

WATER, SOCIETY AND URBANIZATION IN THE 19th CENTURY BELGRADE: LESSONS FOR ADAPTATION TO THE CLIMATE CHANGE

*Dragana Ćorović*¹, University of Belgrade, Faculty of Architecture, Belgrade, Serbia
Ljiljana Blagojević, University of Belgrade, Faculty of Architecture, Belgrade, Serbia

This paper traces urban history of Belgrade in the 19th century by looking into its waterscape in the context of its transformation as the capital of the Principedom of Serbia. Aiming to underline the importance of water as a resource, with the view to contemporary environmental concerns, we explore how citizens historically related to waterscape in everyday life and created a specific socio-spatial water network through use of public baths on the river banks and public fountains, water features and devices in the city. The paper outlines the process of establishing the first modern public water supply system on the foundations of the city's historical Roman, Austrian and Ottoman waterworks. It also looks at the Topčider River as the most telling example of degradation of a culturally and historically significant urban watercourse from its natural, pastoral and civic past to its current polluted and hazardous state. Could the restitution of the Topčider River be considered as a legacy of sustainability for future generations, and are there lessons to be learned from the urban history which can point to methods of contemporary water management?

Key words: *Belgrade, 19th century, urban history, waterscape, climate change.*

INTRODUCTION

Geographically positioned at the confluence of two major rivers, the Sava and the Danube, Belgrade has historically been bound to the shifting relations to its broad waterscape. In geopolitical terms, ever since the split of the Roman Empire and into modern history, the two rivers formed borders between often conflicting empires (i.e., between Eastern and Western Roman Empires, Franks and Byzantine Empire, and Ottoman and Austrian/Austro-Hungarian Empires). Border on the Sava and Danube remained in force between Kingdom of Serbia and Austro-Hungary until the unification of the Kingdom of Serbs, Croats and Slovenes after World War I, and reinstated during World War II, dividing German occupied Serbia and the Axis puppet Independent State of Croatia. In terms of geomorphology, apart from Sava and Danube, the historical waterscape consisted of a complex web of small rivers and streams which played a

significant role in the urban life and functioning of the city, but have since disappeared in the process of urbanization. Today, we look at the relationship of the city of Belgrade to its waterscape, and in contrast we see pollution, disrepair, unsustainable exploitation of rivers and lack of engagement coupled with the absence of general awareness of the importance of overall urban water management.

The purpose of this paper is to discuss historical relation of both citizens and policy makers to Belgrade waterscape in order to instigate thinking and research towards developing ways of including contemporary understanding of water management, water policy and the notion of *hydro-social contract*, which assumes new values and wider social consensus on how water should be managed. (Lundquist *et al.*, 2001, in: Brown *et al.*, 2009: 848) In this respect, we ask if there are lessons to be learned from urban history with regard to socio-cultural attitudes towards waterscape. In what ways had Belgrade's waterscape geopolitics, access to water, water supply and associated policies affected its urban

development? How can past uses and experiences of waterscape researched through the discipline of urban history, be incorporated into sustainable town planning which fully embraces contemporary practice of water management, as one of the principal aspects of urban sustainability?

THE WATERSCAPE OF BELGRADE

Synonyms of the phrase *urban landscape* include *townscape*, *cityscape*, *city scene*, *city view*, all of which imply looking or gazing onto a city. Similarly, the term *waterscape*, the topic of this paper, contains the meaning of looking onto water, or within the context of the discipline of urban history, looking into the relationship of city and water through history. An absorbed look at waterscape, can lead to its

This paper was realized as a part of the project "Studying climate change and its influence on the environment: impacts, adaptation and mitigation" (43007) financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia within the framework of integrated and interdisciplinary research for the period 2011-2014.

¹ Bul. kralja Aleksandra 73/II, 11 000 Beograd, Serbia
dcorovic@arh.bg.ac.rs

better or more profound understanding, for instance as one passage from a 19th century travel writing relates:

"I pushed open the door, and there, completely secluded from the bustle of the town, and the view of the stranger, grew the vegetation as luxuriant as ever, relieving with its dark green frame the clear white of the numerous domes and minarets of the Turkish quarter, and the broad-bosomed Danube which filled up the centre of the picture; but the house and stable [...] were tenantless, ruinous, and silent." (Paton, 1845: 51)

The described image of the Danube gazed upon from an abandoned house in a Turkish suburb of Belgrade offers a good metaphor for the dual nature of the waterscape: a skyline of myriad minarets and domes nestled in the green of gardens and arboreta against the backdrop of the massive waterway, the interplay of the two yielding a new quality, despite the ruinous surroundings.

