – ethnology. Through describing an encounter with his professor, the author establishes his own professional position in opposition to a spatial vernacular of experience, which he collected through his teaching career and field work. It quickly becomes clear that auto-ethnography and his own experience are the building blocks of this book. With this in mind, his ethnographical journey is not, as some people would believe, a journey through "exotic and unexplored" destinations of the world, but rather "anthropological magic", as he himself calls it, by which he is searching for the knowledge of the quotidian in his experiences. Hence the advice to any reader embarking on the adventure of reading this book: embrace the concepts that the book offers, and try to experience the book through your own auto-ethnographic lens. Phenomenology might help the reader to form his personal relationship with the structure of the book which is divided into four chapters: Can the Real Space Please Stand Up, Defining Space, Creating Space, The Magic of Creating Real Space.

The reader, armed with such an approach to the text, becomes an active explorer of the book, which might serve as an incentive, inspiration and a call for the usage of the reader's own creative force. Maybe that is the main intricacy of the relations in space that this book attempts to reveal. "Spreading Culture" in the title might lead us to discover a possible goal of the author, whose decision to use such a dense, collage like textual structure, which discards linear modes of thought, demands that the reader invents a new reader/writer relationship, while at the same time, inviting him to actively produce his own book. Through the author's display of how relationships between space and people are built, "Spreading Culture" urges us to physically experience the subtext of "How People Create Space". In such a way, with the reader's engagement in the construction of his own space of thought, the book calls for "the magic of the creations of (real) space", from the last chapter of this book, to reveal itself. The "real" here is put in brackets, which, symptomatically, opens up the basic vagueness of the author's process. Despite many theoretical references, which force us to put the word real under quotation marks, the author is stubbornly trying to defend the reality of space in the empirical part of the book.

Without entering a debate about theorical references which are plentiful, especially in parts revolving around architectural theory or pedagogical artistic concepts, let us examine the "magic of creating space" of this book through the eye of the reader, and let us venture through the ink on the paper, in search of our own "reality of space". The body of this book, written by the readers and their own topography, is a multi-layered journey which has many different access points. With the author's ambiguity towards the representation of empirical material, the structure of the book calls for a non-linear read, although the author clearly indicates that he wants a hard structure (introduction and conclusion with three subchapters and two central chapters with four subchapters).

The central chapters are called "Defining Space" and "The Creation of Space". In the former, the author separates space in distinct categories, namely corporeality, movement, and borders (natural, as well as, cultural and territorial). In the latter, the author tries to de-territorialize spatial relations, which will later enable him to further debate the space of a night sky, the bottom of the sea, drywall structures and tattooed bodies. By engaging in such a development of the text, explaining space so he could lead it from bodies and human territorialisation to deterritorialization and dispersion, the author implies "the necessity of forming and crossing borders, with all the magic of the temptation to move across borders".

New spatial relations and a shift from the theoretical view of space that the author talks about are interesting and important to anyone connected with the theory of space in any way, but the experience of the reader's journey can hardly help us clarify some of the more complex theoretical concepts which the book refers to. On the other hand, developing the borders of the imagination of space remains exceptionally relevant for the architectural profession and informs many pedagogical practices of teaching spatial concepts. It would be interesting, for instance, to conjoin the chapter "The Creation of Space", written in ethnographic discourse, with recent architectural pedagogical research developed in the period between 2011 and 2019 during the graduate and post-graduate study of Diane Agrest's "Architecture of Nature: Nature of Architecture" (2019) at the Irwin S. Chanin School of Architecture at the Cooper Union in New York City, which resulted in the mentioned book. The research is based on the data collected in environmental studies, history of science, philosophy and art, reviewing the materiality and effects of forces which have impacted land through architectural lens throughout history, and technics of visualisation (drawing and diagram), broadening and transcending the enforced borders of the architecture.[1]

In conclusion, this book is a piece of extensive and personal ethnographic research that calls for a lot of subsequent research. Its main shortcoming is incoherence and poor connection between theory and empirical material, but on the other hand, for the patient reader this is precisely what could prove to be beneficial in opening some important issues. It seems that the author himself understood all the problems by stating that: "A textbook about space gets judged by the time it has spent in the open, as it would be desirable for every book challenged by a wide scope of influences – as well as for every space".

1 From a book review: https://www.amazon.com/Architecture-Nature-Diana-Agrest/dp/1939621941 (25.4.2021.)

Maroje Mrduljaš

Models of Public Programmes' Architecture within the Context of the Modernisation of Rijeka from 1868 to 1974

Arhitektonski modeli javnih programa u kontekstu modernizacije Rijeke od 1868. do 1974.

Doctoral dissertation [Summary]

Maroje Mrduljaš (Rijeka, 1971), graduated from the Faculty of Architecture, University of Zagreb. He is a lecturer at the Chair of Architectural Design at the same Faculty.