The first geologic map of Serbia, published in 1842, includes information about the geologic history of the terrain, as well as of the geopolitical situation of the day. It shows the Belgrade waterscape as an intertwinement of waterways framed by the river border between Serbia and the Austro-Hungarian Empire (Figure 1). The state border on the Danube and Sava, established between the Ottoman and Austrian Empires in 1739 (Treaty of Belgrade), decisively affected the form that the urbanization of the city took over 18th and 19th centuries. After passing the 1830 Turkish Law, Belgrade was a seat to both the Serbian and the Turkish administration, remaining the only Serbian town where the Turkish civilian population was still permitted to live, but apart from the remaining population, no new Turkish citizens were allowed to settle in the city thereafter. The town space was structured into three principal parts: the town proper encircled by the Moat and palisade embankments; the Fortress held by the Turkish garrison poised above the rivers confluence and separated from the town space by the wide Kalemegdan field; and the village-suburbs outside the Moat. In 1834, Belgrade had total of some 12,700 inhabitants, as follows: 5,503 Serbs and 1,530 Jews in 769 houses, and 5,704 Turks – 4,600 civilians and 1,104 soldiers – in 830 houses (Jovanović *et al.*, 2003: 13). The civilian Turkish population concentrated on the side of the town sloping towards the Danube, the Jewish population inhabiting the lower areas, and the Serbian population in the centre and on the opposite side of town sloping towards the river Sava, as well as in the village-suburbs.

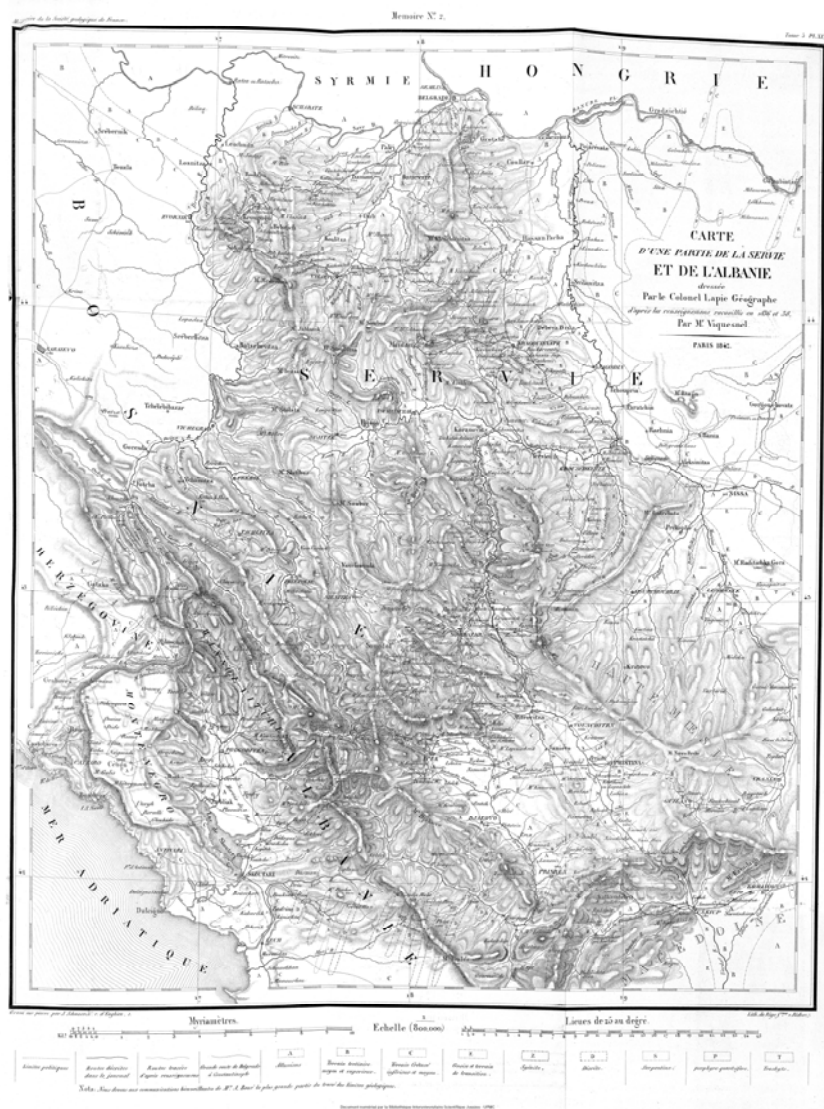


Figure 1. Geologic map of Serbia (Viquesnel, 1842: Pl. XIX)

Bound by the border and the fortress, the city grew inland, lopsided in relation to its rivers, and it was not until modern history after the World War II that the urban structure crossed over the Sava, with the planning and construction of the modern city of New Belgrade (Blagojević, 2009, Blagojević, 2007).

Waterscape and Everyday Life

Viewed from the neighboring city of Zemun on the Austro-Hungarian side of the border, 19th century Belgrade was a city without much life on the water. Fear of the plague and strict quarantine regulations forced ships to pass by Belgrade, holding as much as possible to the Austro-Hungarian side. As opposed to the view from the river, for the sojourner arriving by way of land, the city was "unusually colorful, prettier and more European-like than any other city" in Serbia (Hervé, 1837, in: Momčilović, 1993: 49). Nevertheless, in 1847, the German

Karl (Dragutin) Karlovanski opened the first bathing and swimming area on the Sava on the river bank below the city Fortress and Kalemegdan, which was at the time still held by the Turkish military and administration. Visitors to the baths, mostly children and youth, could learn to swim and use the river safely in the wooden pool of approximately 26 meters by 7 meters constructed in the water, which also had 10 changing rooms on the side. "Seeing the scarcity of baths on the river" (*Srbske*, 1856: 423), captain Miša Anastasijević, wealthy merchant and benefactor, built a bathing area in 1854, also on the Sava, which was open to all citizens without charge. The demand was so great that during the summer people sometimes waited up to an hour in line to get in. In 1856, the municipal government appealed to citizens for donations to help build a general bathing area on the Sava which would allow 50 people at a time to bathe. These bathing areas, "one of the centers of Belgrade life of the day,"

(Deroko in: *Beograd u*, 1977: 26) were made from wooden planks on floating barrels, marking off the area of the pool. Towards the end of the century, life on the water intensified with more traffic, industry, entertainment and recreation including swimming, rowing and diving competitions, the latter held from the only bridge on the two rivers, the Railway Bridge. The city was deeply engaged with the rivers, even though, or possibly precisely because *over there* was a border and a foreign land beyond. In 1904, The Rowing, Fishing and Swimming Society built a bathing area on the Sava with an accompanying club house, naming it *Six Poplars*. All sports and recreation activities, swimming, rowing practice and competitions, took place parallel with the river bank and water flow, up to the imaginary line in the middle of the river. In 19th century, everyone who spent time on the riverbanks and on the water, all the travelers, merchants, fishermen, soldiers, bathers, rowers, or anyone otherwise connected to the river, formed part of the waterscape. In the 1920-30s, however, based on plans of the Ministry of Transport the railway tracks network was extended and new depots, utility cargo and passenger stations along the Sava and the Danube bank were constructed, thus creating an iron barrier between the city and its rivers (Đorđević, 1966: 4).

The Waterscape as Source for the Public Water Supply System

The network of waterways, sources, streams and underground waterways had an important role in the past, as they were the backbone of the city's water supply system. Up until the last decade of the 19th century, Belgrade's water supply system was made up of three systems,

all created in different historical periods, and in different traditions and cultures: Roman, Ottoman and Austrian waterworks. What they had in common was that they sourced water in the south-eastern part of the city region, from whence it was channeled to the fortress and the town proper. The hydro-geological map of Belgrade and the region shows the clearly divided watersheds, that is river-basins of the streams Mokri Lug and Bulbulder (Nightingale Stream, in Turkish: *bulbule*, nightingale; *dere*, valley, stream), which were the major contributors to the old water supply systems (Figure 2). The water was supplied to public fountains, usually erected at roads intersections. The Austrian system supplied the Sava slope, whereas the Ottoman system followed the Bulbulder stream and brought water to fountains in the Turkish parts of town on the Danube slope. The Roman waterworks traced its way in between the other two along a canal where Knez Mihailova Street is today, and entered the Belgrade fortress.

The 19th century Belgrade had some 50 publicly accessible fountains fed by three old waterworks systems and another 20 built at various water sources in the peripheral areas. In addition, there were some 1,200 private yard and garden wells. From official and police documents of the first half of the 19th century we can see the importance of their use and maintenance. To that end, the municipality employed a person to "oversee and maintain in good condition all the fountains in the city, as well as in the army barracks, at municipal cost." (Jovanović *et al.*, 2003: 366) Still, tensions and conflicts arose with regard to water, be it concerning water supply from public fountains within the city or streams in the vicinity, or concerning shipping and fishing on the

Sava and Danube. Rules passed in 1838 prescribed ways of shipping, navigation and fishing to prevent conflicts between boatmen, merchants and fishermen with Austrian authorities (Jovanović *et al.*, 2003: 179-180). Nevertheless, the agreed-upon and sanctioned ways of water use were often broken, and there were illegal redirections of water flow both by the Ottoman and Serbian government, as well as by the citizenry.