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The dissertation has 338 pages, 11 chapters, 47 sub-chapters, 116 illustrations, 512 footnotes

The dissertation investigates the public programmes' architecture in Rijeka and Sušak in the period from 1868 to 1974, when cities underwent radical modernization driven primarily by instrumental interests, resulting in the urban structure marked by conflicts of disparate programs and dysfunctional spatial relations.

The period under consideration began in 1868 when Croatian-Hungarian settlement assigned the formal-legal status of a "provisorium" *(Provizorij)* to Rijeka and the city *de facto* became a semi-autonomous territory under the jurisdiction of the Hungarian Crown. This marks the beginning of a vigorous urban and economic expansion of the city, on which shall continue for the next hundred years within the context of various political and administrative constellations. A common denominator of all administrations is a rejection of fixed urban planning which is why the city developed based on spontaneous processes and loose regulations. A huge infrastructural-industrial complex was built on artificial land in front of the entire "civil city". In such conditions, the public programmes' architecture had to overcome the lack of strategic urban planning and fight for the public domain. The research concludes with the year 1974 when the first truly operational General Urban Plan of Rijeka was adopted. However, a growing social and economic crisis in Yugoslavia significantly slowed down the development processes in Rijeka.

The dissertation deviates from the interpretation of architecture focused on form or style and interprets how the public programmes' architecture informed the creation of community spaces and strengthened the public domain in Rijeka. The turbulent social circumstances and the pragmatic character of the modernization of Rijeka led to cultural discontinuities, conflictual spatial usages and the lack of suitable locations for public programs. Architecture had to compensate for the shortcomings of the conflicting urban structure and the reduced public domain. In this confrontation, architecture went beyond the usual design principles and created new models that are specific to Rijeka and Sušak but are also instructive for other comparable situations. The dissertation defines architectural models as a reaction to various crises in Rijeka and Sušak. These crises were used for experiments and transgressions of conventions and programmatic requirements. Each model is elaborated on a case study.

The first set of crises refers to finding suitable places for the implementation of public programs within the structure of the city in which the domain of the public is reduced, and contact with the sea and nature is prevented. The model of activation of modernization's spatial by-products locates public programs in areas that are an integral part of the infrastructure or were sources of materials for its production. The mono-functionality of infrastructural elements and other forms of artificial land is transgressed, and hotspots of modernization become bearers of collective urban identities. Bathing establishments and rowing clubs were situated on infrastructural elements of Molo longo, Brajdica and Delta, and Brgudi so certain locations of the "industrial-infrastructure complex" were won over for the public. The Kantrida and Preluk quarries were spontaneously adopted for sports and socialization. The institutionalization of these actions created "un-designed" city symbols. The unrealized project for the Combined Swimming Pool on the Delta proposed the conversion of artificial land into a sports park that would bring public space to the sea.

The second set of crises refers to the implementation of public programs which resolved conflicting trans-local political constellations and did not necessarily fit the local needs. The model of typological experiments responds to the challenge of articulating programmatic combinations that did not exist before, or if they did exist, then it was the case of known programs taking on a completely new urban role and growing to a new scale. Typological experiments transgress typological givens, create provocative program composition and assign new urban roles to the architectural complexes. The Emigrants' Hotel provided a more humane framework for social segregation within the context of state-organized emigration in Hungary. The project of People's Home in Sušak diminished the divisions between "high" and "popular" culture, between citizens and tourists, between culture, sports and leisure whereas the large programme of Ri Department Store was used as a departing point to develop a pedestrian platform that connected the main street Korzo and the port.

The third set of crises refers to the discontinuities of the dominant nations and ideologies. Urban morphology, symbolic meaning, and the specific purposes of historical ambiences were either no longer satisfactory or they were even considered undesirable. The model of radical transformations of historical heritage transgresses cultural conventions as well as tests a liberal and experimental approach to historical architecture and ambience. Radical programmatic and symbolic transformation of the Trsat Castle was carried out with relatively modest physical interventions. The interpolation of the Museum of the People's Revolution building into the Governor's Palace complex introduced formal dialogue and an ideological competition. The reconstruction of the Old Town tested a creative, but also a controversial method of simulating the historical ambience which preserved only the most prominent monuments and completely altered the programmatic structure of the historical core.

Conclusions suggest that the public programmes' architecture in Rijeka showed determination to use the creative and destructive energies of modernity as driving impulses for the creation of a more stimulating city and society. Some of the original intentions of the case studies have not been realized, some remain unfinished, and some have been short-lived, but it is important to recognize their inherent potentials. The researched models show architectural procedures that destabilized seemingly completely concluded dominance of instrumental modernisation on urban structure and led to more favourable relations between the separated "civil" and "port-infrastructural" city. Based on a critical approach to the historical experience, further urban transformations of Rijeka should lead to the reconfiguration of existing urban elements, face stagnation and decline, and create new partnerships between disparate programs and conflicting uses of space.

PROSTOR

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