The public fountains had a significant role in city's cultural history. For example, the site of the old Bulbulder fountain at the source of the Ottoman water system, that had been used for annual celebrations of Belgrade's Turkish population in the 19th century, was also the place of the new fountain of the "Conscripts of the Third Call (*Trećepozivačka*)", installed ca. 1915 to commemorate World War I battle of Varovnica. The fountain was renovated in 1927 under the patronage of the Society for the Beautifying of Bulbulder and more recently, in 1982. The Pasha's (Turkish: *paşa*) fountain, for instance, was placed at the likely site of death of Vizier Suleyman Pasha and his entourage in 1807. Known also as "Colorful Source" (Serbian: *Šareni izvor*), this fountain was actually placed at the source of the ancient Roman water system. It was renovated after World War I, in honor of the soldiers from the nearby village of Mali Mokri Lug. The Ottoman water system contained along its length structures similar to water towers, which served as reservoirs and methods of distributing water among public fountains, in other words, a kind of scale for measuring out water. One of the three water towers named after the Turkish word for a scale – *terazi*, is known to had been located at the centre of today's Belgrade. It was replaced by



Figure 2. Hydro-geology map of Belgrade (Dukić, 1970: 12-13)

the European style public fountain in 1860, even though, its Turkish name "Terazije" persists to this day, not only as the name of the fountain itself but of the street and the central area around it. Even though blueprints were drawn in 1846 and again in 1855, during the reign of Prince Aleksandar (reigned 1841-58) of the Karđorđević dynasty, this fountain was only erected, under the new draft, after the dynastic change, marking the second reign of Miloš Obrenović (reigned 1815-39, 1859-60). The fountain drew crowds both as an important symbolic representation of Obrenović dynasty rule and power, but also by the sheer fact that public water fountain was brought to that very spot in the centre. In 1911, new plans were drawn for the roads, traffic solution and public space with the monumental proposal for the new fountain with the statue of the Victor by the sculptor Ivan Meštrović, but the Balkan Wars and World War I discontinued its construction (Vanušić, 2008). Opposed by local population on grounds of obscenity, the Victor being represented as a naked man (Borić, 2005), the Meštrović fountain was never completed in its envisaged form. The statue of the Victor, however, was installed on to the promontory position of the city Fortress above the confluence of Sava into Danube, where it still stands today as the most powerful symbol of Belgrade. In the process of planning, the old Terazije fountain was moved out of the city centre, into the yard of the Church of Saint Apostles Peter and Paul in Obrenović dynasty suburb of Topčider, where it stayed from 1911 until it was reinstalled to its original location at Terazije in 1976.

Notwithstanding the historical, social and symbolic function of the public fountains, the citizenry of Belgrade in the 19th century suffered the lack of hygienic and modern water supply. The first modern urban plan of Belgrade was presented in 1867 in the changing political climate following the mass moving out of both the Turkish garrison from the fortress and civilian population from the city, and the subsequent transformation of the inherited Ottoman urban structure. After three years of surveying the city in detail, the author of the plan Emilijan Josimović, an engineer and mathematician, published the "Explanation and plan of urban regularization of that part of the city which lay within the Moat", which forms the basis of modern European Belgrade. In his assessment of the condition of the existing structures as well as the quality of the streets and urban sanitary conditions, Josimović specifically points to the lack of trees, parks, gardens and green space in general, which he calls "reservoirs of air", as

well as of drinking and household water, and a proper sewer system for excess rain and waste water. As an alternative to the existing water supply from surrounding streams, he suggested using technological devices for supply with treated river water pumped up to the upper part of the fortress from the Danube. Josimović envisaged a "steam machine sufficing of just a few horse powers" to pump water up into storage basin or reservoir placed half way up the fortress hill, and then another machine pumping up to the top sedimentation basin and reservoir placed in the fortress area, from where it would be distributed throughout the city (Josimović, 1867: 44-45).

After 1867, a series of regulations were passed, with the goal of improving sanitary and hygienic conditions, such as the ones forbidding private individuals to dump household waste water into the existing system of drainage, "since the poorly built street pipes are thus overloaded, blocked, and spill into the street." (Stanojević, 1966: 143) Rather, citizens were required to dig septic tanks in their yards for that purpose. At that time, for instance, the waste water was collected into 500 l barrels and carted out of the city area to be dumped into the Danube. Following an epidemic of cholera in 1884, the president of the municipal government, Dr. Vladan Đorđević, declared the construction of a sewer system more important than that of the water supply system.

Water supply, however took precedence over the sewer system construction. The clearing of forests in the area, as well as the growth in population after 1867 weakened the water sources in the city's surroundings, causing an ever poorer water supply. The renewal of the water supply system in 1890-91, which comprised of connecting of the Roman and Austrian systems, and then the Austrian and Ottoman ones, as well as cleaning of sources, partial replacement of pipes and the construction of several new reservoirs, did not solve the problem. The first step towards the installation of a modern water system was the suggestion of the municipal president Živko Karabiberović in 1880 to charge the city customs in order to collect funds for public works. The first phase plan for the construction of utility systems, that is paving of streets, street lighting, water supply and sewerage, finally got underway with the legalization of taxing and earmarking funds in 1884-85. As 50% of the projected utility designs concerned access to water and its use, the municipality founded a "Permanent Technical Committee" in charge of water supply. During the 1888 examination of the Makiška plain, between the villages Ostružnica, Železnik and Žarkovo, it

was established that there is a far-reaching and strong network of underground waters, flowing downwards towards Ćukarica and the Sava. It was determined that this water basin could cover the city's water needs, not only for the current population, but taking into account future city growth. The digging of the first wells began in 1889. At the same time, the existing waterworks systems were reconstructed, and the building of a new one was under way. The new waterworks system opened June 29th 1892 with the capacity of 2,800 m³ per day, i.e., a daily average of 50 liters per inhabitant (by 1914, increasing to 8,000 m³ per day, average 100 l per inhabitant).

The turning over of water supply for public use was marked by a ceremonial switching on of the Terazije fountain by the municipal president Milovan Marković. On his signal, a jet of water shot several meters into the air, announced by the sounds of the military band playing the national anthem. The citizens and dignitaries present were served cups of water. The same evening, a celebration was organized in Kalemegdan, in honor of what was announced as an "epic moment in the life of Belgrade." The celebration included the lighting of "a thousand lamps," a concert, and fireworks which "made known to all that Belgrade was in every way set upon the path of progress, development, and modern life!" (*Beogradske*, 1892, in: Lujanović, 1992: 30-31)

The establishment of modern sewerage began in 1905, with the city centre network finalized by 1910 and plans to cover 2/3 of the whole city area by 1914. Until the war stopped works, 71 km of the sewage network was constructed. In 1929, there were 108 km of sewer system network covering some 5000 houses, i.e., ca. 45% of population. (Stanojević, 1966: 150) In 1920s, the Bulbulder, Mokri Lug, and Ćubura streams were incorporated into the new system, their beds paved and tunnels constructed intermittently. In addition, entire rivers coursing through the Belgrade underground have since been tamed. The strength and importance of brooks of the past is reflected in the importance of individual streets to the overall traffic network built atop. The underground waters gush in full force when foundations for big structures are struck or trenches for infrastructure are dug. Not much is known about these water networks, since the extant maps are arbitrary and out-of-date. In the late 1930s underground waters network was partly surveyed for purposes of a waterworks operation plan in case of war. Several wells were dug, mostly in parks, and some of the source fountains were redesigned with a view towards creating an alternative supply system should the need arise. The map

of underground water networks was destroyed during the bombing of Belgrade in 1941. The first General plan of Belgrade sewer system (with New Belgrade and Zemun) was drawn up only in 1950. Today, the sewerage consists of huge underground utility lines, the most notable being the Mokroluški collector designed to receive storm water from the catchment areas of the Mokri Lug stream, one of the most expensive sanitation facilities in the history of Belgrade, which runs beneath the highway Belgrade-Niš. The total volume of the wastewater is discharging into the Danube and Sava rivers at 29 locations.

Contested Waterscape: the Case of Topčider River

Topčider River in the suburb of the same name, denoting "cannon valley" (Turkish: *top*, cannon; *topçu*, artillery man; *dere*, valley, stream), is interesting for study of the changed relationship of Belgrade to its waterscape. In the 18th century this marshy valley with a meandering river was sparsely populated, with some Austrian hunting lodges and summer houses, and several villages of German settlers (Figure 3). At the beginning of the 19th century, the Turkish artillery units used to perform training practice there, and it was also used as *çayır* (Turkish: a field) for horse grazing, or as a resort and hunting ground of Turkish prelates. In 1831, Topčider acquired a highly significant political status, as Prince Miloš built his residence (*Milošev Konak*) there. By ordering the displacement of villages and denying the right to the use of land for horse grazing, he depopulated the area and turned the land for use as the park around the residence. The formation of the park began in 1842, when Atanasije Nikolić, an engineer educated in Vienna, was appointed for its arrangement. Nikolić, who was both professor and engineer, also founded a seed-plot in Topčider, as well as the School of Agriculture, the first of its kind in the Balkans. The park in Topčider was the first Serbian park system based on European models of the palace complex located in the "natural, yet cultivated environment." (Milanović, 2008: 79) It replicates the English garden style with its meandering paths, lush vegetation, and abundant presence of still water, as well as with several aquatic devices, and adds to these a few classical elements.

A distinct feature of the park is the Topčider River, which flows through it. Right bank tributary of the river Sava and one of the water flows that dominates the hilly southern terrain of Belgrade, the Topčider River is about 30 km long and has a basin of 148 km². Its source is in the Lipovica forest on the mountain Kosmaj, and it flows through four current city

municipalities. The earliest archival records show unplanned expenditure in the budget of the princely grounds, caused by the river overflow in 1850s. Geodesic survey of the river and park was carried out in 1857-58 by cadets of the Gunnery school (Military Academy), and the river was regulated in 1863 under the supervision of engineer Jakov Slivić, when Topčider was officially incorporated into Belgrade. There are historical records of a crossing ferry and a custom house on Topčider River, which was at the time one of seventeen total on the Sava and Danube. Swimming areas with the sandy beach were designated along of the river bank, and there was a steam bath in the park near by. In the 1880s, at the time of King Milan Obrenović (reigned 1872-89), a fountain was built between the park's obelisk and the glasshouse. The fountain had a decorative bowl in the centre of a basin, containing exotic aquatic plants and the sculpture of a boy with a heron, since

demolished. Today, Topčider park with its area of 12.8 hectares is one of the favorite recreation areas in Belgrade. It has three parts: the part near the glasshouse and the drinking fountain that bears the name of Prince Miloš, with an area of 2.5 hectares; the park around Prince Miloš's Residence, with ornamental flower beds *parterre*, measuring 7.1 hectares; and last, the part with a surface of 3.2 hectares containing playgrounds for children and an artificial lake constructed in the second half of the 20th century. The park has more than a thousand trees and over one hundred different species of trees and shrubs. Together with the neighboring forest of Košutnjak, the park in Topčider makes a unique complex from a natural, ambient, cultural and historical point of view. Košutnjak forest area of 267 hectares, which was used as the hunting ground of the Obrenović dynasty, serves today as the link between urban and suburban green, and a reservoir of fresh air that reduces weather



Figure 3. Belgrade and its environs in 1721, by Captain Aman (Miljanić, 1985: 48)

extremes and affects the city's climate.

Presently, the Topčider River is regulated in the part that runs through the city proper and it flows into the Sava at the particularly congested traffic intersection of road and rail networks and at the point of a newly constructed major bridge. The river itself is polluted and characterized by a high degree of environmental degradation, with several ecological incidents recorded in the last few years. It tends to flood during periods of sudden abundant rainfall. As the most frequent type of natural disasters in Serbia are caused by torrential floods, scientists insist that their frequency of occurrence and destructivity in the last 15 years indicate a necessity to achieve a higher degree of coordination of different activities related to the problems of erosion control and torrential floods. Taking the cue from the scientific approach to assessment of the flood risk at watershed level being based on a historical overview of floods (Ristić *et al.*, 2011: 5, 2), we would also argue for the historical overview of cultural relation to water. In the area of Topčider River, better understanding of historical aspects of waterscape could provide guidance for contemporary *Sustainable Urban Water Management* in this location of prime historical, cultural and ecological importance. Could we trace examples from history in order to achieve "stormwater management as art form" or "artful rainwater design" (Echols and Pennypacker, 2008: 269)? This approach requires learning about historical water condition through different ways and design techniques, such as: making stormwater trail visible and legible, creating a narrative of the historical water condition and employing expressive symbols of historical water condition (*ibid.*: 272).

Towards Sustainable Waterscape: Lessons To Be Learned

Recent scholarship on *Sustainable Urban Water Management* might be useful to point to new theoretical framework and relationship of society towards water in a *hydro-social contract* which can be relevant for Belgrade. By exploring ideological and technological characteristics of this relationship in different historical periods, the research of ongoing process of development of urban water transitions policy in four largest Australian cities (presented in: Brown *et al.*, 2009) differentiates six stages: *Water Supply City*, *Sewered City*, *Drained City*, *Waterways City*, *Water Cycle City*, *Water Sustainable City*. The first three belong to the 19th and first half of the 20th century, the fourth and fifth represent a

current recommendation for a comprehensive regulation of waters, and the last one is the stage towards which the cities aspire to in the future. *Waterways City* promotes, among other things, new normative values in the context of the protection of the natural environment, as well as an integration of urban waters in planning, as an important visual and recreational aspect. *Water Cycle City* includes the protection of water networks by: "finding fit-for purpose diverse water supplies at a range of scales that are also sensitive to the energy and nutrient cycles and ultimately contingent on protecting waterway health." (*ibid.*: 853) Finally, *Water Sustainable City* implies a complete change and integration: "the normative values of environmental repair and protection, supply security, flood control, public health, amenity, livability and economic sustainability". (*ibid.*: 854) The research shows that each of accomplished stages demonstrates a strong correlation with the cultural context and the importance of knowing and understanding both historical and current socio-political context in establishing "cumulative socio-political drivers" (*ibid.*: 850) leading to more sustainable urban water management.

Based on these interpretations, this paper marks the three initial stages as already achieved in Belgrade, and points to sustainable regulation of its urban waters in connection with redefinition of public green areas in 21st century in order to fully achieve the stage of *Waterways City*. In that sense, urban history of Josimović's plans projecting a healthy city with reservoirs of air, greenery and water, is understood as anticipatory of current thinking of sustainable future in the conditions of climate change. Current hydrology research points to importance of water storage reservoirs on a large scale (Đorđević and Dašić, 2011: 15), but can we think on a different scale of an analogous city network of water and greenery reservoirs along the lines of Josimović ideas, as part of the overall strategy of urban water management and striving to achieving *Water Cycle City*? Also, urban history can help identify how and where urbanization had effected natural water balance and hydro-social/political/cultural contract, which would help develop the principles of policy on urban water, including stormwater policy in relation to specific context and history of the city.

CONCLUDING NOTE

Awareness of climate change and the importance of water as a vital resource requires a radically new consideration of the relation of urban landscape and waterscape. By

substituting technical and technological solutions for the romantic images of the 19th century, contemporary urban design strategy moves towards synergy of infrastructure, landscaping and ecological design, place-making, circulation and urban function, with the specific focus on flood risk and stormwater management. In conclusion, we believe that Topčider River, the backbone of the Spatial cultural and historic ensemble of the outstanding value Topčider, and as such included in normative and planning documents as an important part of the area, could also be thought of as a paradigmatic case of sustainable urban water management practice. Research of historical layers of architectural, social and urban experience of Topčider River adds to understanding the generative potential of waterscape as cultural heritage and challenges traditional boundaries between disciplines in rethinking, re-imagining and adaptation to the climate change towards the *Water Sustainable City*. In that sense, a new generation of strategic schemes of truly sustainable development needs to fully address the issue of reconciliation of conservation, heritage protection and culture-led agendas with the integrated sustainable landscape, infrastructure and urban water management techniques and technologies. Only by complex and multidisciplinary reinterpretation and with the open and transparent hydro-social contract in place, can Belgrade waterscape be hoped to recover its nearly lost comparative advantages in local, regional and European context.

Acknowledgements

We wish to thank the anonymous reviewers for constructive comments which led to the improvement of this paper.

References

- Anonim. (1856) Različite stvari, *Srbske novine*, 25 May, p. 423.
- D. R. V. (1892) Svečano osvećenje vodovoda, *Beogradske opštinske novine*, Vol. 10, No. 28, 5 July, pp. 278-277, reprinted in Lujanović (ed.) *Jedan vek*, pp. 30-31.
- Deroko, A. (1977) Beograd na susretu dva veka, in *Beograd u sećanjima, 1900-1914*. Beograd: Srpska književna zadruga, pp. 10-42.
- Blagojević, Lj. (2007) *Novi Beograd: asporeni modernizam*. Beograd: Zavod za udžbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zaštitu spomenika kulture.
- Blagojević, Lj. (2009) Urban regularisation of Belgrade, 1867: Trace vs. Erasure, *Serbian Architectural Journal*, Vol. 1, No. 1, pp. 27-44.

- Blagojević, Lj., Ćorović, D. (2011) Klimatske promene i estetika savremene arhitekture, in Đokić, V. and Lazović, Z. (eds.) *Uticaj klimatskih promena na planiranje i projektovanje*. Beograd: Univerzitet u Beogradu, Arhitektonski fakultet, pp. 19-33.
- Borić, T. (2005) O istoriji i arhitekturi Terazijske fontane, *Nasleđe*, No. 6, pp. 227-236.
- Brown, R. R., Keith, N., Wong, H. F. (2009) Urban water management in cities: historical, current and future regimes, *Water Science & Technology*, Vol. 59, No. 5, pp. 847-855.
- Bunjac, V. (1993) *Česme i fontane: 150 miliona godina Beograda*. Beograd: Turistička štampa.
- Ćorović, D. (2010) Three Parks in Nineteenth Century Belgrade, *Serbian Studies: Journal of the North American Society for Serbian Studies*, Vol. 24, No. 1-2, pp. 75-89. [published in 2012].
- Dukić, T. (1970) Prikaz hidrogeološke karte područja Beograda, *Urbanizam Beograda* (UB), No. 6, pp. 11-13.
- Djapa, D. (2006) Water Management in Urban Context: the Case of Belgrade, in *Proceedings, The Implementation of the EU Water Framework Directive from International, National And Local Perspectives*. Vienna: Vienna University of Technology, pp. 48-54.
- Đorđević, A. (1966) Razvoj Beograda i aktuelni urbanistički problemi, *Arhitektura, urbanizam*, No. 41-42, pp. 4-11.
- Đorđević, B., Dašić, T. (2011) Water Storage Reservoirs and Their Role in the Development, Utilization and Protection Of Catchment, *SPATIUM International Review*, No. 24, pp. 9-15.
- Echols, S., Pennypacker, E. (2008) From Stormwater Management to Artful Rainwater Design, *Landscape Journal*, Vol. 27, No. 2, pp. 268-290.
- Erve (Hervé), F. (1837) Carigradskim drumom i bačkom ravnicom, in Momčilović, B. ed. (1993), *Britanski putnici o našim krajevima u XIX veku*. Novi Sad: Matica srpska, pp. 40-60.
- Josimović, E. (1987) *Objasnenje predloga za regulisanje onoga dela varoši Beograda što leži u šancu sa jednim litografisanim planom u razmeri 1/3000* (1867). Reprint. Beograd: Juginus.
- Jovanović, M. (1958) Snabdevanje Beograda vodom do izgradnje modernog vodovoda 1892. godine, *Godišnjak grada Beograda* (GGB), No. 5, pp. 241-248.
- Jovanović, M., Marković, P., Perišić, M., Stojanović, D., Ristović, M. (eds.) (2003) *Živeti u Beogradu, I, 1837-1841, Dokumenta Uprave grada Beograda*. Beograd: Istorijski arhiv Beograda.
- Kanalizacioni sistem grada, *Beogradski vodovod i kanalizacija*, http://ns.bvk.rs/o_kanalizaciji.htm, accessed 18th Mar 2012.
- Lujanović, M. (ed.) (1992) *Jedan vek Beogradskog vodovoda i kanalizacije: 1892-1992*. Beograd: JKP Beogradski vodovod i kanalizacija.
- Maksimović, B. (1957) Projekti za Terazisku česmu od pre sto godina, *Godišnjak Muzeja grada Beograda* (GMGB), No. 4, pp. 238-242.
- Milanović, H. (2006) *Zelenilo Beograda*. Beograd: JKP Zelenilo Beograda.
- Milanović, H. (ed.) (2008) *Zaštićena prirodna dobra Beograda*. Beograd: Zavod za zaštitu prirode Srbije.
- Milovanović, B. (1957) Geološka istorija beogradskog tla, *GMGB*, No. 4, pp. 9-34.
- Miljanić, M. (1985) Topčider i Beograd u poslednja dva veka, *Arhitektura, urbanizam*, No. 96, pp. 47-49.
- Mitrović, K. (2008) *Topčider – dvor kneza Miloša Obrenovića*. Beograd: Istorijski muzej Srbije.
- Nikić, Lj. (1980) Jedan nepoznati plan Topčidera, *UB*, Vol. 12, No. 57, pp. 80-82.
- Paton, A. A. (1845) *Servia, the youngest member of the European family*. London: Longman, Brown, Green, and Longmans.
- Ristić, R., Radić, B., Nikić, Z., Trivan, G., Vasiljević, N., Dragičević, S., Živković, N., Radosavljević, N. (2011) Erosion Control and Protection From Torrential Floods In Serbia – Spatial Aspects, *SPATIUM International Review*, No. 25, pp. 1-6.
- Stanojević, V. (1966) Zdravstvena zaštita i komunalne službe u starom Beogradu, *GGB*, No. 13, pp. 139-151.
- Timotijević, M. (2004) Memorijal oslobodiocima Beograda 1806, *Nasleđe*, No. 5, pp. 9-34.
- Todorović, S. (2009) *Sport u starom Beogradu (XIX vek)*. Beograd: Zepter Book World D.O.O.
- Vanušić, D. (2008) Podizanje spomenika pobe na Terazijama, *Nasleđe*, No. 9, pp. 193-210.
- Viquesnel, A. (1842) *Journal d'un voyage dans la Turquie d'Europe*. Paris: Langlois et Leclercq.
- Vladislavljević, S. (1989) O počecima uređivanja Topčidera za izletničku i park šumu, *GGB*, No. 36, pp. 105-122.
- Zavod za zaštitu spomenika kulture grada Beograda (n. dat.) *Uslovi čuvanja, održavanja i korišćenja kulturnih dobara i dobara koja uživaju prethodnu zaštitu za potrebe izrade programa za urbanistički plan područja Prostorne kulturno-istorijske celine Topčider*.